

# Social and Economic Analysis of Final Recommendations for the Central West Investigation Area

June 2019

Prepared for: Victorian Environmental Assessment Council

Prepared by:



ABN 13 317 461 682

Dr Rob Gillespie

W: [www.gillespieeconomics.com](http://www.gillespieeconomics.com)

**Midas Consulting**

ABN 11 161 773 161

Dr Rob Dumsday

## Contents

Executive Summary .....	4
1. Introduction.....	9
1.1 Victorian Environmental Assessment Council .....	9
1.2 The Central West Investigation .....	9
2. Conceptual Models to Estimate Economic Values.....	11
2.1 Introduction.....	11
2.2 Economic Values and Cost Benefit Analysis.....	11
2.2.1 Total Economic Value Framework .....	11
2.2.2 Measures of Economic Value .....	15
2.2.3 Baseline Values & Impacts Versus Marginal Change .....	15
2.3 Regional Economic Impacts .....	16
3. General Application of CBA Framework to the Central West Investigation Area .....	18
3.1 Current Uses .....	18
3.2 VEAC Recommendations .....	18
3.3 Consequences .....	19
3.4 Identification of potential economic costs and benefits .....	20
3.5 Valuation of Costs and Benefits .....	20
3.6 Results Across the Central West Investigation Area .....	32
3.7 Sensitivity Testing.....	33
3.8 Distribution of Costs and Benefits.....	33
4. The Wellsford Block.....	34
4.1 Introduction.....	34
4.2 Main Current Uses.....	34
4.3 Final Recommendations .....	36
4.4 Consequences .....	37
4.5 Valuation of Impacts .....	38
5. Mount Cole - Pyrenees Block .....	40
5.1 Introduction.....	40
5.2 Current Uses .....	40
5.3 Proposal.....	43
5.4 Consequences .....	43
4.5 Valuation of Impacts .....	45
6. Wombat - Macedon Block.....	47
6.1 Introduction.....	47
6.2 Current Uses .....	47
6.3 Proposal.....	49
6.4 Consequences .....	50

4.5 Valuation of Impacts .....	51
7. Regional Impacts .....	53
7.1 Introduction.....	53
7.2 Timber .....	53
7.3 Sovereign Hill and Sport of Woodchopping and Sawing .....	57
7.4 Recreation and Tourism Impacts .....	57

## Executive Summary

### Introduction

The Victorian Environmental Assessment Council (VEAC) is conducting an investigation into public land in the Central West of Victoria.

The culmination of the VEAC investigation is a mosaic of recommendations that aim to conserve and enhance the natural and cultural values of the public lands while trying to accommodate a diverse range of recreation and other activities.

From an economic perspective there are two economic frameworks that can be used to evaluate the VEAC recommendations:

- cost benefit analysis (CBA), which provides the basis for the identification, valuation and comparison of the economic costs and benefits of the recommendations; and
- the economic activity framework, which provides the basis for the consideration of implications for regional townships and communities.

However, the VEAC recommendations are difficult to analyse from an economic perspective because:

- there has been no primary study to value the potential environmental and cultural benefits of the proposals; and
- there are very few data on current usage levels – particularly for recreational uses – of the public lands of the Central West.

### Potential Economic Costs and Benefits

At a broad level, the VEAC recommendations would have the following potential types of economic costs and benefits to the Victorian community.

**Table ES1 - Potential Economic Costs and Benefits of VEAC Recommendations**

Economic Costs	Economic Benefits
Reduction in commercial timber production including commercial firewood	Increased conservation of native vegetation
Reduction in domestic firewood collection	Increased conservation of fauna species
Reduction in grazing	Increased protection of Aboriginal heritage and cultural values (tangible and intangible), and historic heritage values
Reduction in potential mining	Water quality and quantity regulation
Restriction on nonmarket recreation in some locations - hunting, prospecting, dog walking and potentially some recreation events (e.g. dogsledding) but availability of substitute sites for many activities	
Cost of managing for conservation	Cost saving from no longer managing primarily for timber

Studies have demonstrated that the community holds values for the conservation and protection of forests and the attributes they contain. These values can be substantial because they are public good values i.e. the values to the community is the sum of the values held by

all people in the community. Consequently, the economic benefits of VEAC recommendations are likely to be quite high.

The main extractive uses that will be impacted by the VEAC recommendations are timber harvesting, domestic firewood collection and grazing.

Forestry in the Central West of Victoria is associated with small scale timber harvesting licences. They are relatively low value in terms of revenues/royalties to VicForests.

Domestic firewood collection from forest management and harvesting residues following VicForests' operations is an important current use of forests that has a nonmarket value to regional households.

The economic value of grazing in the forests of public lands is low.

Commercial gold mining is a potential high value activity. Because existing licences are allowed to continue after park establishment, the VEAC recommendations will not impact any imminent proposals. Using an expected value approach, the impact of VEAC recommendations on gold mining values is likely to be minimal.

While there are few systematic or reliable data on recreational usage levels of the forests of Central West Investigation Area, it is evident from observation that:

- recreational usage levels vary from high to relatively low – modest on average
- substantial areas of public lands would continue to permit a range of recreation activities under VEAC's recommendations
- for most forms of recreation impacted by the VEAC recommendations, if they are restricted in one area of public land, there are potential substitute locations both within the investigation area and elsewhere.

Consequently, economic costs of VEAC recommendations are likely to be modest.

This report also attempted to provide a more quantitative analysis based on a range of assumptions about visitation levels and other uses, as well as benefit transfer of potential conservation values. Based on this approach, Table ES2 summarises the estimated magnitude of potential costs and benefits of VEAC recommendations. Values over 30 years are discounted to present value using a 7% discount rate.

**Table ES2- Cost Benefit Analysis Results for the Central West Investigation Area (Present Values @ 7% Discount Rate Over 30 Years)**

<b>Economic Costs</b>	<b>\$</b>	<b>Economic Benefits</b>	<b>\$</b>
Reduction in commercial timber production	\$14,552,297	Increased conservation of native vegetation	\$269,526,040
Reduction in commercial firewood collection	Include in above	Contribution to fauna and flora species protection	NQ
Reduction in domestic firewood collection	\$5,584,069	Increased protection of Aboriginal heritage and cultural values, tangible and intangible	NQ
Reduction in grazing	\$99,551	Water quality and quantity regulation	NQ
Reduction in mining	NQ		
Reduction in dog walking	\$335,044		
Reduction in dogsledding event	\$158,836		
Reduction in horseriding	\$27,300		
Reduction in prospecting	\$1,363,630		
Reduction in hunting	\$346,212		
Reduction in land values of adjoining properties	NA		
Cost of managing for conservation	NQ	Cost saving from no longer managing primarily for timber	NQ
<b>Total</b>	<b>\$22,466,938</b>		<b>\$269,526,040</b>
<b>NET BENEFITS</b>			<b>\$247,059,102</b>

NA = Not Applicable

NQ = Not Quantified

The results indicate that there may be substantial net benefits of the VEAC recommendations. In this respect, it should be noted that the benefit estimate is likely to be conservative as it does not include any benefit for species protection, Aboriginal heritage protection and water quality and quantity regulation.

There is considerable uncertainty around these estimates and future studies would benefit from primary valuation studies of potential benefits using nonmarket valuation methods such as choice modelling. However, the disparity between the level of benefits and levels of costs clearly indicates that the recommendations are likely to have net benefits to the community of Victoria. Notwithstanding, VEAC recommendations are not costless.

Benefits of conservation accrue to the broader community whereas potential costs accrue to specific individuals or groups in the community. In particular, costs of VEAC recommendations are borne by some recreators, domestic firewood collectors, commercial firewood and timber harvesters and processors, hunters and prospectors. Restricted access to timber has downstream impacts on timber mills and the economic activity they provide to the regional economies.

## **Economic Activity Impacts**

Impacts of VEAC recommendations on regional economies can potentially arise from:

- reduction in commercial activities such as timber milling, commercial firewood etc, that purchase inputs to production from the local economy and employ people who spend some of their income in the region economy
- any impacts on tourism sites or activities depending on timber from the region e.g. Sovereign Hill and the sport of woodchopping and sawing
- displaced recreation activities (where there is no substitution) undertaken by people travelling from outside the region into the region i.e. tourists, and spend money in the region on accommodation, food and inputs into their recreation activity.

The greatest potential impact on regional economies relates to the reduction in timber milling and commercial firewood production. In all local government areas (LGAs) the total extent of timber industry employment (up to 61 direct and 102 direct and indirect) is a small proportion of regional employment (0.08% for direct timber industry employment and 0.14% for direct and indirect timber industry employment). However, this employment is only partially reliant on the timber from the investigation area, and VEAC is recommending areas of state forest from which timber harvesting can continue. That is, the actual impacts of VEAC's recommendations will be much lower than this ceiling. There will also be some dispersed flow-on impacts to businesses that supply inputs to timber production and the goods and services demand by timber industry employment.

VEAC recommendations are not expected to have any significant impacts on Sovereign Hill and woodchopping users due to the small quantities involved, the fact that some quantities will still be able to be sourced from the Central West Investigation Area, and potential for sourcing small quantities from alternative sources.

There will be minimal regional economic impacts associated with impacts of VEAC recommendations on:

- displaced recreation uses of the forests by adjoining landowners or locals since these activities are not associated with any significant expenditure in the regional economy; and
- displaced uses by tourists if substitute sites in the region are available for their activity.

There is also likely to be minimal change in recreation and tourism levels from changing state forests to national parks, reserves and regional parks.

The main regional economic impacts will arise from any tourist activities that are displaced, with no alternatives or substitute sites available locally, and hence instead of visiting the region and spending money in the economy, these tourists stay home or visit other regions. However, major tourism events are likely to continue under the VEAC recommendations.

