APPENDIX 1

River Red Gum Forests Investigation –

Socio-Economic Assessment

Final Report

Prepared for the

Victorian Environmental Assessment Council

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To those we have omitted – our apologies.

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Note: Appendices to this report are not included in the hard copy version of the VEAC Final Report. They are available at VEAC's website www.veac.vic.gov.au

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1 INTRODUCTION

The purpose of this report is to outline a social and economic assessment of VEAC's final recommendations for the River Red Gum Forests (RRG) Investigation.

Background information for this report has appeared in the VEAC River Red Gum Forests Investigation Discussion Paper, published in October 2006, and the Draft Proposals Paper (DPP) for Public Comment, published in July 2007. The Discussion Paper includes comprehensive treatment of the Environmental, Social and Economic Setting; the Public Land Use Framework; Uses of Public Land; and Discussion of Issues. The Draft Proposals Paper included a description of VEAC's draft recommendations.

The outcomes sought through the report are:

(a) an assessment of the costs and benefits of VEAC's recommendations and how those costs and benefits are distributed;

(b) an assessment of the social implications of VEAC's recommendations, with particular attention to the viability of small towns, including those dependent on timber;

(c) suggestions on measures that could be adopted to either strengthen the positive, or mitigate the negative effects of the recommendations; and

(d) a description of a survey of timber industry businesses to quantify key factors (including employment, product markets, value adding and trends, and production from New South Wales) required to achieve outcomes (a) to (c) above.

All costs and benefits are identified and described, and quantified in dollar terms where possible. Where this was not possible, a qualitative assessment is provided, together with order of magnitude estimates where appropriate. Economic and social implications are determined both for the study area[1] and for Victoria as a whole.

The two main types of socio-economic impact assessment employed in this study are Benefit Cost Analysis (BCA) and Regional Impact Analysis (RIA). *The two methods have quite distinct roles.*

Benefit Cost Analysis – BCA assesses the net economic gains or losses to Victorians[2] that may arise as a consequence of changed public land management. The analysis would support implementing the recommended changes if the benefits of the changes exceed the costs. Whether or not a project is adopted by government should be guided by the results of a BCA, not by RIA. If government decides that the project is to be implemented, the BCA would normally be followed by financial analysis incorporated in a business plan.

Regional Impact Analysis – Local and regional communities have a strong interest in the possible immediate impacts of changed public land management on their employment prospects and incomes. In this study the consultants used an Input-Output (IO) model to provide estimates of these impacts on regional economies, including both direct and flow-on effects. This method of analysis *does not* determine whether the people of Victoria are likely to incur a net economic gain or loss as a result of changed management. Rather, it is of use, for example, in guiding the development of assistance packages for those who may be disadvantaged by the project.

In this analysis the BCA is State-wide – benefits and costs are considered from the viewpoint of all Victorians – while the regional impact analysis is confined to VEAC's study area.

A number of submissions to VEAC confused the two methods of analysis so the consultants have attempted to clarify the differences between the methods in a number of places in this report.

With respect to the regional economic impact framework used here, it should be noted that many proposals, whether economically beneficial in net terms or not, will provide an economic stimulus to a region. For instance, the Exxon Valdez oil spill generated significant amounts of economic activity, however, it could not be argued that the spill was socially desirable. Unproductive job creation schemes, such as 'digging holes and filling them in again' would be seen to create jobs in a regional analysis but, more sensibly, would show net losses in a BCA.

Hence while RIA can be used to estimate changes in regional economic activity (value-added, output, income and employment) associated with alternative policy scenarios, unlike the benefit cost analysis framework there are no guidelines for interpreting whether or not an increase or decrease in economic activity is economically desirable. The technique can however be useful for social planning purposes, particularly where the activities affected represent a significant proportion of the regional economy.

2 BENEFIT COST ANALYSIS

The Victorian River Red Gum (RRG) forests, wetlands and floodplains of the Murray Valley are valuable environmental resources with many, sometimes competing, public land uses giving rise to benefits for a wide range of people. Determining the appropriate balance of these uses from a society-wide perspective requires information about the relative values generated from those uses to be incorporated into the conceptual framework of a benefit cost analysis. Under this framework, alternative scenarios for future use of the River Red Gum forests (Scenarios 2 and 3) are compared against the base case or 'do-nothing new' option (Scenario 1) to identify if the alternative scenarios will lead to an improvement in well-being for the people of Victoria. The scenarios are:

Scenario 1 BASE CASE – No new management changes over the next 20 years (includes delivery of 127 GL per annum (average) for existing environmental allocations and 500 GL per annum (average) for The Living Murray icon sites but no water from other sources such as Foodbowl Modernisation Stages 1 or 2 or allocation purchases).

Scenario 2 Scenario 1 plus all VEAC's public land use recommendations but no additional water.

Scenario 3 Scenario 2 plus adequate additional volume, duration and frequency of environmental water to conserve specified natural values of the River Red Gum floodplains.

An explanation of how each of the scenarios was derived is included in Appendix A.

Information about the commercial values of forest uses such as timber production and grazing in the River Red Gum forests is available from the markets in which outputs are exchanged. Forest protection benefits arise from recreation and tourism activities, and ecosystem and cultural heritage conservation.

1 The 'study area' is that applying to the social and economic analyses. It does not correspond precisely to VEAC's 'Investigation area' due to restrictions reflecting Australian Bureau of Statistics (ABS) boundaries.

2 VEAC's recommendations are to be made to the Government of Victoria so this determines the scale of the analysis. However, some of the benefits and costs may in practice have national, or even international implications.

Quantification of these non-market values was the focus of an earlier study for VEAC on the Non-Use Values of Victorian Public Land (Bennett et al. 2007), available on the VEAC website (www.veac.vic.gov.au). Additional non-market values are estimated in this report.

2.1 Estimating the Market-Based Values Associated with Forest Use

In terms of market based values, VEAC recommendations for public land use mainly affect the timber and grazing uses of the RRG forests and, potentially, the allocation of water to existing users. As documented in the social and economic assessment of VEAC's Draft Proposals, there are many factors that make reliable costing of water for the environment difficult. It would require the cooperation of three State governments and the Commonwealth Government. Environmental water in the Murray Darling Basin is the subject of a number of rapidly developing state and national policies and programs. In addition, in its Final Report VEAC's approach to environmental water does not focus on specifying a required volume. Accordingly, VEAC advised it was outside the scope of this social and economic study to quantify the cost of environmental water.

The implications for duck hunting are assessed in the non-market sections of the report.

2.1.1 The Timber Industry

The economic impacts on the timber industry were based on the results of a financial survey of participants in the industry, including mill operators, sleeper cutters and commercial firewood licensees. The survey questionnaire is shown in Appendix B. Interviews were held in person and included open ended discussion of issues. A total of 19 operators were interviewed out of approximately 22 licensees in the study area. The survey was confidential and individual responses were not given to VEAC or any other party. Around 10 operators provided financial information in sufficient detail to allow extrapolation to the rest of the industry, based on licensed volumes of four categories of timber.

The currently licensed allocations of timber in the study area are shown in Table 1. In practice, some adjustments have been made to these allocations as is usual when managing the forests. The figures do not include domestic firewood collection or volumes associated with some recent thinning operations.

Table 1: Timber Licence Volumes – 2006/2007 Allocations

Licence category	Volume (m^3)
Red Gum sawlogs	6,072
Red Gum standard logs	4,428
Red Gum residual logs	6,603
Red Gum firewood	4,380
TOTAL	21,483

The direct gross annual value of the RRG-based timber industry is currently about $9.3m with a net economic contribution to the Victorian economy of about $2.58m per year. Assets dedicated to the industry are valued at approximately $11.3m.

VEAC has advised that the sawlog harvest to be expected over the next 20 years for the Base Case (Scenario 1) will be about 71 percent of the 2006/07 allocations (as a result of lower tree growth rates due to reduced forest flooding), resulting in a net economic contribution for all timber products of $1.83m per year[3]. The calculated contributions for the other two scenarios, respectively, are $0.46m and $0.58m per year, reflecting the impacts of VEAC's recommendations, and increased water availability for Scenario 3. Details of the timber yields that are to be expected based on the various scenarios, are shown in Appendix C.

Estimates of timber volumes supplied by DSE differ from those in the draft report for a number of reasons – which are described in VEAC's Final Report.

While DSE's estimates indicate the sustainable volume available from the remaining area of state forest, VEAC advises that Gunbower forest has extensive areas of relatively young River Red Gum trees which will not provide harvestable timber for several years.

2.1.2 Grazing

VEAC's recommendations include cessation of grazing in the Barmah forest (about 29,600 ha), other recommended parks and reserves (about 44,760 ha), and exclusion of grazing from water frontage reserves and streamside areas (about 9,280 ha). It is assumed in the BCA that only the water frontage and streamside areas will require provision of fencing and watering points. Graziers were not surveyed as part of this study and the analysis is based largely on other studies conducted for the Victorian (Read Sturgess & Associates 2000, URS 2005) and NSW Governments (Hassall & Associates 1998) and on area estimates provided by VEAC.

Two methods were used for estimating the costs associated with fencing: one using per hectare costs for all components, based on the above studies; and a second which used per hectare costs for pest management and lost feed value, per kilometre costs for fencing, and per licensee costs for watering points. Both methods gave very similar results (Appendix D).

For the Barmah forest it is estimated that the annual net economic contribution of grazing is $0.14 m in the base case scenario (Scenario 1), based on grazing of 2,000 head of cattle in the summer six month period and 800 head in the winter six month period. For the other two scenarios (Scenarios 2 and 3) the net economic contribution is zero.

For the other public land, including water frontage areas, grazing returns an annual net economic contribution of $0.76m in the base case and annual net costs of $0.87m per year for the other two scenarios – due to the need for fencing, watering points and increased pest management. It is assumed, conservatively, that these costs are incurred immediately, although they may not be due for up to five years.

Grazing licences in the study area represent a small proportion of the farm area for most licensees. It is therefore unlikely that the removal of grazing licences will significantly change the financial performance of those landholders affected by VEAC's recommendations. In addition, the estimates of costs of fencing etc. reported here do not include any subsidies. For some, if not many graziers, assistance of up to 50 percent of the costs of fencing is available from Landcare and Catchment Management Authorities. In some cases, assistance is also available for pest management and watering points.

Recent estimates provided by CMAs for the study area suggest that about 60 percent (about 870 km) of licensed Crown frontage (total of about 1,450 km) is already fenced.

3 Throughout the report small differences in totals are due to rounding. In addition, VEAC made small changes to some components of their investigation after the economic analyses were completed which had no material implications for our results. Therefore, some totals in the VEAC report may not be exactly the same as those reported here.

2.2 Estimating the Non-Market Environmental Values Associated with Forest Protection

2.2.1 Context

The Victorian River Red Gum (RRG) forests, wetlands and floodplains of the Murray Valley are valuable environmental resources with many, sometimes competing, land uses giving rise to benefits for a wide range of people. Determining the appropriate balance of these uses from a society-wide perspective requires information about the relative economic values generated from those uses. It is only with access to such information that trade-offs between competing uses for the resources can be assessed and sound policy and management decisions made (Bennett et al. 2007).

For example, parts of the forests may be managed for recreational use in an undisturbed natural setting, or for timber harvesting. Making that choice is facilitated where information about the benefits society enjoys if an area of forest is set aside primarily for recreation can be directly compared against the benefits generated from the harvesting of its timber. In the case of some RRG forests, grazing is a licensed activity. Significant ecological values may be affected by timber harvesting, grazing or some recreation activities. Alternatively, parts of the forest could be managed for a range of recreation, conservation and minor resource uses, as was recommended for the Forest Park land use category in VEAC's recent Angahook-Otway Investigation.

Information about the commercial value of timber production and grazing in the River Red Gum forests is readily available from the markets in which the products are exchanged. More problematic is the estimation of values associated with forest benefits that are not marketed. These benefits arise from ecosystem conservation, protection of cultural heritage, and recreation and tourism activities.

If resource management decisions are made with reference only to information on the values of the *marketed benefits*, there is a risk that the outcome will not be in the best interests of society as a whole. Efforts to estimate the *non-marketed*[4] (un-priced) benefits are therefore to be encouraged in order to secure balanced decision making.

The non-market values of forests can be based on evidence of such values collected from other case studies. For example, the international EVRI database maintained by the Canadian EPA sets out the results of non-market valuation exercises in a wide range of different contexts. Value estimates could be extracted from that database and used as approximations for the values of the River Red Gum forests. This practice – called 'benefit transfer' – is prone to inaccuracies if there is no strict comparability between the circumstances of the case at hand and those pertaining to the original study site. This is likely to be the case with the River Red Gum forests because their characteristics, both in terms of their ecology and the human communities that enjoy their benefits, are not represented in any existing valuation study. Hence, using benefit transfer as a means of generating value information for resource management decisions may not be satisfactory in this case.

The alternative is to conduct original research with the specific goal of estimating the non-marketed benefits of the River Red Gum forests, as was done for the VEAC investigation (Bennett et al. 2007).

A practical outcome of quantifying non-market benefits is that it assists in resolving conflicts between the various vested interest groups and helps to clarify the choices open to those who ultimately make decisions on the balanced use of public land and other natural resources. The values derived from this exercise can be directly included in benefit cost analyses and social assessments of VEAC's recommendations.

2.2.2 Previous studies employing non-market valuation

Non-market valuation now has widespread application to assist policymaking in Australia, Europe and the US. The UK Treasury (2004) has adopted similar methods to those described here. In the USA the NOAA (1993) panel's high level review of the methods following the Exxon Valdez environmental disaster, has led to an increased array of applications. Internationally, the World Bank and the OECD routinely apply the methods to assist in environmental decision-making and policy formulation (Pagiola 1996, 2001, Pagiola et al. 2004).

The Victorian Government has supported the use of non-market valuation methods in a wide range of applications in recent years, including assessment of the economic value of: historic places; reducing the frequency of algal blooms, recreation in Victorian parks; the Royal Botanic Gardens, Cranbourne; and creating new national parks and expanding existing national parks. The Government has also supported other studies employing the methods in: river management; floodplain management; and nutrient management.

Members of the consulting team have conducted non-market valuation studies in all the eastern states of Australia, with applications covering national parks, heritage rivers, environmental flows, wetlands, river health, farm forestry, wind farms, coal mining, gold mining, urban streams, sewage disposal, recycled water, and environmental contributions by agriculture.

2.2.3 Other estimates of the value of national parks

Several studies that consider the values associated with forest restoration and protection have been undertaken in Australia and overseas:

- The Nadgee Nature Reserve on the south coast of New South Wales has some characteristics in common with parts of Victorian damp forests. The Reserve contains a number of endangered species of birds and a diverse set of habitats in a natural setting. Using the contingent valuation method, Bennett (1984) estimated that the average existence benefit (measured as a once-only lump sum) of this preserved natural area to the residents of Canberra over the age of 18 years was about $27 per person in 1979 dollars.
- In 1989 the Resource Assessment Commission (1992) used a contingent valuation study to assess the community's willingness to pay for those areas currently used for timber production in south-east NSW and East Gippsland to be converted to conservation zones of the National Estate. This revealed that the median willingness to pay for total preservation of the National Estate was about $43.50 per household per year or $22 per person per year.
- Lockwood et al (1992) used contingent valuation procedures to estimate the Victorian Community's willingness to pay to reserve unprotected National Estate forests in East Gippsland from timber harvesting. The median value of the willingness to pay was $25 per household per year.
- A contingent valuation study of the preservation values of East Gippsland forests, undertaken by Lockwood and Loomis (1993) estimated that 50 percent of Victorian households were willing to make an annual contribution of $52.

4 *Non-market benefits* refer to those benefits that are not directly transacted in markets, and where values can not be estimated directly from market transactions. *Non-use benefits* are a key subset of non-market benefits. Other non-market benefits include some direct use values (e.g. recreation) as well as indirect use benefits (water filtration, carbon sequestration).

Non-use values are the values that people in the community might hold for environmental assets, irrespective of whether they use them. Examples of the sorts of drivers for non-use values are that people gain enjoyment from knowing that assets exist, want to bequest them to future generations, want to be cautious about development to maintain future options, or want to preserve them until better knowledge is available. Non-use benefits are part of a package of benefits that are normally associated with assets such as forests, with other key areas being use and indirect-use benefits.

- Macmillan et al. (2001) used contingent valuation procedures to assess the values that people attached to the restoration of two large areas (80,000 ha each) of native forest in Scotland. The values ranged from UK£ 24-53 per household per year.

Nunes et al. (2001) reviewed a total of 61 representative biodiversity valuation studies published between 1983 and 1999 from various countries, but mainly the United States. Contingent valuation and choice modelling were the preferred methods used since the other methods are unable to identify and measure passive or non-use values. The other methods used included travel cost and tourism revenues – particularly for biodiversity values related to recreational values.

Values ranged from US$5-126 per household per annum for protection of single species; US$18-194 per household per annum for protection of multiple species; and US$27-101 for protection of ecosystems and natural habitat diversity.

A study by Lockwood et al. (2000) and Lockwood and Walpole (2000) included market and non-market valuations of conserving remnant native vegetation (RNV) on private land in north-east Victoria and southern NSW. The Victorian study area covered 1,880,056 ha, including 113,313 ha of RNV; 1,205,498 ha of forested public land; 8,000 ha of private pine plantations; and 553,245 ha of predominantly cleared private land.

Lockwood et al. (2000) used two stated preference methods, contingent valuation (CVM) and choice modelling (CM), to assess the non-market economic values of remnant native vegetation (RNV) in the two study areas. Both of these methods involved the use of mail surveys to determine community willingness to pay (WTP) for RNV conservation. The economic estimates from the two methods were not significantly different, providing evidence for the convergent validity of the results. The CM data were used in subsequent analyses, because they allowed calculation of WTP for a range of different scenarios.

Average household WTP for RNV conservation in north-east Victoria was about $73, as a one-off payment. If we assume a discount rate of 7 percent in perpetuity, this value translates into $5 per household per year, or $6.90m per year for all Victorian households (adopting the ABS 1996 Census figure of 1.35 m households in Victoria). It is likely that Victorians would be willing to pay more for biodiversity conservation in national and state parks than in remnant native vegetation areas on private land so these values are likely to be conservative.

Participants in the WTP survey were recruited from random samples of 2,000 Victorian and 2,000 NSW voters obtained from the state electoral rolls. Each of the four survey instruments (CVM and CM for each State) was mailed to 1,000 potential participants. The return rate for Victoria was about 60 percent, relatively high for this type of survey.

2.2.4 Choice Modelling

Choice Modelling (CM), a *stated preference* non-market valuation technique, was used to estimate the protection values associated with the RRG forests (Bennett et al. 2007). The CM technique involves a sample of people being asked to make a sequence of choices between different forest management strategies described in terms of their impacts on particular attributes.

For the RRG forests, the attributes and the ranges over which they may vary over the next 20 years under the various management scenarios are summarised in Table 2. For each attribute the levels are based on the experience of experts consulted for the choice modelling study. For example the current populations of Murray Cod and other threatened native fish are about 10% of their levels before European settlement. With sufficient resources, over 20 years their populations could be increased to about 60%. Options for how much people were willing to pay to protect the environmental values range from zero to $100 – around the upper limit in comparable studies.

Table 2: Attributes and their Levels for River Red Gum Forests

Attribute	Description	Levels
Cost	Compulsory annual payment ($)	0; 20; 50; 100
Healthy RRGs	Area in hectares	54,000; 67,000*; 74,000; 80,000
Threatened Parrots	Number of breeding pairs (Regent and Superb Parrots)	900; 1,200; 1,500; 1,800
Murray Cod and other threatened native fish	Percentage of pre-European numbers	10; 20; 40; 60
Recreation Facilities	Number of campsites with facilities	6; 9; 12; 18

* The current extent of healthy River Red Gum forest is approximately 67,000 ha. Without additional resources and management, this is expected to decline to about 54,000 ha in 20 years.

The three environmental attributes, viz. (1) healthy River Red Gums, (2) threatened parrots, and (3) Murray Cod and other threatened native fish are surrogates for, respectively, (1) terrestrial ecosystem health, (2) terrestrial threatened species and species diversity, and (3) aquatic ecosystem health, threatened species and species diversity. Collectively, these three components effectively cover the range of non-market benefits that most people associate with protection of the natural environment in the River Red Gum Forests Investigation area.

Descriptions of the survey materials used and survey logistics are provided by Bennett et al. (2007). The six samples used in the surveys are shown in Table 3. They include samples from towns and rural areas within the RRG area; and from Melbourne and Bairnsdale to gauge the views of people remote from the Murray River.

Table 3: Selection of Samples

	REGION			
	Melbourne (out of region)	**Murray Region**		**Gippsland Region**
STUDY AREA River Red Gum forests (RRG)	1. Metro	2. Echuca 3. Mildura 4. Wodonga	5. Rural*	6. Bairnsdale (out of region)

* The rural sample involved respondents living on farms, outside urban areas.

The surveys were conducted using a drop-off-pick-up process in November 2006.

2.2.5 Results for River Red Gum forests

Models explaining respondents' choices between alternative forest management options are used to estimate the marginal values of the Healthy RRGs, Parrots, Cod and Recreation attributes. These values are expressed in terms of *implicit prices*: the marginal willingness to pay for the average respondent household (per year) over a 20 year period for a unit increase in the attribute. Refer to the report on VEAC's website (www.veac.gov.au) under 'Economic evaluation of forest environmental attributes' for explanations of these attributes and the material provided to survey respondents. This report also describes the procedure for condensing complex ecological concepts into terms which respondents can understand.

The results in the table below show that respondents in the Bairnsdale and Melbourne sub samples are willing to pay $3.29 and $1.45 (per annum per household for 20 years) respectively for a 1,000 hectare increase in the area of healthy RRG forest. 'Within region' respondents (an aggregate of the Echuca, Wodonga and Mildura samples) recorded values that are not significantly different from zero. People in those areas were prepared to accept the status quo with respect to that attribute.

Respondents were found to attach a positive value to increasing the numbers of breeding pairs of threatened parrots, ranging from around $4 to $8.40 per 100 pairs. The implicit price for

a one-percent increase in the populations of Murray Cod and other threatened native fish species varies across the sub samples from about $1 to $1.40. Implicit prices for the recreation attribute are not significant for any of the sub samples.

Table 4: Implicit Price Estimates for River Red Gums

	Sub sample		
	Melbourne ($/yr/hh)	Bairnsdale ($/yr/hh)	Within region ($/yr/hh)
Attribute			
Healthy RRGs / 1,000 ha	1.45***	3.29**	0.0677
	(0.46)	(1.29)	(0.47)
Parrots /100 pairs	4.39***	8.39***	3.96***
	(1.04)	(2.76)	(1.04)
Cod /1 percent increase	1.02***	1.37***	1.09***
	(0.17)	(0.44)	(0.17)
Recreation /campsite	-0.11	-0.85	-0.24
	(0.62)	(1.53)	(0.66)

Notes: Significance levels indicated by: * 0.1, ** 0.05, *** 0.01. Standard Errors in parentheses.

Based on comments made in the questionnaires, the non-significance of the recreation/ campsite attribute may be due to a conflict of preferences between those seeing positive outcomes (eg. more facilities providing a better camping experience) and those seeing negative outcomes (eg. more facilities leading to more congestion and environmental damage).

The ABS data that were available at the time of the CM survey were from the 2001 Census and were therefore out of date for comparisons with survey socio-economic characteristics. The required ABS 2006 Census data became available (October 2007) well after the CM report deadline. Comparisons with both Censuses are shown in Appendix E. There were difficulties in comparing household income data due to the ABS changing their income categories three times over the two censuses – as shown in the appendix. Nevertheless, the comparisons demonstrate that the sample data are consistent with the ABS data with few exceptions. Some of the exceptions are to do with age and sex – the respondents submitted their own details and the questionnaires were more frequently completed by older males. The other exceptions are mainly due to the changes in ABS income categories.

2.2.6 Application to Benefit Cost Analysis

The implicit prices estimated from the choice data are directly applicable to the consideration of alternative forest management options. Specifically, they are compatible with the principles of BCA. The process of employing implicit prices in the BCA involves four basic stages:

1. Predicting the impact of a management change on the attributes used in the choice modelling exercise relative to the predicted continuation of the 'status quo'.
2. Multiplying the implicit prices by the respective predicted attribute change to estimate the willingness to pay (per household) for each attribute change.
3. Aggregating the willingness to pay across all attribute changes.
4. Extrapolating across the relevant population, using the percentage survey response rate, to estimate the societal willingness to pay for the management change.

It should be noted that the implicit prices (IPs) are based on respondents' values when asked what they would be willing to pay for environmental improvements that take place over a 20 year period. The IPs are therefore discounted at the respondents' personal discount rates so they can be regarded as applying from the commencement of implementation of the parks, not from when the benefits are actually realised on the ground later in the 20 year period. Personal discount rates are likely to be higher than the social rates that are used in the BCA so this may be a source of under-estimation of environmental benefits.

2.3 Assumptions for Environmental Outcomes

The assumptions for environmental outcomes were specified by VEAC in April 2008 and are summarised below. The derivation of the values for each scenario is described in Appendix A.

Table 5: Assumptions for Environmental Outcomes

Environmental attribute	Scenario 1	Scenario 2	Scenario 3
Healthy RRGs ('000 ha)	54	64	80
Threatened parrots ('00 pairs)	6	10	16
Murray Cod & other threatened native fish (%)	20	20	30

Non-market issues that are not addressed in this analysis include implications for Indigenous cultural heritage, and the cultural heritage value of the Barmah muster and other red gum related heritage issues. The implications of different forest management regimes for emissions of greenhouse gases have not been considered. In the view of the consultants, it is not likely that the net effect of these issues will change the conclusions to be drawn from the BCA.

Environmental Water

VEAC has emphasised the importance of 'adequate' environmental water and the effect is apparent in the comparison of the outcomes for Scenarios 2 and 3. 'Adequate' watering offers improved outcomes that may be disproportionately greater than the additional amount of water. According to VEAC this result may be expected for a number of reasons:

1. The additional environmental water under Scenario 3 should significantly ameliorate the effects of climate change.
2. The area watered (and therefore, the environmental benefits derived) increases more than proportionally as the water level rises above natural levees, and flooding extends over the floodplain.
3. VEAC's approach, focussing on mapping and watering areas with flood-dependent natural values, should provide the following benefits:
   - greater ecological connectivity along and across the floodplain (including between the river and the floodplain);
   - greater emphasis (and therefore greater likelihood of watering) on those natural values most susceptible to reduced flooding;
   - greater confidence that key natural values are not overlooked and thereby not adequately watered; and
   - greater opportunity to react to environmental changes (particularly water availability) and adjust floodplain watering to continually maximise environmental benefits.

However, as explained earlier, the consultants were advised by VEAC that while assessing the costs of providing these benefits in terms of water resources is obviously important, it was beyond the scope of this study.

2.3.1 Demographic data

Demographic data (from the ABS Census for 2006) and the Choice Modelling survey response rates relevant to estimating the environmental values are summarised in Table 6. Victorian rural areas outside rural cities and towns are not included due to the low survey response rate for these areas.

Table 6: Demographic Data

	Number of households (m)	Survey response rate
Melbourne	1.382	50
Murray region cities and towns	0.105	80
Out of region cities and towns	0.31	70

2.4 Estimating the Values Associated with Wetland Protection and Duck Hunting

In addition to the above environmental outcomes, VEAC recommendations involve increased protection of about 6,710 ha of wetlands and restrictions affecting approximately 4,390 duck hunters. Appendix F provides details of the wetland areas to be protected and Appendix G provides details of the number of duck hunters affected.

Duck hunting

A study in South Australia (Whitten and Bennett 2001) puts the economic value (measured as consumer surplus) of duck hunting at about $48 per trip, with 95 percent confidence limits of about $30 and $120. These values are consistent with the economic values estimated for other highly valued recreational pursuits such as fishing.

Duck hunting is increasingly taking place along rivers and streams and the hunting season normally runs for 12 weeks, mid-March to mid-June.

The estimate of 4,390 duck hunters is probably too high as it draws on numbers in wet years and does not take account of dry years when the duck season is cancelled. A more realistic estimate of the number of hunters affected is 2,790[5] but the economic analysis conservatively relies on the higher figure.

Based on estimated hunter numbers for the whole season and an assumption concerning the percentage of duck hunters who could find alternative sites within Victoria (60 percent), the annual loss of consumer surplus is $545,163 per year for Scenario 2 and $490,646 for Scenario 3 where more water is available for wetlands.

Wetland protection

Functions of wetlands

Wetlands perform many economically valuable functions including:

- providing habitat for native plants and animals;
- providing refuges for rare and threatened species;
- assimilating and recycling nutrients;
- trapping sediments;
- functioning as flood control basins;
- providing hydrological stability between surface water and ground water in catchments;
- providing sites for recreation; and
- providing landscape values.

Many of these functions produce goods or services which are of a public nature, that is, they cannot be appropriated exclusively by the owners of wetlands and one person's use does not diminish another person's use. Because landowners usually cannot collect revenue on the environmental services provided by the wetlands, such as pleasant landscapes, flood protection, habitat for wildlife, and nutrient assimilation, they will tend not to account for them in their decision making. Thus, the area and quality of remaining wetlands are likely to be lower than the community would desire, providing an argument for protection by the State, normally on public land.

Values of wetlands

Jensen (1993) notes that estimates of indirect use values in the United States put the value of wetlands for flood retention buffers at A$19,285 per ha and up to A$286,000 per ha for nitrogen retention. Jensen also cites a demonstration by the US Army Corps of Engineers that intact wetlands stored 70 percent of a 1 in 2 year flood, providing a cheaper and more effective method of flood mitigation than levees. Other studies in the United States, have shown high values, up to US$14,600 per ha (1971 values), for the life support values of forested wetlands (see Young 1991).

A study of the wetlands of the Barmah Forest using contingent valuation procedures found a value of about $3,000 per ha for both direct use and non-use (Stone 1992). The Barmah wetlands can be regarded as above average wetlands because of their listing under the Ramsar Convention.

Sappideen (1992), also using contingent valuation, estimated the total annual willingness to pay to preserve the Sale wetlands in Victoria for recreational purposes (direct use value) to be about $766,000. Using a four percent real rate of discount and a 30-year planning period, the present value of the future recreational benefits of preserving the Sale wetlands would be $13 million or about $3,600 per ha. Non-use values were not estimated but 60 percent of respondents in Sappideen's survey regarded such values as important or very important.

These examples show that the total economic value of wetlands can be high. Therefore, the payoff to policies and practices which conserve the functions and values of wetlands are likely to be high.

While it may be inappropriate to transfer directly values such as those estimated for Sale and Barmah to all wetlands in the study area, they provide indicative values for wetlands which are prized for their recreation opportunities or their conservation status. Using this approach, Jensen (1993) valued the Coorong section of the Ramsar site (36,000 ha) at $108 million ($3,000 per ha).

A conservative value of $1,000 for wetlands without these characteristics has been used in other studies for which an indicative value of wetlands was required (McGregor, Harrison and Tisdell 1994).

Wetlands can be threatened by many processes, including those which take place at the wetland itself (such as, land reclamation and drainage for other uses, and recreation pressure) and those which take place elsewhere (such as, reductions in the quality and quantity of inflows, whether from surface water or groundwater). As implied in the discussion of wetland functions, the damage caused to wetlands can express itself at the site (loss of recreation opportunities) or elsewhere (increased flooding downstream). These 'externality' effects associated with wetlands and the public-good nature of many of the goods and services provided by them (noted above), mean that it is likely that there would be an under-supply of the conservation benefits of wetlands if left entirely to the market. In some cases this problem can be particularly serious because the damages are irreversible.

As noted by Pearce and Turner (1990) the absence of integrated resource policies means that inconsistencies between the policies of various sectors can produce 'government failure'. For example, artificially high producer prices for agricultural commodities or tax concessions for land development can threaten the environmental values of wetlands. While this type of failure is most likely to affect wetlands on private land, wetlands on public land are not immune, as is illustrated by the debate over the use for chemical storage

5 Based on data from State-wide mail surveys provided by DSE.

of part of the Ramsar-listed wetland at Point Lillias (Victoria). Other problems affecting the values of wetlands on public lands may arise from lack of resources for effective management and care of the wetlands, lack of an effective institutional structure to account for wetland values, competing views between the responsible government agencies, or simply from neglect.

More recent studies of the economic value of wetlands are reported by Whitten and Bennett (2005). These estimates range from around $3,700 to $5,700 per hectare in present value terms.

Many of the wetlands in the study area already benefit from some protection, for example by being located within a wildlife reserve. A detailed analysis of the degree to which increases in the level of wetland protection are reflected in environmental value (Appendix F) showed that for the wetlands under consideration the weighted average was about a 50 percent increase in protection.

Using an average Present Value of $3,000 per hectare at a discount rate of six percent, it was calculated that the net economic gain from wetland protection for Scenario 2 was $604,080 per annum and $664,488 for Scenario 3 (see Appendix F).

It is emphasised that no original survey work was undertaken in this study with respect to wetlands and duck hunting, the values were extrapolated from other studies and therefore provide only approximate estimates. In addition, the other studies have not explicitly considered the extent to which duck hunting and wetland protection are in conflict in economic terms.

2.5 Tourism and Recreation

Tourism Victoria's 'Murray Region' (see Figure 1) corresponds roughly to VEAC's investigation area. In the year ending December 2006 it was estimated that a total of almost 5 million people visited the region, with 2.2m overnight visitors, and 2.7m day visitors.

Estimates for the year ending December 2005 showed that the Murray Region received expenditure by overnight and daytrip visitors of $868m, the second highest regional total in Victoria behind the Great Ocean Road Region. Expenditure by domestic overnight visitors totalled $597m while domestic daytrip visitors spent $271m. International visitors to the region spent an additional $22m.

Tourism and recreation in the study area is focussed on the Murray River but the Red Gum forests provide the natural setting along the river that contributes to decisions to visit. Data on visitation to the River Red Gum Forests showed that nearly 75 percent of all respondents to the choice modelling survey had visited the forests at least once in the past ten years (Bennett et al. 2007).

The total numbers of tourists and visitors going to the forest areas each year are likely to be small in relation to the total visitation to the study area. Based on Parks Victoria and DSE data provided by VEAC, the consultants have estimated that approximately 5 percent of all visitors to the region actually visit the RRG Forests. Many of these visitors camp along the river. It will take several years for park managers to address and resolve problems of congestion and pollution in the forests and along the river. Subject to management outcomes, there is scope to increase the number of visitors, particularly from interstate and overseas.

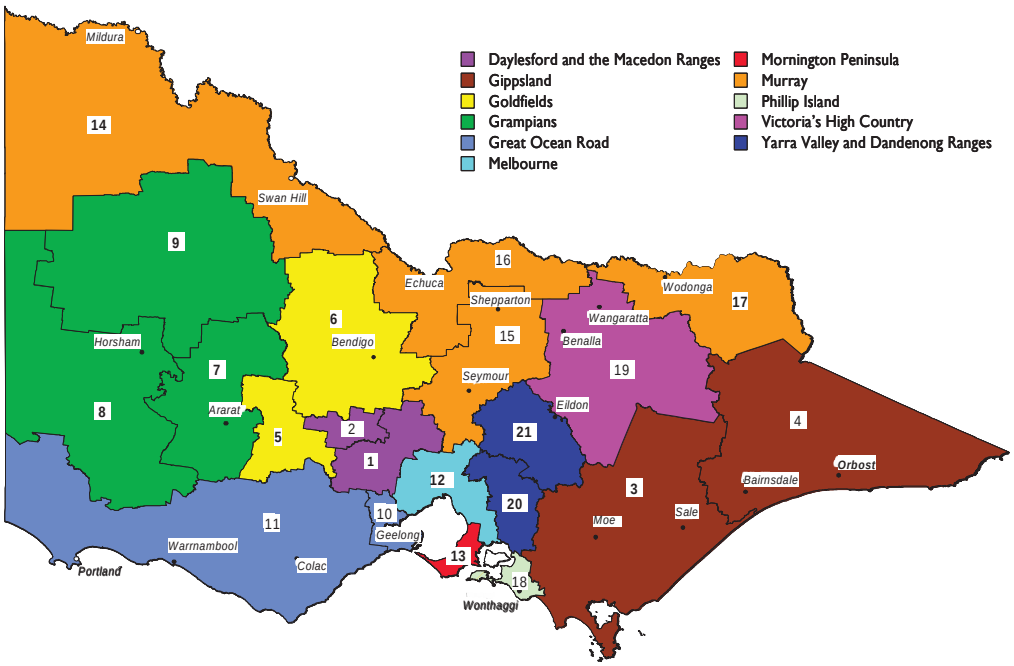
A change in status from state forest or state park to national park is likely to increase visitation in most cases (Dumsday 2001). The precise scale of change cannot be predicted with certainty, since this depends on a variety of factors including:

- accessibility to major markets;
- nature of the scenic resource;
- presence of key attractors (including well-known natural or cultural heritage attractions);
- potential activities available for visitors;
- existing level of investment in surrounding tourist facilities; and
- expenditure by park managers on facilities and promotion

In discussions for the social & economic studies prior to the Draft Proposals Paper, VEAC had the view that the camping changes may result in no net gain or loss, and that increased

Figure 1: Tourism Victoria's Campaign Regions

The table and map below list the sub-regions that make up Victoria's campaign regions. These regions form the basis of data reported from the *National Visitor Survey (NVS)*, the *International Visitor Survey (IVS)* and the *Survey of Tourist Accommodation (STA)*.



camping in the new national parks may be balanced by reductions in campers as a result of tighter management of camping. There is currently a high level of camping use along the rivers, and at peak times available campsites at most beaches from Yarrawonga to Koondrook, and near Mildura, are occupied. However, Parks Victoria visitation statistics demonstrate that except in the Christmas – early January peak, and to a lesser extent at Easter, there is ample camping space available, so there is potential to increase camping at these times.

During public consultation, and in submissions, there was much concern over the perceived effects of VEAC's draft proposals amongst regular users of these areas.

In addressing the possible reduction in camper numbers, in its Final Report VEAC Council has:

- clarified the situation regarding continuation of dispersed camping and the application of its camping proposals on-ground;
- modified its recommendations on campfires under certain conditions; and
- proposed several long, popular areas along the Murray River be excluded from the proposed national parks and remain available for camping with dogs.

Further, VEAC effectively ignored non-camping tourism in the Draft Proposals Paper. Tourists who come to the area with the purpose of visiting the national parks but who stay in nearby towns were not considered. Tourists already in the area but who stay an extra day or two to visit the parks, were not included. Day visitors were not considered. Future tourism developments near the proposed national parks were not anticipated.