There will be some impact to hunting tourism, in the Ballarat region as a result of reduced opportunities for deer hunting in the investigation area. However the economic impact of this will be small, as all hunting on private and public lands by locals and tourists is only estimated to contribute 32 jobs to this regional economy and VEAC's recommendations would only impact on a small part of this activity (just deer and just a small proportion of all the land contributing to that employment).

Prospecting will also become not permissible in large areas of forest. There is some local specialisation in sale of prospecting equipment and supplies and hence this activity, which

attracts tourists, is likely to be associated with a greater level of spending than other forest based recreation activities. However, areas of higher prospectivity have been retained in Regional Parks, where prospecting remains permissible. Hence impacts on regional economic activity are not likely to be significant.

Dog sledding will be prohibited in the Wellsford Block where it currently occurs. It is not evident that alternative substitute sites exist in the region. Hence, any regional expenditure associated with this activity may be lost. However, the nature of the event i.e. low key camping in forest with dogs, means that the level of regional expenditure is likely to be low.



# 1. Introduction

## 1.1 Victorian Environmental Assessment Council

The Victorian Environmental Assessment Council (VEAC) is established under the *Victorian Environmental Assessment Council Act 2001*. The role of VEAC is to conduct investigations and assessments, provide advice and make recommendations to the Minister for Energy, Environment and Climate Change on the protection and ecologically sustainable management of public land. The matters which the Council must have regard to in carrying out investigations and in making recommendations are specified in section 18 of the VEAC Act, including in sub-section (g) the potential environmental, social and economic consequences of implementing the proposed recommendations.

## 1.2 The Central West Investigation

In March 2017, the Government of Victoria requested VEAC conduct an investigation into public land in the Central West comprising three areas:

- Wellsford forest (Wellsford Block) near Bendigo, located in the Greater Bendigo Local Government Area (LGA)
- Wombat-Macedon Ranges, Hepburn area and Cobaw forest (Wombat-Macedon Block), located in the Hepburn, Moorabool and Macedon Ranges LGAs
- Mount Cole and the Pyrenees Range forests (Mount Cole-Pyrenees Block), located primarily in the Pyrenees LGA.

The purpose of the Central West Investigation is to:

- a) identify and evaluate the condition, natural and biodiversity values and cultural, social and economic values and the current uses of public land in the specified area; and
- b) make recommendations for the balanced use and appropriate management arrangements to conserve and enhance the natural and cultural values.

This social and economic assessment report aims to provide:

- a) an assessment of the current costs and benefits of public land and how those costs and benefits are distributed;
- b) an assessment of the costs and benefits of VEAC's final recommendations and how those costs and benefits are distributed;
- c) an economic baseline and/or a review of the available information on the economic value of the industries and recreational and other activities in the investigation area (as listed in Table 1 below);
- d) an assessment of the social implications of VEAC's recommendations, with attention to implications for regional townships and communities; and
- e) advice as required by VEAC suitable for public communication materials related to the economic and social assessment.

**Table 1 - Potential Industries and Recreation Activities in the Central West Investigation Area**

	<b>Sector or activity</b>
<b>Industries</b>	Timber, mining, apiculture, water, public land grazing, outdoor education, commercial guiding
<b>Recreational activities incl associated events</b>	Prospecting, horse riding, hunting, 4WDing, trail bike riding, car rallying, mountain biking, bush walking, bird watching and nature study, orienteering, camping, scenic driving/day touring/picnicking
<b>Other</b>	Domestic firewood collection, events and festivals, altered property values

This requires the use of two economic frameworks:

- the cost benefit analysis (CBA) framework, which provides the basis for the identification, valuation and comparison of economic values; and
- the economic activity framework, which provides the basis for the consideration of implications for regional townships and communities.

These frameworks are outlined in Section 2. The broad application of the CBA framework to the Central West Investigation Area is provided in Section 3. This framework is also used in Sections 4 to 6 to inform the consideration of the economic values associated with each of the forest blocks of the Central West Investigation Area and how these may change with VEAC's recommendations. The application of the economic activity framework to the Central West Investigation Area is provided in Section 7. Discussions and conclusions are proved in Section 8.

## 2. Conceptual Models to Estimate Economic Values

### 2.1 Introduction

This Section provides the technical conceptual framework for consideration of the economic values and economic activity associated with forests of the Central West Investigation Area and how these may change with the VEAC recommendations.

The primary way that economists consider economic values is via the Total Economic Value (TEV) framework and CBA. The Total Economic Value framework helps to identify the types of economic values that may be associated with a resource, whereas CBA focuses on how these values may change under a proposed policy or project. Only those values that change are actually valued in dollar terms. Provided the aggregate increases in economic value (benefits) to a society are greater than the aggregate decreases in value (costs) to a society, then the society is considered to be better off and the policy or project is desirable on economic grounds. Notwithstanding, an economically desirable policy will have distributional implications - some individuals in the community will bear the costs while a different group in the community may get the benefits.

All activities that involve expenditure in a region also provide some stimulus to economic activity in that region. Measures of this stimulus to regional economies are different to the economic values considered in the CBA framework.

### 2.2 Economic Values and Cost Benefit Analysis

#### 2.2.1 Total Economic Value Framework

The forests of the Central West Investigation Area have many economic values that can contribute to the welfare of society. These economic values are anthropocentric in nature and so relate to anything from which individuals gain satisfaction (DEST *et al.* 1995).

Baseline economic values of the forests of the Central West Investigation Area may be associated with goods and services that are traded in markets, as well as goods and services that are outside the market system, provided these contribute satisfaction to individuals in society.

Combined, all the economic values that can be obtained from a resource are often referred to as TEV, although it needs to be recognised that some values that a resource is able to provide may be at least partially mutually exclusive. For instance, forests can provide conservation values and timber values. However, the magnitude of the conservation values may be diminished by extracting timber.

The mechanisms that link resources to individual and community well being are direct use of the resources (for example, commercial and non commercial activities), indirect use of a resource (i.e. ecosystem function values such as catchment water regulation) and non-use (such as the preservation of natural ecosystems, species or special areas) (James and Gillespie 2002). A summary of TEV is provided in Box 2.1

### Box 2.1 - Summary of Total Economic Value Framework

TOTAL ECONOMIC VALUE = DIRECT USE VALUES + INDIRECT USE VALUES (OR ECOSYSTEM FUNCTION VALUES) + NON USE VALUES

Adapted from Brown *et al.* (1993), p. 13.

NON USE VALUES = OPTION VALUE + QUASI OPTION VALUE + VICARIOUS VALUE + BEQUEST VALUE + EXISTENCE VALUE

Reference: DEST *et al.* (1995), p. 18.

*Direct use values* are those that arise from the direct physical use of environmental resources (DEST *et al.* 1995) and may be further classed as commercial/market or non-commercial/non-market activities.

*Indirect use values or ecosystem function value*<sup>1</sup> is the value of the ecosystem services and functions provided by an environmental resource. The concept attempts to capture indirect ecosystem values due to the interconnectedness of ecosystems through a variety of food chain and nutrient cycles (Young 1992). Ecosystem function values of forests may include regulation of water in catchments, nutrient recycling, climate regulation etc.

Non-use values comprise *option values*, *quasi-option values*, *vicarious use values*, *bequest values* and *existence values*.

*Option values* relate to the benefit of maintaining the right to use resources without necessarily doing so. It may include future use by existing individuals or by future generations.

*Quasi-option values* refer to the welfare obtained from the opportunity to get better information by delaying a decision that may result in irreversible environmental damage.

*Vicarious use values* are gained by people from the knowledge that others may be enjoying use of a natural environment, for instance, for recreational activities, commercial activities and through the indirect consumption of an environmental resource through books and other media.

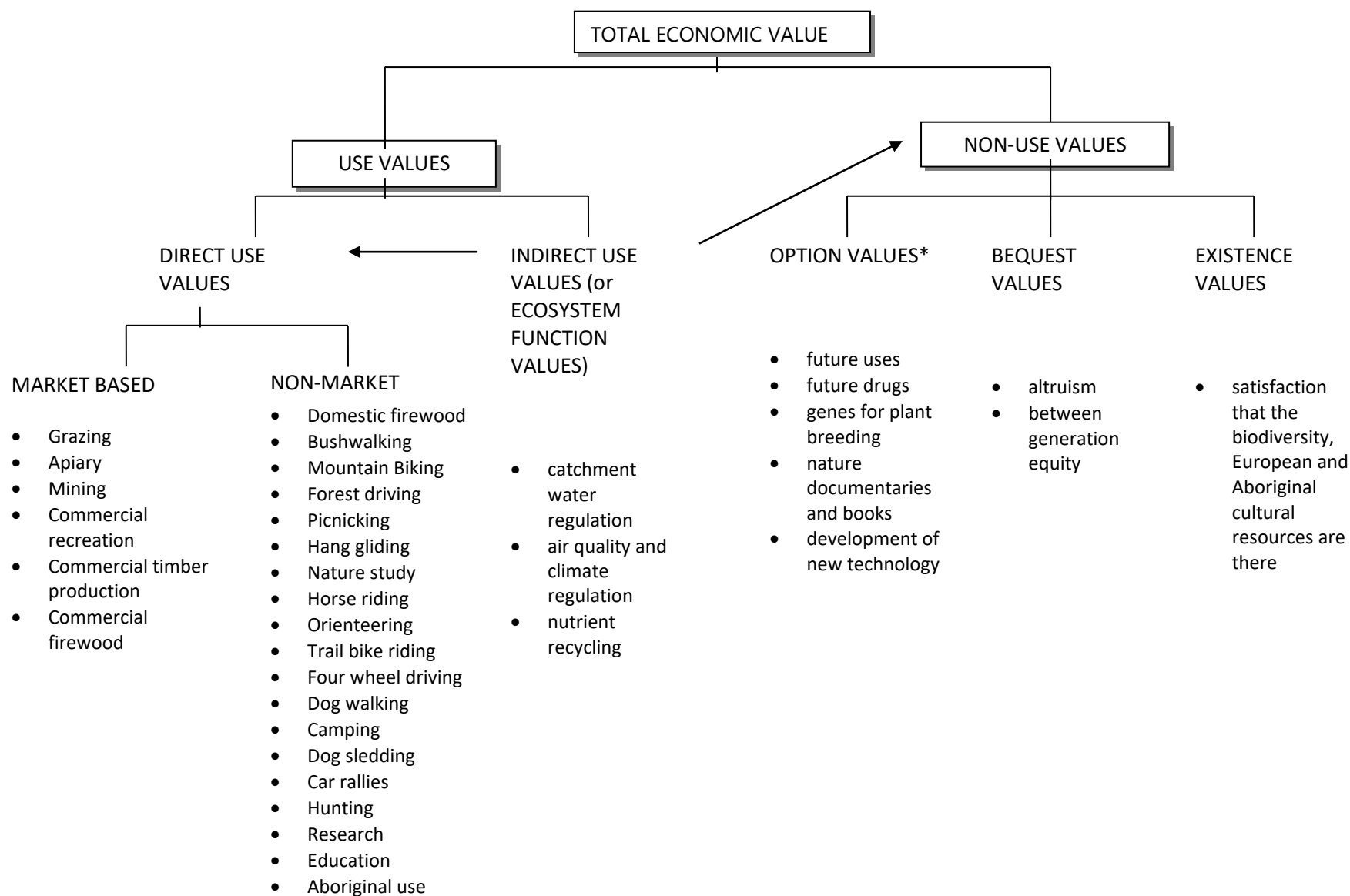
*Bequest values* refer to the maintenance of environmental attributes for the benefit of future generations.