The new parks will have a number of possible advantages:

- they are accessible from Melbourne and other population centres and are easily accessed by road;
- the river(s) provide an integrating theme with other regional tourist attractions;
- the rivers with their bends, beaches and River Red Gum trees are highly valued scenic resources;
- there are numerous biodiversity, recreational and cultural heritage attributes associated with the new parks; and
- national park status will lead to increases in expenditure on promotion and facilities.

The study of Box-Ironbark parks (Dumsday 2001) estimated the likely increase in visitation, based on two previous cases where land has changed designation from state forest to national park — the Grampians National Park and Murray-Sunset National Park.

The Grampians were declared a National Park in 1985. Visitor numbers prior to declaration (2 years' figures) averaged 1.12 million visitor days. Visitor numbers following the park declaration (figures for 11 years) have averaged 1.50 million. That is, the increase in visitors following Park designation was approximately 30 percent.

Murray-Sunset National Park was declared in 1991. Visitor numbers post designation have averaged 2.3 times those pre designation (27,200 average compared with 12,000). Statistical analysis revealed that visitation following declaration as a park increased by 32 percent for the Grampians and 62 percent for the Murray-Sunset National Park. Both these increases were net of trends due to increase in population, for example, and were significant at the 1 percent level.

A large number of people made submissions to VEAC that introduction of restrictions on the use of the new RRG national parks would negatively impact on current users. This may be so but the same sorts of restrictions have applied in other cases where the establishment of national parks in areas previously designated as state forest has lead to substantial increases in visitor numbers to those areas. Presumably the attractions of national parks more than negate the perceived effects of such restrictions on overall visitor numbers.

An analysis conducted as part of this study for the more recently established Yarra Ranges National Park showed a statistically significant increase in visitation of approximately 28 percent. Unfortunately, visitor data for the other recently established national parks – in the Box-Ironbark area and the Great Otway National Park have not been collected in a form that is useful for comparison with earlier data.

On the basis of these analyses, the consultants have assumed a possible increase of up to 20 percent in visitation following designation as a national park and associated promotion. This assumption is important to the benefit cost analysis and to the analysis of regional economic activity.

It should be noted that reliable visitor statistics for public land are difficult to collect, particularly in areas such as the RRG forests where there are many access points and some major through roads, so the data need to be interpreted cautiously. They may be based on vehicle counts at the entry to parks. They are frequently based on sample head counts taken at irregular intervals. The visitor data used in statistical analysis also have numerous missing values and these affect the results depending on how they are dealt with in the analysis. So the estimate of 20 percent increase in visitation should be seen as a 'what if' analysis based on the best available information, not a forecast of what is likely to happen.

From a State-wide perspective, increasing visitor numbers for the RRG parks may be at the expense of visitation to other parks in the State. However, offsetting this possible source of overestimation of benefits to some degree, we make the conservative assumption that the above increases apply to visitors to the expanded national parks and not to the establishment of other protected areas recommended by VEAC.

The unit values for the net economic contribution of visitors to the RRG national parks are based on a number of earlier studies (Read Sturgess & Associates 1999, Dumsday 2001, URS 2004). We have assumed a consumer surplus of $35 per visitor day, weighted for the likely ratio of recreationists (originating from the local area) and tourists from overseas, interstate and other parts of Victoria. It is likely that the number of tourists will increase following the establishment of the new national parks, as noted in the regional analysis.

As a result of these analyses, the increases in net economic values for tourism that potentially arise as a result of VEAC's proposals for the RRG national parks are estimated to be approximately $872,000 per year. The detailed calculations are shown in Appendix H.

It should be noted that while the BCA analysis assumed total increased annual visitation of about 24,900 per year, the regional analysis assumed a uniform 20 percent increase in visitation over all new RRG parks – 48,000 visitors per year – because the regional model did not allow differentiation of visitor numbers between the parks.

2.5.1 Additional park management costs

Administrative responsibility for managing recreation on public land proposed to be included in the new parks is likely to be shared between DSE and Parks Victoria. Parks Victoria have higher management costs with respect to visitors because of the higher level of facilities and promotion associated with national parks compared with state forest.

DPI/DSE and Parks Victoria are likely to retain existing responsibilities for fire protection, management of pest plants and animals, and researching ecological management, as appropriate, hence those costs should not be affected.

It was assumed that *additional* management[6] costs for the public land areas, including new national parks, would be $1m per year. This is an estimate based on other studies of the establishment of national parks (Dumsday 2001) and advice from VEAC and has not been explicitly calculated for this study. The cost is over and above the costs of the DPI/DSE employees now involved in managing, regulating and administering these public land areas, and the costs for other items such as road construction and maintenance, fire protection, and pest plant and animal control. The costs are net of any reductions in DSE management costs due to the removal of timber harvesting and grazing. The assumption would need to be re-examined in the course of undertaking the implementation program should the Government ultimately accept VEAC's recommendations.

It is quite difficult to extract the appropriate cost data from various departmental and government sources, partly because of the influence of large scale fire control in recent years and because financial statements do not always reveal whether the funds expended are new funds or have been redirected from somewhere else. Despite all this, there is the possibility that the estimate of $1m is an underestimate.

Several VEAC recommendations in the RRG Final Report imply that some Indigenous employment should result if the recommendations are implemented. Jobs for Indigenous people are relevant as they relate specifically to roles in the new RRG parks. Recommendations refer to properly resourced programs to: identify Traditional Owners; employ (Indigenous) contractors to work on land and natural resource management projects; employ Aboriginal rangers; set up opportunities for increased employment and training; and provide for park co-management. Taken together there is a clear expectation that at least several part-time Indigenous jobs should result from implementation of the recommendations.

Several people submitted the view that existing parks in Victoria were already under-resourced and that adding to the area of parks would only exacerbate this problem. This view has been consistently put to the consultants in other national park assessments that they have conducted. A recent example of park implementation contradicts this assertion – funding allocated to implementing the Box-Ironbark Parks and reserves was $20.8m over four years[7]. This amount included financial assistance to those who were directly disadvantaged by the establishment of the parks, and a range of other programs for park management, recreation and firewood supply. Appendix I details the implementation of the Box-Ironbark recommendations.

Furthermore, as shown in Appendix J, expenditure by DSE/NRE and PV on park management has trended upwards over the eleven years from 1995/96 to 2005/06, showing an increase of about 154 percent over the period. Expenditure increased in real terms (ie. net of inflationary increases). While there were significant additions to the park and reserve estate in Victoria over this period (including the Yarra Ranges & Great Otway National Parks, Box-Ironbark parks and reserves, and Marine National Parks), the total area of these additions only added 10.5 percent to the extent of parks and reserves in Victoria.

While these examples do not 'prove' that existing public land management is adequately funded (that would depend in part on what different people would consider 'adequate'), they show that resourcing of parks and reserves has improved over the eight years examined, both in general, and especially in association with the establishment of new parks and reserves such as in the implementation of the Box-Ironbark recommendations.

2.6 Protecting Riparian Areas

Introduction

The following introduction draws on Vollebergh (2006).

Riparian land performs important terrestrial and riverine ecological functions. From an instream perspective, riparian land with intact native vegetation provides:

- a supply of organic matter into the river, both from vegetation and invertebrates, a major food source for instream biota;
- a supply of woody debris for the river which forms key habitat areas for many fish and invertebrates;
- shade in upland areas which influence water temperature and light penetration;
- a filter for runoff to improve instream water quality, and
- stability to the bed and banks, reducing erosion of banks and sedimentation of streams.

Intact riparian vegetation is also important in the terrestrial landscape:

- it contains highly diverse flora and fauna;
- it can act as a refuge for fauna in dry times;
- it is often the only remaining remnant native vegetation in largely cleared catchments;
- it can act as a wildlife corridor, and
- it may act as important refuges and biolinks and assist in adaptation to climate change.

Riparian land can also be of significance to the community for recreation, particularly for access for fishing, swimming and boating. Riparian land also often contains cultural heritage sites of significance to Indigenous and non-Indigenous communities.

Riparian land is also often highly valued by farmers as productive farming land and, often more importantly, as access to rivers and creeks for stock watering. This potentially brings their current management into conflict with managing riparian areas for their environmental and social values of a public nature.

Valuing riparian areas

River management in Victoria presents decision makers with a set of complex issues that involve trade-offs between competing uses. Information on which to base sound river management decisions should include details of the relationships between alternative uses and the biophysical condition of rivers. For instance, decision makers should be aware of the consequences for attributes of river condition (such as native fish species numbers, the health of riverside vegetation, native waterbird and animal species numbers, and water quality) of various river management strategies (such as permitting more extraction, excluding stock from river banks, increasing the cap on extractions, etc.) (URS 2006).

There have been a number of Australian and international studies which value the environmental services of riparian areas in economic terms. The Australian studies are reviewed in Appendix K.

For the purposes of this report we have derived values from the first choice modelling survey conducted in Victoria (URS 2006). This study assessed the value of improved environmental health in Victorian rivers, focussing on the Goulburn, Moorabool and Gellibrand Rivers. The environmental attributes included for the Goulburn River are shown in Table 7.

6 The subject of park management costs highlights the difference between BCA and RIA. In the former case, higher park costs make the project less attractive, other things equal. In the RIA case higher park costs lead to more jobs, among other things, so it is seen as a good thing.

7 This figure is not to be compared with the park management costs discussed as financial assistance, for example, is a 'transfer payment' from one group in the economy to another and is not included in a BCA as there is no net change in contributions to the economy.

The vegetation attribute for the Goulburn River was taken as representing the values obtained from increasing protection of the riparian areas (excluding the Murray River). This is probably an underestimate of the value of protecting riparian areas – other attributes such as 'fish' could be added but the consultants took a conservative approach. The implicit price for the vegetation attribute was averaged over all samples, as shown in Appendix L. Some comparisons with values from similar studies in NSW are also included in this appendix.

Table 7: Environmental Attributes for the Goulburn River

Attribute	Description	Levels/ unit: Goulburn
Cost	Compulsory one-off payment to a trust fund	$0, 20, 50, 200
Fish	Percentage of pre-settlement species and population levels	5, 10, 20, 30
Vegetation	Percentage of river's length with healthy native vegetation on both banks	50, 60, 70, 80
Birds	Number of native waterbirds and animal species with sustainable populations	35, 45, 55, 65
Water quality	Percent of the river suitable for primary contact recreation without threat to public health	70, 80, 90, 100

Applying the average implicit price to 30 percent of Melbourne households at a discount rate of six percent yields an annuity in perpetuity of around $2,335,700. This procedure of assuming a conservative response rate and applying it to only Melbourne households is used throughout the report where we are use 'benefit transfer' from other studies to estimate values. This conservative approach is taken because these values are not as reliable as those obtained in the CM study for the RRG Forests that preceded this study and which was specific to the VEAC Investigation.

Another source of underestimation of riparian values in this report is due to using the value from just one river in the study area, the Goulburn, and applying it to all the riparian areas. In the DSE healthy rivers study the questionnaires focused on each of the three rivers separately. In the case of the Goulburn the estimates were derived for the Goulburn below Eildon – representing about twice the length of the Goulburn in the VEAC investigation area. It is not appropriate to simply calculate the lengths of the affected rivers in the VEAC investigation area and scale the Goulburn estimate to reflect the whole area because if the survey was done in that context in the first place the respondents' values would probably have been lower.

2.7 Maintaining Viable Rural Communities

Australian rural society has undergone change as the agricultural sector has adjusted to changing economic conditions (Bennett et al. 2004). Populations in rural areas have declined. Services provided to rural areas (and rural populations) have become more concentrated in larger rural centres and the fortunes of many small towns have waned. Many rural inland regions have experienced net migration and this has generated falls in population.

In 1911, 43 percent of Australia's population was located in rural areas. By 1976, that figure had fallen to 14 percent as the terms of trade experienced by many Australian agricultural industries declined and capital substituted for the relatively more expensive labour input. It remained relatively constant at that level until the mid-1990s when it began to fall again. That is not to say that there have not been pockets of rural population growth – largely centred on some larger rural centres. However the populations of many other country towns have fallen and those of the large urban centres have risen. In the Australian context, the rural communities facing the reality or the prospect of decline are largely those that are dependent on primary production.

There is some evidence to suggest that the broader Australian society would like to avoid a continuation of this decline in the viability of rural communities. Specific policies to support rural communities have been implemented. Governments have imposed rules to maintain levels of telecommunication services in rural areas and have convinced banks to install charters of "social responsibility". The urban-dwelling public's demand for maintaining the social structure of rural areas is regularly witnessed through donations made to various media appeals in times of "crisis" – such as droughts, floods and fires.

Whilst this evidence points to the existence of a public demand for supporting country people, it is not in a form that is useful to the design of specific policies. More detailed empirical evidence of the extent of the demand held by urban people for viable rural communities would be useful in the policy process.

Bennett et al. (2004) describe the results of two Australian studies that were aimed at estimating the non-marketed values associated with the outcomes of alternative natural resource management strategies. Both studies employed the Choice Modelling technique for estimating non-market values but in different settings. The first involved the estimation of values associated with wetland management strategies for the Murrumbidgee River Floodplain (MRF), situated in southern inland New South Wales. The second study investigated values associated with the implementation of alternative natural resource management strategies across the whole nation and, specifically, in two agricultural regions – the Great Southern in south west Western Australia and the Fitzroy River Basin in Central Queensland. The two studies therefore offer empirical evidence on the extent of community willingness to pay for maintaining the populations of rural communities. Specifically the studies investigate situations where the viability of communities is threatened by measures designed to provide environmental protection benefits but which reduce the profitability of agricultural enterprises.

The results of the two studies demonstrate that both rural and urban Australians value the continued viability of rural communities. This finding is robust in that it has been replicated for three diverse and geographically separated regions across a variety of rural, regional and urban populations, as well as in the national context.

In the MRF study, the social impact attribute was defined as the number of farmers leaving the region. In the second study, the number of people leaving country towns was the focus. These two attributes are not the same. The net migration of people from country towns is a 'catch all' measure for population change while farmers leaving is open to interpretation. That is, the exit of farmers may also lead to the closure of businesses that support other members of the community.

Despite various complications, it can be concluded that both studies reveal a consistency in value estimates between rural and urban populations. Comparisons within each study of the values estimated for respondents living in rural and urban areas showed no significant differences. This is a result not expected *a priori* given that the composition of the values enjoyed by the two groups of people could be expected to be different. However, it appears that the values of a viable rural community enjoyed directly by people living in a rural area are equivalent to the "nostalgic attraction" of the areas felt by urban dwellers for country townships.

There are numerous policy implications that follow from these results. Not the least of these is a justification for the redirection of wealth from the city to rural areas to ensure that rural Australia remains viable. It is worth reinforcing the point that this should not be achieved through price intervention in commodity markets but rather through payments specifically designed to achieve the goal of maintaining rural communities. Payments for environmental stewardship may assist in this quest.

A caveat to this conclusion is that the results do not necessarily justify the provision of support to rural areas in the absence of any environmental stewardship obligations. The context of the study was one in which environmental damage control and rural viability were directly linked. Where no such link exists, the conclusion that declining rural viability warrants wealth redistribution cannot necessarily be drawn. In line with this contextual caveat, the converse of the support argument is that policies impacting rural and regional Australia need to be assessed carefully for any detrimental impact they may have on the viability of country communities. These impacts should be factored into the policy assessment process.

Appendix M shows the process for estimating the willingness to pay for maintaining rural communities. An average value of $161,310 per annum is included in the BCA as it is likely that many of those losing their current employment if VEAC recommendations are implemented will be able to find other employment.

2.8 An Assessment of VEAC Recommendations

A summary of undiscounted annual benefits and costs for each scenario relative to the base case is shown in Table 8. The benefits include the non-marketed environmental protection values, including wetlands. The costs include the foregone value of timber and grazing production and duck hunting.

Table 8: Undiscounted Benefits and Costs of VEAC Recommendations

SCENARIO	BENEFITS ($m/year)			COSTS ($m/year)
	Low	**Average**	High	**Average**
Scenario 2 (no additional water)	18.99	**41.72**	64.45	**4.84**
Scenario 3 ('adequate' water)	48.84	**111.29**	173.74	**4.66**

The Low and High results reflect the 95 percent confidence limits placed on the estimates of the environmental values.

A more detailed summary, using 'average' values for the environmental benefits of establishing the new parks, is shown in Table 9. It is apparent from Table 8 and Table 9 that the environmental benefits of VEAC's recommendations dominate both other non-market benefits, and the costs in terms of lost timber, grazing and duck hunting opportunities. *However, it is important to note that the costs do not include the costs of provision of 'adequate' water for Scenario 3.*

Assuming a planning horizon of 20 years and a real discount rate of 6 percent and in the absence of water costs, annuities and Net Present Values (NPVs) for all three scenarios are strongly positive. However, because water has been excluded from the analysis the results that we present should be seen as part of a pre-feasibility analysis and further work is warranted before making decisions on the allocation of 'adequate' water from the Murray River and tributaries.

It should be noted that the benefits of VEAC's recommendations considered in this analysis are only those enjoyed by Victorians. The management regime considered under Scenario 3 will inevitably also benefit ecosystems in NSW and SA with consequent environmental benefits to people in those States.

Table 9: Summary of the Benefit Cost Analysis

	Scenario 2 no additional water ($m/year)	**Scenario 3** 'adequate' additional water ($m/year)
BENEFITS OF VEAC RECOMMENDATIONS		
Increased environmental benefits from establishing parks in the study area (using average values from CM study)	37.906	107.417
Other non-market benefits (conservative estimates from benefit transfer)		
Increased protection of wetlands	0.604	0.664
Increased protection of riparian areas	2.336	2.336
Increased tourism and recreation (assuming visitation increased by up to 20%)	0.872	0.872
Total benefits	41.718	111.289
COSTS OF VEAC RECOMMENDATIONS (excluding costs of 'adequate' water)		
Additional park management	1.000	1.000
Reduction in timber harvest	1.363	1.245
Reduction in grazing in Barmah Forest	0.140	0.140
Reduction in grazing in riparian areas	0.759	0.759
Increased costs in riparian areas (fencing, watering points, pest control)	0.867	0.867
Reduction in duck hunting	0.545	0.491
WTP for maintaining rural communities	0.161	0.161
Total costs	4.835	4.663
UNQUANTIFIED		
Costs of 'adequate' water (Scenario 3)		
Indigenous and non-indigenous cultural heritage		

2.8.1 Distribution of benefits

Table 10 shows the distribution of environmental benefits for Scenario 3 that would occur if VEAC's recommendations are adopted by government. The distribution is similar for the case of Scenario 2. Because the analysis depends in part on values per household and the vast majority of households are located in Melbourne, it is not surprising that the environmental benefits are distributed 59 percent to Melbourne (population share 77 percent); 4 percent to the in-region/study area (population share 6 percent) and 37 percent to out of region areas in the State (population share 17 percent).

Table 10: Distribution of Environmental Benefits

Scenario 3 – 'adequate' water

	LOCATION			
Attribute	**Melbourne**	**In Region**	**Out of Region**	**Total**
Healthy RRG	24%	0%	17%	42%
Parrots	28%	3%	17%	48%
Cod	7%	1%	3%	10%
Total	59%	4%	37%	100%
Population share	77%	6%	17%	

2.8.2 Conclusions to BCA

The BCA reveals an estimated net benefit to the Victorian economy of approximately $107 million per year on average for 20 years, excluding the cost of the environmental water which is essential to realising this net benefit. The costs of allocating 'adequate' environmental water are likely to be substantial. The other benefits and costs assessed are relatively small.

The environmental benefits of VEAC's recommendations as assessed in this work are distributed according to where Victorians live, as indicated in Table 10, while the bulk of the costs affect people living in the study area. This issue is addressed in the next part of this report.

3 REGIONAL IMPACT ANALYSIS

3.1 Introduction

Benefit Cost Analysis is concerned with the net costs and benefits of VEAC's recommendations to the *whole* Victorian community in terms of changes in net benefits to consumers and producers. Regional Impact Analysis is concerned with changes in economic activity associated with changes in expenditure patterns *within* the RRG study area that may arise as a consequence of VEAC recommendations. Regional economic impacts are measured in terms of a number of specific indicators:

- ***Gross regional output*** – is the gross value of business turnover;
- ***Value-added*** – is the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output;
- ***Income*** – is the wages paid to employees including imputed wages for self employed and business owners; and
- ***Employment*** – is the number of people employed (including full-time and part-time).

Unlike BCA, these indicators do not measure net benefits to the Victorian or regional community and hence care needs to be taken in interpreting them.

There are a range of methods that can be used to examine the regional economic impacts of an activity on an economy including Keynesian multipliers, econometric models, mathematical programming models and input-output models.

Input-output models are the most commonly used and involve two broad steps:

- construction of an appropriate input-output table (regional transaction table) that can be used to identify the economic structure of the region and multipliers for each sector of the economy; and
- identification of the initial impact or stimulus of the recommendations in a form that is compatible with the input-output equations so that the input-output multipliers and flow-on effects can then be estimated.

This latter step typically involves collecting primary data on the revenue, expenditure and employment of the industry or sector that will be affected.

VEAC recommendations are likely to have impacts on regional economic activity in terms of output, value-added, income and employment. It is important to recall that while the proposals generate substantial economic benefits as shown in the Benefit Costs Analysis, few of these benefits and most of the costs are captured in the RRG study area.

It is also important to note that the following impact analysis only applies to Scenario 2 where additional areas of River Red Gum forests are protected (and receive existing commitments for environmental water allocations) but no additional water is made available. The regional impacts of diverting additional 'adequate' water for environmental flows would be substantial, potentially, in terms of irrigated agriculture and horticulture but the quantification of these effects was beyond the scope of this study.

This section of the report comprises three parts:

- A review of an input-output study undertaken by La Trobe University and submitted as part of the Murray River Councils of North Central Victoria's response to VEAC's River Red Gum Forests Investigation Discussion Paper;
- Estimation of the likely regional economic impacts of VEAC recommendations on the timber industry, duck hunting, grazing and tourism. Consideration of impacts from changes in water allocation was beyond the scope of the study;
- Consideration of the regional impacts at a more micro (town) level.

3.2 La Trobe Study of the Economic Contribution of the Timber Industry

As was the case for many submissions to VEAC in response to the Draft Proposals Paper (DPP), critics of the socio-economic analysis appeared to have confined their reading to the Executive Summary of our report attached to VEAC's draft report, or to Section 4 of VEAC's report, and had not read the full report (Gillespie Economics et al. 2007) which was available on VEAC's website. One of the criticisms was the claim that we had not addressed the La Trobe University study. The following section is the same[8] as that which was included in our 2007 report.

La Trobe University examined the economic contribution of the timber and related industries to the North-Central Murray region, which comprises Mildura (RC), Swan Hill (RC), Campaspe (S), Gannawarra (S) and Moira (S).

An input-output table was built for the North-Central Murray region using 2001 census data. Four sectors of the economy were examined as representative of the timber industry in the region:

- Forestry and logging – which consists of units engaged in growing standing timber (both native or in plantations) including government agencies engaged in management of commercial or business activities and those engaged in felling trees for logs, posts, sleepers, firewood etc;
- Sawmill products – which consists of units engaged in producing rough sawn timber, sleepers, palings, scantling etc, resawn timber from logs sawn at the same units, manufacturing of woodchips and production of dressed timbers such as floorboards, weatherboards or mouldings, kiln drying or seasoning timber.
- Other wood products – which consists of units engaged in manufacturing plywood and veneers, particle boards, chip boards, other fabricated boards of wood and laminations of timber and non timber materials, manufacturing of wooden structural fittings, wooden components for prefabricated wood buildings, wooden or wooden framed doors or wooden roof trusses or wall frames or shop fronts etc. It also includes units engaged in installing shop fronts made of wood or joinery; and units engaged in manufacturing wooden containers, pallets or packing cases or articles of cork, or wood, bamboo or cane products.

8 With the exception that the title of 'La Trobe University' has been corrected.

- Furniture – which includes units engaged in manufacturing wooden furniture, upholstering, re-upholstering or French polishing furniture, manufacturing upholstered seats for transport equipment, manufacturing furniture, storage structures, shelving or parts of furniture predominantly from steel, manufacturing mattresses, pillows or cushions.

The model was used to identify the magnitudes of the above sectors in terms of direct and indirect output, employment, income (wages and salaries) and valued added.

The results are summarised below.

Forestry and Logging Impacts

	Direct	Industrial Induced Effect	Consumpt. Induced Effect	Total Effect
Output	$9.27m	$4.22m	$7.73m	$21.23m
Type 11A Ratio Multiplier	*1.00*	*0.45*	*0.83*	*2.29*
Value-added	$4.37m			
Income	$3.22m			
Employment	59	17	49	125
Type 11A Ratio Multiplier	*1.00*	*0.29*	*0.83*	*2.12*

Sawmill Products

	Direct	Industrial Induced Effect	Consumpt. Induced Effect	Total Effect
Output	$19.00m	$7.28m	$9.20m	$35.48m
Type 11A Ratio Multiplier	*1.00*	*0.38*	*0.48*	*1.87*
Value-added	$7.26m			
Income	$3.31m			
Employment	59	29	58	146
Type 11A Ratio Multiplier	*1.00*	*0.49*	*0.98*	*2.47*

Other Wood Products

	Direct	Industrial Induced Effect	Consumpt. Induced Effect	Total Effect
Output	$40.61m	$18.59m	$23.76m	$82.96m
Type 11A Ratio Multiplier	*1.00*	*0.46*	*0.59*	*2.04*
Value-added	$13.48m			
Income	$8.89m			
Employment	196	71	150	418
Type 11A Ratio Multiplier	*1.00*	*0.36*	*0.77*	*2.13*

Furniture

	Direct	Industrial Induced Effect	Consumpt. Induced Effect	Total Effect
Output	$29.43m	$10.37m	$15.77m	$55.57m
Type 11A Ratio Multiplier	*1.00*	*0.35*	*0.54*	*1.89*
Value-added	$10.30m			
Income	$6.43m			
Employment	*163*	*40*	*100*	*303*
Type 11A Ratio Multiplier	1.00	0.25	0.61	1.86

The study concluded that:

- The timber sector directly employs 477 people, and once industrial and consumption related flow-on effects are taken into consideration the total contribution to employment in the region is estimated at 991 jobs
- The contributions of the timber related sectors are relatively modest – the entire manufacturing sector in the region has an output value of $4.386 billion while the region has a gross regional product of $5.820 billion

The covering letter from the Murray River Councils of North Central Victoria identified the following results:

- Total value of (direct) output generated by the timber related industry is estimated at $98.31 million per annum;
- 477 people were employed in the timber related sectors in the region in 2001;
- Value-adding to timber products contributes $35.41 million to the regional economy.

However, care must be taken in interpretation of the La Trobe data because:

- no primary data on these sectors in the region was collected and inserted into the model. Instead secondary data was used which in the context of the input-output modelling means that broad national or state ratios of output to employment etc. were used to estimate the total value, value-added and income of the timber industry sectors.
- the secondary data reflects *all* the timber industry in the region (including timber sourced from East Gippsland), not just that related to river red gum;
- while the furniture sector has been included as part of the timber industry, the sector is very broad and includes upholstery and the manufacturing of steel furniture, mattresses, pillows or cushions. Also, while this sector has links to the timber sector it is likely that because of the availability of substitutes it would be little affected by changes to forestry activities in the region. Specialist redgum furniture manufacturers would be most affected, at least in the short run;
- flow-on effects summarise backward linkages so it is incorrect to sum the total employment (or other) effect of furniture, other wood products, sawmill products and forestry and logging, since this will result in double counting of employment impacts. For example, industrial effect flow-on employment for the sawmill sector relate to employment associated with purchases of timber from the forestry and logging sector. Similarly, industrial effect flow-on employment for the Other Wood Products sector includes employment associated with purchases of sawn timber from the Sawmill products sector;
- output is a poor measure of value because the output of one sector may be an input into another and hence adding up the output of all sectors results in double counting. Value-added is the best measure in a regional economic context.

Nevertheless, some conclusions can be drawn from the study:

- The direct timber industry, in its entirety, is a small contributor to the regional economy i.e. in the order of 0.6 percent of regional value added and 0.8 percent of regional employment.
- The estimated direct employment of 477 is equal to less than half the annual growth in regional employment between 1996 and 2001.
- The industry associated with river red gum is an even smaller contributor.

The regional impact assessment described in the following sections is aimed, in part, at remedying some of the deficiencies of the La Trobe study

3.3 Regional Economic Impact Assessment

3.3.1 Introduction

The economy on which an impact is measured can range from a township to the entire nation (Powell et al., 1985). For this study, regional economic impacts have been estimated for an approximation of the River Red Gum Forests Investigation area comprising the ABS statistical local areas (SLAs) of Mildura (RC), Swan Hill (RC), Campaspe (S), Gannawarra (S), Moira (S), Gr. Shepparton (C), Loddon (S) – north, Wodonga (RC), Indigo (S), Benalla (RC), Wangaratta (RC) and Mansfield (S). The ABS has changed some of the boundaries of the regions from those used in the 2007 draft report which had to rely on ABS data from the 2001 Census. Data from the 2006 Census are used in this report.

This region is larger than that used in the La Trobe study, and is larger than the River Red Gum Forests Investigation area due to constraints imposed by ABS boundaries.

This assessment is concerned with regional impacts arising from the VEAC scenarios including:

- Reduction in the River Red Gum timber industry;
- Reduction in hunting;
- Reduction in forest grazing;
- Reduction in grazing of riparian areas; and
- Increases in tourism and park management costs.

3.3.2 Input Output Table and Economic Structure of the Region

For this study, a 2006 input-output table of the regional economy was developed using the Generation of Regional Input-output Tables (GRIT) procedure, developed by the University of Queensland (refer to Appendix N for an overview of the GRIT procedure). The regional table was developed from a 2006 Victorian input-output table provided by Monash University and 2006 census data on employment by ANZSIC Industry Class, purchased from the Australian Bureau of Statistics.

A 109 sector input-output table of the regional economy was aggregated to 30 sectors and 6 sectors for the purpose of describing the economy.

A highly aggregated 2006 input-output table for the regional economy is provided in Table 11. The rows of the table indicate how the gross regional output of an industry is allocated as sales to other industries, to households, to exports and other final demands (OFD - which includes stock changes, capital expenditure and government expenditure). The corresponding column shows the sources of inputs to produce that gross regional output. These include purchases of intermediate inputs from other industries, the use of labour (household income), the returns to capital or Other Value Added (OVA - which includes gross operating surplus and depreciation and net indirect taxes and subsidies) and goods and services imported from outside the region. The number of people employed in each industry is also indicated in the final row.

From Table 11, it can be seen that the value of the gross regional output for the regional economy in 2006 is estimated by the model at $49,953m. However, it is generally considered that gross regional product (value-added) is a better measure of economic activity, as it avoids double counting associated with purchases of intermediate products.

Gross regional product for the regional economy is estimated at $11,792m, comprising $6,522m to households as wages and salaries (including payments to self employed persons and employers) and $5,270m in Other Value Added.

The employment total was 123,249.

The economic structure of the regional economy is summarized in Figure 2. This reveals the economic significance of the agriculture, forestry and fishing sector, manufacturing sectors and services sectors.

Figure 2: Summary of Aggregated Sectors: Regional Economy (2006)

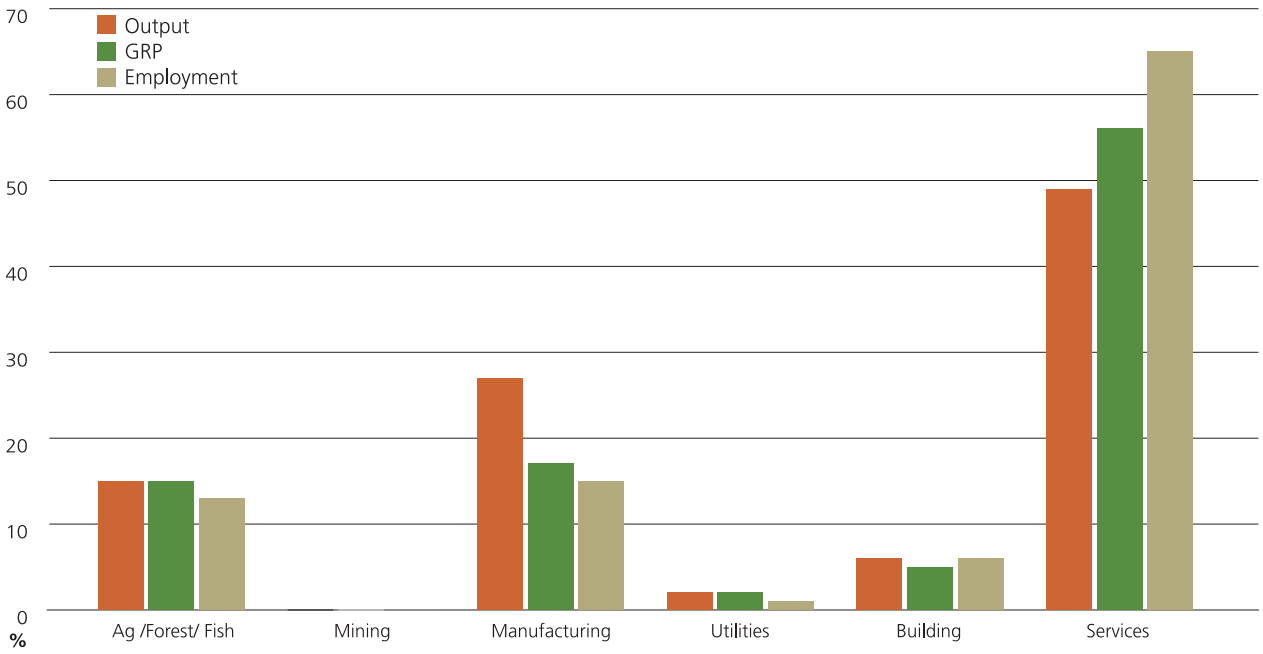


Table 11: Aggregated Transactions Table: Regional Economy 2006 ($'000)

	Ag/Forest/ Fish	Mining	Manufacturing	Utilities	Building	Services	TOTAL	H-hold Exp	O.F.D	Exports	Total
Ag/Forest/Fish	315,383	12	802,904	42	979	23,280	1,142,600	39,801	564,920	2,160,476	3,907,798
Mining	197	615	17,933	194	2,023	1,408	22,370	707	135	28,677	51,889
Manufacturing	220,732	1,816	834,495	12,270	169,499	486,989	1,725,800	395,257	666,721	4,342,792	7,130,570
Utilities	57,035	147	40,077	57,061	5,096	68,054	227,470	71,983	17,632	259,426	576,510
Building	18,979	653	11,729	9,851	305,968	103,040	450,220	0	998,596	154,553	1,603,369
Services	318,999	3,883	879,658	29,431	139,928	1,784,206	3,156,105	2,780,655	2,865,299	3,892,061	12,694,119
TOTAL	931,325	7,125	2,586,796	108,848	623,493	2,466,976	6,724,564	3,288,404	5,113,301	10,837,986	25,964,255
H-hold Income	988,400	10,247	944,967	78,288	381,048	4,119,756	6,522,706	0	0	0	6,522,706
O.V.A.	775,059	20,937	1,111,812	205,264	177,545	2,437,403	4,728,019	323,957	186,618	31,798	5,270,392
Imports	1,213,014	13,580	2,486,995	184,110	421,283	3,669,984	7,988,966	2,243,275	1,242,741	721,217	12,196,199
TOTAL	3,907,798	51,889	7,130,570	576,510	1,603,369	12,694,119	25,964,255	5,855,636	6,542,661	11,591,001	49,953,552
Employment	16,283	181	18,010	1,210	7,073	80,491	123,249				

Figures 3 to 5 provide a more expansive sectoral distribution of gross regional output, employment, household income, value-added, exports and imports, and can be used to provide some more detail in the description of the economic structure of the economy.

In terms of gross regional output and value-added the Food Manufacturing sector (predominantly dairy products, wine and spirits, fruit and vegetable products and other food products) is the most significant sector of the regional economy followed by Other Agriculture (which includes horticulture). While these sectors are also significant to the regional economy in terms of income and employment, the retail sector is the most significant sector for employment and income. The services sectors are also significant.

There are a number of timber industry sectors in the input-output table, namely:

- forestry and logging
- sawmill products manufacturing; and
- other wood products manufacturing

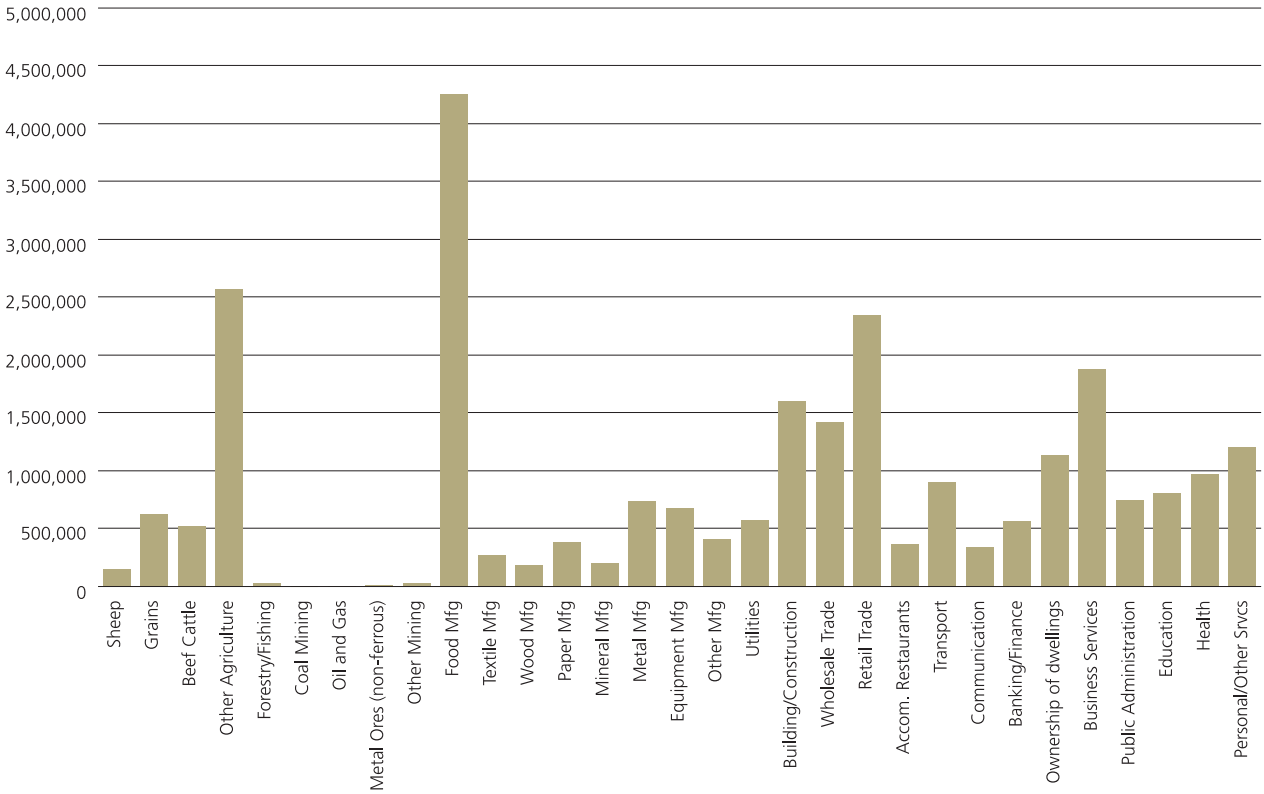
Table 12 summarises the magnitude of these sectors relative to the estimated magnitude of the regional economy. In terms of direct output, value-added, income and employment the total timber sectors are less than 1 percent of the regional economy. The timber industry associated with River Red Gum forests is a portion of the total timber industry.