*Existence value* is the satisfaction that the community derives from simply knowing that certain things exist (including because of ethical concerns), for example, rare species or special ecosystems (James and Gillespie 2002).

These values as they apply to the forests of the Central West Investigation Area are presented diagrammatically in Figure 2.1.

---

<sup>1</sup> Some economists consider ecosystem function values as a special category of environmental values, but they can usually be decomposed into the other categories of use and non-use value.



**Figure 2.1 Components of Total Economic Value of the Forests of the Central West Investigation Area**

\* includes option, vicarious and quasi-option values; Adapted from Young (1992), p. 23.

In more recent times there has been an increased focus on what is referred to as Ecosystem Services. Millennium Ecosystem Assessments classifies the services that ecosystems can provide into four broad categories along functional lines:

- Provisioning Services – products obtained from ecosystems
- Regulating Services – benefits obtained from regulation of ecosystem processes
- Cultural Services – nonmaterial benefits obtained from ecosystems
- Supporting Services – services necessary for the production of all other ecosystem services (Pagiola 2004, p. 5).

Table 2.1 shows the main ecosystem types recognised by the Millennium Ecosystem Assessments and the principal services that each provides.

**Table 2.1 - Main Ecosystem Types and their Services**

Ecosystem Service	Cultivated	Dryland	Forest	Urban	Inland Water	Coastal	Marine	Polar	Mountain	Island
Freshwater			*		*	*		*	*	
Food	*	*	*	*	*	*	*	*	*	*
Timber, fuel, fibre	*		*			*				
Novel products	*	*	*		*		*			
Biodiversity regulation	*	*	*	*	*	*	*	*	*	*
Nutrient recycling	*	*	*		*	*	*			
Air quality and climate	*	*	*	*	*	*	*	*	*	*
Human health		*	*	*	*	*				
Detoxification		*	*	*	*	*	*			
Natural hazard regulation			*		*	*			*	
Cultural and amenity	*	*	*	*	*	*	*	*	*	*

Source: Pagiola et al 2004, p. 6.

However, it is evident from this classification that the services provided by ecosystems that may impact human welfare tend to encompass direct use values and non-use values e.g. provisioning services may be considered to be direct use values. Cultural services may also be considered to be a combination of use and non-use values. Indeed, as identified by James and Gillespie (2002), while some economists consider ecological function values (ecological services) as a special category of environmental values, they can usually be decomposed into the categories of use and non-use values.

Nevertheless, separation of indirect use values (or ecosystem values) in the economic value typology does serve to provide additional focus to a range of ecosystem values, particularly regulating services, that are generally not at the forefront of valuation exercises and policy makers' consideration.

---

### 2.2.2 Measures of Economic Value

The economic values of goods and services provided by forested public land to the community are measured by the consumer and producer surplus they provide.

Producer surplus values are relevant to government operations, such as management of forests or environmental areas, and market based activities such as commercial timber production, commercial firewood collection, commercial recreation, grazing, apiary, mining etc. and are measured via market data. Producer surplus is the difference between the costs of the inputs used in the provision of a good or services (economic cost to producers) and the price received for the goods and services (total benefit/revenue to producers). In practical terms, it is the net revenue that is earned by producers (James and Gillespie 2002). Because CBA of State policy is often undertaken from a State perspective only that part of net revenue that accrues to the State would be counted. In some instances, for example government management of natural areas, the producer surplus may be negative i.e. just a cost with no associated revenue. Producer surplus values can be estimated from market data.

Consumer surplus values are relevant to non-market uses e.g. all types of non-commercial recreational activity, as well as non-use values.<sup>2</sup> Consumer surplus is the difference between what a person would be willing to pay for a good or service (the total benefit to the consumers) and what they have to pay (the cost to the consumer i.e. consumer expenditure). Economists use a range of valuation techniques to estimate the consumer surplus for non-commercial recreational activity and nonuse values. For recreational activities the main method is the Travel Cost Method (TCM). For nonuse values the main valuation methods are the Stated Preference techniques such as the contingent valuation method (CVM) and choice modelling (CM).

### 2.2.3 Baseline Values and Impacts versus Marginal Change

The TEV of the forests of the Central West Investigation Area therefore relates to the:

- Producer surpluses associated with each commercial activity
- Consumer surpluses associated with each non-market use activity
- Net costs to government
- Consumer surpluses associated with non-use values.

While the TEV framework is useful for ensuring all values are considered, it is not actually possible or necessary to estimate baseline TEV. It is not possible because Stated Preference valuation techniques such as the CVM and CM can only be used to estimate people's willingness to pay (value) for marginal **changes** in environmental outcomes. It is not necessary because when consideration is being given to the economic desirability of policy alternatives, the key economic consideration is the estimation of the *incremental* change in values. That is, it is relevant to identify and measure how each component of TEV, and the associated drivers, would change *over time* between the "with" and "without" alternative policy outcomes. That is, how producer and consumer surpluses as well as net government costs would change over time. It is almost always the case that many values are constant "with" and "without" the policy change and therefore there is no need to value them. This is the case with the Central West Investigation Area where many current uses are unaffected by the recommendations of VEAC.

---

<sup>2</sup> Consumer surplus values can also be relevant to commercial activities depending on price elasticity of demand. However, individual enterprises in competitive markets are price takers and face infinitely elastic demand curves. There is no consumer surplus associated with the goods and services provided by these individual enterprises.

---

The key principle is that any producer surpluses and/or consumer surpluses that are predicted to occur over time under the “without” or baseline case but are reduced or foregone under the “with” alternative policy scenario case are considered an economic cost, while increased or new producer and consumer surpluses generated from the “with” alternative policy case are considered an economic benefit.

In this CBA framework, provided the discounted incremental economic benefits exceed the discounted incremental economic costs i.e. the net present value (NPV) is greater than zero, then the proposal is considered to provide a net benefit to the community and an improvement in economic efficiency.

The net present values (NPV) presented in many ex-ante CBAs are based on future values being achieved with certainty. This approach does not give recognition to the reality that future values are subject to risk and uncertainty. One way of incorporating risk is to use expected values instead of certain values. This requires the range of potential outcomes being assigned probabilities. Expected values are the certain values multiplied by the probability of their occurrence. Where policy impacts involve sequences of future events, expected values will depend upon the accumulation of outcomes and their probabilities. In such cases, and where probability estimates are available, decision tree analysis can be used to calculate the expected NPV.

### 2.3 Regional Economic Impacts

All activities that involve expenditure in a region provide some stimulus to economic activity in that region. Hence, the following will provide economic stimuli to a region:

- Market-based or commercial activities
- Non-market use activities that involve expenditure in the region
- Government expenditure.

Non-use values do not provide any stimuli to a region since they do not involve any actual expenditure by the producer or the consumer.

Regional economic impact analysis measures regional economic activity in terms of direct and indirect (multipliers):

- *Gross output* – which is the gross value of business turnover. Costs are not subtracted
- *Value-added* – which 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. Some costs such as wages are not subtracted
- *Income* – which is the wages paid to employees including imputed wages for self employed and business owners. Income is one cost of production
- *Employment* – which is the number of people employed (including full-time and part-time).

These measures of regional economic stimulus are different to the measures of consumer and producer surplus.

Examining how expenditure patterns in the region would change (and modelling this using input-output analysis or computable general equilibrium analysis) can also be undertaken to estimate the incremental change in regional economic stimulus “with” and “without” an alternative policy approach.



---

With respect to this regional economic impact framework, it should be noted that all proposals whether economically desirable or not will provide an economic stimulus to a region provided that they involve expenditure. Hence while the regional economic impact method can be used to estimate changes in regional economic activity (value-added, output, income and employment) associated with alternative policy scenarios, unlike the CBA framework, there are no guidelines for interpretation of whether or not an increase or decrease in economic activity is economically desirable. The technique can, however, be useful for social planning purposes.

---

## 3. General Application of CBA Framework to the Central West Investigation Area

### 3.1 Current Uses

The public lands in the Central West Investigation Area support most of the native vegetation that remains in the largely cleared landscape in central west Victoria, north of the Otway Ranges. As a result, this land is important for industries, recreation pursuits and distinctive natural values that rely on these forests.