Table 12: Relative Magnitude of Entire Timber Industry Sectors

	Gross O/P ($'000)	Value-added ($'000)	Income ($'000)	Employment (no.)
Forestry and logging	25,427	9,290	4,844	86
Sawmill products	63,021	32,800	10,044	239
Other wood products	119,355	39,653	26,948	625
Sub-total	***207,803***	***81,743***	***41,836***	***950***
TOTAL REGION	**49,953,552**	**11,793,098**	**6,522,706**	**123,249**
	0.42%	**0.69%**	**0.64%**	**0.77%**

Figure 3: Sectoral Distribution of Gross Regional Output and Value-added ($'000)

Gross Regional Output



Gross Value Added

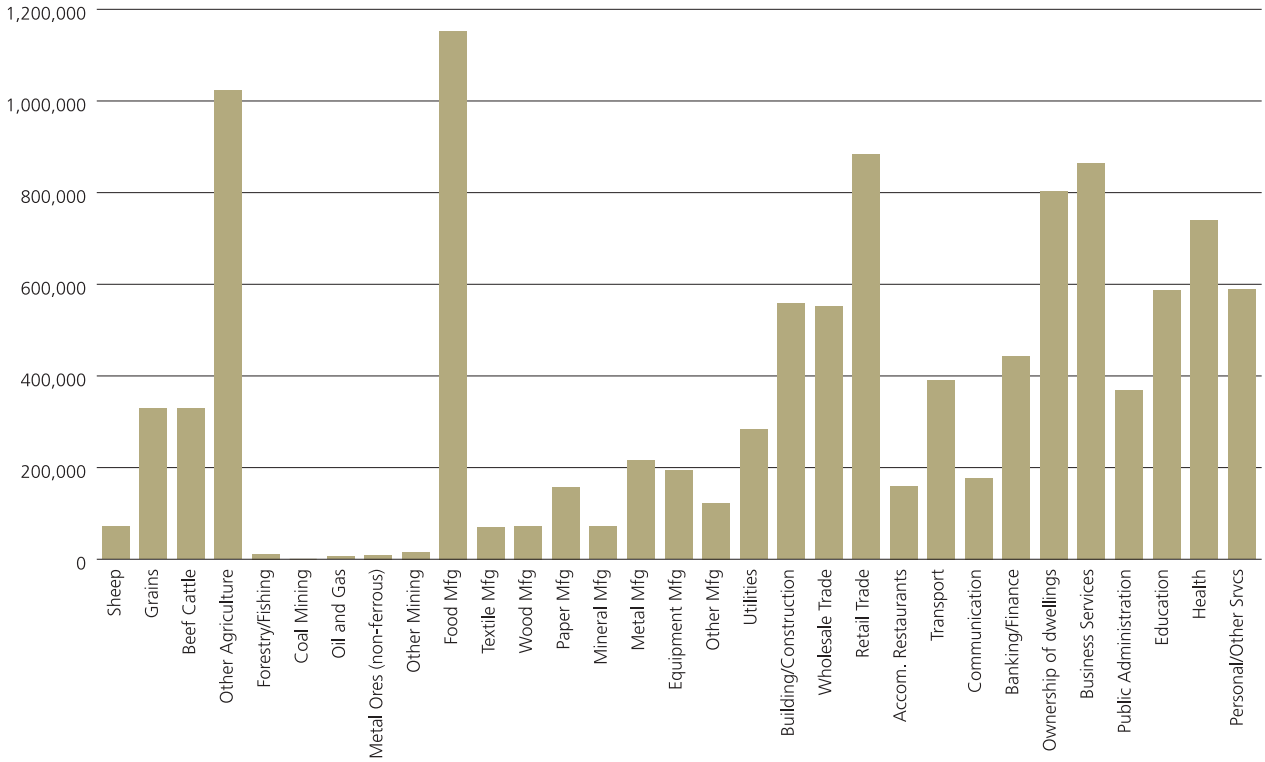
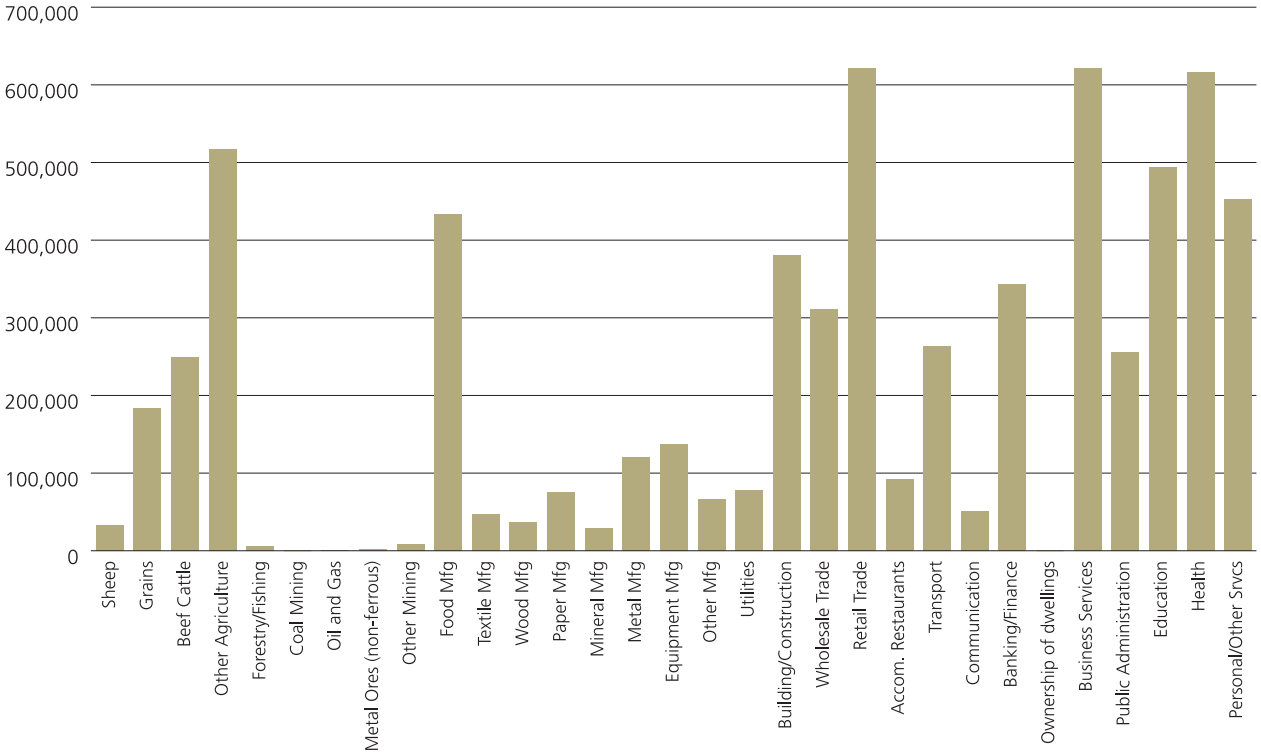


Figure 4: Sectoral Distribution of Gross Regional Income ($'000) and Employment (no.)

Income



Regional Employment

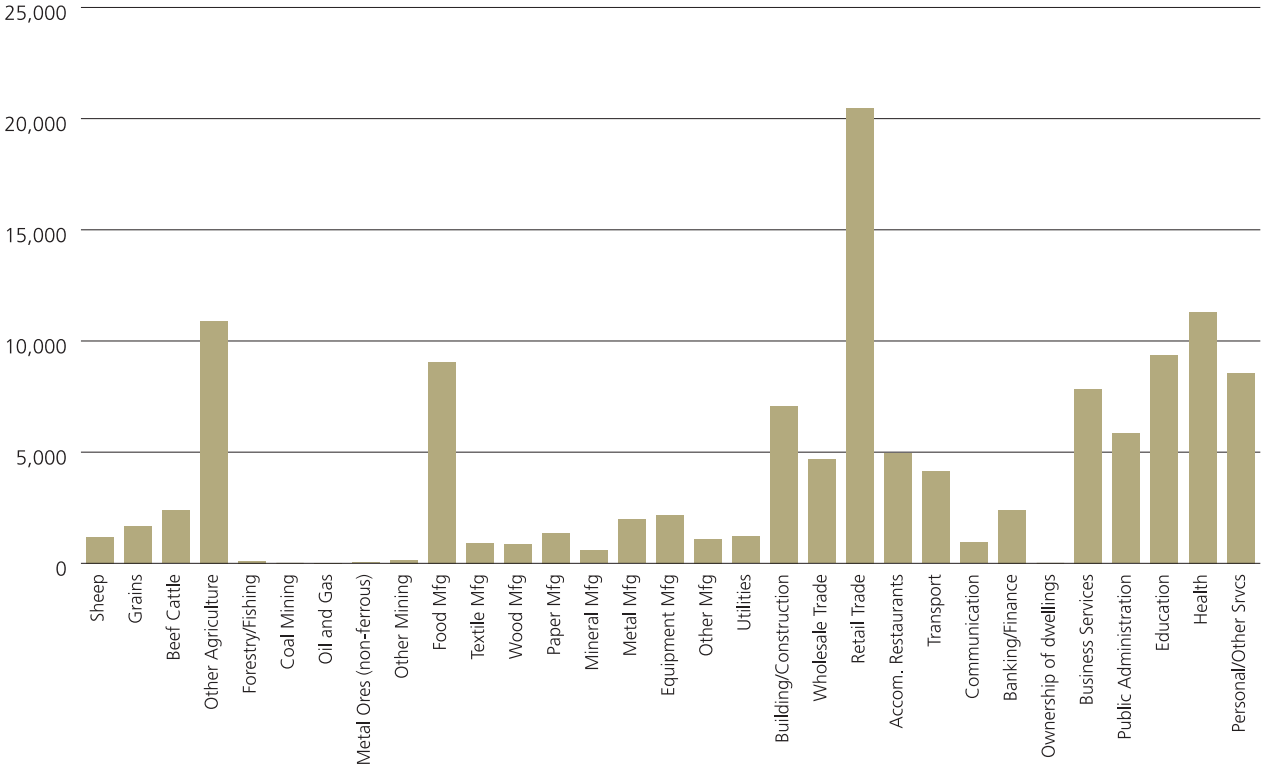
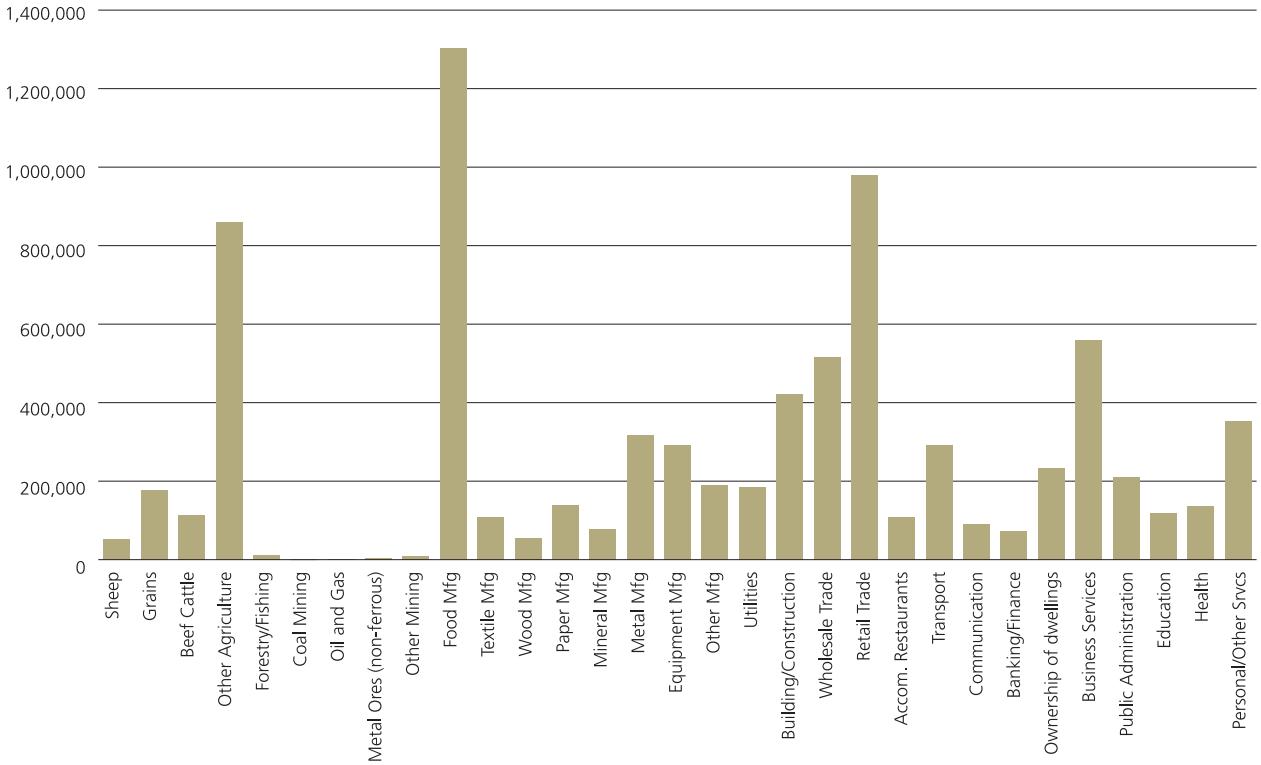
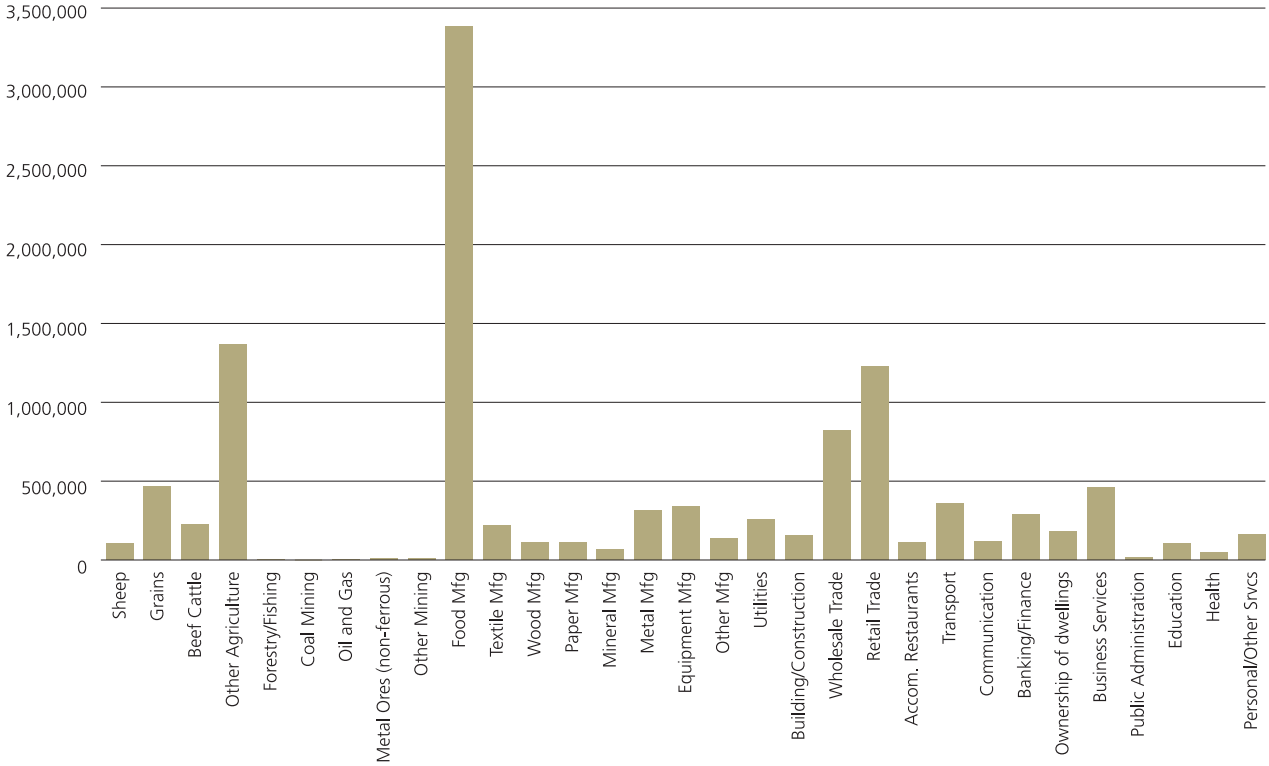


Figure 5: Sectoral Distribution of Imports and Exports ($'000)

Regional Imports



Regional Exports



3.4 Regional Economic Effects of the River Red Gum Timber Industry

Annual revenue, expenditure and employment data for the River Red Gum Timber Industry was obtained from a financial survey of a sample of mills and sleeper cutters. This sample was aggregated to the estimated population of mills and cutters.

The financial and employment data was then used to develop a River Red Gum Timber sector for insertion into the input-output table. For this new sector:

- the estimated average annual gross revenue was allocated to the *Output* row;
- expenditure items were allocated to appropriate *intermediate sectors*, the *household wages* row, the *other value-added* row and *imports*;
- purchaser prices were adjusted to basic values, margins and taxes using relationships in the national input-output tables; with taxes and margins allocated to appropriate sectors;
- location quotients were used to adjust basic values for intermediate expenditure further between local expenditure and imports;
- the difference between total revenue and total costs was allocated to the *other value-added* row;
- direct employment was allocated to the *employment* row.

The total and disaggregated annual effects of the River Red Gum Timber Industry on the regional economy (in 2007 dollars) are shown in Table 13.

It is estimated that VEAC's recommendations and reductions in sustainable timber yields will affect in the order of 75 percent of the River Red Gum timber industry[9]. Hence, regional economic impacts will range between 75 percent of the direct effects plus production induced effects and 75 percent of total effects, that is:

- $10.0m to $12.1m in annual regional output;
- $2.5m to $3.0m in annual income;
- $5.3m to $6.4m in annual value-added;
- 67 to 77 jobs.

This range is because consumption effects are associated with spending of employees and if these people remain in the region then not all consumption-induced effects will be lost.

These represent an upper estimate of the impacts of the VEAC recommendations because they assume that current harvest levels could be maintained into the future in the absence of VEAC recommendations. VEAC advice is that future sawlog harvest levels would be only about 71 percent of current allocation, reflecting a revised sustainable harvest level, even if the area available for harvest was not reduced.

Apart from the direct impacts on the mills and forestry and logging flow-on output, value-added and income effects are likely to be mainly in the :

- forestry and logging sector;
- wholesale trade sector;
- retail trade sector;
- road transport sector;
- other repairs sector;
- other machinery and equipment manufacturing sector.

Examination of the estimated direct and flow-on employment impacts gives an indication of the sectors in which employment would be lost.

Table 13: Annual Regional Economic Effects of the River Red Gum Timber Industry

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	9,610	3,681	2,781	6,462	16,072
Type 11A Ratio	*1.00*	*0.38*	*0.29*	*0.67*	*1.67*
INCOME ($'000)	2,431	854	689	1,543	3,974
Type 11A Ratio	*1.00*	*0.35*	*0.28*	*0.63*	*1.63*
VALUE ADDED ($'000)	5,622	1,391	1,452	2,844	8,465
Type 11A Ratio	*1.00*	*0.25*	*0.26*	*0.51*	*1.51*
EMPL. (No.)	74	15	14	28	102
Type 11A Ratio	*1.00*	*0.20*	*0.18*	*0.38*	*1.38*

This sector represents 0.08 percent or less of the regional economy. Refer to Table 14.

Table 14: Relative Magnitude of the River Red Gum Timber Industry

	Gross O/P ($'000)	Value-added ($'000)	Income ($'000)	Employment (no.)
Direct contribution	9,610	5,622	2,431	74
Total contribution	16,072	8,465	3,974	102
TOTAL REGION	**49,953,552**	**11,793,098**	**6,522,706**	**123,249**
Direct contribution (%)	0.02%	0.05%	0.04%	0.06%
Total contribution (%)	0.03%	0.07%	0.06%	0.08%

9 As is shown in Appendix C, there is likely to be a reduction in timber yields of about 29 percent, even in the absence of VEAC recommendations, so the estimate of 75 percent is an overestimate in terms of the impacts of the recommendations.

Table 15: Sectoral Distribution of Total Regional Employment Impacts for the Timber Industry

Sector	Average Direct Effects	Production Induced	Adjusted Consumption-induced	Total
Milling and forestry & logging	56	3	0	58
Other Primary	0	0	0	0
Mining	0	0	0	0
Other Manufacturing	0	4	1	5
Utilities	0	0	0	0
Wholesale/Retail	0	1	2	3
Mechanical & other repairs	0	0	0	1
Accommodation, cafes, restaurants	0	0	1	1
Building/ Construction	0	0	0	0
Transport	0	2	0	2
Services	0	1	5	6
Total	56	11	10	77

Note: Totals may have minor discrepancies due to rounding.

Table 15 indicates that direct, production-induced and consumption-induced employment impacts of a reduction in the River Red Gum Timber sector on the regional economy are likely to have different distributions across sectors.

The direct effects would be felt in the timber milling sector and forestry and logging sectors.

Production-induced employment impacts would occur across a range of sectors including the primary sector, manufacturing sectors, wholesale and retail trade sectors, transport sector and services sectors, while consumption induced employment impacts would be felt primarily in the services sectors and wholesale and retail trade sectors.

3.5 Regional Economic Impacts of Reduction in Duck Hunting

There are in the order of 22,000 active duck hunters in Victoria. The average annual expenditure per hunter can be estimated from the mail survey of hunters in Victoria 1995, adjusted to 2008 dollars (Table 16).

Table 16: Average Annual Duck Hunter Expenditure

Items	$
Ammunition	267
Fuel	287
Food	197
Clothing	164
Accessories	128
Gundogs - food and care	212
Boats -operational costs	90
Camping equipment	192
Other	346
Total	**1,883**

While it is estimated that in the order of 4,390 hunters will be impacted by VEAC proposals, duck hunters who travel from outside the region to hunt are likely to have a different regional expenditure pattern to those who reside in the region. For the latter group all expenditure was assumed to occur regionally while for the former group only 10 percent of ammunition, and 50 percent of fuel, food and boat operating costs (fuel) were assumed to occur within the region. Following the results of survey by Whitten and Bennett (2001), 33 percent of duck hunters were assumed to reside in the immediate region. The assumed final demand regional expenditure for the 4,390 hunters was allocated to appropriate *intermediate sectors* with location quotients used to further adjust intermediate expenditure between local expenditure and imports.

The total and disaggregated annual impacts of losing the expenditure of 4,390 hunters on the regional economy (in 2008 dollars) are shown in Table 17.

Table 17: Annual Regional Economic Impacts of Displaced Duck Hunters

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	1,842	633	496	1,129	2,971
Type 11A Ratio	*1.00*	*0.34*	*0.27*	*0.61*	*1.61*
INCOME ($'000)	431	155	123	278	709
Type 11A Ratio	*1.00*	*0.36*	*0.29*	*0.65*	*1.65*
VALUE ADDED ($'000)	691	257	259	516	1,207
Type 11A Ratio	*1.00*	*0.37*	*0.37*	*0.75*	*1.75*
EMPL. (No.)	10	3	2	5	15
Type 11A Ratio	*1.00*	*0.26*	*0.23*	*0.49*	*1.49*

In the order of 4,390 hunters would potentially be affected by VEAC recommendations resulting in impacts of:

- $2.5m to $3.0m in output;
- $0.6m to $0.7m in income;
- $1.0m to $1.2m in value-added; and
- 13 to 15 jobs.

The regional impacts of a reduction in regional expenditure of 4,390 hunters will range between the direct effects plus production induced effects and total effects. This is because consumption effects are associated with spending of employees and if these people remain in the region then not all consumption induced effects will be lost.

However, this is a worse case scenario because it assumes that there are no substitute sites within the region for the displaced duck hunters and that there are no alternative recreation activities in the region to which they can divert their expenditure.

The impacts are linear and hence if it is assumed that 40 percent of duck hunters can be accommodated in substitute sites within the region then the impacts will be 60 percent of those identified in Table 17[10].

As explained for the BCA, the estimated number of duck hunters affected is probably too high as it draws on estimates from wet years.

10 The assumed substitution rate for the BCA (60%) is larger because it applies to Victoria as a whole – that is, more hunters are likely to be able to find alternatives elsewhere in Victoria as a whole than just the potential alternatives in the study area.

Impacts of fewer duck hunters for output, value-added and income effects are likely to be mainly in the:

- retail trade sector;
- wholesale trade sector;
- fabricated metal products sector;
- other food products sector;
- petroleum and coal products manufacturing sector;
- accommodation, cafes and restaurants;
- health services sector; and
- road transport sector.

Examination of the estimated direct and flow-on employment impacts gives an indication of the sectors in which employment would be lost under the worse case scenario.

Table 18: Sectoral Distribution of Total Regional Employment Impacts for Duck Hunting

Sector	Average Direct Effects	Production Induced	Consumption-induced	Total
Primary	0	0	0	0
Mining	0	0	0	0
Manufacturing	2	1	0	3
Utilities	0	0	0	0
Wholesale/Retail	5	1	0	6
Mechanical and other repairs	0	0	0	0
Accommodation, cafes, restaurants	1	0	0	2
Building/ Construction	0	0	0	0
Transport	0	0	0	1
Services	2	1	1	4
Total	**10**	**3**	**2**	**15**

Note: Totals may have minor discrepancies due to rounding.

From Table 18 it can be seen that the main employment impacts are direct impacts in the wholesale and retail trade sectors.

3.6 Regional Economic Impacts of Restrictions on Forest Grazing

3.6.1 Barmah Forest

It is estimated that an average of 1,400 head of cattle are grazed in the Barmah forest each year, 2,000 head during the summer term and 800 in the winter term. In recent times there has been an overall reduction in numbers, due to persistent dry conditions. One year's grazing in the Barmah forest is estimated to contribute in the order of $100 in gross value to each cow. Hence, loss of this grazing resource under the VEAC recommendations is estimated to result in a loss of $140,000 per annum in gross revenue. No detailed expenditure profile was available for cattle grazing in the forests and hence the expenditure pattern for the beef cattle sector of the input-output table was assumed to be representative.

On this basis, the total and disaggregated annual impacts of 1,400 head of cattle on the regional economy (in 2008 dollars) are shown in Table 19.

Table 19: Annual Regional Economic Impacts of Displaced Grazing in the Barmah Forest

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	140	30	62	92	232
Type 11A Ratio	*1.00*	*0.21*	*0.44*	*0.65*	*1.65*
INCOME ($'000)	66	7	15	22	89
Type 11A Ratio	*1.00*	*0.10*	*0.23*	*0.34*	*1.34*
VALUE ADDED ($'000)	88	12	32	44	132
Type 11A Ratio	*1.00*	*0.14*	*0.37*	*0.50*	*1.50*
EMPL. (No.)	1	0	0	0	1
Type 11A Ratio	*1.00*	*0.18*	*0.50*	*0.68*	*1.68*

The regional impacts of a reduction in cattle grazing expenditure in the region will range between the direct effects plus production induced effects and total effects. This is because consumption effects are associated with spending of employees and if these people remain in the region then not all consumption induced effects will be lost.

Flow-on impacts of the beef cattle sector for output, value-added and income effects are likely to be mainly in the:

- wholesale trade sector;
- grains sector
- retail trade sector;
- road transport sector;
- services to agriculture sector;
- legal and accounting sector.

There are in the order of one direct and one indirect jobs associated with the loss of $140,000 of beef output.

3.6.2 Riverside Reserves and Other Public Land Grazing

VEAC estimates that grazing in 9,280 ha of riverside areas and 44,760 ha in parks (other than Barmah) and other public land would be affected by VEAC's recommendations. It is estimated that in the order of $758,700 of gross revenue would be lost each year from withdrawing grazing over that area. As for Barmah forest grazing, the beef cattle sector of the input-output table was assumed to be representative of grazing expenditure in the region.

On this basis, the total and disaggregated annual regional impacts (in 2008 dollars) of taking parks (excluding Barmah), riverside reserves and other public land out of grazing production are shown in Table 20.

Table 20: Annual Regional Economic Impacts of Displaced Grazing in Other Public Land

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	759	161	336	496	1,255
Type 11A Ratio	*1.00*	*0.21*	*0.44*	*0.65*	*1.65*
INCOME ($'000)	359	37	83	120	480
Type 11A Ratio	*1.00*	*0.10*	*0.23*	*0.33*	*1.33*
VALUE ADDED ($'000)	476	64	175	240	716
Type 11A Ratio	*1.00*	*0.14*	*0.37*	*0.50*	*1.50*
EMPL. (No.)	3	1	2	2	5
Type 11A Ratio	*1.00*	*0.19*	*0.50*	*0.69*	*1.69*

The restriction of cattle grazing in other public land would have the following regional economic impacts:

- $919,000 to $1,255,000 in output;
- $540,000 to 716,000 in value-added;
- $397,000 to $480,000 in income; and
- 4 to 5 jobs.

The regional impacts of a reduction in cattle grazing expenditure in the region will range between the direct effects plus production induced effects and total effects. This is because consumption effects are associated with spending of employees and if these people remain in the region then not all consumption induced effects will be lost.

Flow-on impacts of cattle grazing for output, value-added, income and employment effects are likely to be in the same sectors as described above for grazing in the Barmah Forest.

3.7 Regional Economic Impacts of Additional Tourism

Land allocated for conservation may stimulate regional economic activity through management expenditures and expenditures associated with additional tourists attracted to the region.

To assess the regional economic impacts of park management expenditures the estimated additional management expenditure of $500,000 per annum[11] (including salaries to 5 direct jobs) was assumed to have a pattern resembling those for other national parks[12] (Gillespie Economics 2004).

Additional annual visitation of up to 48,000 people was assumed. As explained for the BCA, the regional model did not allow increases in visitors to be differentiated between individual parks. This number is based on an assumed 20 percent increase in visitors to *all* parks, and is likely to be an overestimate.

Visitor breakdown between domestic day visitors, domestic overnight visitors and international visitors was assumed to be the same as for the Murray Tourism Region. Visitor length of stay and daily expenditure for each of these categories of visitor was also assumed to be the same as for the Murray Tourism Region. The expenditure profile for day visitors, domestic overnight visitors and international visitors was assumed to be as reported by the Bureau of Tourism Research.

National Park management expenditure and tourism expenditure was allocated across relevant intermediate sectors, adjusted for margins and taxes and adjusted between local expenditure and imports based on location quotients.

The total and disaggregated annual impacts of the management of additional lands as National Parks, and 48,000 additional visitors, on the regional economy (in 2008 dollars) are shown in Table 21 and Table 22, respectively.

Table 21: Annual Regional Economic Impacts of Additional Park Management Expenditure

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	500	292	240	532	1,032
Type 11A Ratio	*1.00*	*0.58*	*0.48*	*1.06*	*2.06*
INCOME ($'000)	200	84	60	144	344
Type 11A Ratio	*1.00*	*0.42*	*0.30*	*0.72*	*1.72*
VALUE ADDED ($'000)	205	119	126	245	450
Type 11A Ratio	*1.00*	*0.58*	*0.61*	*1.19*	*2.19*
EMPL. (No.)	5	1	1	3	8
Type 11A Ratio	*1.00*	*0.29*	*0.23*	*0.53*	*1.53*

Table 22: Annual Regional Economic Impacts of Additional 48,000 Visitors

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	2,584	909	719	1,628	4,212
Type 11A Ratio	*1.00*	*0.35*	*0.28*	*0.63*	*1.63*
INCOME ($'000)	626	223	178	401	1,027
Type 11A Ratio	*1.00*	*0.36*	*0.28*	*0.64*	*1.64*
VALUE ADDED ($'000)	1,015	374	375	749	1,764
Type 11A Ratio	*1.00*	*0.37*	*0.37*	*0.74*	*1.74*
EMPL. (No.)	19	4	3	7	26
Type 11A Ratio	*1.00*	*0.21*	*0.19*	*0.39*	*1.39*

11 This is conservative compared with the figure of $1m per annum used in the BCA but the regional analysis had been completed before estimates of management costs were revised.

12 The average expenditure profile across seven national parks was used.

Management of lands as National Park would have the following regional economic impacts:

- $792,000 to $1,032,000 in annual regional output;
- $284,000 to $344,000 in annual income;
- $324,000 to $450,000 in annual value-added;
- 6 to 8 jobs.

The assumed 48,000 additional visitors to the reserves would have the following regional economic impacts:

- $3.5m to $4.2m in annual regional output;
- $0.9m to $1.0m in annual income;
- $1.4m to $1.8m in annual value-added;
- 23 to 26 jobs.

This range is because consumption effects are associated with spending of employees who migrate into the region and if these people are already in the region then the consumption-induced effects are negated.

Output, value-added and income flow-on effects of park management are likely to be mainly in the:

- Wholesale trade sector;
- Wholesale mechanical repairs sector;
- Mechanical repairs sector;
- Construction services sector; and
- Other property services sector.

Output value-added and income effects of visitation are likely to be mainly in the:

- Retail trade sector;
- Ownership of dwellings sector;
- Health services sector; and
- Other business service sector.
- Accommodation, cafes and restaurants sector;

Examination of the estimated direct and flow-on employment impacts gives an indication of the sectors in which employment would be gained.

Table 23: Sectoral Distribution of Total Regional Employment Impacts of Park Management

Sector	Average Direct Effects	Production Induced	Consumption-induced	Total
NP management	5	0	0	5
Primary	0	0	0	0
Mining	0	0	0	0
Manufacturing	0	0	0	0
Utilities	0	0	0	0
Wholesale/Retail	0	0	0	0
Mechanical and other repairs	0	0	0	0
Accommodation, cafes, restaurants	0	0	0	0
Building/Construction	0	1	0	1
Transport	0	0	0	0
Services	0	0	1	1
Total	**5**	**1**	**1**	**8**

Note: Totals may have minor discrepancies due to rounding.

Table 24: Sectoral Distribution of Total Regional Employment Impacts of Visitors

Sector	Average Direct Effects	Production Induced	Consumption-induced	Total
Primary	0	0	0	0
Mining	0	0	0	0
Manufacturing	1	1	0	2
Utilities	0	0	0	0
Wholesale/Retail	5	1	1	6
Mechanical and other repairs	0	0	0	1
Accommodation, cafes, restaurants	10	0	0	10
Building/Construction	0	0	0	0
Transport	1	0	0	2
Services	1	1	2	4
Total	**19**	**4**	**3**	**26**

Note: Totals may have minor discrepancies due to rounding.

The direct, production-induced and consumption-induced employment impacts of additional park management and visitors on the regional economy are likely to have different distributions across sectors.

The direct effects of park management (Table 23) would be would be felt in the national park management sector. Production-induced employment impacts would occur in the building construction sectors while consumption induced employment impacts would be felt in the services sectors.

The direct effects of additional visitors (Table 24) would be would be felt mainly in the accommodation, cafes and restaurants sectors and wholesale/retail trade sectors. Production-induced employment impacts would occur in the manufacturing sectors, wholesale/retail trade sectors and services sectors while consumption induced employment impacts would be felt in the wholesale/retail trade sectors and services sectors.

3.8 Summary of Regional Impacts

A summary of the likely impacts of VEAC's recommendations on the regional economy are shown in Table 25.

Table 25: Summary of Regional Impacts

	Output ($'000)	Income ($'000)	Value Added ($'000)	Employment (no. jobs)
Activity Lost				
Timber	12,054	2,981	6,349	77
Duck Hunting	2,971	709	1,207	15
Barmah Grazing	232	89	132	1
Riverside Reserves Grazing	1,255	480	716	5
Total	**16,512**	**4,259**	**8,404**	**98**
Activity Gained				
NP Management	1,032	344	450	8
Visitation	4,212	1,027	1,764	26
Total	5,244	1,371	2,214	34
Net Activity	**-11,268**	**-2,888**	**-6,190**	**-64**

3.9 Cities and Towns Affected

3.9.1 Introduction

Notwithstanding the relatively small regional impacts associated with loss of River Red Gum timber harvesting, duck hunting and forest grazing and the gain in tourism, some towns are likely to be more affected by VEAC's recommendations than others. This is because some rural and remote towns are often relatively specialised, with activity centred on a handful of core industries. Hence closure of a major business in a small regional centre is likely to have a larger impact on the surrounding community than would the closure of a similar operation in a more diverse or growing town.

The ultimate impact is therefore a function of the location of potentially affected production activities, the residential location of affected employees and the size and trend of economic growth of regional centres. Impacts in a growing economy are likely to be less significant than those in a declining economy. Indeed impacts in a declining economy can contribute to a cycle of decline whereby population losses result in closure of services, which in turn makes it difficult to attract new populations (Sorensen 1990).

Detailed information is not available on the residential location of potentially affected employees. However, based on the location of affected forests and mills it is anticipated that the effects will be mainly seen in Echuca, Picola and Nathalia, Koondrook, Cohuna and Shepparton.

The sensitivity of these areas to loss of employment can be gauged by examining some of the simple indicators of regional economic health. Whether a population is growing or declining can be an important indicator of the economic health of a regional community (Collits 2001). Other indicators include employment opportunities, unemployment levels and diversity of economic activity.

These indicators are examined below for the statistical local areas (SLAs) and towns most likely to be impacted by the VEAC policy options[13]:

- Gannawarra (S) SLA which contains the towns of Cohuna and Koondrook;
- Campaspe (S) – Echuca (SLA) which contains the town of Echuca;
- Moira (S) West (SLA) which contains the towns of Barmah, Nathalia and Picola.
- Shepparton

3.9.2 Gannawarra (S) (SLA)

Gannawarra (S) SLA has been experiencing declining population over time.

Population for Gannawarra SLA

Year	1996	2001	2006
Population	11,922	11,394	10,898
Average annual population change		-106	-99

Employment has also been declining. However, because the number of people in the labour force has declined at a faster rate than employment levels, the unemployment rate has declined and reached a steady state.

Employment for Gannawarra SLA

	1996	2001	2006
Unemployed	365	218	206
Employed	5,006	4,971	4,777
In the labour force	5,371	5,189	4,984
Not in the labour force	3,643	3,288	3,229
Unemployment rate	7%	4%	4%
Average annual employment change	-44	-7	-39

13 ABS boundaries for some of these areas have changed from those defined for the 2001 Census so the data from the two censuses are not always comparable.

The agricultural sector (29 percent) is the largest employer in the region followed by retail trade (11 percent) and manufacturing (9 percent) (predominantly food manufacturing). While employment in the agricultural sector has declined over time and employment in manufacturing has oscillated, employment in retail trade and health and social services has increased. Nevertheless, from Figure 6 it is evident that the Gannawarra economy is heavily reliant on agriculture with limited diversity.

At the 2006 census, employment in the region in forestry and logging was 11 and employment in sawmilling and wood product manufacturing was 35. This represents 0.2 percent and 0.7 percent of the SLA employment.

Cohuna urban locality within the Gannawarra SLA has a population of in the order of 1,893 down from 1,956 in 2001. Employment levels are 723 and unemployment at 4.2 percent.

Cohuna Urban Locality Employment Information

Employed:	
Full-time	438
Part-time	212
Not stated	127
Total	*723*
Unemployed	32
Total labour force	*755*
Not in the labour force	728
Unemployment rate	4.2%

Employment of the population of Cohuna is predominantly manufacturing (18 percent), agriculture/forestry/fishing (14 percent) and construction (14 percent).

Koondrook urban locality within Gannawarra SLA has population of in the order of 802. Employment levels are 319 and unemployment of 4.5 percent

Koondrook Urban Locality Employment Information

Employed:	
Full-time	178
Part-time	112
Not stated	38
Total	*319*
Unemployed	15
Total labour force	*334*
Not in the labour force	313
Unemployment rate	4.5%

Employment of the population of Koondrook is predominantly manufacturing (13 percent) and retail trade (13 percent) followed by agriculture, forestry & fishing (11 percent). There is also some heritage tourism, although that is not evident from the ABS data.

Any losses in employment (and population) in Gannawarra SLA as a result of VEAC's recommendations would be in a declining rural economy and hence potentially significant in terms of Sorensen's (1990) cycle of decline even if the magnitude of losses is relatively small.

3.9.3 Campaspe (S) - Echuca (SLA)

Campaspe (S) - Echuca SLA has been experiencing population growth over time.

Population for Campaspe (S) - Echuca

Year	1996	2001	2006
Population	10,014	10,717	12,401
Annual population change		+141	+336

Employment has also been growing. Because employment has been growing faster than the potential workforce the unemployment rate has been declining.

Employment for Campaspe (S) - Echuca

	1996	2001	2006
Unemployed	316	302	270
Employed	4,032	4,530	5,448
In the labour force	4,348	4,832	5,718
Not in the labour force	3,293	3,125	3,382
Unemployment rate	7%	6%	5%
Average annual employment change		+100	+184

The economy of Campaspe (S) – Echuca SLA is very diverse compared to that for Gannawarra SLA. The manufacturing sector is the largest in the economy followed by the retail trade retail trade sector and health and social services. Most sectors have been experiencing growth over time except agriculture, forestry and fishing, and wholesale trade.

According to the 2006 census, employment in the region in forestry and logging was 0 and employment in sawmilling and wood product manufacturing was 29. This represents 0.0 percent and 0.5 percent of the SLA employment.

Possible losses in employment are potentially greatest for Echuca. However, any such losses as a result of VEAC's recommendations would be in a growing rural economy and hence likely to be less significant.

3.9.4 Moira (S) West (SLA)

Moira (S) SLA has also been experiencing a growing population over time.

Population for Moira (S) West (SLA)

Year	1996	2001	2006
Population	17,339	17,605	19,976
Average annual population change		53	474

Employment has also been growing. Because the number of people in the labour force has been growing slower than the growth in employment, the unemployment rate has declined.

Employment for Moira (S) West (SLA)

	1996	2001	2006
Unemployed	515	473	397
Employed	7,176	7,595	7,839
In the labour force	7,691	8,068	8,236
Not in the labour force	5,280	4,990	5,177
Unemployment rate	7%	6%	5%
Average annual employment change		+84	+49

While the Moira (S) West (SLA) has been growing it is less diverse than Campaspe (S) – Echuca with a great reliance on the agricultural sector followed by manufacturing (predominantly food and beverage manufacturing) and retail trade. While employment in the agricultural sector has declined over time it remains significant to the region. Employment in manufacturing grew between 1996 and 2001 but declined between 2001 and 2006. Employment in retail has grown strongly. Other growth sectors include accommodation and food, construction, transport and storage, technical services, public administration and health and social services.

Figure 6: Gannawarra SLA Employment by Industry

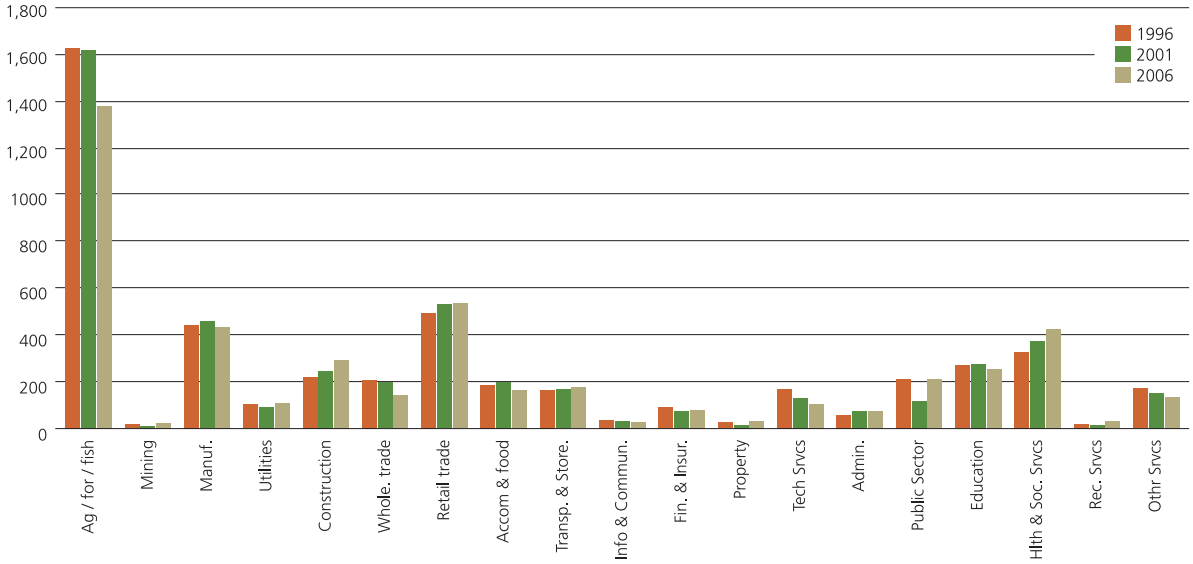


Figure 7: Campaspe (S) – Echuca Employment by Industry

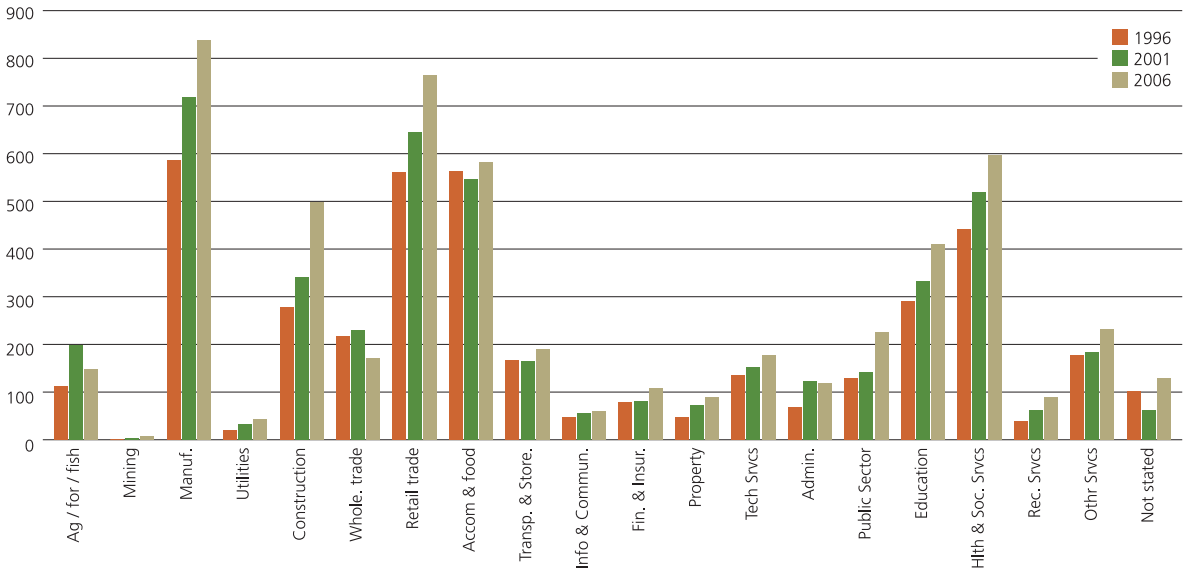
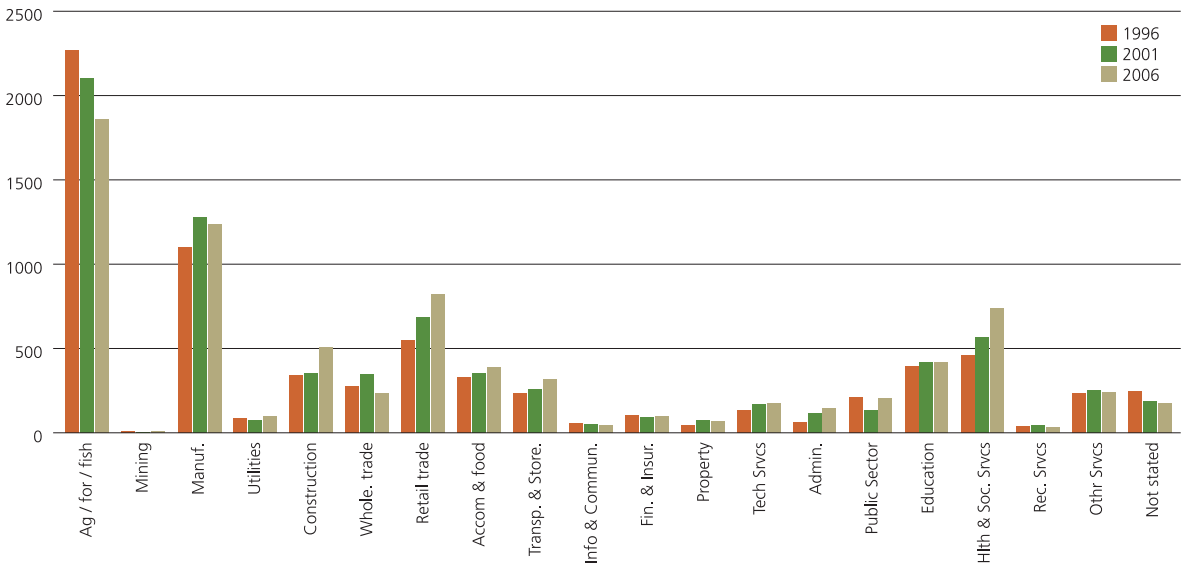


Figure 8: Moira (S) West (SLA) Employment by Industry



At the 2006 census, employment in the region in forestry and logging was 0 and employment in wood and paper products manufacturing was 21. This represents 0.0 percent and 0.3 percent of the SLA employment. Timber workers were all recorded under sawmilling.

Nathalia urban locality within the Moira (S) West SLA has a population of in the order of 1,431, compared to 1,416 in 2001. Employment levels are 561 and unemployment of 4.1 percent.

Nathalia Urban Locality Employment Information

Employed:	
Full-time	343
Part-time	185
Not stated	15
Total	*561*
Unemployed	23
Total labour force	*584*
Not in the labour force	555
Unemployment rate	4.1%

Employment of the population of Nathalia is predominantly retail trade (13 percent), manufacturing (17 percent) and health and community services (15 percent).

The towns of Picola and Barmah have very small populations (110 for Picola) and hence no ABS data is available for them. These small towns (including Nathalia, despite its growth) are already likely to be experiencing 'backwash' effects of growth in surrounding larger towns including Echuca and Shepparton. They are therefore likely to be sensitive to any loss of employment and population.

3.9.5 Greater Shepparton City Part A

Greater Shepparton City Part A has been experiencing a growing population over time.

Population for Greater Shepparton City Part A

Year	1996	2001	2006
Population	39,694	42,749	43,999
Average annual population change		+611	+250

Employment has also been growing. Because the number of people in the labour force has been growing slower than the growth in employment, the unemployment rate has declined.

Employment for Greater Shepparton City Part A

	1996	2001	2006
Unemployed	2,042	1,622	1,368
Employed	16,253	18,526	19,510
In the labour force	18,295	20,148	20,878
Not in the labour force	11,178	11,175	11,065
Unemployment rate	11%	8%	7%
Average annual employment change		+455	+197

Shepparton has a growing and diverse economy. The predominant sector is retail trade followed by manufacturing (predominantly food and beverage manufacturing). While the employment in the manufacturing sector has oscillated over time, employment in the retail sector as well as construction, accommodation and food, technical services, public administration, education and health and social services, have been growing over time.

At the 2006 census, employment in Shepparton in forestry and logging was 0 and employment in sawmill and wood product manufacturing was 89. This represents 0.0 percent and 0.4 percent of the workforce in Shepparton Statistical District. Timber workers were all recorded under sawmilling.

This city is likely to be very resilient to modest losses in direct employment (and population).

Overall the towns of Cohuna, Koondrook, Nathalia and Picola are likely to be the most sensitive towns to any job losses (and potential population losses).

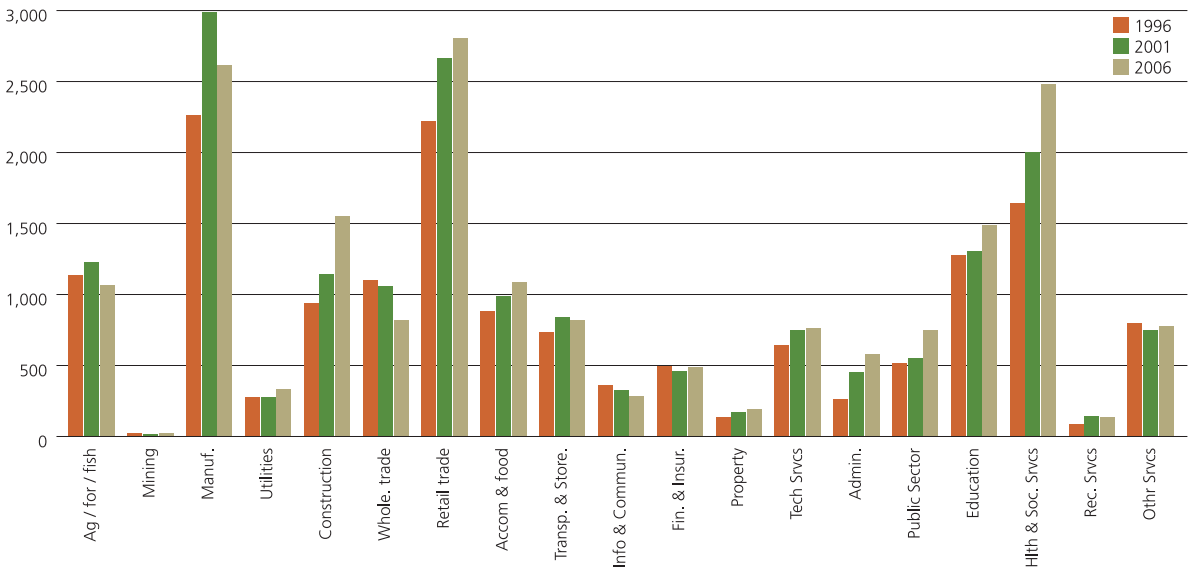
While tourism has the potential to offset some job losses, spatial and skills mismatches mean that those individuals adversely impacted by VEAC's proposals are unlikely to be those that benefit from creation of tourism jobs. Similarly, the towns most sensitive to jobs losses may not be the towns that benefit from increased tourism.

3.10 Impacts on Individuals

At an individual level the loss of employment for individuals and their families can potentially have a range of impacts including financial hardship, reduced future work opportunities, reduced participation in mainstream community life, and strains on family relationships (Ganley 2002-2003).

In severe cases there may also be psychological difficulties that can cause distress to individuals and their families; prevent a return to work; and be costly to the community (Ganley 2002-2003). Prolonged unemployment can also

Figure 9: Employment for Greater Shepparton City Part A Employment by Industry



generate a range of personal and social problems including increased drug and alcohol dependency and increased demand for health services (University of NSW, 2006).

For these reasons it is important that the implementation of any approved recommendations that result in loss of economic activity be accompanied by a structural adjustment package containing elements for addressing impacts on businesses, employees and towns.

A significant number of submissions to VEAC made much of the potential impacts on individuals that were described in the consultants' draft report on VEAC's Draft Proposals Paper (Gillespie Economics et al. 2007). This was partly due to an inadvertent omission of the italicised paragraph above during the editing for the Executive Summary that was included in VEAC's report. And many people responding did not refer to the consultants' full report.

However, the important point here is that the above outcomes are possible only if nothing is done to support people adversely affected by implementation of VEAC's recommendations. In addition, as is noted elsewhere in this report, the impacts described in the regional analysis section of this report are *maximum* potential impacts – they take no account of the fact that at least some of the people potentially adversely affected if VEAC's recommendations are adopted, will be able to move to other jobs, occupations, or businesses within the study area.

4 MITIGATION MEASURES

The BCA shows that the net economic benefits of VEAC's recommendations fall mostly outside the study area, with approximately 59 percent going to Melbourne, 37 percent going to regional urban areas, and 4 percent going to the study area. The regional impact analysis provided estimates of the direct and indirect impacts of the recommendations on employment and incomes in the study area.

In the absence of government intervention, most of the direct costs of VEAC's recommendations are likely to be borne by those living in the study area, particularly those in the timber and grazing industries. The potential recreation and tourism benefits will take some time to be felt in the study area.

Assessment of the impacts of VEAC's recommendations on current water users is an important matter for Government consideration. However, it was beyond the scope of this study and would require the cooperation of three State governments and the Commonwealth Government. Nevertheless, it is likely that a combination of mitigation measures for major water users, predominantly irrigators, would include: purchasing water entitlements on a temporary or permanent basis; water savings schemes; and structural adjustment of irrigation areas. These measures also need to be examined in the context of climate change.

Mitigation measures for those in the timber industry could be similar to those implemented for the case of the Box-Ironbark National Parks (eg. see Dumsday 2001). Some people in the industry would have difficulty in adjusting to new forms of employment and some live in small towns that are already in decline. Adjustment in rural areas is generally more difficult than that in cities and the regional impact assessment addresses this issue for the timber industry. Financial assistance would be based on lost income and loss of assets that have no alternative uses.

Mitigation of the losses imposed on graziers in the Barmah Forest and other public land could be similarly based on lost income, but in this case most assets would have alternative uses and would therefore not require the same level of assistance. Graziers on water frontage reserves in particular would also have access to Landcare and other funding to meet some of the costs of providing fencing, watering points and pest control. The transaction costs of negotiating with graziers outside the Barmah Forest could be substantial and would need to be considered when drawing up mitigation measures. For these graziers it may be better to work through the relevant Catchment Management Authorities.

Increased expenditure and employment in the management of the new proposed parks and reserves would also mitigate the losses imposed on people living in the study area.

Of those directly employed in the RRG Forests, timber cutters are likely to be the most affected if VEAC's recommendations are adopted. In the short to medium term at least, several of them may lose their livelihoods completely while others may face cut-backs in their timber allocations.

In contrast, most of the benefits of VEAC's recommendations are likely to go to people living in Melbourne and other parts of the State, in the form of environmental values obtained through the conservation of biodiversity. In other words, the benefits of the VEAC recommendations are widely dispersed while the costs are localised. This helps to explain the vigorous opposition to the recommendations from those affected within the study area, and provides a case for appropriate assistance. However, not all individuals in the study area oppose VEAC's recommendations and it was apparent from the Choice Modelling survey that there was statistically significant support from people within the study area for protecting the environmental attributes associated with threatened parrots and threatened native fish.

The existing income distributions of those expected to suffer losses are likely to be below those expected to gain, even if adjusted for the relative living costs of rural vs urban areas. The effects of VEAC's recommendations in some areas may be potentially regressive, reinforcing the case for assistance. However, inspection of the charts included in Appendix E suggests that the main difference between the income distributions of people in the VEAC study area and those living in Melbourne occurs in the high income categories.

There is agreement among many economists and sociologists that adjustment in rural industries can be more difficult than that in urban industries, other things being equal. The lack of access to re-training facilities, the average age of those affected, the need to consider moving house, and the lack of other job opportunities are just some of the reasons for this view. They present yet another case for assisting those affected.

It is important to recognise that the regional centres – in areas affected by VEAC recommendations – are continuing to grow in population and employment, with employment generally growing at a faster rate than population growth, as demonstrated by the 2006 Census data. Echuca (Figure 7) and Shepparton (Figure 9) are growing strongly across a range of industry sectors. As described in Section 2.7, decline of population in rural areas, and growth in regional centres, are longstanding, entrenched, trends.

Many people making submissions expressed disquiet about the perceived lack of resources for public land management in national and state parks and reserves, and state forest areas, particularly with respect to the management of fire and pests.

Particular attention should be paid to the resourcing of new parks and reserves recommended by VEAC. Additional resources for park management would also create possibilities for increased employment, particularly in those areas likely to be hardest hit by the recommendations. Timber cutters and graziers may not necessarily win the new positions but many of them have a keen interest in caring for the forests.

In conclusion, it should be noted that the regional impact analysis shows that the share of the regional economy that is taken up by timber and grazing activities on public land is small to negligible. The impacts of VEAC's recommendations will be important to the people living in some small towns but overall the region will not be significantly affected. The main issue that could not be addressed concerns the potential impacts on irrigators and their communities.

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Note: Appendices to this report are not included in the hard copy version of the VEAC Final Report. They are available at VEAC's website www.veac.vic.gov.au

APPENDIX 2

Advisory Groups: Community Reference Group, Government Contact Agencies and Indigenous Steering Committee

River Red Gum Forests Investigation Community Reference Group

Organisation	Member
Australian Motorcycle Trail Riders Association	Peter Ellard[1]
Barmah Forest Cattlemen's Association	Kelvin Trickey
Barmah Forest Preservation League	Stan Vale
Birds Australia	Chris Tzaros; Euan Moore
Bush Users' Group Victoria	Audrey Dickins[2]
Bushwalking Victoria	Steve Robertson; Phil Brotchie
Campaspe Shire	Cr Neil Repacholi
Confederation of Australian Motor Sport, Victoria	Gary Grant; Ian Crook
Country Fire Authority	Rachel Rogers
Environment Victoria	Rod Orr
Four Wheel Drive Victoria	Doug Parke; Zac Powell; Josh Ambrosy
Friends of Nyah Vinifera Forest	Joe Blake
Gannawarra Shire Council	Cr Neville Goulding
Goulburn Valley Environment Group	Doug Robinson; Louise Costa
Horse Riding Clubs Association of Victoria	Debbie Warne
Minerals Councils of Australia (Victorian Division)	Laura Chibnall; Trevor Shard; Jeff Dunwoodie
Moira Shire Council	Cr David McKenzie
Murray Lower Darling Rivers Indigenous Nations	Wayne Webster
Sporting Shooters' Association of Victoria	Colin Wood
Timber Communities Australia	Faye Ashwin
Tourism Alliance Victoria	Matthew Rechner, Nicholas Hunt; Jacqueline Blackwood
Victorian Association of Forest Industries	Paul Madden
Victorian Farmers' Federation	Ian Lobban
Victorian National Parks Association	Nick Roberts
VRFish	John Corbett

1 until September 2006
2 until August 2006
* Meetings were also attended by proxies and other guests.

River Red Gum Forests Investigation Government Contact Agencies

Aboriginal Affairs Victoria, Department of Planning & Community Development
Coliban Water
Department of Water, Land & Biodiversity Conservation (South Australia)
Department of Environment & Climate Change (New South Wales)
Department for Environment & Heritage (South Australia)
Department of the Environment, Water, Heritage and the Arts (Commonwealth)
Department of Planning (New South Wales)
Department of Primary Industries (Victoria)
Department of Sustainability & Environment (Victoria)
Goulburn Murray Rural Water
Goulburn Valley Water
Goulburn-Broken Catchment Management Authority
Grampians Wimmera Mallee Water Authority
Lower Murray Urban & Rural Water Authority
Mallee Catchment Management Authority
Murray Darling Basin Commission (Commonwealth)
North Central Catchment Management Authority
North East Water
North-East Catchment Management Authority
Parks Victoria
Regional Development Victoria (Department of Innovation, Industry & Regional Development)
Tourism Victoria
VicForests
VicRoads

River Red Gum Forests Investigation Indigenous Steering Committee

Members*
Henry Atkinson
John (Sandy) Atkinson
Rose Kirby
Sam Morgan
Gary Murray
Bobby Nicholls
Darren Perry
Sissy Pettit-Havea
Ken Stewart
Wayne Webster (Co-Chairperson)
Victorian Environmental Assessment Council
Duncan Malcolm (Co-Chairperson)
William Glenbar (consultant)
Karen Milward (consultant)
Mel Mitchell
Paul Peake
Additional people involved
Brett Ahmat (DSE)

* Meetings were also attended by other Indigenous community members and other guests.

APPENDIX 3

River Red Gum Forests Investigation Draft Proposals Paper
(July 2007)

Report on the Indigenous Community Consultation Workshops

Table of Contents

Prepared by:

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Executive Summary

A series of Indigenous specific consultation workshops were organised to obtain feedback from Indigenous people on the draft recommendations contained in VEAC's *Draft Proposals Paper for Public Comment (July 2007)*. Indigenous consultants were engaged to organise and facilitate these workshops in selected locations within the River Red Gum Forests Investigation area.

Feedback obtained from Indigenous participants indicated a high level of support for all Indigenous specific recommendations. Specifically there was widespread support at all workshops for recommendations focusing on the provision of funding and other resources for Traditional Owner Groups and other Indigenous stakeholders to be more actively involved in the co-management and advisory board structures which will be established if the draft recommendations are implemented by government.

At the same time, there was consistent agreement at all workshops that proposals for creating more employment and training opportunities for Indigenous people at a local level in public land management tasks and activities was a positive approach. This would create more accessible opportunities for Indigenous people living in the Investigation area to participate in land management.

One of the key issues raised at all workshops was the need to provide more examples of how each recommendation may impact on Indigenous stakeholders. In particular, what the options may be in relation to funding and other resources to enable Traditional Owner Groups and other Indigenous stakeholders to fully participate in the future.

A high level of support was indicated for the proposed creation of co-management boards and advisory committees for specific areas of public land, however, it was suggested that more detail could be provided to describe how these may involve Indigenous stakeholders. In particular, it was suggested that a detailed set of *Selection Criteria* be developed to ensure that the most experienced and knowledgeable Indigenous persons are selected to fill representative positions in these management structures.

Recommendations for changes to legislation to clarify and allow for traditional cultural practices to take place on public land areas in the Investigation area were widely supported. However, issues were raised about the 'use of fire' and other proposals limiting the use of campfires on public land. Given the importance of this particular issue, it is suggested that consideration be given to the merits of making provision for further discussions to take place with Traditional Owner Groups.

Finally, it should be noted that a number of Indigenous people who did not attend the workshops due to other commitments also provided feedback and voiced strong support for Indigenous-specific recommendations in the Draft Proposals Paper. Where this occurred, individuals were encouraged to contact VEAC directly and provide a written submission outlining their views.

Introduction

On 19 July 2007, the Victorian Environment Assessment Council (VEAC) released copies of its *Draft Proposals Paper for Public Comment (July 2007)* outlining a range of draft recommendations for public land in the River Red Gum Forests Investigation area. Of these, 10 recommendations (R18 to R27) relate specifically to opportunities to improve Indigenous involvement in public land within the Investigation area.

A series of Indigenous specific consultation workshops were organised to obtain feedback from Indigenous people about the draft recommendations. VEAC engaged external independent consultants to organise and conduct the Indigenous consultation workshops in a number of locations within the River Red Gum Forests Investigation area and in Melbourne.

The strong spiritual ties Aboriginal Traditional Owner Groups have with specific tracts of land in the River Red Gum Forests Investigation Area, established over hundreds of generations, based on belief systems, practices, social and ceremonial rules and responsibilities are acknowledged and continue to evolve and exist today. The connection between Aboriginal people and land is expressed in terms of 'being related to' rather than 'owning' the land or country and that Aboriginal people often express this relationship as being custodians rather than landowners.

> *Country is a place that gives and receives life. Not just imagined or represented, it is lived in and lived with.*
>
> *Country in Aboriginal English is not only a common noun but also a proper noun. People talk about country in the same way that they would talk about a person: they speak to country, sing to country, visit country, worry about country, and feel sorry for country, and long for country.*
>
> *People say that country knows, hears smells, takes notice, takes care, and is sorry or happy. Country is not a generalised or undifferentiated type of place, such as one might indicate with terms like 'spending a day in the country' or 'going up the country'. Rather, country is a living entity with a yesterday, today and tomorrow, with a consciousness, and a will toward life. Because of this richness, country is home, and peace; nourishment for body, mind, and spirit; heart's ease.*
>
> *Each country has its sacred origins, its sacred and dangerous places, its sources of life and its sites of death. Each has its own people, its own Law, its own way of life. In many parts of Australia, the ultimate origin of the life of country is the earth itself...* *(Rose 1996)*

The purpose of this report is to provide a summary of the issues raised by participants who attended the Indigenous Consultation Workshops which can be used by VEAC during their deliberations about what changes, if any, should be made to the draft recommendations before they are finalised. A summary of the key points and issues raised at each workshop against each draft recommendation appears in the Appendices to this report.

Consultation Methodology

Indigenous Steering Committee

The community consultation project was guided by an Indigenous Steering Committee established by VEAC. A 'Terms of Reference' document outlining the role and responsibilities of the Indigenous Steering Committee was prepared and circulated to identified Indigenous community members along with an invitation to nominate for membership on the VEAC Indigenous Steering Committee.

The purpose of the Steering Committee was:

1) To ensure that Indigenous stakeholders have:

   a) as substantial a role as possible in setting the direction of and overseeing the running of the project, and

   b) as effective as possible channels with which to communicate their views and information to VEAC staff and, in particular, Council;

2) To provide advice and assistance to the consultants about issues and stakeholders that may need to be taken into consideration in both the consultation and report production stages – particularly in relation to Indigenous involvement in public land management;

3) To provide feedback on the planning and conduct of consultation activities (meetings, workshops, etc.); and

4) To comment on drafts of written material.

Meetings of the VEAC Indigenous Steering Committee were convened in two phases of the River Red Gum Forests Investigation process.

Input from Indigenous Stakeholders

The Indigenous community consultation process occurred in two separate and distinct phases. Phase 1 occurred in March 2007 where Indigenous stakeholders were invited to participate in a series of Indigenous community consultation workshops convened in 12 locations in major population centres and throughout the Investigation area. The purpose of these workshops was to obtain input from workshop participants on what specific and general opportunities may be considered to increase Indigenous participation in public land planning, decision-making and management processes within the Investigation area.

Members of the VEAC Indigenous Steering Committee provided advice to the project consultants about where the Indigenous community consultation workshops should be held – see Table 1 below.

Table 1 – Phase 1 Indigenous Community Consultation Workshops (by Date, Location and No. of Participants)

Date	Location	No. Participants	Other Comments
10 March 2007	Echuca	16	Yorta Yorta Workshop
14 March 2007	Wodonga	3	
15 March 2007	Bendigo	2	
16 March 2007	Echuca	5	
17 March 2007	Swan Hill	6	
18 March 2007	Barham (NSW)	6	+ 2 other guests
18 March 2007	Deniliquin (NSW)	6	
19 March 2007	Robinvale	3	
20 March 2007	Mildura	4	
21 March 2007	Berri (SA)	9	
22 March 2007	Shepparton	6	
25 March 2007	Thornton	11	
Total No. of Participants		**79 persons**	

To ensure consistency in the issues discussed, a Workshop Program was prepared and used at each of the workshop sessions conducted in Phase 1. Participants at each workshop were provided with a copy of the following documents:

- "VEAC River Red Gum Forests Investigation – Submissions Invited" brochure (October 2006)
- VEAC Resource Document 1: Indigenous Land Management Framework Discussion Paper
- VEAC Resource Document 2: Models of Indigenous Involvement in Land Management
- VEAC Resource Document 3: Views from the Community – Indigenous Issues
- VEAC Resource Document 4: VEAC Angahook-Otway Investigation Final Recommendation R12 – Enhancing Indigenous Involvement
- "Permitted Uses and Activities in Major Public Land Use Categories" handout
- River Red Gum Forests Investigation – Discussion Paper (October 2006)

Large scale current public land use maps of selected areas along the River Red Gum Forests Investigation area were displayed at each workshop. The purpose of the large scale maps was to provide participants with a more detailed view of the public lands within the Investigation area including areas around the townships where the workshops were held.

Information gathered from these workshops was collated, compiled, analysed and reported to VEAC for consideration. Information contained in the written submissions received directly from individuals and groups was also presented for consideration.

The second phase of Indigenous community consultation occurred in September 2007 following the release of the Draft Proposals Paper for Public Comment (July 2007). Copies of the draft recommendations in this report were made available to participants who attended Phase 2 Indigenous Community Consultation Workshops.

Following advice from members of the VEAC Indigenous Steering Committee, a series of workshops were organised and conducted in September 2007 – as shown below in Table 2.

Table 2 – Phase 2 Indigenous Community Consultation Workshops (by Date, Location and No. of Participants)

Date	Location	No. Participants
1 September 2007	Shepparton	4
2 September 2007	Melbourne	1
8 September 2007	Robinvale	5
9 September 2007	Gunbower Island	20
15 September 2007	Echuca (YYNAC)	8
	Total No. of Participants	**38 participants**

To ensure consistency in the information gathering process, the following format was used at each workshop to obtain feedback/comments from participants. The primary focus of these workshops was to consider and comment on Indigenous-specific draft recommendations R18 to R27. The workshops followed the format described below.

- An overview was given about the process used by VEAC to obtain comments and views from Indigenous and non-Indigenous stakeholders who have an interest in public land areas in the Investigation area.
- Participants were each provided with a Recommendations Summary Sheet which contained a compilation of the Indigenous specific draft recommendations made in the Draft Proposals Paper. Participants also received a copy of the Draft Proposals Paper and Discussion Paper for their information.
- Copies of maps showing proposed public land use were made available to workshop participants so they could view the proposed changes to public land use within the Investigation area.
- Participants were then asked to consider each draft recommendation individually and time was set aside for questions to be asked and explanations or clarification to be provided by the consultants and the VEAC staff member who attended each workshop.
- A number of examples were provided about how the recommendations may be implemented and how Indigenous people and Traditional Owner Groups could be involved in various aspects of the proposed recommendations (if they are implemented by Government).

- Comments made at each workshop about each draft recommendation were noted and compiled into individual workshop reports (see Appendices).
- Comments made for each draft recommendation were collated, cross-referenced and analysed to form the report outlining the findings and feedback to emerge from workshops.

Participants were invited to review each recommendation separately and to ask questions. Where possible, examples were provided and any comments made or issues raised were responded to.

Promotion of the Indigenous Consultation Workshops

There were at least 17 distinct Aboriginal Traditional Owner Groups who were invited to participate in Indigenous specific VEAC River Red Gum Forests Investigation community consultation workshops. Information about workshops was sent to representatives of the following Traditional Owner groups:

- Bangerang
- Bararapa Bararapa
- Dhudoroa
- Dja Dja Wurrung
- Jarra Jarra
- Jupagulk
- Latje Latje
- Ntait
- Nyeri Nyeri
- Tati Tati
- Taungurung
- Wadi Wadi
- Wamba Wamba
- Way Wurru
- Wergaia
- Yorta Yorta
- Yulupna

An information flyer containing details about the purpose, dates, locations and start/end times of the workshops was prepared and distributed as follows:

- The Indigenous Steering Committee recommended that Native Title Services Victoria (NTSV) mailing list would provide a comprehensive contact list of Indigenous people who may be interested in attending VEAC Indigenous Consultation Workshops. Information about the workshops was sent to 260 Indigenous people in Phase 1 and 340 people in Phase 2 who were registered with the NTSV as being Native Title Claimants in the Investigation area.
- Copies of the workshop information flyer prepared for Phase 2 were sent to people who participated in the Phase 1 consultation workshops held in March 2007.
- Information about the workshops was also emailed to staff of Natural Resource Management agencies to be circulated to Indigenous people in their local communities who may not be on the NTSV mail list or attended a Phase 1 workshop.

Key Findings from Indigenous Community Consultations

This section of the report provides a summary of the feedback provided and the issues raised at each workshop for each recommendation contained in the Draft Proposals Paper for Public Comment (July 2006). Direct quotes from Indigenous community members who participated in the VEAC workshops are made throughout the report to illustrate the comments received.

General Comments about draft Indigenous- specific recommendations

Participants at all workshops indicated a strong level of support for the work undertaken by VEAC and were very appreciative of arrangements VEAC had made to undertake specific consultation activities with Indigenous stakeholders. There was some concern expressed at all workshops about the level of negative publicity occurring in the local media in communities located in the Investigation area and the impact this was having on Indigenous people generally.

There was widespread support for the Indigenous specific and other recommendations made in the Draft Proposals Paper especially the clearly identified actions needed to create more opportunities to involve Indigenous people in public land management, planning and decision-making processes. It was suggested that more examples could be provided in the final report to government about how the Indigenous specific recommendations may be implemented.

Participants at each workshop were asked to made specific comment about each draft recommendation. They also raised a number of other issues during the discussions which are outlined below.