The main commercial industries on the public lands in the Central West Investigation Area are apiculture, timber harvesting, mining, quarrying and licensed grazing.

The main recreational and domestic activities that extract resources from public land in the investigation area are prospecting, firewood collection and hunting.

There are also a range of recreation activities that do not involve extraction. These include activities such as horse riding, four-wheel driving, mountain biking, trail biking, dog walking, bush walking, camping, and organised car rallies and dog sledding.

Population growth in and near the investigation area as well as changes in leisure patterns is leading to increasing recreational pressure on these public lands.

However, as identified by the Commissioner for Environmental Sustainability, Victoria (2019, p. 179) there is no data on current visitors to State Forests.

### 3.2 VEAC Recommendations

In accordance with the terms of reference and the VEAC Act, an important driver for the VEAC recommendations is the establishment of a comprehensive, adequate and representative system of protected areas, which also contain key areas for threatened species conservation. This is largely achieved by allocation of state forests to new national parks, conservation parks, nature reserves and bushland reserves. Regional parks – that are not part of the protected area system – are also recommended and do result in some increased protection of biodiversity relative to continued extractive uses.

**Table 3.1 - Major Land Use Changes from VEAC Recommendations (ha)**

Public Land Category	Current	Recommended	Change
State Forest	89,278	11,901	-77,377
National park	22,967	73,113	50,146
Conservation Park	-	5,246	5,246
Regional Park	5,264	24,992	19,728
Nature Reserve	6,703	8,051	1,348
Bushland Reserve	1,047	2,808	1,761
<b>Total</b>	<b>35,981</b>	<b>114,210</b>	

### 3.3 Consequences

The main consequences for permitted activities in each of the major landuse classifications is provided in Table 3.2. The main activities impacted are those deeply shaded i.e. timber harvesting, domestic firewood collection and grazing. For these activities substitution possibilities are more limited. For those recreation activities that may not be permissible in some areas or are subject to management planning and discretion e.g. camping, car rallies, horse riding, dog walking, prospecting and recreational hunting, substitution possibilities are generally moderate to high and hence economic impacts are likely to be lower than they may otherwise be. Mining is a special case that is discussed in more detail below.

**Table 3.2 - Permissible Activities in Public Land Use Classifications**

Activity	State Forest	Nature Reserve	Conservation Park	National Park	Bushland Reserve	Regional Park
Apiculture <sup>1b</sup>	√	√	√	√	√	√
Bushwalking	√	√	√	√	√	√
Nature Observation	√	√	√	√	√	√
Four-wheel driving <sup>4</sup>	√	√	√	√	√	√
Trail bike riding <sup>5</sup>	√	√	√	√	√	√
Bicycle riding (including mountain biking) <sup>6</sup>	√	√	√	√	√	√
Camping	√	○ <sup>2</sup>	√	√	○ <sup>2</sup>	√
Car rallies	√	○ <sup>7</sup>	○ <sup>7</sup>	○ <sup>7</sup>	√	√
Horse riding	√	X	○ <sup>8</sup>	○ <sup>8</sup>	√	√
Dogs	√	X	○ <sup>9</sup>	○ <sup>9</sup>	√	√
Mining <sup>1a</sup>	√	√	○	○	√	√
Prospecting	√	X	X	X	√	√
Recreational hunting <sup>10</sup>	√	X	X	X	X	X
Domestic firewood collection	√	X	X	X <sup>11</sup>	X <sup>12</sup>	X <sup>14</sup>
Grazing	√	X	X	X	X	X
Timber Harvesting	√	X	X	X	X	X <sup>13</sup>
<b>Change in Area (ha)</b>	<b>-77,229</b>	<b>1,348</b>	<b>5,246</b>	<b>50,146</b>	<b>1,761</b>	<b>19,728</b>

- √ Allowed  
X Not allowed  
○ Conditionally allowed (see notes)

Notes:

<sup>1a</sup> Continuation of operations within existing permits and licences is permitted

<sup>1b</sup> Apiculture at licensed sites

Camping in designated camping areas where provided and in other areas as specified by the land manager; may not be provided in smaller reserves, where there is high day visitor use or where there are ample camping opportunities in adjacent land

<sup>2</sup> Four wheel driving in register vehicles on formed roads and vehicle tracks open to the public, and on other roads and tracks as specified by the land managers; 4WD not allowed off road

<sup>4</sup> Trail bike riding by licensed riders on registered vehicles on formed roads and vehicle tracks open to the public, and another roads and tracks specified by the land manager: not allowed off-road

<sup>5</sup> Bicycle riding (including mountain biking) on formed roads on formed roads and vehicle tracks open to the public, and another roads and tracks specified by the land manager: not allowed off-road

<sup>6</sup> and another roads and tracks specified by the land manager: not allowed off-road

- 
- 7 Competitive sections of car rallies generally not allowed in national parks and nature reserves; transport sections through these areas is allowed
- 8 Horse riding on roads and tracks as specified by the land manager; no overnight camping  
Dogs may be allowed on lead in visitor areas, along a restricted number of tracks, or in cars as specified by the land manager in the management plans; no overnight camping with dogs. Dogs on leads will continue to be allowed in
- 9 at the Bacchus Marsh Trench Reserve  
Recreational hunting for pest animals will be allowed on public land if part of an authorised control program at the discretion of the eland manager
- 10 Current domestic firewood coupes allowed to be completed in proposed Pyrenees NP
- 11 Current domestic firewood coupes allowed to be completed in some places
- 12
- 13
- 14 Current domestic firewood coupes at Glenmore Bushland allowed to be completed

### 3.4 Identification of potential economic costs and benefits

At a broad level, the VEAC recommendations would have the following potential types of economic costs and benefits to the community.

**Table 3.3 - Potential Economic Costs and Benefits of VEAC Recommendations**

Economic Costs	Economic Benefits
Reduction in commercial timber production including commercial firewood	Increased conservation of native vegetation
Reduction in domestic firewood collection	Increased conservation of fauna species
Reduction in grazing	Increased protection of Aboriginal and Historic heritage values
Reduction in potential mining	Water quality and quantity regulation
Restriction on nonmarket recreation in some locations - hunting, prospecting, horseriding, dog walking and potentially some recreation events (e.g. dogsledding) but availability of substitute sites for many activities	
Reduction in land values of adjoining properties*	
Cost of managing for conservation	Cost saving from no longer managing primarily for timber

\* This is not an additional economic cost to reductions in recreational activity. See discussion below.

There are no impacts of the recommendations on apiary. Apiculture will continue to be permitted at licensed sites and permitted in different public land use classifications, subject to the 2013 Apiculture (beekeeping) on public land policy and operating procedure.

### 3.5 Valuation of Costs and Benefits

#### Introduction

Valuation of impacts is a two step process comprising:

- estimation of the level of the physical change that will occur
- estimation of unit economic values for each type of physical change.

Both of these steps are associated with uncertainty. However, for the Central West Investigation Area this uncertainty is magnified by the fact that there is little reliable information on the current usage levels of the forests and hence assessment of the likely physical impacts on current and future users is problematic. Notwithstanding, some indication of the relative costs and benefits of the VEAC recommendations can be obtained from relying

---

on best estimates of current use levels based on expert judgments and applying unit economic values. There will be considerable uncertainty around these estimates. However, they provide the only means on which to enhance qualitative analysis and provide some indicative quantitative analysis.

This Section provides a consideration of how the broad categories of costs and benefits of the VEAC recommendations could potentially be valued and applies unit values to an indicative order of magnitude estimate of the level of physical impacts. Values over 30 years are discounted to present value using a 7% discount rate.

### ***Timber Harvesting***

All three blocks of the investigation area currently provide wood for a variety of product types. The annual totals for all licensees who may harvest in the investigation are currently:

- sawlogs: a total volume of 2,000 cubic metres to six licensees
- fencing timbers: 2,200 cubic metres to 12 licensees
- woodchop logs: 2,200 lineal metres to two licensees
- commercial firewood: 8,000 cubic metres to 19 licensees
- commercial firewood residual from sawlog harvesting: 2,550 tonnes to one licensee;
- bark: 400 cubic metres to one licensee
- wheel hub logs: 400 lineal metres to one licensee.

The economic value of standing timber can be estimated using market prices of royalties if these prices are determined in competitive markets and reflect the true resource value to Australian society. Alternatively the residual pricing technique can be used, taking the competitively determined domestic price of sawn timber and deducting from that the costs of processing, harvesting, marketing, transporting and felling. This is the value of standing commercial timber (the value of royalties) in a competitive market.<sup>3,4</sup>

VicForests identify that most of the timber products from the Central West Investigation Area are sold to local businesses at prices set by an open market process. Consequently, these prices can be considered to be indicative of the economic value of the commercial timber.

VicForests identify the following estimated sustainable yield and potential revenue from the Wombat and Mt Cole forests of investigation area, although it is noted that current production is well below the identified sustainable yield.

---

<sup>3</sup> From which the costs of forest management must be deducted to determine the net value. However, forest management costs will be considered separately.

<sup>4</sup> This is the appropriate value for inclusion in a CBA. However, it is recognised that the value of production from timber log inputs is in excess of this value and contributes to regional economic activity. This regional economic activity value is addressed the Section 7.