Location	Participant Comments
Shepparton	We would like the two Traditional Owner Groups (Yorta Yorta and Bangerang) to work together on the land area to generate funds and employment and economic opportunities for all Aboriginal people who live on the lands that both families' groups represent. The main issue with the draft recommendations is that the suggested changes outlined don't say which parcels of public land, water areas or parks, etc that it will be applicable or not applicable to.
Melbourne	All the recommendations are good but they need to be deliverable (examples of how, what, when, who and resources). The consultation process is really good to provide comments and discuss any issues. It is really good to see that no cultural centres and buildings are being recommended.
Robinvale	Concern was raised about the membership of the VEAC Indigenous Steering Committee and how it was established and confirmed. An issue of concern raised at Robinvale, was that one member of the Steering Committee had been opposed to the VEAC proposals paper through statements made in public VEAC forums held in Mildura that were reported in the local paper.
Echuca	The main issue raised was the terminology used throughout the VEAC Draft Proposals Paper and not wanting VEAC to leave words open for misinterpretation by government, Indigenous and non-Indigenous people. The term used by the non-Indigenous economic consultants that contributed to this process was 'Intergenerational welfare dependency'. Even though this is targeting non-Indigenous people it impacts Indigenous people through past usage.
	National Park – Can have employment and education for our young ones. Are adults in our group denied the right to take their kids into the bush and light a campfire when they need to?
	Hand back-lease back needs to be a focus on the VEAC agenda in the future (currently in the paper it recommends the option to change legislation so that HB/LB and other opportunities can occur for Traditional Owners)
	Dharnya Centre needs protection and recognition (and other issues) in the recommendations and to have this in the Indigenous recommendations not just in the general recommendations.
	Discuss the role of the media campaign and whether VEAC's got some resources to counteract these claims re. negative fears that other stakeholders have to the Draft Proposals Paper and recommendations.
	Traditional Owner identification and having complete control over spiritual connection that is there on country – need to stipulate who comes and goes as opposed to what AAV introduces (highlighting the lighting of fires in the forest for camping). It is currently included under Recommendation R26 (cultural ceremony) but it needs to be made clearer about what this really means in more detail.

Recommendation R18 - Increasing Indigenous community capacity

That government provides assistance with strategic decision-making regarding public land management along the River Murray and across boundaries of Aboriginal Traditional Owner Groups by establishing a properly resourced program to provide the following services:

(a) a mediated and resourced process to facilitate:
  (i) Aboriginal Traditional Owner identification and registration,
  (ii) engagement of Aboriginal Traditional Owner Groups or bodies with public land management agencies,
  (iii) group internal decision-making and procedures or protocols such as informed consent and choice of spokespersons,
  (iv) the establishment of boundaries of Country between groups, and
  (v) dispute resolution.

(b) administrative support for relevant Aboriginal Traditional Owner Groups,

(c) coordination of consultation requests from government agencies and preferential selection of appropriately qualified Traditional Owner Groups or organisations for contract services to work on land and natural resource management projects on Country,

(d) assistance for relevant Aboriginal Traditional Owner Groups with targeted training and capacity building exercises such as work placements, traineeships and use of existing programs to establish Aboriginal rangers and land management contractors to work on public land on traditional Country,

(e) assistance with coordination of relevant Aboriginal Traditional Owner Groups' responsibilities under cultural heritage and native title processes where these coincide with public land management,

(f) support for initiatives aimed at retaining traditional knowledge and expertise and assisting with the integration of this knowledge in land and natural resource management projects and partnerships on Country, and

(g) support for Aboriginal Traditional Owner Groups wanting to develop a permit regime as described in recommendations R26 and R27 for the traditional hunting, gathering and ceremonial use of Country.

Notes: 1. Aboriginal Traditional Owners are defined as those people who are the direct descendants of specific Indigenous groups present prior to European settlement.

2. Indigenous people refer to land and natural resources of an area over which they have a profound cultural and spiritual relationship as their traditional Country.

A significant majority of workshop participants indicated that increasing Indigenous involvement in management, planning and decision-making processes on public land in the Investigation area was an opportunity they and other members of Traditional Owner Groups would actively embrace.

All workshop participants were highly supportive of Recommendation R18 and indicated that a critical first step was for government to provide initial and sufficient resources to Traditional Owner Groups so they could establish viable administrative infrastructure to enable them to be effective, active and equal participants in management, planning and decision-making processes occurring on public land areas within the Investigation area.

It was confirmed at all workshops that properly resourced programs would enable Traditional Owner Groups to engage in management, planning and decision-making processes with Government agency staff as well as with other land holders and stakeholder groups who may have an interest in public land areas within their local area.

> "We want to build partnerships with other interested groups (farmers, graziers, etc). It's the way you approach people and the interest groups that is the key to effective outcomes." *(Shepparton)*

Some participants raised the issue of past promises being made by government for provision of resources to Indigenous groups but then not following through on these undertakings. It was suggested that in its final report VEAC could provide more details outlining how this recommendation would be implemented by providing some practical examples.

> "We would need more examples provided on how the recommendations would look in practice rather than theory." *(Gunbower Island)*

Workshop participants agreed that it was important for sufficient resources being available to facilitate mediation and dispute resolution processes where there were differences of opinion occurring within and between members of Traditional Owner Groups.

It was agreed that this issue was of particular importance given that unresolved issues may influence and impact on action taken to establish the joint management and co-management arrangements as well as membership selections for advisory committees set up for specific public land areas.

> "As long as the process undertaken and proposed is properly resourced there is support for this recommendation. That is - for overlapping boundaries with Traditional Owners and Native Title that is still an issue to be resolved between the three Traditional Owner groups. Representatives to be proposed for these structures need to be in town for a few days on a couple of occasions – no 'blow ins' will be accepted." *(Robinvale)*

Issues were raised with the identification recommendation in the proposals paper.

> "This recommendation should include whether or not it means 'identification as an individual or Traditional Owner Group' the word identification should be changed to 'recognition'." *(Gunbower Island)*

Participants attending the Yorta Yorta Nations Aboriginal Corporation (YYNAC) workshop in Echuca indicated that they were very supportive of Recommendation R18. Specifically, they want government to ensure that their Corporation also receives matched funding that is given to other parties contracted to undertake scientific and research activities on public land areas within their traditional boundary area.

> "There needs to be resourced research to Yorta Yorta Nations whenever Yorta Yorta is engaged by non-Indigenous groups and businesses. That is - if Yorta Yorta are engaged and have a non-Indigenous consultant to do a scientific report on country, then Yorta Yorta should be resourced to do their own research and scientific reports." *(Echuca)*

The following comment was also made in relation to Recommendation R18 (g):

> "Non-Indigenous people would need to get a permit but not Indigenous people." *(Robinvale)*

Recommendation R19 - Enhancing Indigenous involvement

(a) That planning and management relating to traditional interests and uses acknowledge the unique relationship of Aboriginal people with Country and be based on recognition and respect for the traditional and contemporary relationship of Aboriginal people with the land,

(b) That prior to implementing VEAC's recommendations for parks and reserves, and changes in public land management, government consult with Traditional Owners and Aboriginal groups regarding their native title rights and interests,

(c) That government, in consultation with Aboriginal Traditional Owner Groups, establish mechanisms to improve and resource Indigenous participation in land and water management including:

- (i) development of principles and protocols to improve the policy and planning processes of public land and water management agencies and resource the representation and participation of Aboriginal people in these processes,
- (ii) preparation of a strategy to improve the participation of Aboriginal people in land, water and resource use decision-making and day-to-day management,
- (iii) provision of information to assist the facilitation of land and water use agreements between agencies and Aboriginal Traditional Owner Groups,
- (iv) facilitation of surveys and site visits necessary for planning and development purposes,
- (v) development of cross-cultural awareness programs for land, water and natural resources agency staff to improve knowledge and understanding of, and communication with, Aboriginal communities, and
- (vi) assistance to provide Aboriginal communities with the capacity (including resources and skills) to fully participate in future consultation and management planning arrangements.

(d) That opportunities for increased employment and training for local Aboriginal people be resourced and provided in the implementation of parks and reserves in the River Red Gum Forests Investigation area.

A significant majority of workshop participants supported all aspects of draft Recommendation R19. It was agreed that the Government and its agencies could make more policy statements to acknowledge the traditional and contemporary relationship that Indigenous people have to land in Victoria. In particular, it was suggested that:

> "Government need to consider the Reconciliation Australia's Road Map to Reconciliation in relation to human rights and the rights of Aboriginal people to effectively participate in this recommendation, particularly part c(i)." *(Shepparton)*

A significant majority of workshop participants agreed that Government should consult with Traditional Owners and Aboriginal groups regarding their native title rights and interests before any changes are made to the management of parks and reserves. It was also strongly supported that sufficient resources needed to be provided to Indigenous groups as part of this process given that most groups do not have or receive any financial support. Specifically, it was suggested that funds needed to be made available to meet the participation costs of Indigenous stakeholders.

> "Any resourcing agreed to needs to be adequate to Indigenous representatives and participants. Aunties and Uncle's can't just wait around for contracts to become available. Need to make it worth the Elders' while." *(Robinvale)*

Concerns were raised about how the process for undertaking hand-back/lease-back would occur as the process outlined in the VEAC Draft Proposals Paper did not seem to be clear. It is suggested that VEAC provide an expanded and more detailed explanation about how this process will occur and include reference to how Indigenous stakeholders may be involved in the process.

> "If the Traditional owners propose and implement Hand-back/Lease-back, government would need to make the public land freehold first before it can be considered. How would this be achieved by government?" *(Gunbower Island)*

Recommendation R19 (d), which focused on creating more opportunities for employment of Indigenous people in parks and reserves located in the Investigation area, was widely supported. It was agreed that the creation of training opportunities would also provide a greater choice of career options for locally based Indigenous people who may have limited employment options in their local area.

Participants at the Echuca workshop also expressed a strong view that, from their perspective, the Dharnya Centre played a pivotal role in any future decisions taken. The following key points were raised about this particular issue in response to Recommendation R19 (c)(v):

- We need to see where the Dharnya Centre will be included and to provide this training. The Dharnya Centre provides an important facility for cultural awareness training to occur – it is the 'Jewel in the Crown' for a "Bush University". There needs to be a campaign to keep the Dharnya Centre going as it rose from the LCC study done in 1983. Government then came to Yorta Yorta and agreed to build the Dharnya Centre with $1.2M from the Commonwealth to create economic and employment outcomes. Families can then go there and spend time and keep the culture going and strong.
- Dharnya Centre is vital in this process. Shane Walker concept – Bush University concept (does this need a separate recommendation in the final report or does the existing written text just need to be strengthened more?).
- Bring the Dharnya Centre recommendation to the Indigenous recommendations – cross reference. The Dharnya Centre is important to deliver the cultural awareness training on country. The Yenbena Indigenous Training Centre is also an important centre as it has the middens, trees for canoes, etc.
- The Dharnya Centre written material on page 60 of the Draft Proposals Paper under the Community Use Areas Recommendation was discussed. There are problems with mixing the Dharnya Centre with the Muster Yards. Only area for specific Yorta Yorta use is under the co-operative management board proposed in part of the Barmah Forest. The Muster Yards can't be jointly considered with the Dharnya Centre.
- The white ant damage has been known since 1996 (15 years). Parks need to put its hand in the pocket to repair it. This was highlighted in the original submission.
- The development of cultural awareness needs to be done which recognises and acknowledges the Traditional Owners and the land of where it is delivered. Recognises prior and existing ownership of the land by Yorta Yorta ancestors and existing people. Recognised why it is being done. Cultural awareness that occurs in this part of the VEAC study area must be delivered by Yorta Yorta people.

It was also suggested by participants at this workshop that VEAC consider the inclusion of an additional recommendation in the final report as follows:

That the Dharnya Centre is handed back to total control of Yorta Yorta Nations as part of a Hand-back/Lease-back arrangement.

Recommendation R20 - Joint management provisions for national parks

That the *National Parks Act 1975* be amended to make provision for a process for scheduled areas to be transferred to Aboriginal Traditional Owners, identified in accordance with Recommendation R18, as national park Aboriginal Land (inalienable freehold), subject to agreement to enter into a lease for use of the land as a national park, that the board of management has a majority of Traditional Owners, and that a process be established for nomination and addition of parks to the schedule.

There was widespread support at all workshops for Draft Recommendation R20 and the implementation of hand-back/lease-back arrangements for specific public land areas within the Investigation area. There were, however, some concerns raised about what the implications would be for Traditional Owner Groups in relation to their native title rights – now and in the future.

It was agreed that the provision of resources to assist with mediation and dispute resolution processes (as outlined in Recommendation R18) would be critical as part of this process.

"If this recommendation is supported it should be made clearer for Indigenous groups to fully comprehend and understand when the final report is published." *(Shepparton)*

"Really need National Parks and support for Hand-back/Lease-back opportunities and discussions." *(Melbourne)*

"This recommendation is supported because Government will need to change the legislation for the changes not already recognised to be implemented." *(Robinvale)*

"Some Traditional Owner Groups are not as up to speed as the Yorta Yorta as we have not been resourced in the past to be involved in processes to discuss and negotiate public land management." *(Gunbower Island)*

"Need to ensure that the Traditional Owners are recognised in all negotiating processes. Government is also increasing Indigenous community capacity building through other mechanisms and all of these commonalities need to come back to each other and to be complimentary. It is all inclusive." *(Echuca)*

Recommendation R21 - Co-management provisions for parks and reserves

That the *National Parks Act 1975* be amended to make provision for co-management of the specific parks listed below with which an Aboriginal group or groups have a traditional association by establishing co-management agreements, and

(a) the co-management agreements will be between relevant Aboriginal Traditional Owner Groups, identified in accordance with Recommendation R18, and government, and

(b) the park or reserve be managed by a co-management board consisting of a majority of members of the relevant Aboriginal Traditional Owner group or groups, identified in accordance with Recommendation R18, and

(c) the co-management board provide for (amongst other obligations):

- (i) protection for the natural environment, flora and fauna, and other natural values
- (ii) continued enjoyment of the area by members of the public in a manner consistent with the designated public land-use category
- (iii) preservation and protection of Aboriginal sites, features, objects and structures of spiritual or cultural significance within the area, and
- (iv) continued enjoyment of the area by the relevant Aboriginal groups for cultural, spiritual and traditional uses.

(d) the co-management partners prepare a management plan for the park, and

(e) the co-management partners manage the park or reserve on the 'business as usual' basis agreed between the co-management partners that the park can continue to operate normally until the first co-management plan comes into operation.

There was widespread support indicated at all workshops for Draft Recommendation R21 and the creation of opportunities for formally involving Traditional Owner Group representatives on co-management boards that may be established for public land areas within the Investigation area. It was also pointed out that sufficient financial resources needed to be provided to Traditional Owner Groups so they could participate in these processes.

"This recommendation is supported but adequate resourcing is required to meet the Traditional owners and groups' needs for proper participation on Advisory Committees and Boards." *(Robinvale)*

The preservation and protection of Aboriginal sites, features, objects and structures of spiritual and/or cultural significance should be a priority focus of co-management board members – as outlined in Recommendation R21 (c) (iii) and was strongly supported.

"Most important recommendation and this should be highlighted as such in the final report. Need to recognise Aboriginal 'Dreaming" more in this recommendation so everyone understands the importance of why this recommendation has been suggested." *(Shepparton)*

A number of workshop participants understood the importance of Management Plans being prepared for parks and other similar public land areas in the Investigation area – as stated in Recommendation R21 (d). It was suggested that VEAC could provide examples in their final report which outline how this will impact on Traditional Owner Groups.

"The final report needs to have an example provided (such as Lake Mokoan). All Traditional Owners groups would have a say in the management if all groups have an interest." *(Shepparton)*

Recommendation R22 - Co-management provisions for parks and reserves

That the *National Parks Act 1975*, and other relevant legislation such as the *Crown Land (Reserves) Act 1978* be amended to provide for:

(a) a process for additional areas with which an Aboriginal group or groups have a traditional association to be added to the areas over which the above co-management arrangements may apply, and

(b) other co-management arrangements not necessarily involving a board of management or a board of management with majority Aboriginal Traditional Owners.

Draft Recommendation R22 was widely supported by participants at all workshops and it was agreed that government should change relevant legislation to allow for greater involvement of Traditional Owner Groups.

"This recommendation is supported. There are too many logging groups in the forests and parks cutting down our scarred trees." *(Gunbower Island)*

Recommendation R23 - Aboriginal advisory committees

That provision be made for involvement of Aboriginal people in management of designated areas of public land by establishing:

(a) advisory committees (under existing legislation) consisting of Aboriginal Traditional Owner representatives, identified in accordance with processes outlined in Recommendation R18, to provide the land manager with advice on one or more aspects of land management, and that:

(b) advisory committees be adequately resourced to perform their functions and that, if required, legislation be amended to provide for allowances and expenses, and that:

(c) the specific role of the advisory committees can be changed following review and agreement by the parties.

Draft Recommendation R23 was widely supported at all workshops, however, some participants were not clear about roles and responsibilities an advisory committee would have as compared to those of a co-management board. To clarify these differences, it was suggested that information sessions could be conducted in locations in the Investigation area.

"Advisory committee term used needs to have the reasons for why 'advisory' is used and to explain the differences in the roles of advisory committees as compared to the suggested co-management board." *(Shepparton)*

"Advisory committees are supported but need more detail regarding representation and how they would operate over what period of time and who with (i.e. government, business, etc)." *(Gunbower Island)*

A number of workshop participants also suggested that a clearly defined selection process could be developed and put in place to ensure that the appropriate and most suitably qualified and experienced Indigenous representatives are made members of co-management boards and advisory committees.

"We need to get everyone's opinion and not just the opinion of one person." *(Melbourne)*

"There is no real selection criteria determined in Recommendation R23. Maybe these comments could be included under Recommendation R23 (c) or as a footnote in the final report." *(Melbourne)*

"A 'Terms of Reference' should be developed for the advisory committees and distributed to the Elders and the Traditional Owners for comment." *(Melbourne)*

It was also suggested that consideration needed to be made about terminology and language used in advisory committee documents to ensure that Indigenous representatives could understand and grasp the issues being raised and discussed.

"We need to have 'true Elders' on the advisory committees. Some Elders have the same ideas as the bureaucracy. Traditional Owners need to be there to explain and present the story telling and make sure it is sustainable for the future. The Traditional Owners and the State Government are becoming the same at the moment because they are bound by the rules and legislation of the State Government." *(Melbourne)*

"Elders need to be acknowledged by putting them on these advisory committees. Need the language changed so that Elders know and understand what is going on. The best people should be on these advisory committees." *(Melbourne)*

Recommendation R24 - Co-management of specific parks

That a co-management agreement be entered into between the government and the relevant Aboriginal Traditional Owner Group or groups identified in accordance with Recommendation R18 and that the following areas be managed by a co-management board consisting of government and a majority of Aboriginal Traditional Owner group representatives in accordance with Recommendation R21:

(a) Barmah National Park (Recommendation A7)

(b) Nyah–Vinifera Park (Recommendation B7).

Note: The establishment of this co-management arrangement for the proposed Barmah National Park is not intended to affect the existing agreements for other areas of public land under the Yorta Yorta Cooperative Management Agreement.

Recommendation R24 was widely supported at all workshops.

"A lot of discussion has been held around the public land use areas suggested by VEAC to be changed re. public access. These suggested changes will need to include the exact public land use areas and be made clear to Indigenous people." *(Robinvale)*

All participants at the Echuca workshop were very supportive of the draft recommendation to create the Barmah National Park. They also indicated a strong preference to be part of the co-management board for the new national park when it is established.

"Agreement that there are advisory committee structures and co-management boards in place and that Barmah is made a national park." *(Echuca)*

At the Shepparton workshop one participant indicated strong opposition to the creation of the Barmah National Park as they believed that it would create strong divisions in the Shepparton community with other non-Indigenous stakeholders who have had access to this area of public land. Other participants at the workshop did not hold the same view.

"Agree with all the recommendations with the exception of Recommendation R24. I don't agree with making the Barmah Forest a national park. No to closing the Barmah forest for good. We don't want Indigenous people to be held responsible by other non-Indigenous interests as the reason for the closure." *(Shepparton)*

Advice was received from participants at another workshop that they also knew of one other Indigenous person in their area who also publicly expressed concern about the draft VEAC recommendations as they believed the Indigenous specific recommendations would do more harm than good.

It is noted all other Indigenous participants at the workshops strongly disagreed with these opinions as they were of the view that the Victorian government should implement the recommendations as soon as possible.

Recommendation R25 - Specific Aboriginal advisory committees

That an Aboriginal advisory committee be established as described in Recommendation R23 for:

(a) west Wallpolla Island area of Murray-Sunset National Park

(b) Bumbang Island Historic and Cultural Features Reserve.

Draft Recommendation R25 was widely supported at all workshops. It was suggested that VEAC consider expanding this recommendation to advisory committees for the Hattah-Kulkyne National Park and the Murray-Kulkyne Park as well as for Gunbower Island.

Recommendation R26 - Aboriginal traditional cultural practice

That policies and legislative restrictions inhibiting traditional cultural practice on specified areas of public lands and waters be amended to provide for Aboriginal Traditional Owners to undertake the following activities for personal, domestic and non-commercial communal use:

(a) hunt (including using firearms), gather, collect and fish,

(b) collect earth materials, and

(c) conduct a cultural or spiritual ceremony, including (if required) having exclusive use of specified areas for a specified time.

Recommendation R26 generated a lot of discussion at all workshops convened. It was strongly agreed at all workshops that legislative changes should occur to include greater opportunities for Traditional Owners to access public land areas so they could undertake activities associated with traditional cultural practices.

"Need to be able to collect wood for cultural practices to make boomerangs, artefacts, etc." *(Echuca)*

It was also suggested that park management plans make specific reference to the provision of access to public land by Traditional Owner Groups for the purposes of traditional cultural practices.

"This recommendation is ok. Always need to suggest that any management agreements have all interested Indigenous people to be consulted." *(Shepparton)*

Participants at the Gunbower Island workshop highlighted the need for consideration to be made for the use of fire by Indigenous people as this is a critical aspect of any traditional cultural practices. It was suggested that VEAC may need to make more specific reference in their final report to the importance of this issue from an Indigenous perspective. The following example was raised by participants at this workshop to highlight their concerns:

"We don't want to be told we can't go down to the river and light a (camp)fire when I need to do this. I need to be able to go and do this so I can think clearly about things and my culture, etc.

Issues and discussions focused on needing to have camp fires and smoking ceremonies to occur in the parks and specifically at Gunbower Island.

"We don't want government to manipulate our traditional and contemporary cultural practices".

"One male Elder was getting flux and his food was not going down properly. He went to 3 health specialists who said it was the cooking on gas that was causing his health problem. He went back up the bush and went back to cooking his food on the open fire and then his health improved and the flux disappeared. Cooking on gas is bad for blackfellas."

Finally, it was suggested at one workshop that the wording in this recommendation could be 'tightened up' more. When this issue was raised at each workshop, it was suggested to participants that it may be more practical and appropriate to establish a separate process involving Indigenous stakeholders working with Government agency staff to more clearly define the actual mechanics behind how this particular recommendation will be implemented. All workshop participants agreed that this option was acceptable, however, they indicated that resources would need to be made available so they could participate in these processes when they occur.

"The wording in these recommendations needs to be tightened up more in relation to hunting, gathering and fishing - needs to include resources to do these cultural practices and to include natural resources for cultural practices before the dot points. Examples could also include: bark trees, ochre, gypsum, etc." *(Echuca)*

Recommendation R27 – Permits for Aboriginal traditional cultural practice

That traditional cultural practice be governed by a permit regime and protocols established by the land manager in partnership with the identified Aboriginal Traditional Owners for the specific area(s).

A majority of workshop participants supported Draft Recommendation R27, however, it was agreed that more information needed to be made available on how the permit regime would operate. It was also suggested that a working group be formally established by government to facilitate discussion about the proposed permit regime and that representatives of Traditional Owner Groups be invited to participate in and lead these discussions.

"If someone takes bark off the tree but has to get permission to take the bark from a Traditional Owner Group that has been agreed upon through this new system proposed then a letter of understanding should come from the Minister and the Traditional Owner Groups." *(Shepparton)*

"We would not support a whole blanket permit system but would consider a permit system for some areas to ensure areas and species of cultural significance would be protected and sustained for the future." *(Robinvale)*

Participants in Robinvale provided and discussed the following case study example in relation to not having a permit system in place:

"Permits for contractors that want to remove sand, soil, etc is needed.

One contractor went to a burial ground, removed sand and disturbed our burial site. Local Council gave permission to the contractor for this to happen. Local contractors don't know what they are to look out for re. Indigenous interests and issues.

Earth removers should be trained on what to look out for and get a certificate of confirmation and understanding from Traditional Owners to approve this knowledge and understanding by the contractor. They then can't claim ignorance like they do now. The Sandy Hills (high ground) is where we buried Indigenous people. They go to NSW DPI and get permission to do this and the royalties the contractors get goes back to the NSW DPI.

We need to be able to say 'this track' goes over a midden so don't have access to remove the sand or soil that is in that area.

The areas we are referring to are Gadsens, Lake Powell and all around Robinvale.

Need to be able to restrict NSW access to Victorian side of the Murray River. Cross border arrangements has been with Traditional Owners on the NSW side and Robinvale side".

Gunbower Island workshop participants made the following comments about Recommendation R27:

"There were many issues raised under this recommendation.

Should not be restrictions on areas along the whole River for access by Indigenous people. We should just have a permit for Milverton Bend only. We camp and traversed along the River within our traditional boundaries and this should be recognised.

Fishing – we don't fish and take a lot of fish at once and go home and put it in our freezers because it doesn't taste fresh or like we just caught the fish that day. We only hunt and fish when needed and eat and use the fish at the time of catching the fish. We just chuck it straight on the 'nickie' the ashes, we don't use frying pans or whitefella stuff.

Need to be able to collect wood for cultural practices to make boomerangs, artefacts, etc".

Other Issues – Co-management and Advisory Committee Provisions

It was evident from comments made at a number of the workshops that participants were not familiar with the process that is required to put in place legislative changes which would result in the creation of co-management boards or advisory committees for selected public land areas – as proposed in the VEAC draft recommendations. A number of participants requested further information about how this would occur and what the opportunities and implications would be for them - if the VEAC recommendations are taken up by the government.

It is suggested that VEAC consider the merits of including a specific recommendation that government make arrangements for information sessions to occur about these provisions and that funding be made available to meet some of the participant costs – where appropriate.

The use of evolving technology

Aboriginal people have long recognised the benefits of taking up new technology when it becomes available to add value to their hunting and gathering lifestyles thus confirming that Aboriginal culture is evolutionary in nature – as with all world cultures. In a paper written about *Native Title and Intellectual Property*, Dr David H Bennet noted that Australia is a signatory to the Convention on Biological Diversity which came into force on 29 December 1993 and that Section 8 (j) of the Convention states that each government shall, as far as possible and as appropriate:

> Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations and practices.[1]

Section 10(c) of the Convention on Biological Diversity states that each Contracting Party shall, as far as possible and as appropriate:

> Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.[2]

In considering native title rights and interests to hunt, fish and gather as being more than an acknowledgement of Aboriginal and Torres Strait Islander peoples' right to collect food, Bennet stated that two points need to be made immediately:

> First, conducting these activities in accordance with "traditional laws acknowledged, and the traditional customs observed, by the Aboriginal peoples and Torres Strait Islanders" does not mean that those laws, customs and practices were fixed once and for all time in 1788. Second, as a corollary to the first point, traditional practice does not mean that exclusively traditional implements (tools and weapons) must be used to conform with traditional practice.[3]

Finally, Bennet expressed the following view about the evolutionary nature of Indigenous culture:

> Traditional practice is not static. Traditional practice informs and guides Aboriginal and Torres Strait Islander peoples, it does not fossilise them.
>
> On the second point:
>
> > the use of present day tools in the harvesting of plans, modern transport and firearms in hunting animals, boats and nest made of present day materials in fishing still comprise the exercise of traditional right, albeit in a modern way (Sweeny 1993, 115-116)
>
> In cases, such as *Regina v Sparrow, Simon V Regina,* and *Campbell v Arnold*, the point is made that in the absence of statutory provisions, the implements used for hunting, fishing and gathering in accordance with traditional rights are not frozen in time and indigenous people may use modern implements to carry out their traditional practices.

Another issue to consider in relation to the use of modern technology is the impact on animal welfare where firearms are used. In considering the significance of traditional hunting to Indigenous peoples, Dominique Thiriet made the following comments in an article titled "*Tradition and Change – Avenues for improving animal welfare in Indigenous hunting*":

> The economic, social, cultural and ecological significance of traditional hunting for many Indigenous people cannot be underestimated. Many Aboriginal and Torres Strait Islander people, particularly those living in urban areas, do not hunt at all and many others do so only as a recreational activity or as a chance to enjoy particular foods.
>
> The greatest significance of traditional hunting, however, concerns its spiritual dimension but is one that is virtually impossible for non- Indigenous people to fully comprehend. Most writers agree that traditional hunting does much more than merely meet physical and economic needs:
>
> Foraging and hunting [allows Indigenous women and men] to express profound environmental knowledge stretching back over many generations, and continually reinforces their beliefs in the spiritual value of such knowledge; it is also an important medium of education, whereby both spiritual and ecological knowledge is handed on to succeeding generations. (Young 1991).

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[1] Bennet, Dr David H., "Native Title and Intellectual Property", Land, Rights, Laws: Issues of Native Title, Issues Paper No 10, April 1996, page 4.

[2] Ibid, page 5.

[3] Ibid, page 6.

In considering the nature and reasons of traditional change, Thiriet also made the following comments (selected extracts):

> It would be an error to think that all traditional hunting practices are fixed in time and incapable of sustaining change.
>
> Hunters now use vehicles rather than walk. They also use aluminium dinghies instead of outrigger canoes, firearms instead of spears and boomerangs, metal instead of wooden spearheads, nylon instead of fibre fishing lines, and crowbars instead of digging sticks.
>
> The considerable changes to the extent, nature and methods of traditional hunting do not make the current hunting itself less traditional. The Supreme Court of the Northern Territory accepted this much when it held in *Campbell v Arnold* that the shooting of kangaroos with a firearm met the traditional requirements outlined in the *Crown Lands Act 1978* (NT).
>
> It is argued that the reason for the change or adaptation is immaterial and that in general the significant changes to hunting practices outlined above, whether they be imposed or chosen, do not affect the legitimacy of the relevant traditions. As a result, any changes to current traditional hunting practices introduced for the purpose of eliminating animal cruelty would not make these practices less traditional, whether such changes were chosen or imposed.
>
> In general, changes to killing methods do not make the hunting less traditional, unless the changes are extreme.
>
> In most cases when the purpose of the hunt is traditional but the killing methods have no inherent cultural value, modifying the methods will not detract from the tradition. In such cases, it would be unnecessary, unjustifiable and unreasonable to continue using methods which inflict or are likely to inflict pain on animals in preference to humane alternative methods. Indigenous representatives have already acknowledged that 'the use of modern methods has reduced the suffering of animals [killed for traditional purposes]', so there appears to be no valid reason why widespread changes would not be supported by communities.

There are a number of examples and legal precedents from other States and Territories where the use of modern technology (including the use of firearms) by Aboriginal people as part of their traditional cultural practices have been accepted by Government and included in legislation and regulations. A number of studies have also been undertaken over the past 20 years which have examined and made specific conclusions about this particular issue. Below are examples of two of these.

> Aboriginal Access and Living Areas – Pastoral Industry Working Group Final Report (September 2003)
>
> *What is meant by 'accustomed manner'?*
>
> Because of changing times, the Working Group acknowledges that 'accustomed manner' now includes modern techniques such as the use of cars and firearms. According to the National Native Title Tribunal 'accustomed manner' may be defined as 'customary, habitual', but this does not resolve the issue of firearm use. This appears to conflict with s267 of the LAA which provides that it is an offence to discharge a firearm or weapon on Crown land without the Minister's permission or without reasonable excuse. It may be that Aboriginal people (either for the purposes of s104 of the LAA or s44A Native Title Act or in accordance with a relevantly framed determination of native title) exercising their right to hunt with a firearm may have 'reasonable excuse' under s267. This may rely on whether using a firearm is:
>
> a) in accordance with their 'accustomed manner'
> b) was a traditional activity
> c) was the exercise of a native title right or interest (see s223 Native Title Act).
>
> It has become widely accepted that 'accustomed manner' now includes the use of firearms for hunting. Various agreements, including those discussed in relation to Term of Reference Three, set down a regime for the use of high calibre firearms through the use of 'code of conduct' type guidelines.
>
> The Working Group also considered the issue of excessive harvesting of native animals through exercising their right to hunt. It was the view of some members that appropriate management and education should address the issue, rather than introducing provisions that serve to restrict peoples' rights to hunt.
>
> The Bush Tucker Ruling
>
> In 1994, Murrandoo Yanner, a member of the Gunnamulla clan of the Gangalidda tribe of Aboriginal Australians, speared two juvenile estuarine crocodiles on country in the Gulf of Carpentaria. These were then shared with other members of his clan for food. For this he was charged with hunting without a permit under the Queensland Fauna Act. The action ricocheted through the courts until, in October 2000, the High Court of Australia set aside the prosecution and confirmed the native title right of Aboriginal traditional owners to hunt wild animals.

Traditional hunting and gathering practices in protected areas

In November 2005, the Research Unit at the National Native Title Tribunal published "*Traditional Hunting with Firearms in National Parks – A Short Review*" which contained examples of how governments in other States and Territories have taken action to allow or disallow the use of firearms by Indigenous people in public lands. This document was updated in March 2006.

Information obtained during this project indicates that the Victorian government has yet to formalise any legislation which supports Indigenous Traditional Owners undertaking traditional hunting and gathering activities on public land areas in Victoria. A Management Plan for Barmah State Park and Barmah State Forest, published in September 1992 by Department of Conservation and Environment, contained the following references about Aboriginal Heritage and hunting and gathering of food:

> 6 MANAGEMENT OF CULTURAL RESOURCES
>
> *6.1 ABORIGINAL HERITAGE*
>
> The Yorta Yorta Aboriginals have a long and continuing association with the Barmah Forest and adjacent NSW forests. They consider these areas living examples of Aboriginal cultural heritage and an important part of their ancestral homelands.
>
> The hunting of native wildlife and collection and use of native plants for food and ceremony is an integral part of Aboriginal culture. At present it is contrary to the National Parks Act 1975 (for State Park) and Wildlife (General) Regulations 1980 under the Wildlife Act 1975 (for State Forest) for anyone to catch and kill animals such as kangaroo in the forest. A variety of traditional food plants can also be found in the forest (Wilson 1990). DCE is currently preparing a State-wide policy on the taking of native plants and animals by Aboriginals for traditional purposes.
>
> Medium Priority - Allow limited hunting and gathering of traditional foods in Zone 4 by Aboriginal people if and when arrangements for such use are established by DCE policy and related regulations.

The following case studies taken from other States and Territories demonstrate how traditional cultural practices may be administered.

Case Study 1 - Malimup communiqué (Malimup Spring - May 1998)

This communiqué was developed at a meeting of indigenous representatives, staff of government land management agencies and representatives of non-government environmental groups at Malimup Spring, Western Australia in May 1998.

The communiqué is concerned with indigenous people and the management of areas reserved or zoned as 'wilderness', primarily within national parks or other lands reserved for conservation or recreational purposes. However, the meeting participants believe the broad management principles developed apply equally to all protected areas managed by government agencies. It is proposed that land management agencies use these guidelines with this in mind.

Management Framework

Rightful indigenous communities should be involved in joint management partnerships with land management agencies and participate in the making of 'wilderness' planning and management decisions which affect their rights and the maintenance of their cultures. This involvement should occur within a framework which includes:

- the inclusion of rightful indigenous people at all administrative levels of planning and management, including representation on all relevant committees;
- the involvement of rightful indigenous communities in relevant policy formulation, management plan preparation and day-to-day management;
- the direct management of areas, sites and matters of indigenous significance within 'wilderness' areas by rightful indigenous people;
- requiring the approval, control and participation of rightful indigenous communities before permitting:
- the publication of sensitive indigenous knowledge;
- access to indigenous cultural sites (including fragile, sacred and culturally important places); and
- scientific research on indigenous sites and issues;
- the incorporation of indigenous resource knowledge and land use practices in 'wilderness' management regimes;
- the involvement/employment of members of rightful indigenous communities in undertaking land management practices and programs in 'wilderness' areas;
- the promotion of indigenous themes in 'wilderness' educational and interpretive material (as approved by the rightful indigenous communities);

Hunting and Gathering (Native Species)

- enabling sustainable hunting and gathering by rightful indigenous people in their ancestral lands, including the use of firearms;
- the resolution of nature conservation or park user conflicts associated with indigenous hunting and gathering activities through specific provisions in park management plans, wildlife management plans or other agreed mechanisms;

Case Study 2 - Knuckey Lagoons Conservation Reserve Management Plan (NT)

3.6 FAUNA

All mammals, birds, reptiles and amphibians in the Reserve are protected under the *Territory Parks and Wildlife Conservation Act (NT).* As a declared protected area the use of firearms and traps is prohibited. Aquatic life is protected under the *Fisheries Act (NT)*. Under section 122 of the *Territory Parks and Wildlife Conservation Act* traditional hunting and collecting by Aboriginal people may be carried out on the Reserve (refer to section 3.9).

Management Plan

- Parks and Wildlife Commission will carry out a biological study of the Reserve, in consultation with the Reserve Management Committee, during the life of this plan. The study will aim to refine knowledge of the Reserve's wildlife and habitats as well as the impacts upon them.
- Grass slashing operations will be monitored to determine any impacts on flora and fauna distribution within the Reserve and slashing programs will be adjusted where necessary.
- Hunting, fishing, trapping or other taking of wildlife is prohibited, unless approved for research purposes or unless undertaken by Aboriginals as part of traditional hunting and gathering practices in accordance with the *Territory Parks and Wildlife Conservation Act* and its By-laws and Regulations.
- The use of nets, traps and firearms will be prohibited within the Protected Area. In accordance with the *Territory Parks and Wildlife Conservation Act* signs will be placed in the Reserve, notifying visitors of these restrictions within the Protected Area.
- Management will liaise with the relevant Aboriginal clans which are able to harvest resources from the Reserve to develop sustainable use levels and discuss with the community any management changes required.

3.9 ABORIGINAL USE AND CULTURAL RESOURCES

Larrakia Aboriginal people claim traditional responsibility for the Knuckey Lagoons area. In 1980 an area of land adjacent to the Reserve was granted to the Aboriginal Development Foundation to provide hostel type accommodation for Aboriginal people.

Knuckey Lagoons are known to Aboriginal people as 'Muddie', meaning barramundi and the area is referred to as Barramundi Dreaming (Valadian, 1974). Presently, no sacred sites have been recorded or registered with the Aboriginal Areas Protection Authority for Knuckey Lagoons Conservation Reserve.

Any Aboriginal artefacts within the Reserve are protected as 'Prescribed Archaeological Objects' under the *Heritage Conservation Act*. Sacred Sites are protected under *Northern Territory Sacred Sites Act* whether or not they are recorded.

Under Section 122 of the *Territory Parks and Wildlife Conservation Act* the right to hunt, fish and collect for traditional purposes has been secured for Aboriginal people who have traditionally hunted in the Reserve.

Along with other impacts unsustainable harvesting practices can lead to a reduction of numbers or the localised disappearance of wildlife species from a habitat. This is not a desirable outcome for either Aboriginal people or the Parks and Wildlife Commission.

Management Guidelines

- Aboriginal cultural resources will be managed in accordance with the *Northern Territory Sacred Sites Act* and the *Heritage Conservation Act*.
- The PWCNT will consult with relevant Aboriginal people and authorities regarding the significance, conservation and management of Aboriginal cultural resources in the Reserve.
- Aboriginal hunting and gathering is permitted in the Reserve in accordance with the *Territory Parks and Wildlife Conservation Act*.
- Relevant Aboriginal people and their representative organisations will be consulted regarding the appropriate use and treatment of material on Aboriginal cultural and spiritual beliefs in the Reserve's interpretive program.
- Liaison with the relevant Aboriginal community regarding harvesting of the Reserve's flora and fauna will allow monitoring of harvested species and development of appropriate sustainable harvesting practices.

4.6 VISITOR SAFETY

Management Guidelines

- The Parks and Wildlife Commission will liaise with Aboriginal people with a traditional right to hunt in the Reserve to ensure that hunting and harvesting techniques do not present a safety risk to visitors.

(Source: "Knuckey Lagoons Conservation Reserve Management Plan", Parks and Wildlife Commission NT, September 2000.)

Case Study 3
Aboriginal owned Biamanga National Park Lease to the Minister for the Environment (NSW)

13.8. Reservation of Yuin people's Rights to Use

1. The parties acknowledge that Aboriginal Owners, and other Yuin people, have the following rights, which will operate subject to the directions or decisions of the Board with respect to health, safety or privacy -

   (i) the right to enter upon the Lands and use the Lands to the extent that the entry, use or occupation is in accordance with tradition;

   (ii) the right to engage in the traditional use of any area of the Lands for hunting or food gathering in accordance with this Lease; and

   (iii) the right to engage in the traditional use of any area of the Lands for ceremonial purposes.

2. The Land Councils reserves the right to request the Minister to sub-let any reasonable part of the Lands for Community Development purposes.

3. The Minister will not unreasonably refuse to grant such a sub-lease where it is in accordance with the Act and the Plan.

This sets out the rights of Aboriginal Owners to go on to and use the National Park in accordance with Aboriginal tradition but that this entry and use of the National Park has to be in accordance with the rules and laws governing the National Park.

13.9. Acknowledgment of hunting fishing and gathering rights

1. The parties acknowledge that the Aboriginal Owners of the Lands, and any other Aboriginal people who have the consent of the Aboriginal Owner Board members, are entitled (subject to s. 71AO(2) of the Act), and to other provisions of the Act, to any other Act applying to the Lands and to the Plan, to enter and use the Lands for hunting or fishing for, or the gathering of, traditional foods for domestic purposes and for ceremonial and cultural purposes to the extent that that entry or use is in accordance with the tradition of the Yuin People.

2. For the purpose of this clause, firearms will not be used.

This clause acknowledges Yuin hunting and gathering rights of foods for domestic purposes and for ceremonial and cultural purposes. The Aboriginal Negotiating Panel decided that guns were not to be used in the Park for hunting by Traditional Owners.

13.10. Board to control cultural activities including hunting and gathering

1. The Board has the function of considering proposals for the carrying out, by Aboriginal Owners or other Aboriginal people, of cultural activities (including but not confined to hunting and gathering) within the Lands and of approving (including the setting of conditions for such approvals), or refusing to approve, the carrying out of such activities.

This clause means that the Board will set the rules for Yuin hunting and gathering on the National Park.

(Source: "Merrimans Local Aboriginal Land Council and Bega Local Aboriginal Land Council Lease to The Minister for the Environment for Biamanga National Park - December 2005," pages 49 and 50.)

Case Study 4 - Bare Hill (Bunda Bidandji) Conservation Park Management Statement (Qld)		
5.3. Indigenous culture		
Bare Hill or, as it is known by the Traditional Owners, Bunda Bibandji, is a distinctive cultural landscape providing an important link to the history and use of the area by the Traditional Owners. The Traditional Owners are actively involved in planning processes and day-to-day management assisting in the preservation and protection of scar trees, historical walking pads (tracks), rock art and cultural stories.		
Status and opportunities 2006	Desired outcomes 2016	Actions and guidelines
Natural processes such as weathering, lichen growth and salt deposit have damaged and obscured the ochre rock images. The frequency and intensity of fire could be better understood especially to protect cultural values. Pest pigs and change in land management practices have also disturbed items such as scar trees. The physical and spiritual items associated with the BHCP are inadequately documented. The cultural, historical, social and economic significance of the area is well understood.	I1. Cultural values are protected and preserved in accordance with Traditional Owner customs and best practice management principles.	I1a. Assist Traditional Owners in undertaking cultural heritage values assessment, mapping and monitoring programs to develop and implement a *Site Conservation and Heritage Plan*. I1b. Develop protocols and procedures in collaboration with Traditional Owners that maintain the confidentiality and integrity of cultural places, material and information. I1c. Register places, artefacts and stories in accordance with Traditional Owner wishes and relevant legislation, and where possible list them on state and national heritage registers. 1Id. In partnership with Traditional Owners develop a *Fire Management Plan* that protects areas of cultural significance as well as the natural integrity of the area. 1Ie. In partnership with Traditional Owners review management practices where evidence of on-going damage to places of cultural significance is identified. 1If. Maintain Indigenous cultural practices by restricting general community access from time to time.
5.7. Community Partnerships		
Status and opportunities 2006	Desired outcomes 2016	Actions and guidelines
Limited opportunities are available for the involvement of Traditional Owners in natural resource and visitor management.	P1. Traditional Owners are involved in planning processes and natural resource management practices.	P1a. Investigate options for more formal partnership arrangements with Traditional Owners, including but not restricted to a joint trustee agreement. P1b. Support Traditional Owners in gaining skills through the availability of relevant and accredited training programs. P1c. Develop an *Infrastructure Maintenance Plan* for the area. P1d. Provide opportunities for Traditional Owners to minimise potential impacts to Indigenous cultural values. P1e. Ensure a collaborative approach is adopted to implement the strategies outlined under the Wet Tropics Regional Agreement. P1f. Develop a *Cultural Practices Agreement* in association with QPWS to determine appropriate practices (taking of wildlife, fire), group size and location for indigenous cultural events.
Protected areas in Queensland are owned and managed by the State Government.	P2. The Traditional Owners own and manage an ecologically sustainable tourism business on Bare Hill Conservation Park.	P2a. A whole-of-government approach is used to support the Traditional Owners' interests in economic development and the transmission of traditional values. P2b. Encourage the sharing of information between major stakeholders, thereby allowing a consistent approach to decision making in tourism/promotion ventures and day-to-day management obligations.
Information supplied by various stakeholders is not always accurate, such as old contact details for Traditional Owners.	P3. Communication pathways with all stakeholders are appropriate and accurate.	P3a. Assist Traditional Owners to develop and maintain relationships with other stakeholders.

Review of Consultation Processes involving Indigenous Stakeholders

Consultation processes which engage Indigenous stakeholders have a number of factors influencing the level and quality of participation by members of this segment of the Australian population. These factors include, but are not limited to the following:

a) Financial capacity of individuals to travel to/from locations where workshops were held. To overcome this, it is suggested that consideration be given to reimbursing participant fuel costs.

b) Availability of participants to attend workshops convened on weekdays and on weekends. This is always problematic as most Indigenous people have work commitments during the day and family commitments on weekends – similar to other non-Indigenous people in the community but with less flexibility in many instances.

c) Level of interest in the topic or subject matter being discussed. In many instances, Indigenous people have relied on a single person or family group to participate in these processes and then report back to them.

   Associated with this issue is the lack of confidence individuals may have about their literacy and communication skills combined with many years where they have not been invited to participate in consultation processes in their community. That is – they may have been marginalised by leaders in their community and, where they have been involved in past activities, not encouraged by the person facilitating the process to contribute to the discussions.

d) Limited options for receiving communications about consultation processes that are occurring. In this instance, access to telephones, mobile phones or a computer connected to the internet. The end result of this is a reliance on information received in the mail (if they are on a mailing list) or advice received from someone they know who has been informed about what is happening.

e) Connecting with the wrong person in a community or organisation who may not have a desire to pass on information to others interested in a particular issue. This is not an easy issue to resolve unless the person facilitating the process has extensive networks to draw upon for advice about who to speak with in a community.

It can be expected that VEAC will seek out the views of Indigenous people when they conduct future investigations on public land use in other parts of Victoria – in particular those of Traditional Owners. Consultants engaged to facilitate the Indigenous community consultations of the River Red Gum Forests Investigation agreed with VEAC that it was essential to establish an Indigenous Steering Committee as part of this Investigation.

It is strongly suggested that VEAC consider the merits of forming Indigenous Steering Committees at the start of each investigation it undertakes where input from Indigenous stakeholders is sought. As part of this process, a 'Terms of Reference' document should be prepared and a list of potential Steering Committee members be drawn up with input from identified Indigenous agencies – such as Native Title Services Victoria. A separate budget should also be assigned to meet the participation costs of Indigenous Steering Committee members which covers sitting fees, travel, meals and accommodation expenses (where required).

While it is understood that there are limitations impacting on the level of engagement at this level with Indigenous stakeholders, it is also critical to understand that Victorian Traditional Owner Groups are becoming more active and assertive with government to ensure that their interests are taken into account in any planning, decision-making or management activities. This can often limit the scope and capacity of interactions with Indigenous community members who are not from the area where a consultation process is taking place.

It is also important to understand that the budgets for Indigenous consultation processes needs to take into consideration that Indigenous 'informed consent' processes may be preferable in some instances as this will influence how many people from a particular group decide to participate in consultation. That is, providing an amount directly to a group so they can meet their participant costs to attend a consultation meeting – which may often involve travel, accommodation and meals.

Comments from Indigenous Steering Committee Members

VEAC established an Indigenous Steering Committee to provide advice and direction to the consultations with Indigenous stakeholders located in the River Red Gum Forests Investigation area. The following comments were made by members of the Indigenous Steering Committee about the consultation process undertaken for this study.

Wayne Webster (Co-Chair)

"I thought the VEAC consultation process was excellent as it provided Indigenous people in the study area with a real opportunity to have our thoughts and comments to be heard directly. More government agencies need to follow VEAC's example by ensuring support is provided for Indigenous stakeholders to be actively consulted about what is happening on their Traditional country.

I would also like to thank all the Indigenous people who were community members for making the time and the personal effort to contribute to and comment on the process as well as sharing their views, thoughts and feelings in relation to cultural connections with land in the Investigation area.

We look forward to building stronger relations with VEAC and other connected agencies as well as the Government taking up the (final) recommendations handed down by VEAC."

Uncle Henry Atkinson

"Even though we did not want to be involved in the consultation process when it first started, we were very pleased with how it progressed and that we were encouraged and supported to be a part of the process once it commenced. We were also very pleased that our views were taken on board even though we did not really understand what VEAC were trying to do. From our perspective, the recommendations were very good and we will be keeping a very close eye on how the government responds to support the VEAC Indigenous recommendations in particular those that impact on the Yorta Yorta people and other Traditional Owner groups located in the study area.

We would also like to see the Victorian government taking more positive action to support the human rights of Traditional Owners who have very strong links with land in Victoria. We are very keen to ensure our knowledge and skills as Traditional Owners are utilised to better care for country so future generations have a healthy environment. We have given the government something to take notice of in relation to global warming and having a clean environment. I hope they listen to what we have put forward and I am glad that Yorta Yorta people participated in the consultation process.

On a final note, we were very pleased with how inclusive VEAC were in seeking out the views of Indigenous people. VEAC and the consultants they engaged did an excellent job – well done!"

Aunty Rose Kirby

"I thought the consultation workshops were very informative and gave people an opportunity to have a say. It was good having the workshops in our community but it's a pity more Indigenous people were not involved in these. I think the recommendations reflected what people said in the workshops and they build on the good relationships we already have in our community."

Kevin Atkinson

"Setting up an Indigenous specific Steering Committee was a good idea and having Indigenous facilitators do the workshops was great. Even though the recommendations are good, I still have some concerns that some Traditional Owner groups such as the Bangerang will not be acknowledged or be a part of the implementation processes when they occur. I look forward to being involved in future consultations when they happen."

Doug Nicholls

"There was a lot of negative media about what VEAC where doing and a lot of misinformation being put out about the process. Despite this, our group continued to have support from a number of key groups based on our strong alliances with people we have worked with over the past 15 years.

From our perspective, we were very pleased with the consultation VEAC did and how they actively sought out the views of our people about how to improve opportunities for Indigenous involvement in public land planning, management and decision-making. We look forward to more consultations when the recommendations are implemented."

Involvement of NRM Indigenous staff and Indigenous agencies

In undertaking consultations with Indigenous stakeholders in the Investigation area, the active involvement and views of Indigenous specific staff working in state Government Natural Resource Management (NRM) agencies was important. The main reasons for seeking input and advice from these agency staff included the following:

a) Indigenous specific staff working in government agencies are often actively involved/engaging with local Indigenous stakeholders in their regional areas and tend to have up-to-date knowledge about which local people should be consulted about specific issues;

b) Indigenous specific staff usually have primary responsibility for developing and implementing new and existing policies, programs and strategies which target the interests of Indigenous people and, as such, they are able to provide current advice about outcomes being achieved as a result of the financial and other support being provided by their agency;

c) Indigenous specific staff will have current knowledge about local, regional and statewide issues in relation to their areas of responsibility and can thus provide informed advice about past, current and future issues that may need to be taken into consideration where a consultation process is to occur with Indigenous stakeholders; and

d) Indigenous specific staff at a head office level can utilise their local/regional staffing resources to assist with networking with relevant Indigenous stakeholders at a local/regional level.

The following people are thanked for their input, advice and assistance with this project:

- Mr Brett Ahmat - Manager, Indigenous Partnerships, Department of Sustainability & Environment
- Mr Earl Cleaver - Coordinator Indigenous Facilitators, Land & Fire Management, Department of Sustainability & Environment
- Mr Marlon Parsons - Indigenous Facilitator, Mallee Catchment Management Authority
- Mr Ken Stewart - Indigenous Facilitator, Mallee Catchment Management Authority

At the same time, it is of importance to seek advice, input and assistance from staff of Indigenous focussed agencies that have existing relationships with Indigenous stakeholders. More specifically, the assistance of staff from Native Title Services Victoria (NTSV) provided invaluable support by distributing workshop notices and other information directly to Traditional Owners in the Investigation area.

Ongoing Consultation Processes

Although Indigenous people only constitute a small percentage of the Victorian population, they are often called upon to participate in consultation sessions for a range of issues. In many instances, the same people are involved in multiple processes as a responsibility given by members of their family, community or organisation.

In terms of this project, consideration needs to be given to including on-going consultation process with Indigenous stakeholders after the project has concluded. A communications strategy outlining how this may occur could be developed which includes regular updates about what is happening – even if this only occurs twice a year. Indigenous people who participated in VEAC's consultation may be able to generate increased interest in other locations.

Finally, it is critical that Indigenous bureaucrats are actively involved in future processes as they are often actively involved in contact with Indigenous stakeholders in most communities in Victoria. They also have access to on-ground personnel who may be in a position to assist with raising awareness about a specific issue as well as identify which people in each location should be contacted.

Conclusions

There was very strong support expressed by a significant majority of people who participated in the Indigenous Consultation Workshops for VEAC to finalise the draft recommendations with no changes. In many instances, Indigenous people consulted were of the view that the Victorian government should have taken action before now to implement changes which leads to greater opportunities for Indigenous Traditional Owner Groups to be actively involved in public land management, planning and decision-making processes.

From an economic perspective, the creation of more training and employment options for Indigenous people living in communities located in the Investigation area would be a very positive outcome. It was also confirmed that the active and on-going involvement of Indigenous people directly in public land management tasks would of itself provide a greater incentive for members of each family to remain in the area as they would have access to employment activities which also mirror their interest in maintaining and improving public land areas on traditional country.

It is clear more action needs to be taken by government to educate, inform and empower Indigenous stakeholders about issues associated with becoming active participants on proposed co-management boards and advisory committees. This is area lacks available information about public land policies, planning and decision-making.

To date, members of the Indigenous community in the River Red Gum Forest Investigation appeared to rely on a small number of individuals to be the contact point and conduit of advice about maintaining the integrity of land areas. It is essential that government consider supporting the recommendations which focus on increasing the capacity of Indigenous communities so they can actively participate as equal partners in future activities linked with improving public land use in the Investigation area.

At the same time, consideration needs to be given to ensure that Indigenous stakeholder groups have the financial capacity to undertake informed consent processes which can contribute positively to any management, planning and decision-making processes on public land areas in the Investigation area. Advice received from various departmental staff confirmed that a number of new initiatives were being implemented at the time of this Investigation and that a number of these would benefit from action taken to support the VEAC recommendations.

Workshop participants were also clear that more examples needed to be provided in the final report produced by VEAC to ensure there is no misunderstanding about how the recommendations are interpreted by government. Requests were also made to expand one recommendation and to insert a new recommendation as follows:

Rec No.	Action Recommended
R25	It was suggested that VEAC consider expanding this recommendation to include the establishment of advisory committees for the Hattah and Murray-Kulkyne Parks as well as for Gunbower Island.
New	That the Dharnya Centre be handed back to the total control of Yorta Yorta Nations as part of the Hand-back/Lease-back arrangements.

It is critical that Indigenous stakeholders in the Investigation area are kept informed about what action is being taken by government to implement each recommendation in the VEAC final report. Where possible, Indigenous stakeholders in the River Red Gum Forest Investigation area should be invited to actively participate in and contribute to any discussions that take place about how each recommendation will be implemented. This will ensure that the views of Indigenous stakeholders is reflected accurately in the changes made, that respect is being shown for the views of Indigenous people who also have an interest in progressing actions and that a two-way learning process occurs whereby Indigenous and non-Indigenous stakeholders improve their individual and professional capacities to contribute to the creation and development of new policies, procedures and processes.

Finally, we would like to thank all workshop participants for their contributions to this process and ensuring that robust discussions occurred to inform the VEAC decision-making process. We would also like to thank members of the Indigenous Steering Committee for their advice and support. The contribution made by VEAC staff in this process must also be acknowledged along with the time given by the VEAC Councillors to actively participate in the Indigenous consultation process.

Appendices

Appendix 1 – Shepparton Indigenous Workshop (1 September 2007)

General Comments

- We would like the two Traditional Owner Groups (Yorta Yorta and Bangerang) to work together on the land area to generate funds and employment and economic opportunities for all Aboriginal people who live on the lands that both family groups represent.
- We have issues with AAV's RAP application process and forms that need to be completed. This includes the number of people government want Aboriginal people to talk to before getting their applications processed and approved.
- The main issue with VEAC's Draft Recommendations is that the suggested changes outlined don't say which parcels of public land, water areas or parks, etc that will be applicable or not applicable.
- Agree with all the recommendations except R24. Don't agree with making the Barmah Forest a National park. '*No to closing the Barmah forest for good*'. We don't want Indigenous people to be held responsible by other non-Indigenous interests as the reason for the closure.

Rec No.	Comments
R18	**Increasing Indigenous Community Capacity**
	We want to build partnerships with other interested groups (farmers, graziers, etc). It's the way you approach people and the interest groups that is the key to effective outcomes.
R19	**Enhancing Indigenous Involvement**
	Government need to consider the Reconciliation Australia's Road Map to Reconciliation in relation to human rights and the rights of Aboriginal people to effectively participate in this recommendation, particularly part c(i).
R19 (iii)	The pipeline proposed to go from Yea to Melbourne suggests that 75,000 megalitres of water will be pumped from Lake Eildon to Melbourne. They have not consulted with Taurnarong about this. Any benefits should be spread out across the community (ie. The Murray River – it doesn't matter whose land it is – all Indigenous people need to work collectively together to manage the river system).
R20	**Joint Management Provisions for national parks**
	If this recommendation is to be supported it should be made clearer for Indigenous groups to fully comprehend and understand when the final report is published.
R21	**Co-management Provisions for parks and reserves**
c (iii)	Most important recommendation and this should be highlighted as such in the final report.
c (iv)	Need to recognise Aboriginal 'Dreaming' more in this recommendation so everyone understands the importance of why this recommendation has been suggested.
d	Needs to have an example provided – ie. Lake Mokoan – all Traditional Owner groups would have a say in the management if all groups have an interest.
R22	This recommendation is supported.
R23	**Aboriginal Advisory Committees**
	The Advisory Committees term used needs to have the reasons for why 'advisory' is used and to explain the differences in the roles of advisory committees as compared to the suggested co-management board.
R24	**Co-management for specific parks**
	Need to include the maps for suggested changes in this section – that is, cross reference in the report and to the recommendation/s.
R25	**Specific Aboriginal Advisory Committees**
	This recommendation is supported.
R26	**Aboriginal Traditional Cultural Practice**
	This recommendation is ok. Always need to suggest that any management agreements have it stated that all interested Indigenous people need to be consulted.
R27	If someone takes bark off the tree but has to get permission to take the bark from a Traditional Owner Group that has been agreed upon through this new system proposed, then a letter of understanding should come from the Minister and the Traditional Owner Groups.

Appendix 2 – Melbourne Indigenous Workshop (2 September 2007)

General Comments

- That input should be sought from Canberra.
- This workshop is more about getting my mob into gear so they can do these things if and when the recommendations are endorsed by government.
- All the draft recommendations are good but they need to be deliverable (examples of how, what, when, who and the resources that will be available). The consultation process is really good to provide comments and discuss any issues. It is really good to see that no cultural centres and buildings are being recommended.

Rec No.	Comments
R18	This recommendation is supported.
R19	This recommendation is supported.
R20	Good Luck with getting this approved. Really need National Parks and support for Hand-back/Lease-back opportunities and discussions.
R21	This recommendation is supported.
R22	This recommendation is supported.
R23	We need to have 'true Elders' on the advisory committees. Some Elders have the same ideas as the bureaucracy. Traditional Owners need to be there to explain and present the story telling and make sure it is sustainable for the future. The Traditional Owners and the State Government are becoming the same at the moment because they are bound by the rules and legislation of the State Government. A Terms of Reference should be developed for the advisory committees and distributed to the Elders and the Traditional Owners for comment. Elders need to be acknowledged by putting them on these advisory committees. Need the language changed so that Elders know and understand what is going on. The best people should be on these advisory committees. There is no real selection criteria determined in Recommendation R23. Maybe these comments could be included under Recommendation R23 (c) or as a footnote in the final report. We need to get everyone's opinion and not just the opinion of one person.
R24	This recommendation is supported.
R25	This recommendation is supported.
R26	This recommendation is supported.
R27	This recommendation is supported.

Appendix 3 – Robinvale Indigenous Workshop (8 September 2007)

General Comments

- Concern was raised about membership on the VEAC Indigenous Steering Committee and how it was established and confirmed. An issue of concern was that one member of the Steering Committee had been opposed to the VEAC proposals paper through statements made in public forums held in Mildura that were reported in the local paper. (The Indigenous Steering Committee establishment process was outlined and all queries raised were answered).

Rec No.	Comments
R18	As long as the process undertaken and what is proposed is properly resourced then there is support for this recommendation particularly for overlapping boundaries with Traditional Owners and Native Title as that is still an issue to be resolved between the three Traditional Owner groups. Representatives to be proposed for these structures need to be in town for a few days on a couple of occasions – no 'blow ins' will be accepted.
R18 (g)	Non-Indigenous people would need to get a permit but not Indigenous people.
R19	Any resourcing agreed to needs to be adequate to Indigenous representatives and participants. Aunties and Uncle's can't just wait around for contracts to become available. Need to make it worth the Elders' while.
R20	This recommendation is supported because Government will need to change the legislation for the changes to be implemented.
R21	This recommendation is supported but adequate resourcing is required to meet the Traditional Owners and groups needs for proper participation on advisory committees and boards.
R22	This recommendation is supported but adequate resourcing is required to meet the Traditional Owners and groups needs for proper participation on advisory committees and boards.
R23	This recommendation is supported but adequate resourcing is required to meet the Traditional Owners and groups needs for proper participation on advisory committees and boards.
R24	A lot of discussion has occurred around the changes to public land use areas suggested by VEAC in particular, public access to areas. These suggested changes will need to include the exact public land use areas and be made clear to Indigenous people.
R25	This recommendation is supported. Consider including Advisory Committees for Hattah-Kulkyne National Park and Murray-Kulkyne Park.
R26	This recommendation is OK. Always need to suggest that any management agreements have included all interested Indigenous people to be consulted.
R27	Participants did not support a whole blanket permit system but suggested a permit system for some areas to ensure areas and species of cultural significance are protected and sustained for in the future. Participants provided and discussed the following case study example about not having a permit system in place: • Permits for contractors to remove sand, soil, etc is needed. • One contractor went to a burial ground and removed sand and disturbed our burial site. Local Council gave permission to the contractor for this to happen. • Local contractors don't know what they are to look out for re. Indigenous interests and issues. • It was suggested that earth removers should be trained for what to look out for and get a certificate of confirmation and understanding from Traditional Owners to approve this knowledge and understanding by the contractor. They then can't claim ignorance like they do now when they damage cultural sites. • The Sandy Hills (high ground) is where we buried our Indigenous people. These contractors go to NSW DPI and get permission to do this and the royalties the contractors get goes back to the NSW DPI. • We need to be able to say 'this track' goes over a midden so they don't have access to remove the sand or soil that is in that area. • The areas we are referring to are Gadsen Bend, Lake Powell and all around Robinvale. • Need to be able to restrict NSW access to Victorian side of the Murray River. Cross border arrangements has been with Traditional Owners on the NSW side and Robinvale side.

Appendix 4 – Gunbower Island Indigenous Workshop (9 September 2007)

General Comments

- Bararapa Traditional Owners need to meet as a group after today and discuss the proposals paper and recommendations in detail so we can make a more detailed response to VEAC. Bararapa asked for an extension to the current submission date and would like VEAC to consider providing assistance for the participants to reconvene to develop their submission.
- VEAC to provide participants with copies of proposed public land use maps for Kerang area and surrounds; Gunbower Island National Park; Murray-Sunset National Park; Barmah area and surrounds; Mildura area and surrounds.

Rec No.	Comments
R18	Issues were raised in relation to the 'identification' recommendation in the proposals paper. This recommendation should include whether or not it means 'identification as an individual or Traditional Owner group'. **The word identification should be changed to 'recognition'**. This recommendation is ok for now. We would need more examples provided explaining how the recommendations would look in practice rather than in theory.
R19	Gunbower Island is only located on Bararapa Country and no other Traditional Owner group can claim this Island. If the Traditional Owners propose and implement Hand Back/Lease Back government would need to make the public land freehold first before it can be considered. How would this be achieved by Government?
R20	Some Traditional Owner groups are not as up to speed as the Yorta Yorta as they have not been resourced in the past to be involved in processes to discuss and negotiate public land management.
R21	This recommendation is supported.
R22	This recommendation is supported. There are too many logging groups in the forests and parks cutting down our scarred trees.
R23	Advisory committees are supported but we need more detail re. representation and how they would operate over what period of time and who with (ie. government, business, etc).
R24	We would like a copy of all the maps on the wall sent to participants. Issues and discussions focused on needing to have campfires and smoking ceremonies to occur in the parks and at Gunbower Island. We don't want government to manipulate our traditional and contemporary cultural practices. *I don't want to be told we can't go down to the river and light a fire when I need to do this. I need to be able to go and do this so I can think clearly about things and my culture, etc*.
R25	This recommendation is supported. Gunbower Island should be put into this recommendation and that an advisory committee be established for this area.
R26	This recommendation is ok. Always need to suggest that any management agreements have included all interested Indigenous people to be consulted.
R27	There were many issues raised under this recommendation. • Should not be restrictions on areas along the whole river for access by Indigenous people. We should just have a permit for Milverton Bend only. We camped and traversed along the river within our traditional boundaries and this should be recognised. • Fishing – we don't fish and take a lot of fish at once and go home and put it in our freezers because it doesn't taste fresh or like we just caught the fish that day. We only hunt and fish when needed and eat and use the fish at the time of catching the fish. We just chuck it straight on the 'nickie' (the ashes) we don't use frying pans or white fella stuff. • One male Elder was getting flux and his food was not going down properly. He went to 3 health specialists who said it was the cooking on gas that was causing his health problem. He went back up the bush and went back to cooking his food on the open fire and then his health improved and the flux disappeared. Cooking on gas is bad for blackfellas.

Appendix 5 – Echuca YYNAC Indigenous Workshop (15 September 2007)

General Comments

- "*The environment is our culture*". How do VEAC's recommendations impact on the Cultural Heritage and Native Title processes in place?
- "*We can't currently see any separation between natural and cultural resources from a holistic point of view. The holistic view of land management and care for the land and the Indigenous view that the land is one*".
- *Partnership arrangements need to be negotiated regarding management if Barmah Forest becomes a National Park then it has to be a joint management approach with 'no more rubbish' attached to it. An agreement also needs to be treated legally and put through legislation. This is the last biggest chance to get something for our younger generations and resolve something that has been stolen in the past to get back in Yorta Yorta hands now so it can become our future*.
- Need to be able to gain more information about the VEAC Red River Gum Forest Investigation and the Draft Proposals Paper and its recommendations. We need to keep looking back over the years and the struggle we had for land justice and our rights.
- Looking back at the ILC years there has only been one page written on Indigenous issues and our concerns. This time VEAC has done more and I am pleased to see there is a chance to discuss more about Hand Back/Lease back and the work done to date.
- A lot of listening and learning. Needing to cement and get the words for the need for government, proposals forward. This is true capacity building, stakeholder and to engagement, recognised a sanctuary to enhance our future generations.
- Concern was raised about the current negative media campaign against the VEAC Draft Proposals Paper. "*There is a need for VEAC to be standing up to the plate about all the negative media publicity*".
  - There was concern that Yorta Yorta members are being threatened about the VEAC recommendations.
- Concern was raised that VEAC needed to provide some sort of protection to Yorta Yorta people in relation to how to handle the negative publicity and feedback from interested parties involved in opposing the VEAC process.
- It was pointed out that the McPherson media website owns 10 media outlets along the Murray River region and that they control the whole media agenda for the region that the VEAC study area covers. To counter balance this, it was suggested that VEAC has a role through its own media campaign to counteract what has been happening by McPherson media. "*It only whips up fear, misconception of VEAC and negative publicity*".
- It was further stated that the final VEAC recommendations need to consider the guidelines of the Ethics Committee with the Australia Press Council as they were the ones who stepped in on the Bridge Issue documented and reported on in the Riverine Herald.
- Participants stated that VEAC needs to bring it back to the attention of the Shepparton News as the negativity is being shown and heard on the television all the time. "*It needs to be a hard hitting advertisement by VEAC like the campaign against the Riverine Herald advert*". VEAC advised that they have actively tried to get as much information as possible out in the community.
- Participants stated that no one listens to the Yorta Yorta point of view on knowledge – what is the view on the scientific knowledge. That is - the steering committee and the reference group, as the discussion paper's scientific focus is only one element of this knowledge.
- Participants stated that all of the self interest groups have the financial backing behind them to oppose such measures and the recommendations.
- Hand Back/Lease Back issues were raised and explained.

Rec No.	Comments
R18	It was agreed that government should be resourcing the registered Traditional Owner Groups. Has to be a way to take things forward. Yorta Yorta is a registered and identified Traditional Owner group by government which was endorsed through the Yorta Yorta Nations Co-operative Management Agreement in 2004. This Agreement determines the boundaries and the consultation process for areas within that boundary, and to be able to negotiate for those on the edges of the boundary line (ie. other Traditional Owner groups). VEAC still need to consider cultural heritage legislation. Still at the same time recognise the stance that Yorta Yorta has taken to get to its formal recognition.
R18 (g)	There needs to be resourced research to Yorta Yorta Nations whenever Yorta Yorta is engaged by non-Indigenous groups and businesses. That is - if Yorta Yorta are engaged and have a non-Indigenous consultant to do scientific report on country, then Yorta Yorta should be resourced to do their own research and scientific reports.
R19 (v)	Need to see where the Dharnya Centre will be included and to provide this training. The Dharnya Centre provides an important facility for the Cultural Awareness Training to occur – it is the 'Jewel in the Crown' for a Bush University concept. There needs to be a campaign to keep the Dharnya Centre going as it rose from the LCC study done in 1983. Government then came to Yorta Yorta and agreed to build the Dharnya Centre with $1.2M from the Commonwealth to create economic and employment outcomes. Families go there and spend time and keep culture going and strong. The Dharnya Centre is vital in this process. Bush University concept (does this need a separate recommendation in the final report or does the existing written text just need to be strengthened more?) Bring the Dharnya Centre recommendation to the Indigenous recommendations I5 Barmah Forest Community Use Area– cross reference. The Dharnya Centre is important to deliver the cultural awareness training on country. Yenbena is also an important centre. It has the middens, trees for canoes, etc. Everyone discussed the Dharnya Centre written material on page 60 of the proposals paper under Community Use Areas Recommendation. There are problems with mixing the Dharnya Centre with the Muster Yards. Only area for specific Yorta Yorta use is under the co-operative management board proposed in part of the Barmah Forest. The Muster Yards can't be jointly considered with the Dharnya Centre. The development of cultural awareness needs to be done, which recognises and acknowledges the Traditional Owners and the land from where it is delivered. Recognition of prior and existing ownership of the land by Yorta Yorta ancestors and existing people. Recognition why it is being done. Cultural awareness that occurs in this part of the VEAC study areas must be delivered by Yorta Yorta people.
	The government's land managers have known about the white ants since 1996 (11 years ago). This was highlighted in the original submission but not in the final report. The government needs to put its hand in its pocket to repair the white ant damage.
I5	**<u>Recommendation:</u> That the Dharnya Centre be handed back to the total control of Yorta Yorta Nations as part of a Hand Back/Lease Back arrangements**.
R20, 21 and 22	Need to ensure that the Traditional Owners are recognised in all negotiating processes. Government is also increasing Indigenous community capacity building through other mechanisms and all of these commonalities need to come back to each other and to be complementary. "*It is all inclusive*".
R23, 24 and 25	Agreement that there are advisory committee structures and co-management boards in place and that Barmah Forest is recommended as a National Park.
R26 and 27	The wording in these recommendations needs to be tightened up more in relation to hunting, gathering and fishing -needs to include resources to do these cultural practices and to include natural resources for cultural practices before the dot points. Examples could also include: bark trees, ochre, gypsum, etc. Need to be able to collect wood for cultural practices to make boomerangs, artefacts, etc.

Discussion on the VEAC Draft Proposals Paper Indigenous Community Involvement Recommendations

- One main issue raised was the terminology used in the social and economic assessment of the VEAC Draft Proposals Paper. VEAC staff advised that the term was used by the non-Indigenous economic consultants "Intergenerational welfare dependency" was taken from the social welfare reports.
- Even though this is targeting non-Indigenous people it has impacts on their reaction to Indigenous people. Need to edit this out of the final report determined. Worse case scenario.
- Show where duck hunting is a job. Can't just say this when failing to consider a range of implications – benefits to properties, paid out royalties/commissions, etc.
- National Park – Can have employment and education for our young ones re. not be denied the right to take the kids into the bush and light a cooking fire?
- VEAC advised that the economic assessment consultants didn't separate the Indigenous employment vs. non-Indigenous employment outcomes.
- There was also lots of discussion about the AAV RAP process and the Cultural Heritage Council and native title but of course this VEAC process doesn't directly have an impact on these issues although it was seriously noted. One issue raised in relation to this process is that under the Cultural Heritage Council RAP process Traditional Owners might not have control over their traditional land/country.

"The forest is our culture and is everything to us" – Uncle Henry Atkinson.

Next Steps for Yorta Yorta and VEAC

A follow up meeting to discuss the Yorta Yorta Co-operative Management Agreement was requested.