---

**Table 3.4 - Estimated Sustainable Yield and Revenue from Forests in the Investigation Area**

<b>Year</b>	<b>2013</b>	<b>2014</b>	<b>2100</b>
<b>Wombat Sustainable Sawlog Yield (m3)</b>	10,000	11,700	21,700
<i>Sawlog Value</i>	\$635,584	\$743,635	\$ 1,379,216.24
<i>Commercial Firewood Value</i>	\$131,600	\$153,972	\$311,436
<b>Mt Cole Sustainable Sawlog Yield (m3)</b>	2,400	2,400	4,900
<i>Sawlog Value</i>	\$152,540	\$152,540	\$311,436
<i>Commercial Firewood Value</i>	\$31,584	\$31,584	\$64,484

In 2001 the entire box ironbark state forest area generated \$3.3M in royalties. Wellsford forests account for approximately 6% of the box ironbark state forest area. Linear extrapolation suggests annual revenues in or the order of \$200,000 (Environment Conservation Council, 2001, p. 63). This has been assumed to be sustainable from the Wellsford Block.

There are currently approximately 89,000 ha of forests in the Central West Investigation Area and so for the purpose of the analysis it is assumed that these forests all contribute to the sustainable production. Revenue impacts by Block are apportioned on the basis of percentage of State Forests proposed for alternative land classifications.

The VEAC recommendation is for a reduction in forests of 77,000 ha, which would equate to an economic cost of \$14.6M present value at 7%.

### **Firewood**

#### **Commercial**

Provided that commercial firewood is also allocated on a competitive market basis, its value is the royalties paid to VicForests and so is included in the revenue estimated above for VicForests' Community Forest Operations.

#### **Domestic**

DELWP conducts two domestic firewood collections seasons (autumn and spring) in state forests each year for the public to access at no cost. The location of designated firewood collection sites in which selected trees have been felled by DELWP's paid contractors is made available through DELWP's website and at regional offices throughout the state. Each person is eligible to collect two cubic metres of firewood per day during the collection season. A total of 16 cubic metres may be collected per household each financial year. It is estimated that a typical household uses less than 6 cubic metres per year. It is illegal to sell firewood obtained from domestic collection areas or collect firewood for use in a commercial enterprise.

In 2011 the Victorian government removed the requirement for a permit or licence to collect domestic firewood from public land and hence there is no data on the volumes of firewood collected recently, and the demographics of the people undertaking this activity in the investigation area. However, land managers have indicated that there has been an increasing volume of firewood taken over a shorter time period with collectors travelling some distance to access this resource. Although the majority of people choose the site to collect firewood based on proximity to where they live.

While the current volumes of domestic firewood collection are unknown, the recommendations are estimated to result in a 70% reduction in domestic firewood supply. The most recent data on firewood collection suggested annual domestic firewood collection levels in the order of 3,000 cubic metres per annum. However, this is likely to understate

---

current levels of domestic firewood collection. For the purpose of this analysis it is assumed that the VEAC recommendations will result in to an annual loss of domestic firewood of 6,000 cubic metres.

The collection of firewood from public lands for domestic purposes provides an economic value to participants. The gross value is equivalent to the cost of sourcing this wood from a commercial provider i.e. its replacement cost. However, to obtain this value, domestic firewood collectors must incur some monetary costs (travel costs, chain saw fuel costs etc) and nonmonetary costs (value of travel and processing time)<sup>5</sup>. People will only collect firewood up to the point where the costs of collecting the firewood is equal to the value of the firewood. The marginal firewood collector derives a net economic value of zero, while those located close by would have minimal collection costs and hence the economic value they obtain is close the full replacement cost value of the firewood. A reasonable estimate of the economic value of domestic firewood collection is therefore half the replacement cost of the firewood. Firewood sells for around \$150/m<sup>3</sup>, so a reasonable economic value to domestic firewood collectors is \$75/m<sup>3</sup>.

Any constraints on the location of domestic firewood collection that reduce the overall quantity of firewood collection available will result in an economic cost. If substitute sites are available and there is no quantity constraint on domestic firewood collectors then at worst they incur some extra costs of collection. However, for the purpose of this study reductions in domestic firewood collection quantities is considered more likely. A value of \$75/m<sup>3</sup> is applied to reductions in firewood availability i.e. 7000m<sup>3</sup> per annum. This equates to an economic cost of \$450,000 per annum, or \$5.6M present value at 7% discount rate.

## **Grazing**

Grazing takes place on public land under licences administered by the Department of Environment, Land, Water and Planning.

The VEAC recommendations would result in the termination of all or part of 85 Crown land licences over an area of some 188 hectares. Around 60 of these licences are held for grazing or primary production purposes but it is unlikely that all are actually used for grazing. Notwithstanding, actual use there is a potential opportunity cost from the VEAC recommendations.

The economic value of grazing activities on public lands is the revenue gained from the stock less the costs of management. Gross margin budgets can be used to give an indication of the net economic value associated with grazing activities on private land. To apply these to public lands, allowance would need to be taken for reduced carrying capacity.

Gross margins for cattle grazing on private land native pastures vary by activity type from \$134.80 for coastal weaners - unimproved pasture to \$206.58/ha for feeder steers i.e. average of \$170.69/ha. These gross margins are based on a stocking rate of 4 dry sheep equivalent per ha. However, the stocking rate would be considerably lower on forested land. For the purpose of this analysis a stocking rate of 1 DSE/Ha is assumed for forests in the Central West Investigation Area. This implies a GM/ha/year of up to \$42.67.

Conservatively, applying this to the total area of Crown land licences affected (rather than just those held for grazing or primary production) gives an economic cost of VEAC recommendations of \$8,022 per annum or \$115,000 present value at 7% discount rate.

---

<sup>5</sup> They may also derive some utility from visiting the forest and undertaking physical activity. However, for simplicity this is ignored here.

---

## **Mining**

Existing licences, even those that end up being in land use classifications in which mining is exempt e.g. National Parks and State Parks, will be permitted to continue, including the conversion of exploration licences to mining licences. New mining applications would continue to be permitted in all other public land use applications subject to normal approval processes.

However, there may potentially be some impact of the VEAC recommendations in locations where the following conditions apply:

- prospective areas that due to VEAC recommendations become areas where mining is exempt
- for areas covered by existing licences, the licences lapse over time OR for areas not covered by an existing licence a proponent would have sought to obtain a licence
- exploration would have occurred
- financial viable deposit found
- a proposal for mining would have been developed that proceeds to a development application
- the development application is approved
- finance is obtained
- mining proceeds
- mining is actually profitable.

This economic impact would be equivalent to the present value of the 'expected' foregone producer surplus<sup>6</sup> from a potential mining development in these areas. So for prospective areas that due to VEAC recommendations become areas where mining is exempt, the 'expected' foregone producer surplus is equivalent to the multiplicative probability of dot points 2 to 9 times the annual producer surplus of the mine, discounted to present value. The probabilities are impacted by availability of substitutes inside and outside of State Forests. Refer to Figure 3.1 which shows that the majority of the identified goldfields in the investigation area lie outside the State Forests.

As an example, assume that it takes 10 years from obtaining a licence to commencing mine development and at the time of mine development the mine would provide \$30M per annum in royalties to Victoria for 10 years.

Further assume the following probabilities:

- 50% probability that a proponent would have sought to obtain a licence in the particular area
- 50% probability that exploration would have occurred
- 25% probability that a potentially financial viable deposit found
- 80% probability that a proposal for mining would have been developed that proceeds to a development application
- 80% probability that the development application is approved
- 100% probability that finance is obtained
- 100% probability mining proceeds
- 90% probability mining is actually profitable.

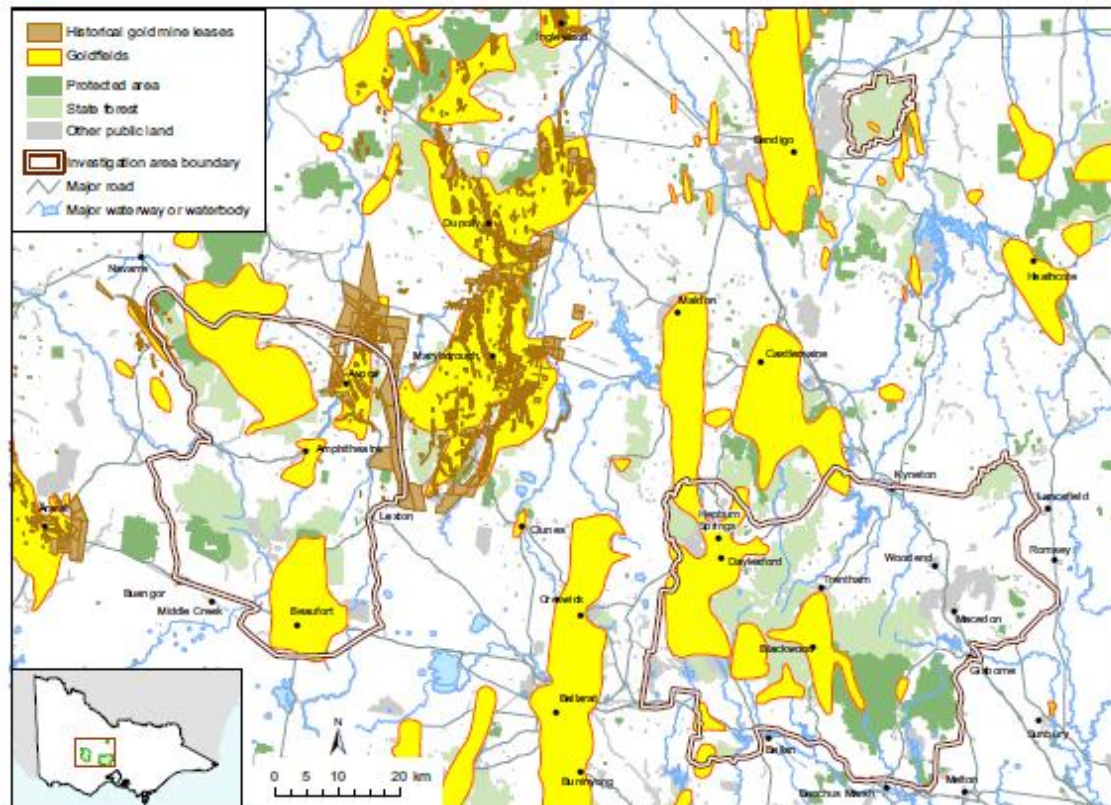
---

<sup>6</sup> Assuming the cost benefit analysis is undertaken from a Victorian perspective, producer surplus of a foreign owned gold mining activity is essentially royalties plus company tax that is redistributed to Victoria.