APPENDIX 4

Timeframe and community consultation process for River Red Gum Forests Investigation

APPENDIX 5

Species names used in the Final Report

Fauna

English Name	Scientific Name
Australasian Darter	*Anhinga novaehollandiae*
Australasian Shoveler	*Anas rhynchotis*
Australian Little Bittern	*Ixobrychus dubius*
Australian Painted Snipe	*Rostratula australis*
Australian Shelduck	*Tadorna tadornoides*
Barking Owl	*Ninox connivens*
Beaked Gecko	*Rhynchoedura ornata*
Blue-billed Duck	*Oxyura australis*
Broad-shelled Turtle	*Chelodina expansa*
Brolga	*Grus rubicunda*
Brown Treecreeper	*Climacteris picumnus*
Brush-tailed Phascogale	*Phascogale tapoatafa*
Bush Stone-curlew	*Burhinus grallarius*
Curl Snake	*Suta suta*
De Vis' Banded Snake	*Denisonia devisi*
Diamond Firetail	*Stagonopleura guttata*
Eastern Great Egret	*Ardea modesta*
Eurasian Coot	*Fulica atra*
Flat-headed Galaxias	*Galaxias rostratus*
Freckled Duck	*Stictonetta naevosa*
Freshwater Catfish	*Tandanus tandanus*
Giant Bullfrog	*Limnodynastes interioris*
Golden Perch	*Macquaria ambigua*
Greater Long-eared Bat	*Nyctophilus timoriensis*
Grey Teal	*Anas gracilis*
Grey-crowned Babbler	*Pomatostomus temporalis*
Growling Grass Frog	*Litoria raniformis*
Hardhead	*Aythya australis*
Hooded Robin	*Melanodryas cucullata*
Hooded Scaly-foot	*Pygopus schraderi*
Inland Carpet Python	*Morelia spilota metcalfei*
Intermediate Egret	*Ardea intermedia*
Little Egret	*Egretta garzetta*
Mallee Emu-wren	*Stipiturus mallee*
Murray Cod	*Maccullochella peelii peelii*
Murray Hardyhead	*Craterocephalus fluviatilis*
Murray Spiny Cray	*Euastacus armatus*
Musk Duck	*Biziura lobata*
Painted Honeyeater	*Grantiella picta*
Pink-eared Duck	*Malacorhynchus membranaceus*
Plains-wanderer	*Pedionomus torquatus*
Red-naped Snake	*Furina diadema*
Regent Parrot	*Polytelis anthopeplus*
Royal Spoonbill	*Platalea regia*
Silver Perch	*Bidyanus bidyanus*
Southern Myotis	*Myotis macropus*
Squirrel Glider	*Petaurus norfolcensis*
Superb Parrot	*Polytelis swainsonii*
Tree Goanna	*Varanus varius*
Trout Cod	*Maccullochella macquariensis*
Unspecked Hardyhead	*Craterocephalus stercusmuscarum fulvus*
White-bellied Sea-Eagle	*Haliaeetus leucogaster*
Yellow-footed Antechinus	*Antechinus flavipes*

Flora

English Name	Scientific Name
Black Box	*Eucalyptus largiflorens*
Bladder Saltbush	*Atriplex vesicaria*
Bluish Raspwort	*Haloragis glauca* f. *glauca*
Branching Groundsel	*Senecio* sp. aff. *cunninghamii* (north-west)
Broombush	*Melaleuca uncinata*
Buloke	*Allocasuarina luehmannii*
Buloke Mistletoe	*Amyema linophylla* subsp. *orientale*
Bush Minuria	*Minuria cunninghamii*
Cane Grass	*Eragrostis australasica*
Chariot Wheels	*Maireana cheelii*
Chenopod	*Chenopodiaceae* spp.
Club-hair New Holland Daisy	*Vittadinia condyloides*
Common Spike-sedge	*Eleocharis acuta*
Curly Flat-sedge	*Cyperus rigidellus*
Desert Lantern	*Abutilon otocarpum*
Dwarf Swainson-pea	*Swainsona phacoides*
Eucalypt	*Eucalyptus* spp.
Giant Rush	*Juncus ingens*
Grey Billy-buttons	*Craspedia canens*
Grey Box	*Eucalyptus microcarpa*
Grey Scurf-pea	*Cullen discolor*
Hairy Tails	*Ptilotus erubescens*
Inland Pomaderris	*Pomaderris paniculosa* subsp. *paniculosa*
Jericho Wire-grass	*Aristida jerichoensis* var. *subspinulifera*
Leafless Bluebush	*Maireana aphylla*
Lignum	*Muehlenbeckia* spp.
Long Eryngium	*Eryngium paludosum*
Mealy Saltbush	*Atriplex pseudocampanulata*
Mueller Daisy	*Brachyscome muelleroides*
Native Couch	*Cynodon dactylon* var. *pulchellus*
Northern Golden Moths	*Diuris protena*
Paddle Saltbush	*Atriplex turbinata*
Pale Flax-lily	*Dianella longifolia s.l.*
Pale Spike-sedge	*Eleocharis pallens*
Purple Diuris	*Diuris punctata* var. *punctata*
Red Swainson-pea	*Swainsona plagiotropis*
River Bottlebrush	*Callistemon sieberi*
River Red Gum	*Eucalyptus camaldulensis*
Riverina Bitter-cress	*Cardamine moirensis*
Riverine Flax-lily	*Dianella porracea*
Rough-barked Honey-myrtle	*Melaleuca parvistaminea*
Rounded Noon-flower	*Disphyma crassifolium* subsp. *clavellatum*
Saltbush	*Atriplex* spp.
Sand Sida	*Sida ammophila*
Shining Glasswort	*Halosarcia nitida*
Silky Glycine	*Glycine canescens*
Silky Swainson-pea	*Swainsona sericea*
Silky Umbrella-grass	*Digitaria ammophila*
Silver Tails	*Ptilotus obovatus* var. *obovatus*
Silver Wattle	*Acacia dealbata*
Slender Darling-pea	*Swainsona murrayana*
Slender Love-grass	*Eragrostis exigua*

English Name	Scientific Name
Small Scurf-pea	*Cullen parvum*
Smooth Minuria	*Minuria integerrima*
Southern Cane-grass	*Eragrostis infecunda*
Spiny Lignum	*Muehlenbeckia horrida* subsp. *horrida*
Spiny Mud-grass (Moira grass)	*Pseudoraphis spinescens*
Spiny Rice-flower	*Pimelea spinescens*
Spiny-fruit Saltbush	*Atriplex spinibractea*
Spotted Emu-bush	*Eremophila maculata* var. *maculata*
Spreading Emu-bush	*Eremophila divaricata* subsp. *divaricata*
Spreading Scurf-pea	*Cullen patens*
Swamp Buttercup	*Ranunculus undosus*
Swamp Wallaby-grass	*Amphibromus* spp.
Tall Kerosene Grass	*Aristida holathera* var. *holathera*
Tangled Lignum	*Muehlenbeckia florulenta*
Terete Culm-sedge	*Carex tereticaulis*
Three-wing Bluebush	*Maireana triptera*
Tough Scurf-pea	*Cullen tenax*
Twin-leaf Bedstraw	*Asperula gemella*
Umbrella Wattle	*Acacia oswaldii*
Warrego Summer-grass	*Paspalidium jubiflorum*
Waterbush	*Myoporum montanum*
Wedderburn Wattle	*Acacia euthycarpa* subsp. *oblanceolata*
Wedge Diuris	*Diuris dendrobioides*
Western Silver Wattle	*Acacia decora*
Western Water-starwort	*Callitriche cyclocarpa*
White Box	*Eucalyptus albens*
Winged New Holland Daisy	*Vittadinia pterochaeta*
Winged Peppercress	*Lepidium monoplocoides*
Woolly Scurf-pea	*Cullen pallidum*
Yakka Grass	*Sporobolus caroli*
Yellow Box	*Eucalyptus melliodora*
Yellow Tails	*Ptilotus nobilis* var. *nobilis*

APPENDIX 6

Revised forest growth rates, state forest areas and sustainable sawlog volume estimates

	Growth Rates (cubic metres/ha/yr)		Available Areas (ha)		Sustainable Sawlog Volumes (cubic metres/year)			
Forest Location and Site Quality	**Original (frequent flooding)**	**Recent (reduced flooding)**	**Current**	**Recommended (by VEAC)**	**Current Area & Original Growth Rates**	**Current Area & Recent Growth Rates**	**Recommended Area & Original Growth Rates**	**Recommended Area & Recent Growth Rates**
Barmah High SQ	0.38	0.23	6089	0	1582	965	0	0
Barmah Low SQ	0.17	0.10	12,052	0	1388	836	0	0
Goulburn High SQ	0.30	0.25	2749	0	412	355	0	0
Goulburn Low SQ	0.20	0.16	2637	0	265	211	0	0
Murray Forests Low SQ	0.20	0.16	2406	0	242	193	0	0
Gunbower High SQ	0.27	0.16	5604	4900	1025	612	899	537
Gunbower Low SQ	0.14	0.08	5854	4984	548	325	467	277
		Totals:	**37,391**	**9884**	**5462**	**3497**	**1366**	**814**
			Percent of 2006-07 sawlog licence volumes:		90%	58%	22.5%	13%
			Percent of 5462 cubic metres/yr:		100%	64%	25%	15%
			Percent of 3497 cubic metres/yr:			100%	39%	23%

Notes

Incorporates River Red Gum Forest in the General & Special Management Zones, new site quality data and Murray Forests (Lower Ovens to Tocumwal) in the analysis. Refer to State Forests in Chapter 3 for an explanation of the changes since the Draft Proposals Paper.

Revised Site Quality data and CFI data were provided by the Department of Sustainability and Environment.

Assumes that growth rates will return to original values if adequate environmental water is provided.

APPENDIX 7

Recommendations for natural features reserves

Recommendations for Natural Features Reserves – Bushland Areas

Rec No.	Name	Area (ha)	Parcel Number List*
G1	Wargan-Mallee Bushland Area	1441.1	P000189, P000182, P000221, P000181, P000180, P000223, P000202, and parts of P003436, P000202 and P000224
G2	Carwarp Bushland Area	6.0	P000321, P000322
G3	Piangil Bushland Area	0.2	P006157, P006156
G4	Nyah Bushland Area	155.3	P003015, P002996, P002994, P372745, P372743, P372744
G5	Lake Kelly Bushland Area	3.4	P004347
G6	McMillans Lake Bushland Area	32.5	P120122, P123963
G7	Spences Lake Bushland Area Note: salt extraction activities can continue in this Bushland Area	40.9	P121808, P121807
G8	Cranes Lake Bushland Area Note: Salt extraction activities can continue in this Bushland Area	34.1	P121844
G9	Beauchamp Salt Lake Bushland Area	18.6	P120056
G10	Beauchamp Bushland Area	5.1	P123295, P120020
G11	Lake Lookout Bushland Area	69.5	P120058
G12	Sandhill Lake Bushland Area	165.2	P120053, P120054, P120067, P120068, P368494
G13	Quambatook Bushland Area	9.5	P123487
G14	Narrewillock Bushland Area	1.1	P122211, P123338
G15	Barrakee Bushland Area	15.8	P128295, P128293, P121350, P121351, P128294
G16	Lake Boort Bushland Area	477.8	P120807, P120797, P120800, P120801, P120798
G17	Boort Bushland Area	2.8	P125408, P364867
G18	Dry Lake Bushland Area	144.6	Dry Lake south of Kerang
G19	Salter Bushland Area	3.8	P122156, P122157
G20	Myall Bushland Area	32.1	P134423, P125285, P125286
G21	Murrabit Bushland Area	17.3	P122149, P125270
G22	Cohuna Bushland Area	1.9	P121580
G23	Wee Wee Rup Bushland Area	6.9	P122411,
G24	Leitchville Bushland Area	9.3	P122420, P122419
G25	Pyramid Hill Bushland Area	3.1	P124729
G26	Blind Creek Bushland Area	3.6	P129452
G27	Mologa Wetland Bushland Area	1.1	P127123
G28	Mologa Triangle Bushland Area	2.6	P132441
G29	Mologa Bushland Area	2.9	P132803
G30	Dingee Bushland Area	10.0	P121911, P121900, P121912
G31	Terrick Terrick North Bushland Area	1.5	P131378, P131379, P131380, P133775
G32	McIntyre Rd Grassland Bushland Area	1.1	P124491, P124492, P124490
G33	Dullard Waterhole Bushland Area	0.8	P124457
G34	Elmore-Cohuna Railway Bushland Area	31.7	Section of unused rail reserve between Kotta and McColl
G35	Lockington Bushland Area	3.7	P370727, P370725, P370724, P370726, P130029
G36	Turrumberry North Bushland Area	7.0	P124493
G37	Wharparilla Bushland Area	9.8	P131652, P131653, P131654, P131666, P131655, P131656, P131657, P131658, P131659, P131660, P131661, P131662, P131663, P131664, P131665, P125466, P131641, P131642, P131643, P131645, P131646, P131647, P131648, P131649, P131650, P131651
G38	Echuca West Bushland Area	10.2	P125462
G39	Piper Bushland Area	12.5	P124697
G40	Beattie Depression Bushland Area Note: This Bushland Area can continue to be used as a floodway. Southern sections of this area should be revegetated.	398.0	Beattie Depression floodway east of Echuca
G41	Nanneella Bushland Area	28.0	P160556, P161253, P161252

Rec No.	Name	Area (ha)	Parcel Number List*
G42	Rushworth-Colbinabbin Rail Line Bushland Area	15.6	P125135, P372106 and sections of disused railway line near Karook
G43	Moira Bushland Area	8.0	P160557
G44	Lower Moira Bushland Area	3.1	P160558, part road reserve
G45	Narioka Bushland Area	2.2	P160560
G46	Brooms Bushland Area	9.9	P160567
G47	Barwo Bushland Area	6.5	P160568
G48	McLellands Bushland Area	35.8	P160571, P160570
G49	Kotupna Bushland Area	3.7	P160569
G50	Kotupna School Bushland Area	2.6	P368704
G51	St Germains Bushland Area	0.4	P162682
G52	Undera Bushland Area	1.3	P162693
G53	Strathmerton Bushland Area	38.0	P16057, P160579, P160577, P160576 and part adjoining rail land
G54	Horseshoe Lagoon Bushland Area	9.5	P204458
G55	Kaluna Park Bushland Area	23.2	P204519, P204488
G56	Ovens Billabong Bushland Area	2.2	P206888
G57	Oxley Bushland Area Note: This Bushland Area should be revegetated	7.3	P200133, P200131, P200132, P200124, P200134
G58	Wodonga Bushland Area	4.9	P205761
G59	Bonegilla Wetland Bushland Area	0.4	P200095

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Recommendations for Natural Features Reserves – Streamside Areas

Rec No.	Name	Area (ha)	Parcel Number List*
G60	Mosquito Creek Streamside Area	179.5	P123484, P123483, P123481
G61	Capels Crossing Streamside Area	292.2	P133045, P125353, P121817, P121836, P123007, and parts of P123008, P124683, P125339 P123006, P121816 and adjoining public land
G62	Kinypanial Streamside Area	22.0	P123174, part P123175
G63	Hayanmi Streamside Area	24.0	P122562, P122564, P122563, P122559, P122560, P122561
G64	Strathallan Streamside Area	21.2	P375442
G65	Bandella Streamside Area	21.4	P126735
G66	Bonn Streamside Area	6.7	P120728, P120729
G67	Runnymede Streamside Area	13.7	P123695, P123696
G68	English Bridge Streamside Area	34.4	P120912, P120910, P120908, P120911, P120913, P120909, P123450
G69	Wakiti Creek Streamside Area	313.5	P161635, P161636 and part P161634
G70	Deep Creek Streamside Area	5.3	P161614
G71	Skeleton Creek Streamside Area	105.1	P161632, P161637, P161638, P161639, P161640, P161598, P161599, P161600, P161601, P161606, P161607, P372699, P372700, P372701
G72	Arcadia Streamside Area	1048.5	P163921, P163905, P163904, P125269, P163900, P163899, P163901, P163902, P162805, P163914, P163925, P164293, P163927, P163909, P163881, P163912, P163913, P163880, P163879, P163910, P163923, P163908, P163911, P163878, P163877, P163480, P163479, P163867, P163922, and parts of P163835, P163921, P163924, P363614, P163898, P163903, P161588, P162806
G73	Dargalong Streamside Area	1.3	P163956
G74	Wahring Streamside Area	2.8	P163436
G75	Oxley Streamside Area	1.1	P201780
G76	Tarrawingee Streamside Area	24.7	P203477, P201614, P201613
G77	Whorouly Streamside Area	12.3	P201892, P203087, P201900
G78	Eurobin Streamside Area	2.0	P202212
G79	Kergunyah Streamside Area	1.8	P204160
G80	Gundowring Streamside Area	4.8	P200890, P204201, P200891
G81	Dederang Streamside Area	7.0	P204637

Recommendations for Natural Features Reserves – Wildlife Areas (State Game Reserves)

Rec No.	Name	Area (ha)	Parcel Number List*
G82	Heywood Lake Wildlife Area	566.6	P007053, P007052, P007054
G83	Lake Mannaor Wildlife Area	86.6	P004284, P366448, P004283
G84	Tutchewop Wildlife Area	514.6	P004298, P004297, P004296, P004295, P131950, P131951, P131952
G85	Cullens Lake Wildlife Area	748.7	P134443, P121805, P121850, P120044, P121849, P120046
G86	Duck Lake North Wildlife Area	296.2	Part of P121848
G87	Little Lake Charm Wildlife Area	61.3	P370260, P370259
G88	Stevenson Swamp Wildlife Area	92.6	P121811
G89	Lake Murphy Wildlife Area	223.4	P126661, P126664, P126662, P126663
G90	Great Spectacle Lake Complex Wildlife Area	150.8	P123213, P131971, P131972, P126695, P131973, P131970 P134448
G91	Lake Lyndger Wildlife Area	331.8	P120790
G92	Two Mile Swamp Wildlife Area	143.6	P124510, P124511
G93	Westblades Swamp Wildlife Area	69.7	P125346, P134667, P134404, P125345
G94	Harts Swamp Wildlife Area	44.9	P125276
G95	McDonald Swamp Wildlife Area	215.2	P122147
G96	Hird Swamp Wildlife Area	456.6	P133719, P134582, P126218, P126219, P133273, P133276, P126218, P122136, P126221, P126214 and part P126190
G97	Baillieu Lagoon Wildlife Area	191.0	P124468
G98	Murphy Swamp Wildlife Area	84.9	P124486, P133403, P133402
G99	Corop Wildlife Area	12.1	P132828, P132827, P132826, P128705, P128706, P128707
G100	Gaynor Swamp Wildlife Area	451.6	P134171, P122129, P134173, P132958, P122137, P134172, P122135, P134174
G101	Mansfield Swamp Wildlife Area	490.4	P133706, P133705, P133712, P133713, P133711, P133714, P133718, P133717, P133958
G102	Murchison Lagoon Wildlife Area	5.9	P163198
G103	Reedy Swamp Wildlife Area	225.5	P364187, P372762 part, P163238, P160527 part from top of eastern bank of the Goulburn River
G104	Big Reedy Lagoon Wildlife Area	274.0	P163638, P364151, P371783, P371784

Recommendations for Natural Features Reserves – Public Land Water Frontage Areas

Rec No.	Name	Area (ha)
G105	Avoca River Reserve	1424.4
G106	Loddon River Reserve	1697.2
G107	Campaspe River Reserve	631.9
G108	Goulburn River Reserve	236.1
G109	Ovens River Reserve	1537.9
G110	King River Reserve	621.9
G111	Kiewa River Reserve	1178.0
G112	Various other public land water frontage areas as indicated on Map A.	8547.8

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APPENDIX 8

Uncategorised public land parcels recommended for revegetation

Parcel Number	Area (ha)
P000188	1.93
P000190	2.35
Part of P000202	28
P000222	4.82
P003030	4.33
P004282	9.18
P120019	0.42
P120062	7.96
P120456	2.23
P122448	2.17
P122723	3.77
P122725	1.62
P122803	2.06
P124431	6.7
P124483	7.77
P124549	2.04
P124565	26.04
P124769	5.08
P124858	4.31
P124919	0.69
P124928	1.7
P125133	3.98
P125404	4.77
P125693	1.98
P127127	2.12
P128363	2.22
P128367	3.06
P128368	0.33
Part of P128370	8.55
Part of P131383	14.52
P131384	2.88
P131818	1.04
P132615	2.4
P132616	9.55
P133036	1.94
P369595	5.78
P370261	4.65
P370262	1.59
P370871	6.42

Note: Crown Land areas have in the past been described using a Crown Allotment (CA), Section (Sec) and Parish (P) or Township (T). More recently Crown land has been attributed a unique identifier known as a Crown parcel number, or P number. The P number is provided above for Crown land parcels. Maps of these parcels can be generated by the Catchment Information Mapper website (http://nremap-sc.nre.vic.gov.au/MapShare.v2/imf.jsp?site=cim or go to the DSE website www.dse.vic.gov.au and select the following links: 'Property, Titles & Maps', then 'Maps, Imagery and Data', then 'Maps', then 'MapShare', then 'Catchment Information Mapper') or can be provided by VEAC upon request.

APPENDIX 9

Reservation Status of Ecological Vegetation Classes (EVCs)

The following representation table provides details on the extent of Ecological Vegetation Classes (EVCs) in the recommended dedicated reserve system across the investigation area. A representation table of EVCs in each bioregion within the investigation area is available on the VEAC website (www.veac.vic.gov.au) or by request from VEAC. Descriptions of vegetation communities, EVCs, mapping, bioregional conservation status methodologies and definitions are provided in the Discussion Paper and summarised below.

Flood-depended EVCs—identified in column 15—have been determined as part of Council's mapping of flood dependent natural assets project across the floodplain of the Murray, Goulburn and Ovens Rivers (appendix 11).

Definitions and Key

Ecological Vegetation Classes (EVCs) are groups of one or more vegetation communities which exist under a common regime of ecological processes and which are linked to broad landscape features. Any variability of communities within an EVC are due to geographical separation rather than major ecological differences.

It is possible to map EVCs distributions with individual site data; aerial photographs; maps of the main environmental determinants of vegetation distribution (such as soils, rainfall, topography); any pre-existing vegetation mapping; and extensive field work to identify boundaries and ground-check EVCs mapping.

As well as the standard EVCs, the process of mapping generates two variations—mosaics and complexes. A mosaic consists of two or more discrete EVCs that cannot be mapped separately due to the mapping scale. A complex occurs where two or more EVCs are unable to be distinguished in an area but are known to exist discretely elsewhere. Some EVCs occur only in mosaics. These types and units are referred to simply as 'EVCs'.

The extent to which vegetation has been depleted—that is, cleared as a result of European settlement—is a key consideration in the establishment of conservation reserve systems and used in conjunction with measures to protect threatened species. Assessing EVC depletion requires mapping of both EVC extent prior to European settlement (pre-1750 mapping), as well as current distribution. Modelling and prediction of original pre-1750 vegetation is used for areas of non-indigenous vegetation or cleared land. For the purposes of establishing targets for reservation, conservation status at the bioregional level is used. Bioregional conservation status of each EVC is presented for the four main bioregions occurring in the study area: Murray Fans, Victorian Riverina, Robinvale Plains and Murray Scroll Belt. Smaller areas of other bioregions also occur within the study area. The representation table of EVCs in each bioregion is available on the VEAC website (www.veac.vic.gov.au) or by request from VEAC. Data in the representation table were derived by GIS analysis, overlaying on computer, maps of:

- the pre-1750 extent of EVCs;
- current extent of EVCs; and
- current and recommended public land-use categories.

DSE released a new geospatial dataset for the extent of native vegetation in early 2008 to accompany the *Net Gain Accounting – First Approximation Report*. At the time of VEAC reanalysing EVC reservation status for the final recommendation, this dataset was not in an appropriate form for use by VEAC. As such the EVC datasets used previously for this investigation were again used for the final recommendations. The recently released DSE mapping, increased the likely distribution of a number of grassy ecosystems, mostly on private land, and has little impact on the previously mapped distribution of EVCs on public land in the investigation area or the conservation status of those EVCs. Some figures may vary slightly from those in the Draft Proposals Paper due to improved data validation. 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. The area of public land in the investigation area is greater than in this representation table because several thousand hectares of public land that have been cleared are not included in the calculations. The following is a detailed key for the column headings and symbols used in the representation table.

Columns 1 and 2: Ecological Vegetation Classes (EVC) number and name

Names and identification numbers of EVCs mapped in the investigation area, including complexes and mosaics.

Column 3: Pre-1750 Extent

Total area in hectares estimated to have been occupied by each EVC prior to European settlement.

Column 4: Current extent (public and private land)

Total area in hectares currently occupied by each EVC – that is, that part of the pre-1750 distribution where indigenous vegetation is currently present.

Column 5: Percent Remaining

Percentage of current extent (column 4) of each EVC compared to pre-1750 extent (column 3).

Column 6: Current Dedicated Reserve

Total area in hectares of each EVC in **existing** public land-use categories that comprise the conservation reserve system.

Column 7: Recommended Dedicated Reserve

Total area in hectares of each EVC in **recommended** public land-use categories that comprise the conservation reserve system.

Column 8: Recommended Other public land

Total area in hectares of each EVC in all recommended public land-use categories outside the dedicated reserve system.

Column 9: Recommended Dedicated Reserves as % of Pre-1750 Extent

Percentage of each EVC in recommended dedicated reserves (column 7) compared to pre-1750 extent (column 3).

Column 10: Recommended Dedicated Reserves as % of Current Extent

Percentage of each EVC in recommended dedicated reserves (column 7) compared to current extent (column 4).

Columns 11-14: Bioregional Conservation Status

Bioregional conservation status of each EVC occurring in the four main bioregions:

MF = Murray Fans
MSB = Murray Scroll Belt
RP = Robinvale Plains
VR = Victorian Riverina

The assessments refer to EVC distributions in the investigation area or in bioregions within the investigation area. The percent remaining (column 5) is a key factor in assigning EVCs to status categories:

E = endangered
V = vulnerable
D = depleted
LC = Least Concern
na = not applicable

Other criteria include degradation, current threats, rarity and naturally restricted occurrence. Bioregional Conservation Status is based on latest advice from DSE (November 2007)

Column 15: Flood-dependent EVCs

Flood-depended EVCs have been determined as part of the mapping of flood-dependent natural assets across the floodplain of the Murray, Goulburn, King and Ovens Rivers (appendix 11).

Y = flood-dependent
N = not flood-dependent
V = potentially flood-dependent in some areas

Column 16: Critical flood interval

The maximum interval (in years) at which flood-dependent EVCs require a flood in order to sustain the EVC in a healthy and viable condition.

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
806	Alluvial Plains Semi-arid Grassland	3,520	3,517	99.9	1,568	3,052	64	86.7	86.8		V	V		Y	25
81	Alluvial Terraces Herb-rich Woodland/ Creekline Grassy Woodland Mosaic	15	9	61.6	0	0	5	0.0	0.0				V	N	
653	Aquatic Herbland	139	139	100.0	0	139	0	99.8	99.8	D				Y	2
1043	Aquatic Herbland/ Floodplain Grassy Wetland Mosaic	59	59	100.0	0	59	0	100.0	100.0	E				Y	2
1044	Aquatic Herbland/Floodway Pond Herbland	1	1	100.0	0	1	0	100.0	100.0	D				Y	2
1045	Aquatic Herbland/ Riverine Swamp Forest Mosaic	1	1	100.0	0	1	0	100.0	100.0	D				Y	2
1047	Aquatic Herbland/Tall Marsh Mosaic	68	68	100.0	0	68	0	100.0	100.0	D				Y	2
993	Bare Rock/Ground	1,160	1,160	100.0	525	691	357	59.5	59.5	na	na	na		V	
334	Billabong Wetland Aggregate	1,317	1,096	83.2	17	337	300	25.6	30.8	D			V	Y	2
297	Billabong Wetland Aggregate/ Red Gum Swamp Mosaic	21	1	7.1	0	0	0	0.0	0.0	V			E	Y	2
61	Box Ironbark Forest	61	17	27.3	0	1	2	1.9	7.1				V	N	
636	Brackish Lake Aggregate	1,959	1,884	96.2	0	0	1,843	0.0	0.0				E	N	
291	Cane Grass Wetland	46	7	16.3	0	0	0	0.0	0.0				V	Y	5
829	Chenopod Grassland	108,008	17,461	16.2	279	413	407	0.4	2.4	E			E	N	
158	Chenopod Mallee	4,508	2,986	66.2	233	1,998	97	44.3	66.9	V	V	V	V	N	
68	Creekline Grassy Woodland	2,390	938	39.2	4	4	93	0.2	0.5	E			E	N	
807	Disused Floodway Shrubby Herbland	23	23	100.0	13	23	0	100.0	100.0		E			Y	25
168	Drainage-line Aggregate	3,668	2,522	68.8	25	683	645	18.6	27.1	V			E	Y	2
1022	Drainage-line Aggregate/ Riverine Swamp Forest Mosaic	116	116	100.0	0	113	0	97.4	97.4	V			V	Y	3
1023	Drainage-line Aggregate/ Sedgy Riverine Forest Mosaic	23	23	100.0	0	23	0	100.0	100.0	V				Y	5
1025	Drainage-line Aggregate/Tall Marsh Mosaic	3	3	100.0	0	3	0	100.0	100.0	V				Y	2

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
108	Drainage-line Grassy Woodland/ Lake Bed Herbland Mosaic	765	0	0.0	0	0	0	0.0	0.0	V				Y	5
809	Floodplain Grassy Wetland	581	577	99.2	0	513	56	88.3	89.0	E	E	E		Y	2
1049	Floodplain Grassy Wetland/ Floodway Pond Herbland Mosaic	6	6	100.0	0	6	0	100.0	100.0	E				Y	2
1051	Floodplain Grassy Wetland/ Riverine Swamp Forest Mosaic	101	101	100.0	0	101	0	100.0	100.0	E				Y	2
1052	Floodplain Grassy Wetland/ Riverine Swampy Woodland Mosaic	9	5	54.5	0	1	0	16.2	29.7	E			E	Y	2
1054	Floodplain Grassy Wetland/ Spike-sedge Wetland Mosaic	22	22	100.0	0	22	0	100.0	100.0	E				Y	2
1055	Floodplain Grassy Wetland/Tall Marsh Mosaic	21	21	100.0	0	21	0	100.0	100.0	E				Y	2
56	Floodplain Riparian Woodland	22,252	15,593	70.1	57	3,763	4,583	16.9	24.1	D			V	Y	7
1033	Floodplain Riparian Woodland/ Floodway Pond Herbland Mosaic	3	3	96.5	0	2	0	82.4	85.5	D				Y	3
1031	Floodplain Riparian Woodland/ Grassy Riverine Forest Mosaic	34	34	100.0	0	6	16	16.3	16.3	D				Y	4
1032	Floodplain Riparian Woodland/ Riverine Grassy Woodland Mosaic	27	18	68.1	0	6	5	21.0	30.9	V			E	Y	7
1034	Floodplain Riparian Woodland/ Riverine Swamp Forest Mosaic	237	55	23.3	0	2	48	0.7	3.2	D			V	Y	3
1035	Floodplain Riparian Woodland/ Sedgy Riverine Forest Mosaic	210	205	97.6	0	3	138	1.3	1.3	D			V	Y	5
1037	Floodplain Riparian Woodland/ Tall Marsh Mosaic	1	1	100.0	0	1	0	100.0	100.0	D				Y	2
172	Floodplain Wetland Aggregate	1,161	912	78.6	3	147	221	12.7	16.2	D			V	Y	2
810	Floodway Pond Herbland	1,166	1,156	99.2	183	606	454	52.0	52.4	D	D	D	V	Y	3
945	Floodway Pond Herbland/ Riverine Swamp Forest Complex	2,523	2,523	100.0	0	750	1,768	29.7	29.7	D				Y	3
1058	Floodway Pond Herbland/ Riverine Swamp Forest Mosaic	89	32	36.3	0	1	6	1.1	3.0	D				Y	3

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
1060	Floodway Pond Herbland/Tall Marsh Mosaic	7	7	100.0	0	7	0	100.0	100.0	D				Y	3
718	Freshwater Lake Aggregate	4,220	4,203	99.6	1	170	3,988	4.0	4.0				V	N	
22	Grassy Dry Forest	676	266	39.4	0	0	18	0.0	0.0				D	N	
106	Grassy Riverine Forest	9,458	8,929	94.4	1,725	3,451	4,688	36.5	38.7	D	D	D	D	Y	4
1015	Grassy Riverine Forest/ Drainage-line Aggregate Mosaic	3	3	100.0	0	3	0	100.0	100.0	D				Y	4
811	Grassy Riverine Forest/ Floodway Pond Herbland Complex	1,141	1,127	98.8	268	456	599	40.0	40.5	D	D	D		Y	4
1029	Grassy Riverine Forest/ Floodway Pond Herbland Mosaic	5	5	100.0	0	5	0	100.0	100.0	D				Y	4
1017	Grassy Riverine Forest/ Riverine Grassy Woodland Mosaic	23	23	100.0	0	23	0	100.0	100.0	V				Y	4
812	Grassy Riverine Forest/ Riverine Swamp Forest Complex	8,323	6,367	76.5	0	2,217	2,331	26.6	34.8	D			D	Y	3
1030	Grassy Riverine Forest/ Riverine Swamp Forest Mosaic	67	67	100.0	0	67	0	99.5	99.5	D				Y	3
1062	Grassy Riverine Forest/ Riverine Swampy Woodland Mosaic	1	1	100.0	0	1	0	100.0	100.0	V				Y	4
1063	Grassy Riverine Forest/ Sedgy Riverine Forest Mosaic	344	344	100.0	0	344	0	100.0	100.0	D			V	Y	4
1065	Grassy Riverine Forest/Tall Marsh Mosaic	2	2	100.0	0	2	0	100.0	100.0	D				Y	2
175	Grassy Woodland	3,933	714	18.2	47	67	63	1.7	9.4	E			E	N	
251	Grassy Woodland/Valley Grassy Forest Mosaic	64	5	7.6	0	0	0	0.0	0.0				E	N	
20	Heathy Dry Forest	6	5	88.2	0	0	0	0.0	0.0				LC	N	
23	Herb-rich Foothill Forest	195	114	58.6	0	4	12	2.2	3.8				D	N	
813	Intermittent Swampy Woodland	9,204	9,157	99.5	5,750	7,040	1,377	76.5	76.9	D	D	D	D	Y	7
107	Lake Bed Herbland	3,695	3,649	98.8	1,850	2,908	392	78.7	79.7	V	V	D	D	Y	5
808	Lignum Shrubland	16,673	16,045	96.2	5,655	9,843	2,103	59.0	61.4	V	LC	LC		Y	15

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
104	Lignum Swamp	51,414	17,101	33.3	1,938	2,636	1,473	5.1	15.4	V	V	V	V	Y	15
823	Lignum Swampy Woodland	69,543	41,331	59.4	5,723	13,435	9,510	19.3	32.5	V	D	D	V	Y	15
942	Lignum Swampy Woodland/ Lake Bed Herbland Mosaic	125	64	51.2	0	0	35	0.0	0.0				V	Y	2–5
943	Lignum Swampy Woodland/ Plains Grassland Mosaic	12,638	1,352	10.7	9	9	20	0.1	0.7				E	Y	15
91	Loamy Sands Mallee	1,399	1,384	99.0	1,336	1,344	2	96.1	97.1	LC		LC		N	
102	Low Chenopod Shrubland	40,848	38,819	95.0	5,972	10,897	522	26.7	28.1	D	D	D		N	
66	Low Rises Woodland	3,013	716	23.8	54	309	60	10.2	43.1	E			E	N	
1038	Low Rises Woodland/ Riverine Swampy Woodland Mosaic	2	2	100.0	0	2	0	100.0	100.0	E				Y	5
652	Lunette Woodland	1,581	131	8.3	0	0	34	0.0	0.0	E			E	N	
1048	Mosaic of Aquatic Herbland/Floodway Pond Herbland-Riverine Swamp Forest Complex	2	2	100.0	0	2	0	100.0	100.0	D				Y	2
1046	Mosaic of Aquatic Herbland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	0	0	100.0	0	0	0	100.0	100.0	D				Y	2
1039	Mosaic of Drainage-line Aggregate/Floodway Pond Herbland-Riverine Swamp Forest Complex	1	1	100.0	0	1	0	100.0	100.0	V				Y	3
1021	Mosaic of Drainage-line Aggregate/Grassy Riverine Forest-Riverine Swamp Forest Complex	146	146	100.0	0	146	0	100.0	100.0	V				Y	3
1024	Mosaic of Drainage-line Aggregate/Sedgy Riverine Forest-Riverine Swamp Forest Complex	66	67	100.2	0	19	0	28.7	28.7	V			V	Y	3
1056	Mosaic of Floodplain Grassy Wetland/Floodway Pond Herbland-Riverine Swamp Forest Complex	1	1	100.0	0	1	0	100.0	100.0	E				Y	2
1053	Mosaic of Floodplain Grassy Wetland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	2	2	100.0	0	2	0	100.0	100.0	E				Y	2
1050	Mosaic of Floodplain Grassy Wetland/Grassy Riverine Forest-Riverine Swamp Forest Complex	23	23	100.0	0	6	16	28.5	28.5	E				Y	2
1036	Mosaic of Floodplain Riparian Woodland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	0	0	104.1	0	0	0	30.2	29.1	na				Y	3

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
1057	Mosaic of Floodway Pond Herbland/Grassy Riverine Forest-Riverine Swamp Forest Complex	4	4	100.0	0	4	0	100.0	100.0	D				Y	3
1059	Mosaic of Floodway Pond Herbland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	8	8	100.0	0	8	0	100.0	100.0	D				Y	3
1020	Mosaic of Grassy Riverine Forest/Floodway Pond Herbland-Riverine Swamp Forest Complex	379	379	100.0	0	379	0	100.0	100.0	D				Y	3
1016	Mosaic of Grassy Riverine Forest/Plains Grassy Woodland-Grassy Woodland Complex	0	0	100.0	0	0	0	100.0	100.0	E				Y	4
1019	Mosaic of Grassy Riverine Forest/Sedgy Riverine Forest-Riverine Swamp Forest Complex	76	76	100.0	0	76	0	100.0	100.0	D				Y	4
1061	Mosaic of Grassy Riverine Forest-Riverine Swamp Forest Complex/Riverine Swamp Forest	239	239	100.0	0	231	7	96.9	96.9	D				Y	3
1042	Mosaic of Riverine Grassy Woodland/Floodway Pond Herbland-Riverine Swamp Forest Complex	1	1	100.0	0	1	0	100.0	100.0	V				Y	3
1072	Mosaic of Riverine Swamp Forest/Floodway Pond Herbland-Riverine Swamp Forest Complex	882	882	100.0	0	881	0	99.9	99.9	D				Y	3
1074	Mosaic of Riverine Swampy Woodland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	32	32	100.0	0	32	0	100.0	100.0	V				Y	3
1078	Mosaic of Sedgy Riverine Forest/Floodway Pond Herbland-Riverine Swamp Forest Complex	31	31	100.1	0	31	0	99.4	99.3	D				Y	3
1075	Mosaic of Sedgy Riverine Forest/Sedgy Riverine Forest-Riverine Swamp Forest Complex	1,253	1,231	98.2	0	1,134	0	90.5	92.1	D				Y	3
1080	Mosaic of Sedgy Riverine Forest-Riverine Swamp Forest Complex/Floodway Pond Herbland-Riverine Swamp Forest Complex	65	65	100.0	0	65	0	100.0	100.0	D				Y	3
1079	Mosaic of Sedgy Riverine Forest-Riverine Swamp Forest Complex/Tall Marsh	7	7	100.0	0	7	0	100.0	100.0	D				Y	3
1083	Mosaic of Tall Marsh/Floodway Pond Herbland-Riverine Swamp Forest Complex	83	83	100.5	0	83	0	100.0	99.5	D				Y	3
1085	Mountain Valley Riparian Woodland	1,325	892	67.3	0	4	553	0.3	0.4				V	N	
132	Plains Grassland	251,009	37,784	15.1	1,969	2,554	598	1.0	6.8	E		E	E	N	

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
267	Plains Grassland/Plains Grassy Woodland/ Gilgai Wetland Mosaic	13,066	1,391	10.6	19	37	318	0.3	2.6	E			E	N	
125	Plains Grassy Wetland	2,172	645	29.7	121	145	0	6.7	22.5	E			E	Y	3
55	Plains Grassy Woodland	14,954	1,532	10.2	3	6	134	0.0	0.4				E	N	
238	Plains Grassy Woodland/ Creekline Grassy Woodland/ Floodplain Riparian Woodland Mosaic	1,288	80	6.2	0	0	0	0.0	0.0				E	Y	7
240	Plains Grassy Woodland/Creekline Grassy Woodland/Wetland Formation Mosaic	0	0	96.6	0	0	0	0.0	0.0				E	V	
259	Plains Grassy Woodland/Gilgai Wetland Mosaic	6	1	10.7	0	0	0	0.0	0.0	E			E	N	
187	Plains Grassy Woodland/ Grassy Woodland Complex	95	30	31.2	0	0	6	0.0	0.0				E	N	
188	Plains Grassy Woodland/Valley Grassy Forest Complex	13	1	3.9	0	0	0	0.0	0.0				E	N	
190	Plains Grassy Woodland/Valley Grassy Forest/ Grassy Woodland Complex	194	15	7.6	0	0	4	0.0	0.0				E	N	
888	Plains Saltmarsh	298	266	89.3	3	0	260	0.0	0.0				E	N	
826	Plains Savannah	14,082	2,257	16.0	12	38	43	0.3	1.7	E			E	N	
803	Plains Woodland	137,036	22,055	16.1	313	3,453	1,805	2.5	15.7	E		E	E	N	
235	Plains Woodland/ Herb-rich Gilgai Wetland Mosaic	1,733	186	10.7	0	0	23	0.0	0.0				E	N	
855	Plains Woodland/Lignum Swamp Mosaic	1,250	137	11.0	0	0	0	0.0	0.0				E	Y	15
273	Plains Woodland/Plains Grassland/ Gilgai Wetland Mosaic	6	2	27.6	0	0	0	0.0	0.0				E	N	
856	Plains Woodland/Red Gum Swamp Mosaic	1,034	169	16.4	0	0	4	0.0	0.0				E	Y	3
292	Red Gum Swamp	1,706	1,600	93.8	45	831	564	48.7	51.9	V			V	Y	3
333	Red Gum Swamp/Plains Grassy Wetland Mosaic	718	398	55.4	1	79	122	11.1	20.0	E			E	Y	3
96	Ridged Plains Mallee	1,819	463	25.5	112	121	93	6.7	26.1	E		E	E	N	

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
18	Riparian Forest	399	319	80.0	0	5	252	1.2	1.4				D	N	
237	Riparian Forest/Swampy Riparian Woodland Mosaic	9	34	384.9	0	0	5	5.5	1.4				D	N	
84	Riparian Forest/Swampy Riparian Woodland/ Riparian Shrubland/Riverine Escarpment Scrub Mosaic	1	1	100.0	0	0	1	0.0	0.0				na	N	
103	Riverine Chenopod Woodland	140,325	60,556	43.2	13,412	23,674	7,492	16.9	39.1	E	D	D	V	Y	30–50
321	Riverine Chenopod Woodland/ Lignum Swamp Mosaic	24	13	54.5	0	0	0	0.0	0.0	E			V	Y	15
110	Riverine Chenopod Woodland/ Plains Grassland Mosaic	1,113	266	23.9	0	0	15	0.0	0.0				E	Y	30–50
975	Riverine Ephemeral Wetland	1	1	100.0	0	1	0	100.0	100.0	V				N	
1088	Riverine Grassland	65	62	95.4	0	61	0	95.0	99.5	E				N	
295	Riverine Grassy Woodland	56,348	28,684	50.9	3,376	10,940	5,725	19.4	38.1	V		D	V	Y	7
1027	Riverine Grassy Woodland/Grassy Riverine Forest-Riverine Swamp Forest Complex	0	0	100.0	0	0	0	100.0	100.0	V				Y	3
870	Riverine Grassy Woodland/ Plains Woodland Complex	1,355	283	20.9	0	0	42	0.0	0.0	E				Y	7
871	Riverine Grassy Woodland/Plains Woodland/ Gilgai Wetland Complex	829	146	17.6	0	5	1	0.6	3.3	E			E	Y	7
872	Riverine Grassy Woodland/Plains Woodland/ Riverine Chenopod Woodland Complex	1,131	280	24.8	0	0	1	0.0	0.0	E			na	Y	30–50
873	Riverine Grassy Woodland/Riverine Chenopod Woodland/Wetland Mosaic	50	9	18.5	0	0	0	0.0	0.0	V				Y	7
1028	Riverine Grassy Woodland/ Riverine Swamp Forest Mosaic	14	14	100.0	0	14	0	100.0	100.0	V				Y	3
1040	Riverine Grassy Woodland/ Riverine Swampy Woodland Mosaic	14,061	4,250	30.2	12	540	545	3.8	12.7	V			E	Y	5
1041	Riverine Grassy Woodland/Sedgy Riverine Forest Mosaic	594	566	95.3	0	215	320	36.2	37.9	V			V	Y	5

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
814	Riverine Swamp Forest	12,630	12,043	95.4	34	4,894	6,395	38.8	40.6	D			D	Y	3
1067	Riverine Swamp Forest/ Riverine Swampy Woodland Mosaic	55	55	100.0	0	30	21	54.9	54.9	V				Y	3
1068	Riverine Swamp Forest/ Sedgy Riverine Forest Mosaic	475	396	83.3	13	54	224	11.4	13.7	D			V	Y	3
1069	Riverine Swamp Forest/Sedgy Riverine Forest-Riverine Swamp Forest Complex	1,325	1,218	91.9	0	1,127	34	85.1	92.5	D				Y	3
1070	Riverine Swamp Forest/ Spike-sedge Wetland Mosaic	6	6	100.0	0	6	0	100.0	100.0	V				Y	4
1071	Riverine Swamp Forest/Tall Marsh Mosaic	573	573	100.0	0	573	0	100.0	100.0	D				Y	2
815	Riverine Swampy Woodland	8,943	6,182	69.1	48	2,667	933	29.8	43.1	V	V		V	Y	5
946	Riverine Swampy Woodland/ Lignum Swamp Mosaic	5,824	2,231	38.3	8	86	132	1.5	3.9				V	Y	15
1099	Riverine Swampy Woodland/ Plains Grassy Wetland Mosaic	308	30	9.7	1	1	0	0.3	3.0	E				Y	3
1073	Riverine Swampy Woodland/ Sedgy Riverine Forest Mosaic	348	345	99.2	0	17	304	4.9	5.0	V				Y	5
28	Rocky Outcrop Shrubland	138	43	31.2	0	1	0	0.5	1.7				V	N	
804	Rushy Riverine Swamp	293	206	70.4	0	144	58	49.3	70.0	D			D	Y	2
717	Saline Lake Aggregate	182	181	99.0	35	176	0	96.4	97.3				LC	N	
101	Samphire Shrubland	1,351	1,266	93.7	307	202	916	15.0	16.0	LC			LC	N	
264	Sand Ridge Woodland	1,845	727	39.4	1	59	80	3.2	8.1	E			E	N	
694	Sandstone Ridge Shrubland/ Low Rises Woodland Mosaic	147	8	5.3	0	0	0	0.0	0.0				E	N	
985	Sandy Beach	73	64	87.7	0	5	28	6.5	7.4	na			na	N	
816	Sedgy Riverine Forest	17,441	16,534	94.8	203	9,566	4,711	54.9	57.9	D		D	V	Y	5
817	Sedgy Riverine Forest/ Riverine Swamp Forest Complex	3,875	3,831	98.9	0	3,591	146	92.7	93.7	D				Y	3
1076	Sedgy Riverine Forest/ Spike-sedge Wetland Mosaic	0	0	100.0	0	0	0	100.0	100.0	V				Y	4

		Area in hectares			Area in hectares					Bioregional conservation status for main bioregions					
EVC No.	Ecological vegetation classes (EVCs)	Pre-1750 extent	Current extent	Percent remaining	Current dedicated reserve	Proposed dedicated reserve	Proposed other public land	Proposed dedicated reserves as % of pre-1750 extent	Proposed dedicated reserves as % of current extent	MF	MSB	RP	VR	Flood dependent	Critical flood interval
1077	Sedgy Riverine Forest/Tall Marsh Mosaic	2	2	100.0	0	2	0	100.0	100.0	D				Y	2
98	Semi-arid Chenopod Woodland	33,717	20,148	59.8	1,977	8,557	1,022	25.4	42.5	E	D	V	E	N	
828	Semi-arid Parilla Woodland	1,839	482	26.2	18	166	84	9.0	34.5			V		N	
97	Semi-arid Woodland	18,415	12,337	67.0	7,137	10,100	261	54.9	81.9	V	V	V	E	N	
200	Shallow Freshwater Marsh	619	618	99.9	43	307	308	49.7	49.7	V	V	V		Y	3
21	Shrubby Dry Forest	9	8	84.1	0	0	0	0.0	0.0				V	N	
818	Shrubby Riverine Woodland	7,957	7,950	99.9	2,373	4,891	2,470	61.5	61.5	LC	LC	LC		Y	7
819	Spike-sedge Wetland	790	726	91.9	78	380	308	48.2	52.4	V	V	V	V	Y	4
1081	Spike-sedge Wetland/Tall Marsh Mosaic	59	59	100.0	50	59	0	99.8	99.8	V			V	Y	2
820	Sub-saline Depression Shrubland	1,011	932	92.1	113	668	109	66.1	71.7		V	D		Y	25
83	Swampy Riparian Woodland	7	3	47.6	0	0	1	0.0	0.0				E	N	
937	Swampy Woodland	9,882	1,712	17.3	0	8	396	0.1	0.5				E	N	
821	Tall Marsh	1,435	1,411	98.3	53	885	471	61.7	62.7	LC		D	D	Y	2
1087	Tall Marsh/Aquatic Herbland Mosaic	7	7	100.0	0	0	7	0.0	0.0				V	Y	2
1084	Tall Marsh/Non-Vegetation Mosaic	16	16	100.0	0	16	0	100.0	100.0	D				Y	2
1090	Tall Marsh/Open Water Mosaic	185	184	99.7	0	0	156	0.0	0.0	LC			D	Y	2
1082	Tall Marsh/Riverine Swamp Forest Mosaic	3	3	100.0	0	3	0	100.0	100.0	D				Y	2
47	Valley Grassy Forest	1,634	214	13.1	0	2	26	0.2	1.1				V	N	
265	Valley Grassy Forest/Grassy Dry Forest Mosaic	3	1	35.7	0	0	0	0.0	0.0				V	N	
998	Water Body - Natural or man made	5,419	6,646	122.6	307	2,470	2,286	45.6	37.2	na	na	na	na	V	
74	Wetland Formation	11,897	3,625	30.5	24	208	74	1.8	5.7	E			E	V	
824	Woorinen Mallee	2,450	1,393	56.9	668	1,116	29	45.5	80.1	V	V	V	V	N	
86	Woorinen Sands Mallee	2,662	2,450	92.0	2,265	2,281	25	85.7	93.1	D	D	D		N	
	TOTAL	**1,214,191**	**480,762**	**39.6**	**68,388**	**169,950**	**79,300**	**14.0**	**35.4**						

In addition to the representation of EVCs in the public land dedicated reserve system shown above, the following EVCs are also represented in Private Protected Areas owned by the Trust for Nature (Vic) and accredited under the National Reserve System (note: not all these reserves are entirely contained within the study area)—

Alluvial Plains Semi-arid Grassland	291 ha
Chenopod Grassland	79 ha
Chenopod Mallee	161 ha
Floodplain Grassy Wetland	1 ha
Floodway Pond Herbland	12 ha
Grassy Riverine Forest	0 ha
Grassy Riverine Forest/ Floodway Pond Herbland Complex	13 ha
Intermittent Swampy Woodland	118 ha
Lignum Shrubland	753 ha
Lignum Swamp	86 ha
Lignum Swampy Woodland	497 ha
Low Chenopod Shrubland	18,921 ha
Plains Grassland	350 ha
Riverine Chenopod Woodland	969 ha
Semi-arid Chenopod Woodland	4,899 ha
Semi-arid Woodland	69 ha
Shrubby Riverine Woodland	275 ha
Total	**27,495 ha**

Key threatened species

English name (see Appendix 5 for scientific name)	Victorian conservation status	Total number of records in investigation area	Number of records in current permanent reserves (and percent of total)	Number of records in recommended permanent reserve additions	Number of records in recommended permanent reserves (and percent of total)	Number of records in other public land	Number of records in freehold land
Animals							
De Vis' Banded Snake	v	12	0 (0)	9	9 (75)	3	0
Broad-shelled Turtle	e, L	22	2 (9)	8	9 (41)	12	1
Inland Carpet Python	e, L	84	15 (18)	16	31 (34)	35	18
Curl Snake	v	34	21 (62)	8	29 (85)	3	2
Grey-crowned Babbler	e, L	347	6 (2)	11	17 (5)	21	298
Murray Cod	e, L	214	13 (6)	60	73 (34)	72	69
Regent Parrot	v, L	284	168 (59)	22	190 (67)	87	7
Silver Perch	ce, L	68	20 (29)	11	31 (46)	37	0
Squirrel Glider	e, L	77	8 (10)	18	26 (34)	45	6
Superb Parrot	e, L	185	12 (6)	120	132 (71)	41	12
Plants							
Mueller Daisy	e, L	8	5 (0)	1	6 (75)	1	1
Slender Love-grass	e	6	1 (0)	5	6 (100)	0	0
Western Water-starwort	v	9	0 (0)	2	2 (22)	7	0
Winged Peppercress	e, L	30	21 (70)	5	26 (87)	0	4
Small Scurf-pea	e, L	55	14 (25)	12	26 (47)	12	17
Spiny Mud-grass (Moira grass)	–	149	20 (13)	46	66 (44)	44	39

The above data are from the Department of Sustainability and Environment's Flora Information System and Atlas of Victorian Wildlife (updated May 2007). See the River Red Gum Forests Investigation Discussion Paper for further details of conservation status. Note that only post-1980 records with a 1 minute or greater level of accuracy were included.

Sites of high geological or geomorphological significance

Significance	No. of sites*	No. sites partly or wholly in conservation reserves (and % of total)	No. sites in VEAC conservation reserve additions	No. of sites in recommended conservation reserves (and % of total)	No. of sites in other public land	No. of sites mostly of wholly in Freehold land
International	0	0	0	0	0	0
National	5	2 (40)	2	4 (80)	1	0
State	16	4 (25)	4	8 (50)	5	3

* Three international and two state significance sites located outside the investigation area were listed in the Discussion Paper to provide context are and not included in the calculation above.

APPENDIX 11

Flood-dependent natural assets project

Background

Although some areas such as the Barmah forest are very well known, there have been few comprehensive inventories of important natural values along the Murray floodplains. For this project, VEAC has sought out and compiled data on flood requirements for all flood-dependent ecological vegetation classes (EVCs) and threatened species along the Murray, Goulburn, Ovens and King Rivers.

Past environmental water allocations have targeted a variety of different natural assets (e.g. stressed red gum trees, colonial nesting waterbirds, various fish species), but consideration of the water requirements of the full suite of floodplain ecosystems and significant species has been limited. By considering the water requirements of the full range of natural assets, the effectiveness of water delivery for biodiversity can be maximised. This approach highlights the species and ecosystems most in need of water.

The process aims to build on the icon sites approach to view the Murray floodplain forests as an interconnected system. This project also identifies for the first time the flood-frequency and duration requirements for the full suite of floodplain ecosystems and significant species.

The analyses cover the riverine forests, woodlands and wetlands along the Murray, Goulburn, Ovens and King Rivers. The project does not include the Kerang Lakes and floodplains of the Avoca, Loddon and Campaspe Rivers.

Description of the project

A more detailed description of the project is available on the VEAC website www.veac.vic.gov.au.

Identification of minimum flooding water requirements for EVCs (i.e. minimum requirements to stay healthy) was undertaken by botanists experienced in the floodplain ecosystems of the River Murray. Flooding requirements for threatened flora and fauna species were also determined through discussions with experts in the respective fields, as well as reviews of published literature. In the majority of cases, the flooding requirements for a species were assigned by applying the water requirements of the EVC/s that comprise its preferred habitat. However, for other species, such as egrets and other colonial nesting waterbirds, it was possible to use more specific information about watering requirements and the location of sites.

Localities for species were derived primarily from DSE's Victorian Fauna Display (Atlas of Victorian Wildlife) and Flora Information System and supplemented by Birds Australia Atlas data and recent ecological survey reports where applicable. Records were excluded if they were old or if there was uncertainty about the location data. Priorities for rare and threatened plant and animal species were also assigned based on their threat status at a national and state level and an assessment of the proportion of the state or national population occurring in the floodplain ecosystems under consideration.

The significant species are listed in tables 1 and 2 below and the floodplain EVCs in appendix 9. The flood frequency requirements for EVCs and threatened species are presented visually in maps D and E (in the back pocket of this report).

A number of taxa have yet to be incorporated into this analysis, including threatened fish and threatened invertebrates. As improved knowledge of their flooding requirements is gained, these too can be incorporated into the analysis.

Application of the project

This project provides information that will assist in determining the likely ecological benefits of various environmental watering options. It factors in a range of rare and threatened species and ecosystems that currently receive little attention, including a number of nationally-listed threatened species and ecological communities.

Importantly, the information derived from this project is equally applicable to current and to likely 'new' environmental water allocations.

This project is the most comprehensive identification of water requirements for natural values on the floodplain to date, and is able to be used immediately to guide prioritisation of environmental watering. As more information on floodplain EVCs and species becomes available, the water requirements and distribution of values can be refined by ecologists and land and water managers. Thus it is an adaptive process allowing for the incorporation of monitoring and feedback over time. The project makes it possible to transparently and easily communicate the extent to which manipulated or natural flows benefit various natural values. Quantitative and visual outputs such as maps will enable environmental managers and the public to easily see which values do and do not receive water. Example maps from the Robinvale area are presented below.

Future work

The project to date should be seen as an initial step towards a more comprehensive and ongoing analysis that is continually updated and refined as new data and results become available. Immediate priorities not included in the project currently include the incorporation of significant fish and invertebrate species, and potential recovery or re-establishment sites (as opposed to just sites of recent occurrence). Most importantly there is a need to review the conservation status of species and EVCs in light of the threat posed by insufficient flooding. The analysis undertaken for this project to date would provide the basis for such a review which would, in turn, feed back into future analyses.

Tables 1 and 2 identify a number of species which are flood-dependent or utlilise flood-dependent EVCs but have too few accurate or recent records to include in the analysis at this point in time. Further surveys for these and other species may be required. Again, this information can be built into future iterations of the database by ecologists and land and water managers.

Table 1. Rare and threatened flood-dependent flora considered or included in analyses

Common Name	Scientific Name	Mapped	Not Mapped*
Native Scurf-pea	*Cullen australasicum*		•
Hoary Scurf-pea	*Cullen cinereum*	•	
Small Scurf-pea	*Cullen parvum*	•	
Annual Flat-sedge	*Cyperus nervulosus*		•
Slender Love-grass	*Eragrostis exigua*	•	
Grey Billy-buttons	*Craspedia canens*		•
Keeled Goosefoot	*Chenopodium carinatum*		•
Jerry-jerry	*Ammannia multiflora*	•	
Small Water-fire	*Bergia trimera*	•	
Mueller Daisy	*Brachyscome muelleroides*	•	
Water-shield	*Brasenia schreberi*		•
Western Water-starwort	*Callitriche cyclocarpa*	•	
Lax Flat-sedge	*Cyperus flaccidus*		•
Dwarf Flat-sedge	*Cyperus pygmaeus*	•	
Bearded Flat-sedge	*Cyperus squarrosus*	•	
Button Rush	*Lipocarpha microcephala*	•	
Lagoon Spurge	*Phyllanthus lacunarius*	•	
Glistening Dock	*Rumex crystallinus s.s.*		•
Yellow Pea-bush	*Sesbania cannabina* var. *cannabina*		•
Lagoon Nightshade	*Solanum lacunarium*	•	
Wavy Marshwort	*Nymphoides crenata*	•	
Twin-leaf Bedstraw	*Asperula gemella*	•	
Reader's Daisy	*Brachyscome readeri*	•	
Cotton Sneezeweed	*Centipeda nidiformis*	•	
Veiled Fringe-sedge	*Fimbristylis velata*		•
Dwarf Brooklime	*Gratiola pumilo*		•
Hydrilla	*Hydrilla verticillata*		•
Brown Beetle-grass	*Leptochloa fusca* subsp. *fusca*		•
Small Monkey-flower	*Mimulus prostratus*		•
Mallee Cucumber	*Mukia micrantha*	•	
Water Nymph	*Najas tenuifolia*		•
Sandhill Spurge	*Phyllanthus lacunellus*	•	
Dwarf Bitter-cress	*Rorippa eustylis*	•	
Floodplain Fireweed	*Senecio glandulosus*		•
Yakka Grass	*Sporobolus caroli*	•	
Sweet Fenugreek	*Trigonella suavissima*	•	
Common Joyweed	*Alternanthera nodiflora*	•	
Common Hornwort	*Ceratophyllum demersum*		•
Native Couch	*Cynodon dactylon* var. *pulchellus*	•	
Yelka	*Cyperus victoriensis*		•
Tall Cup-grass	*Eriochloa crebra*		•
Summer Fringe-sedge	*Fimbristylis aestivalis*	•	
Native Peppercress	*Lepidium pseudohyssopifolium*	•	
Indian Chickweed	*Mollugo verticillata*		•
Velvet Knotweed	*Persicaria attenuata*		•
Tongue Dock	*Rumex stenoglottis*		•
Smooth Blue-rod	*Stemodia glabella s.s.*		•
Perfoliate Pondweed	*Potamogeton perfoliatus* s.l.		•
River Swamp Wallaby-grass	*Amphibromus fluitans*	•	
Umbrella Grass	*Digitaria divaricatissima*		•
Cane Grass	*Eragrostis australasica*	•	
Ridged Water-milfoil	*Myriophyllum porcatum*		•
Small-flower Tobacco	*Nicotiana goodspeedii*		•
Slender Water-ribbons	*Triglochin dubia*		•

Common Name	Scientific Name	Mapped	Not Mapped*
Plains Billy-buttons	*Craspedia haplorrhiza*		•
Pale Spike-sedge	*Eleocharis pallens*	•	
Hypsela	*Hypsela tridens*		•
Slender Bitter-cress	*Cardamine tenuifolia*		•
Straggly Lantern-bush	*Abutilon oxycarpum* var. *malvaefolium*	•	
Silky-heads	*Cymbopogon obtectus*		•
Winged Peppercress	*Lepidium monoplocoides*	•	
Fat Spectacles	*Menkea crassa*		•
Yellow Tails	*Ptilotus nobilis* var. *nobilis*	•	
Woolly Copperburr	*Sclerolaena lanicuspis*		•
Salt Copperburr	*Sclerolaena ventricosa*		•
Violet Swainson-pea	*Swainsona adenophylla*		•
Hairy Darling-pea	*Swainsona greyana*	•	
Spreading Saltbush	*Atriplex limbata*	•	
Billabong Daisy	*Brachyscome* aff. *gracilis* (Kings Billabong)	•	
Yellow Garland-lily	*Calostemma luteum*		•
Darling Lily	*Crinum flaccidum*		•
Riverine Flax-lily	*Dianella porracea*	•	
Pale Flax-lily	*Dianella* sp. aff. *longifolia* (Riverina)	•	
Flycatcher	*Drosera indica*		•
Tall Nut-heads	*Epaltes cunninghamii*		•
Bignonia Emu-bush	*Eremophila bignoniiflora*	•	
Poverty Bush	*Sclerolaena intricata*	•	
Pale Swamp Everlasting	*Helichrysum* aff. *rutidolepis* (Lowland Swamps)	•	
Dwarf Old-man Saltbush	*Atriplex nummularia subsp. omissa*		•
Garland Lily	*Calostemma purpureum* s.l.	•	
Riverina Bitter-cress	*Cardamine moirensis*	•	
Spreading Emu-bush	*Eremophila divaricata* subsp. *divaricata*	•	
Spotted Emu-bush	*Eremophila maculata* var. *maculata*	•	
Woolly Minuria	*Minuria denticulata*		•
Squat Picris	*Picris squarrosa*	•	
Bundled Peppercress	*Lepidium fasciculatum*	•	
Warty Peppercress	*Lepidium papillosum*	•	
Tangled Copperburr	*Sclerolaena divaricata*	•	
Bluish Raspwort	*Haloragis glauca* f. *glauca*	•	
Weeping Myall	*Acacia pendula*	•	
Soda Bush	*Neobassia proceriflora*	•	
Small-leaf Bluebush	*Maireana microphylla*	•	
Pale Plover-daisy	*Leiocarpa leptolepis*	•	
Desert Lantern	*Abutilon otocarpum*	•	
Yarran	*Acacia melvillei*	•	
Dwarf Amaranth	*Amaranthus macrocarpus* var. *macrocarpus*	•	
Silver Saltbush	*Atriplex rhagodioides*	•	
Purple Love-grass	*Eragrostis lacunaria*	•	
Spear-fruit Copperburr	*Sclerolaena patenticuspis*	•	
Annual Bitter-cress	*Cardamine paucijuga* s.s.		•
Mealy Saltbush	*Atriplex pseudocampanulata*	•	
Prickly Bottlebrush	*Callistemon brachyandrus*	•	
Blue Burr-daisy	*Calotis cuneifolia*	•	
Finger Grass	*Dactyloctenium radulans*		•
Goat Head	*Malacocera tricornis*	•	
Smooth Minuria	*Minuria integerrima*	•	
Mallee Annual-bluebell	*Wahlenbergia tumidifructa*		•
Wimmera Woodruff	*Asperula wimmerana*		•
Spiny Lignum	*Muehlenbeckia horrida* subsp. *horrida*	•	
Flat-top Saltbush	*Atriplex lindleyi* subsp. *lindleyi*		•
Bladder Saltbush	*Atriplex vesicaria* subsp. *minor*		•

Common Name	Scientific Name	Mapped	Not Mapped*
Ferny Small-flower Buttercup	*Ranunculus pumilio* var. *politus*		•
Austral Trefoil	*Lotus australis* var. *australis*		•
Desert Spinach	*Tetragonia eremaea* s.s.	•	
Annual Spinach	*Tetragonia moorei*	•	
Native Madder	*Synaptantha tilleacea* var. *tilleacea*		•
Long Eryngium	*Eryngium paladosum*	•	
Swamp Buttercup	*Rananculus undosus*	•	

* Considered flood-dependent (or reliant or utilises flood-dependent EVCs) and known from the investigation area but too few recent records with reliable location data.

Table 2. Threatened flood-dependent fauna considered or included in analyses

Common Name	Scientific Name	Mapped	Not Mapped*
Brown Quail	*Coturnix ypsilophora*	•	
Blue-billed Duck	*Oxyura australis*	•	
Musk Duck	*Biziura lobata*	•	
Freckled Duck	*Stictonetta naevosa*	•	
Australasian Shoveler	*Anas rhynchotis*	•	
Hardhead	*Aythya australis*	•	
Pied Cormorant	*Phalacrocorax varius*	•	
Little Egret	*Egretta garzetta*	•	
Eastern Great Egret	*Ardea modesta*	•	
Intermediate Egret	*Ardea intermedia*	•	
Nankeen Night Heron	*Nycticorax caledonicus*	•	
Australian Little Bittern	*Ixobrychus minutus*	•	
Australasian Bittern	*Botaurus poiciloptilus*	•	
Glossy Ibis	*Plegadis falcinellus*	•	
Royal Spoonbill	*Platalea regia*	•	
Square-tailed Kite	*Lophoictinia isura*		•
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	•	
Grey Falcon	*Falco hypoleucos*		•
Red-chested Button-quail	*Turnix pyrrhothorax*	•	
Brolga	*Grus rubicunda*	•	
Baillon's Crake	*Porzana pusilla*	•	
Latham's Snipe	*Gallinago hardwickii*	•	
Australian Painted Snipe	*Rostratula australis*	•	
Bush Stone-curlew	*Burhinus grallarius*	•	
Gull-billed Tern	*Gelochelidon nilotica*	•	
Caspian Tern	*Hydroprogne caspia*	•	
Whiskered Tern	*Chlidonias hybridus*	•	
Diamond Dove	*Geopelia cuneata*	•	
Swift Parrot	*Lathamus discolor*		•
Superb Parrot	*Polytelis swainsonii*	•	
Regent Parrot	*Polytelis anthopeplus*	•	
Azure Kingfisher	*Alcedo azurea*		•
Red-backed Kingfisher	*Todiramphus pyrrhopygia*		•
Powerful Owl	*Ninox strenua*		•
Barking Owl	*Ninox connivens*		•
Black-eared Cuckoo	*Chrysococcyx osculans*		•
Black-chinned Honeyeater	*Melithreptus gularis*	•	
Painted Honeyeater	*Grantiella picta*	•	
Hooded Robin	*Melanodryas cucullata*	•	
Grey-crowned Babbler	*Pomatostomus temporalis*	•	
Ground Cuckoo-shrike	*Coracina maxima*	•	
Apostlebird	*Struthidea cinerea*	•	
Diamond Firetail	*Stagonopleura guttata*	•	
Giles' Planigale	*Planigale gilesi*	•	

Common Name	Scientific Name	Mapped	Not Mapped*
Squirrel Glider	*Petaurus norfolcensis*	•	
Southern Myotis	*Myotis macropus*	•	
Broad-shelled Turtle	*Macrochelodina expansa*	•	
Murray River Turtle	*Emydura macquarii*	•	
Eastern Bearded Dragon	*Pogona barbata*	•	
Lined Earless Dragon	*Tympanocryptis lineata lineata*		•
Tree Goanna	*Varanus varius*	•	
Samphire Skink	*Morethia adelaidensis*	•	
Eastern Water Skink	*Eulamprus quoyii*	•	
Beaked Gecko	*Rhynchoedura ornata*	•	
Inland Carpet Python	*Morelia spilota metcalfei*	•	
Common Death Adder	*Acanthophis antarcticus*		•
De Vis' Banded Snake	*Denisonia devisi*	•	
Red-naped Snake	*Furina diadema*	•	
Giant Bullfrog	*Limnodynastes interioris*	•	
Brown Toadlet	*Pseudophryne bibronii*	•	
Rugose Toadlet	*Uperoleia rugosa*		•
Growling Grass Frog	*Litoria raniformis*	•	

* Considered flood-dependent (or reliant or utilises flood-dependent EVCs) and known from the investigation area but too few recent records with reliable location data.

Example of natural values mapping and analysis

Purpose: The figures below provide an example of how VEAC's comprehensive mapping of natural values can be used to compare different environmental watering options. It is not intended to represent actual outcomes of applying these amounts of environmental water (see notes below).

Application: The three maps show the extent of flooding for three different-sized floods along a sample reach of the River Murray floodplain east of Robinvale, resulting from three different flow rates along the channel: 20, 81 and 159 gigalitres per day. The varying shades denote the required flood frequency to maintain specific natural values that are flooded by floods of these sizes. Red shades indicate areas that are flooded, while grey shades indicate areas that are not flooded. These maps can highlight priority areas on the floodplain that may not receive water from natural or artificial flood events. It may also serve to highlight areas that could benefit from works (such as levees, regulators or pumping) to enable watering.

Outputs: Table 3 shows a sample of analysis from the maps, including the area of flood-dependent EVCs and habitat for significant species and the percentage of these areas inundated by the various flood levels. For example less than five percent of almost all values are inundated by a very small flood whereas over three-quarters of Floodplain Grassy Wetland EVC, half the Regent Parrot habitat and 100 percent of Silver Saltbush habitat is inundated in a large flood.

Notes:

1. The primary purpose of these maps is to help people understand how VEAC's natural asset mapping approach can be applied. Many important but complicating factors have therefore not been incorporated. These factors include flood duration, timing, the significance of assets including in comparison with priorities in other areas and the difference between the longest possible period without inundation ('critical interval') and average frequency of flooding. These maps and resultant tables are best considered in the context of a period of several years with knowledge of prior flood events in order to prioritise sites most requiring water at any given point in time. While the maps shown overleaf are a combination of the natural values, they can be also be usefully generated for individual EVCs or species.

2. The flooding extents shown in red are based on outputs from CSIRO'S River Murray Floodplain Inundation Model (RiM-FIM) which is derived from satellite imagery of actual floods. While the RiM-FIM provides inundation extents for a range of river flows, these are not necessarily derived from actual floods (i.e. the inundation extent for a particular flow may be inferred from satellite images of floods of other sizes) and should be considered as indicative only. In particular, flow in the River Murray of 159 gigalitres per day may flood a greater area than that shown here. For comparison, the typical flow in this part of the River Murray in September is around 9 gigalitres per day. Flood extent data was provided by the Department of Sustainability and Environment.

Examples of coverage of flood-dependent natural values for various flood scenarios – Robinvale area

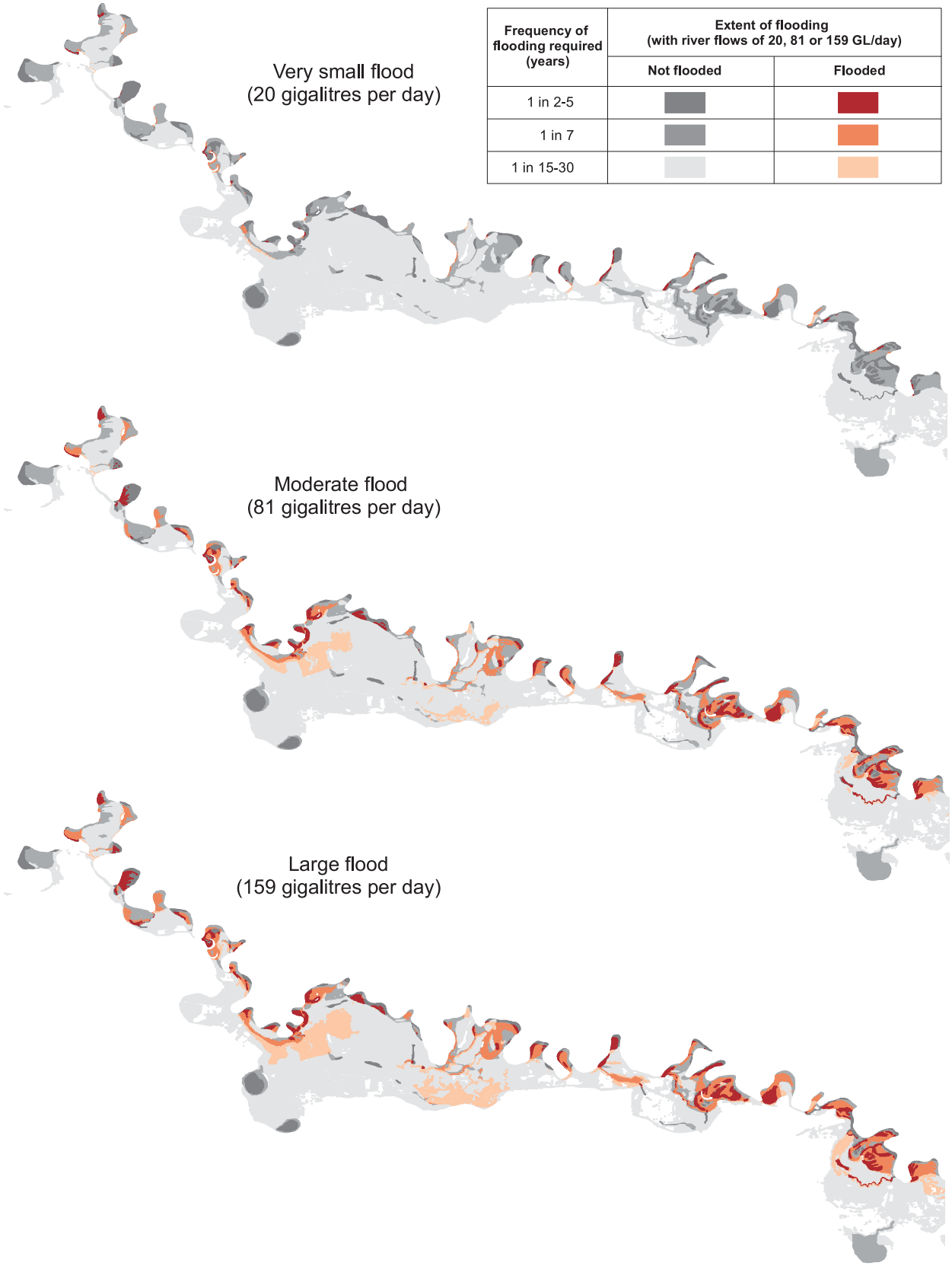

Table 3. Area and percentage of natural values in the Robinvale area inundated by various environmental water volumes

		Percent of EVC or habitat covered by various flood extents		
	Area (ha)	Very small	Moderate	Large
Ecological Vegetation Class				
Floodplain Grassy Wetland	63	3	71	77
Floodway Pond Herbland	370	1	37	47
Grassy Riverine Forest	678	2	27	35
Grassy Riverine Forest/Floodway Pond Herbland Complex	567	2	22	28
Intermittent Swampy Woodland	1,433	1	27	38
Lake Bed Herbland	130	0	0	0
Lignum Shrubland	3,550	0	5	12
Lignum Swamp	562	0	2	7
Lignum Swampy Woodland	5,488	0	5	11
Riverine Chenopod Woodland	5,035	0	5	8
Riverine Grassy Woodland	980	0	4	9
Shallow Freshwater Marsh	394	0	42	51
Shrubby Riverine Woodland	1,972	1	24	37
Spike-sedge Wetland	17	0	62	71
Sub-saline Depression Shrubland	82	0	0	0
Tall Marsh	42	0	9	21
Threatened Fauna				
Apostlebird	6,746	0	3	7
Blue-billed Duck	434	0	0	0
Brown Quail	35	0	0	0
Inland Carpet Python	16,452	0	12	19
Diamond Dove	168	0	0	0
Diamond Firetail	121	0	2	6
Freckled Duck	2,700	0	2	3
Grey-crowned Babbler	215	0	0	0
Hardhead	592	0	0	0
Musk Duck	592	0	0	0
Nankeen Night-Heron	1,690	0	4	6
White-bellied Sea-Eagle	550	0	0	0
Regent Parrot	321	1	29	49
Rare or threatened Flora				
Annual Spinach	89	0	2	3
Bluish Raspwort	249	0	13	20
Common Joyweed	259	0	0	0
Cotton Sneezeweed	88	0	42	65
Desert Lantern	84	0	0	3
Desert Spinach	43	0	4	11
Dwarf Bitter-cress	77	0	0	0
Goat Head	559	0	2	4
Hoary Scurf-pea	81	0	10	15
Mealy Saltbush	42	0	0	0
Native Couch	729	1	22	35
Native Peppercress	518	1	9	13
Pale Plover-daisy	41	2	5	7
Pale Spike-sedge	26	0	0	0
Purple Love-grass	182	0	0	0
Reader's Daisy	380	0	2	7
Riverina Bitter-cress	132	1	25	39
Riverine Flax-lily	69	0	0	0
Silver Saltbush	23	8	79	100
Smooth Minuria	38	0	0	0

		Percent of EVC or habitat covered by various flood extents		
Rare or threatened Flora (continued)	**Area (ha)**	**Very small**	**Moderate**	**Large**
Spear-fruit Copperburr	432	0	6	13
Spiny Lignum	71	0	0	0
Spotted Emu-bush	236	0	2	3
Spreading Emu-bush	776	2	14	18
Squat Picris	509	2	33	55
Summer Fringe-sedge	381	0	1	5
Sweet Fenugreek	86	0	0	0
Tangled Copperburr	127	0	5	14
Twinleaf Bedstraw	1376	1	5	9
Warty Peppercress	150	0	6	9
Yakka Grass	189	0	1	4
Yarran	367	1	5	7