If VEAC recommendations prevent this from happening there is an economic cost of \$4M present value.

**Figure 3.1 - Historic gold mining areas in the Central West Investigation Area**



Note: The historic gold mine leases layer (obtained from the Victorian Spatial Data Library) displays expired gold mining leases from the 1860s to 1958. The goldfields layer displays spatial information compiled by the Geological Survey of Victoria in 1993 and supplied to VEAC by the Department of Primary Industries in 2012.

Source: VEAC (2018), p. 22.

The complexity of the estimation of impacts on gold mining is such that this impact remains unquantified. However, with small areas impacted by the VEAC recommendations and high levels of potential substitute sites not impacted by the VEAC recommendations, the likely probabilities involved and distance into the future that any potential development would occur (and hence the impacts of discounting), the expected value of VEAC recommendations are likely to be modest.

## Recreation

The range of popular recreational activities in the Investigation area is large and includes four wheel driving and car touring, horse riding, bushwalking, mountain bike riding, picnicking, metal detecting, camping, trail bike riding, nature study, deer and other hunting and car rallying. The key areas from which visitors come include Ballarat and Bendigo, towns in the investigation area and especially the western and northwestern suburbs of Melbourne.

Participants in recreation activities derive an economic value (consumer surplus) even though they are not required to pay entry or other fees. This economic value represents their willingness to pay for the activity over and above what they actually have to pay. For noncommercial activities, it is referred to as a nonmarket value and can be estimated using the nonmarket valuation method referred to as the travel cost method.

---

This method requires data on visitation levels and the origin of visitors. This information is not available for the public land in the Central West Investigation Area. However, some indication can be obtained by other studies that have been undertaken in relation to nonmarket recreation to natural areas.

A study by the NSW NPWS (Heagney et al., in press) of visitation across a network of 728 protected areas in the state of New South Wales found average consumer surplus values of \$31/visit, with consumer surplus arising from a visit to the highest profile parks within the network considerably greater than the average i.e. \$331 per visit for NSW residents visiting Kosciusko National Park, \$685 per visit for Royal National Park and \$686 per visit for the Blue Mountains. Therefore consumer surplus values per visit ranged from very low amounts up to \$686 per visit.

Conceptually, where visitation is sourced from further away i.e. is a regional or state significant destination, the consumer surplus per visit will be greater. More locally sourced visitation will have lower consumer surplus per visit. The willingness of people to pay to travel to more distant locations reflects the enjoyment they obtain from the visit, including any expected pay-offs such as finding gold nuggets.

In this context, consumer surplus associated with visits to sites where the visits are primarily by adjoining landholders is likely to be less than visits to sites where people come from farther afield. It is assumed that:

- dog walking is primarily by adjoining landholders and hence has a lower consumer surplus value per visit
- different sites used for horse riding and recreational hunting may cater to adjoining landowners or a broader population and so be associated with different levels of consumer surplus per visit
- visitation for prospecting, dogsledding and car rallies is drawn from further distances and hence associated with higher consumer surpluses per visit.

For the purpose, of the analysis the following consumer surplus estimates per visit have been assumed.

- Camping - \$45/visit
- Dog walking - \$10/visit
- Horse riding adjacent - \$20/visit
- Horse riding non-adjacent - \$40/visit
- Recreation hunting nonadjacent - \$90/visit
- Prospecting - \$330/visit
- Dog sledding - \$200/visit
- Car Rallies - \$200/visit.

Where uses are prohibited and visits cease, the economic cost per visit foregone is as above.

However, the proposals for the public land in the investigation are a mosaic with some areas prohibiting, or controlling certain uses but allowing them in adjoining areas. If visitors are indifferent between recreating in one area (where use becomes prohibited) and the alternative, and do not incur any additional costs in getting to the alternative area, then there is no loss of consumer surplus values.

However, where the alternative is not as desirable (reduction in demand) and/or results in the visitor incurring additional costs, there are two potential effects:

- a reduction in visitors, compared to the current situation (with the full loss of consumer surplus for these visitors)
- a reduction in consumer surplus per visit for those who continue to visit the alternative but incur additional costs or reduced enjoyment.

One further impact on recreation values is also possible on existing visitors to the sites that displaced recreators would then be concentrated in. If congestion or use conflict occurs, the enjoyment (consumer surplus) of these visitors may also be reduced. However, current and future visitation levels to State Forests do not appear to be at levels where congestion issues would arise.

The simplified approach taken to estimating recreation impacts is to:

- identify the areas where different types of recreation may be restricted
- make a judgment about the likely level of annual visitation to that area for different recreation activities. This has been informed by a review of relevant reports and documents e.g. Macedon Ranges Shire Council (undated a), Macedon Ranges Shire Council (undated b), MacroPlanDimasi (2018) etc, as well as submissions by recreation groups and consultation with land managers
- identify the potential for substitution sites for those recreation activities - low, medium or high
- where the substitution potential is low the likelihood of the maximum potential impact is considered high and probability of 80% is applied to the number of visitors impacted. Where the substitution potential is high the likelihood of the maximum potential impact is considered low and a probability of 20% is applied to the number of visitors impacted. Where the substitution potential is moderate the likelihood of the maximum potential impact is considered medium and a probability of 50% is applied to the number of visitors impacted
- apply the abovementioned consumer surplus estimates per visit to the substitution adjusted level of annual visitation impacted.

**Table 3.4 - Indicative Recreational Impacts of VEAC Recommendations**

Recreation Activity	Maximum Visits pa Impacted	Substitution Potential	Expected Visits pa Impacted	Cost per Annum	Costs Present Value (7%)
Horse riding	220	Medium	110	\$2,200	\$27,300
Dogs – general	5,400	High	2,700	\$27,000	\$335,044
Dog – sledding	80	Low	64	\$12,800	\$158,836
Prospecting	1,665	High	333	\$109,890	\$1,363,630
Recreational hunting	1,550	High	310	\$27,900	\$346,212
<b>Total</b>	<b>8,915</b>		<b>3,517</b>	<b>\$179,790</b>	<b>\$2,231,022</b>

## Land Values

Some recreational activities in the public lands are enjoyed by adjoining residents. They derive a recreational benefit from being located in close proximity to a recreational resource.

The value of this benefit may be capitalised in their property value. However, to count both the recreation impact on consumer surplus values and the impact on property values would be double counting. It is the same value estimated in two different ways.

---

In this respect it should be noted that the value of a property ( $P_v$ ) is a function of the structural (S), access (A) and environmental (E) attributes it provides (Abelson, 1996) i.e:

$$P_v = P(S, A, E, Y)$$

Structural attributes include lot size and shape, house attributes, other property improvements, land capability, resource endowments, current zoning, future subdivision potential, road frontage, water, sewerage, electricity, communication services etc.

Access includes proximity to Melbourne and the employment and community and social services this offers as well as access to recreational resources.

Environmental attributes may include:

- air quality, water quality and scenic amenity - all of which positively impact land values
- the presence of native vegetation and biodiversity - which can have a positive impact on private land values in terms of amenity and a negative impact on private land values in terms of restrictions on current and potential use of the land
- the presence of hazards such as flood prone land and bushfire hazard - which reduce private land values by limiting land use opportunities or increase land values by supporting particular farming activity e.g. floodplains.

Overall access to forests for periodic recreation is likely to be a very small component of property value, potentially not measureable using hedonic pricing techniques. Consequently, the focus in this report is on estimation of the recreation values directly rather than via impacts on property value.

### **Illegal Recreation**

Parts of the investigation area are currently used illegally e.g. trail bike riding and four-wheel driving off formed roads. The people undertaking these activities obtain a consumer surplus from them. These illegal activities may be more constrained or controlled under VEAC proposals. However, it is generally considered that those undertaking illegal activities do not have 'standing' in CBA of policy proposals (Boardman et al., 2001) and hence no foregone consumer surplus (economic cost) should be attributed if these activities are curtailed.

### **Forest Management Costs**

The management of community forestry activities was transferred to VicForests from the former Department of Environment and Primary Industries (DEPI) in 2014. VicForests gets a cash grant from DEPI to partially fund this service across all community forests for 5 years. In 2016-17 the level of the grant was \$678,000.

For simplicity, it is assumed that the cost of managing the forests for conservation (i.e. as VEAC's recommended protected areas) would be roughly equal to the cost of managing it for timber.

### **Benefits of Increased Conservation**

The recommendations would result in conservation of in the order of 77,000 ha of forest in national parks, conservation parks, regional parks, nature reserves and bushland reserves.

---

Excluding regional parks which are primarily managed for recreation purposes, around 58,500 ha of forest would be protected.

The improved protection status and conservation management may have economic values to the population. These can be estimated by asking a sample of the population their willingness to pay for the VEAC recommendation outcomes using either the CVM or CM.

There are no existing studies that have examined the willingness to pay of the community to conserve native vegetation in the Investigation area by changing the public land use status and adopting the VEAC recommendations. However, some indication of the potential magnitude of the values to the community can be obtained from other studies. Three potential source studies for valuing native vegetation conservation, are identified below.

Gillespie Economics (2009a) examined the WTP of NSW households for protection of Endangered Ecological Communities that provide habitat for threatened species. The metric used was hectares.

Gillespie Economics (2009b) examined the WTP of NSW households for protection of native vegetation from clearing. The native vegetation was described as including threatened plant species and providing habitat from a range of non-threatened and threatened animal species. The metric used was hectares.

Mazur and Bennett (2009) examined the WTP of Sydney households for the increases in the area of native vegetation in good condition in the Hawkesbury-Nepean catchment. The metric used was square kilometres.

Van Bueren and Bennett (2001) examined the WTP of Australian households for area of farmland repaired and bushland protected. The metric used was per 10,000 ha.

However, application of unit values from the above study are complicated by the issues of aggregation and scale.

### **Aggregation**

Community values are public good values. They are the sum of the WTP of individuals in the community. Values from WTP studies are therefore generally expressed in terms of WTP per household per period of time e.g. once-off or over a number of years. Values are indexed to the current day, and where values are over a period of time they can be converted to present value using discounting. These present values per household then need to be aggregated across the relevant households.

Source studies sampled the Sydney, NSW and Australian population. Even where the NSW and Australian population was sampled, the composition of online panels that are surveyed means that this largely reflects the values of the population of major urban cities. Assuming a similar level of WTP for Melbourne population, the population of Melbourne was used as the base population for aggregation of values in the present study. However, WTP estimates from source studies are based on the average value from questionnaire respondents in the sampled population. Extrapolation of values per household values across the relevant population necessitates assumptions about whether non-respondents to the questionnaire hold the same values as those of respondents included in the sample. Some studies recommend conservative aggregation, by only aggregating WTP values to the proportion of the population given by the questionnaire response rate (see, e.g. Bennett 2008). However, this may understate community WTP as it assumes that all non-respondents have a zero WTP.

---

An alternative method has been suggested by Morrison (2000), who found that approximately one-third of non-respondents hold values similar to questionnaire respondents. Van Bueren and Bennett (2001) support these findings in a follow-up telephone interview with non-respondents in a Choice Modelling study. Response rates to choice modelling studies are typically around 20% to 25%. Using this approach, aggregation to 50% of Melbourne households was undertaken for all unit price estimates.<sup>7</sup>

### **Scale**

It is inappropriate to extend a value beyond the change investigated in the source study. That is, if the source study asked people their WTP for up to 140ha of native vegetation conservation, this value should not be applied to 80,000ha of native vegetation conservation. The primary reason for this is the concept of diminishing marginal utility - people value the first increment of a good higher than they value subsequent increments. In the absence of empirical evidence, it is unclear whether respondents to the source study had any WTP for native vegetation conservation beyond the scope of the study i.e. 140ha. Similarly, where the source study examines a considerably larger scale of impact, the per unit impact may understate smaller scale impacts.

For the conservation of native vegetation values, the scale of the conservation examined in each study (140ha, 300ha, 1,500km<sup>2</sup> and 6,000,000ha respectively) was different to the scale of native vegetation protected (conservatively excluding Regional Parks by VEAC recommendations i.e. 58,500 ha).

Rolfe et al (2013) found that marginal values for the same unit of environmental change could be many times higher when only very small areas of an attribute are considered compared to when the whole amenity was considered<sup>8</sup>. Consequently, calibration factors are required in benefit transfer applications between different scales. Rolfe et al (2013) found a close inverse relationship between ratio of quantities of environmental change involved and the ratio of WTP amounts and recommended the following log-log form of this relationship as a simple and efficient way of calibrating values for benefit transfer:

$$\text{LN}(\text{WTP}_{\text{ATTsmall}}/\text{WTP}_{\text{ATTlarge}}) = \text{LN}(\text{Quantity}_{\text{ATTlarge}}/\text{Quantity}_{\text{ATTsmall}})$$

where WTP refers to the average marginal implicit price for different case studies, and Quantity refers to the amount of the attribute change across different levels of geographic scope.

Consequently, for native vegetation conservation unit prices were calibrated using the Rolfe et al. (2013) approach. This gave unit prices per ha of vegetation conservation from each of the studies of \$1,609, \$1,663, \$4,889 and \$7,604, respectively.

Using average economic value across the four studies, the conservation of 58,500 ha provides an economic benefit in the order of \$270M present value.

This value is a lower bound value because as it only addresses the single attribute of area of vegetation protection. The studies on which it was based also included attributes for other aspects of conservation such as number of native species protected, and kilometres of healthy

---

<sup>7</sup> If different populations are used for different benefit transfer studies then differences in economic values will primarily be due to aggregation rather than the average WTP estimates.

---

waterway, number of significant Aboriginal sites protected. To the extent that the VEAC recommendations provide more benefits than just the protection of native forests there would be additional economic values. For example, Van Bueren and Bennett (2001) included an attribute for "the number of species protected from extinction". However, the physical quantification that is required before any unit value can be applied is problematic. To apply the value for this attribute it would be necessary to identify the number of species that the VEAC recommendations benefit and the extent to which the recommendations reduce the prospects of extinction for each of these species. Consequently, only a conservative value relating to vegetation conservation is applied.

### **Benefits of Protection of Aboriginal Heritage Values**

Additional protection for Aboriginal heritage sites may have benefits to both the Aboriginal and broader community.

However, monetisation of benefits for the Aboriginal community is problematic as it requires a property right assumption that may confound respondents to a CVM or CM questionnaire i.e. they have to be WTP to preserve their own heritage.

Additional protection of highly significant Aboriginal heritage sites has also been shown to affect the well-being of the broader community (Gillespie Economics, 2008, 2009a, 2009b). However, these studies are based on the protection of highly significant Aboriginal heritage sites from destruction. They are therefore difficult to apply in the context of the VEAC recommendations.

These potential benefits of the VEAC recommendations therefore remain unquantified.

### **Water Quality and Quantity Regulation**

The forests of the investigation area contain the headwaters of several of western Victoria's major rivers, such as the Loddon, Campaspe, Coliban, Maribyrnong, Moorabool and Werribee-Lerderderg rivers. Public land forests, vegetated stream frontages and wetlands improve water quality by filtering water, thereby reducing the amount of soils, sediment, pollutants and organic matter that would otherwise be released into the waterways. When ecosystems are degraded or disturbed e.g. through loss of vegetation cover, trampling, overgrazing, weed invasion, introduction of pathogens or large-scale fires, water quality can be reduced. Some of the greatest impacts on water quality are fire and roading.

Maintaining or improving catchment conditions can lower downstream water supply costs as well as improve recreation, amenity and aquatic and riverine ecological conditions. These can all contribute to use and non-use economic values. However, any valuation exercise would first require considerable biophysical modelling of the future state of rivers "with" the VEAC recommendations compared to "without" them. In the absence of this modelling, it is not possible to place an economic value on the potential benefits.

However, any water regulation and quality benefits are likely to mostly potentially arise from the recommendations in the Mount Cole - Pyrenees Block and Wombat - Macedon Block which contain the headwaters of a number of major rivers.

### **Recreation and Tourism Benefit of Additional Protected Lands**

Some public submissions suggested that creating more national parks will increase tourism (especially for outdoor environment or nature-based businesses). However, whether creating

more national parks from state forests will actually increase recreation and tourism activity and value is open to debate.

Heagney et al. (2018) in a study of the recreation values of 728 protected areas in the state of New South Wales found a strong influence of built infrastructure on recreation demand. Of all the site attributes modelled in their study, built recreational infrastructure (rather than natural site values) was the primary contributor to demand generation at protected area sites, with the largest and most consistent contribution made by roads and parking, key pieces of infrastructure that enable site access.

Infrastructure can be provided to forest areas regardless of the public land status. The relevant comparison whether a change in the public land status (e.g. from State Forests to National Park) with all other things, including the infrastructure remaining constant, affect recreation activity and values. Two studies that examined this issue with respect to the declaration of World Heritage Areas both concluded that for most WHAs there is inadequate data to determine whether there is a significant WHA icon value. Where some data existed the results were mixed and uncertain. Consequently, no firm conclusions could be drawn.

Based on the above, the evidence for a recreation and tourism impact of a change in public land use status is limited and hence no economic benefit is included in this analysis.

### 3.6 Results across the Central West Investigation Area

Combining the above estimates, the results of the CBA analysis are summarised in Table 3.5.

**Table 3.5 - Cost Benefit Analysis Results for the Central West Investigation Area**

<b>Economic Costs</b>	<b>\$</b>	<b>Economic Benefits</b>	<b>\$</b>
Reduction in Commercial Timber Production	\$14,552,297	Increased conservation of native vegetation	\$269,526,040
Reduction in Commercial Firewood Collection	Include in above	Contribution to fauna and flora species protection	NQ
Reduction in Domestic Firewood Collection	\$5,584,069	Increased protection of Aboriginal heritage values	NQ
Reduction in Grazing	\$99,551	Water quality and quantity regulation	NQ
Reduction in mining	NQ		
Reduction in dog walking	\$335,044		
Reduction in dogsledding event	\$158,836		
Reduction in horseriding	\$27,300		
Reduction in prospecting	\$1,363,630		
Reduction in hunting	\$346,212		
Cost of managing for conservation	NQ	Cost saving from no longer managing primarily for timber	NQ
<b>Total</b>	<b>\$22,466,938</b>		<b>\$269,526,040</b>
<b>NET BENEFITS</b>			<b>\$247,059,102</b>

NA = Not Applicable

NQ = Not Quantified



---

The results indicate that there are potentially substantial net benefits of the VEAC recommendations. In this respect, it should be noted that the benefit estimate is likely to be conservative as it does not include any benefit for species protection, Aboriginal heritage protection and water quality and quantity regulation.

### **3.7 Sensitivity Testing**

There is considerable uncertainty around the physical impacts of the VEAC recommendations because of the paucity of actual data on current forest uses. However, assumed impacts across all categories would need to be understated to over a factor of 16 to cast doubt on the outcome of the analysis.

### **3.8 Distribution of Costs and Benefits**

Benefits of conservation accrue to the broader community whereas potential costs accrue to specific individuals or groups in the community. In particular, costs of VEAC recommendations are borne by some recreators, domestic wood collectors, commercial firewood and timber harvesters and processors, hunters and prospectors. Restricted access to timber has downstream impacts on timber mills and the economic activity they provide to the regional economies.

Further discussion of the distribution of costs and benefits is given in following sections that examine impacts for each block in the Central West Investigation Area. This provides further clarity around the source of assumptions for the whole of Central West Investigation Area analysis, presented here. Section 7 also examines regional economic impacts.

---

## 4. The Wellsford Block

### 4.1 Introduction

The Wellsford Block encompasses 7,344 ha of public land, comprising:

- Wellsford State Forest (7,100ha)
- Bagshot Water Reserve (3 ha)
- various road reserves (241 ha).

The analysis focuses on the proposed changes to uses of the Wellsford State Forest.

### 4.2 Main Current Uses

#### **Aboriginal Values**

The Wellsford Block is situated entirely within the Dja Dja Wurrung Recognition and Settlement Agreement area. The Dja Dja Wurrung Clans Aboriginal Corporation is the Registered Aboriginal Party with decision-making responsibilities for Aboriginal cultural heritage across their Country, including the Wellsford Block. Cultural heritage values related to creation, burials, stone, mound/occupation sites, routes, history and flora and fauna.

#### **Apiculture**

There are 20 bee sites located in the Wellsford State Forest, accessed by nine licensees.

#### **Mining and Extractive Industry**

The Wellsford Block is close to major goldfields at Fosterville (which extends into the block and contains the largest current gold mine in Victoria) and Bendigo. One small old goldfield is mapped in the Wellsford Block: a 140ha patch over the upper reaches of the Yankee and Kangaroo Creek catchments containing six old mine shafts. There are five other unnamed old mine shafts mapped in this Block.

All but a small part of the southwest corner of the Block is covered by current exploration licences. Part of the Fosterville mining licence extends into the northeast corner of the Block, although this section is not currently used for mining or processing.

Extractive industry interest areas are mapped over approximately 20 per cent of the northern lobes of the State Forest.

#### **Water Production**

Two channels flow through the State Forest from Spring Gully Reservoir (west of the Block). The Ellesmere-Goornong channel runs through the middle of the forest to seasonally deliver water to rural customers to the east of the forest. The Kangaroo-Axe Creek channel runs near the edge of the southern "promontory" of the forest to seasonally deliver water to rural customers to the south and southeast of the forest.

#### **Commercial Wood Products**

Around three quarters of the Wellsford State Forest is of high value for timber and the remainder has not been assessed but is likely to be high value. Recently around one licensee has operated in Wellsford forest. There has also been harvesting of minor products such as firewood as a by-product of sawlog harvesting and silvicultural management. Wellsford forests account for approximately 6% of the entire box ironbark state forest area.

---

In 2001 the entire box ironbark state forest area generated \$3.3M in royalties. Wellsford forests account for approximately 6% of the box ironbark state forest area. Linear extrapolation suggests annual revenues in or the order of \$200,000 (Environment Conservation Council, 2001, p. 63). This has been assumed to be sustainable from the Wellsford Block.

### **Domestic Firewood**

Firewood resulting from this harvesting and management has almost all gone to domestic supply with little if any made available for commercial use. Wellsford State Forest is currently the main public land source of domestic firewood for Bendigo.

The annual volume of firewood that could be taken under permits in Wellsford State Forest in 2011 was 2,599m<sup>3</sup> (10.7 m<sup>3</sup> per ha is available from areas allocated for firewood). Anecdotal evidence suggests that more people have been accessing free firewood since the permit system ceased, however record keeping and compliance activities are minimal.

### **Recreational Uses**

Wellsford State Forest has relatively modest levels of recreational use, partly because there are substantial opportunities in the Bendigo Regional Park and Greater Bendigo National Park that are closer to the major residential areas of Bendigo.

However, recreational activities that do occur in the State Forest include:

- moderate level of horseriding and dog walking, mainly by local residents
- moderate to high level of trail bike riding which is dispersed throughout the forest, with frequent use of lengthy informal single tracks created by trail bikes and not legally available for use by motorised vehicles
- low impact activities such as forest drives, picnics, walking and cycling, nature study, bird watching
- annual two day dog sledding
- annual car rally
- defence training
- rogaining and orienteering activities.

While there are very small, old surface goldfields and a few old shafts, there is little recreational prospecting.

The forests do not contain deer and so there is only a low level of recreational hunting in the State Forest.

### **Tourism**

Any recreation activities that encourage visitors to stay overnight in the region would contribute to the local economy. However, while Wellsford State Forest hosts an annual dogsledding event where people camp overnight in the forest, it has fewer of the recreational activities (e.g. camping, extended bushwalking or four wheel driving) that encourage overnight stays. Recreation use is mainly day visits with even these uses limited by the lack of visitor facilities, especially toilets. Gunyah picnic area is the only formal visitor node and features historical information about the old eucalyptus oil distillery that used to operate at that site but has no other facilities.

---

## Education

La Trobe University makes use of the Wellsford forest for its outdoor education courses.

## Unused Road Licence

There are two current unused road licences held by two licensees, covering a total of 4.8ha. One retains some native tree cover and both are in similar condition to the surrounding private land.

## Grazing Licences

Two licensees each hold a current grazing licence (7.2ha and 37.6 ha) on the western edge of the northeast lobe of the State Forest

## 4.3 Final Recommendations

The final recommendations for this area as follows:

- an area of 3,152 ha be added to the existing Greater Bendigo National Park (this was proposed as a new Wellsford Nature Reserve in the draft recommendations)
- an area of 3,950 ha be added to the existing Bendigo Regional Park with a land use exception that allows some domestic firewood collection restricted to areas treated to improve the ecological structure of the forest with collection targeted to local users and subject to a 10-year phase-out
- existing use of the remaining public land to continue.

The intention of the recommendations is to focus the protection of key natural values in the recommended national park and recreation activities in the recommended regional park.

**Table 4.1 - Major Land Use Changes in Wellsford Block from VEAC Recommendations**

Public Land Category	Current	Recommended	Change
State Forest	7,100	0	-7,100
National park, State Park	0	3,152	3,152
Conservation Park	0	0	0
Regional Park	0	3,949	3,949
Nature Reserve	0	0	0
Bushland Reserve	0	0	0
<b>Total</b>	<b>0</b>	<b>7,100</b>	

## 4.4 Consequences

The main consequences for permitted activities are summarised in Table 4.2.

**Table 4.2 - Impact for Permissible Activities in the Wellsford Block**

Activity	State Forest	Greater Bendigo National Park	Bendigo Regional Park
Mining and extractive industry	√	O <sup>1a</sup>	√
Apiculture <sup>2</sup>	√	√	√
Bushwalking	√	√	√
Nature Observation	√	√	√
Four-wheel driving <sup>3</sup>	√	√	√
Trail bike riding <sup>4</sup>	√	√	√
Bicycle riding (including mountain biking) <sup>5</sup>	√	√	√
Horse riding <sup>6</sup>	√	√	√
Camping	√	√	√
Car rallies	√	O <sup>7</sup>	√
Dogs	√	O <sup>8</sup>	√
Prospecting	√	X	√
Domestic firewood collection	√	X	O <sup>9</sup>
Grazing	√	X	X
Recreational hunting <sup>10</sup>	√	X	X
Timber Harvesting	√	X	X
<b>Change in Area (ha)</b>	<b>-7,100</b>	<b>3,152</b>	<b>3,949</b>

- √ Allowed  
X Not allowed  
O Conditionally allowed (see notes)

Notes:

- 1 Continuation of operations within existing permits and licences is permitted.
- 2 Apiculture at licensed sites, subject to the 2013 Apiculture (beekeeping) on public land policy and operating procedure.
- 3 Four wheel driving in registered vehicles on formed roads that are open to the public and on other formed roads and tracks as specified through management planning; off road driving is illegal on public land.
- 4 Trail bike riding by licensed riders on registered vehicles on formed roads that are open to the public and on other formed roads and tracks as specified through management planning; off road riding is illegal on public land.
- 5 Bicycle riding (including mountain biking) on formed roads that are open to the public and on other roads, tracks and trails as specified through management planning.
- 6 Horse riding on specified formed roads that are open to the public and on other roads and tracks as specified through management planning.
- 7 Competitive sections of car rallies generally not allowed in national parks; transport sections through these areas allowed subject to event policy and procedure.
- 8 Dogs may be allowed on lead in visitor areas or along a limited number of tracks as specified through management planning.
- 9 Domestic firewood collection will be phased out over ten years and should be in areas where it will promote the growth of large trees and improve ecological condition, and be targeted to local communities most reliant on the resource.
- 10 Recreational hunting for pest animals will be allowed if part of an authorised control program at the discretion of the land manager.

---

The main impact of these recommendations are:

- a reduction in the availability of domestic firewood
- the cessation of commercial timber harvesting (sawlogs and minor forest products including commercial firewood)
- some restriction of dog walking in national park
- cessation of recreational hunting
- removal of licensed grazing from two areas (45 ha in total)
- annual dog sledding event ceases in national park area
- potential adjustments to annual car rally around national park
- cessation of prospecting in national park.

#### 4.5 Valuation of Impacts

##### **Mining**

Around 3,152 ha of State Forest is proposed as National Park. Some of this area is covered by an existing Exploration Licence. Department of Jobs Precincts and Regions (DJPR) considers that the north-east part of the Block that is proposed for National Park status and does not contain existing licences has potential for gold mining and so has identified it as a 'review' area. When the previous exploration licences in the 'review' area lapsed recently the government called them in for a competitive tender process. This competitive tender process is scheduled to be completed and licences issued before implementation of the VEAC recommendations in this area. As a result the impact of the VEAC recommendations is likely to be negligible.

##### **Commercial timber**

The recommendations would result in a cessation of all timber supply from the Wellsford Block. Based on an assumed sustainable supply valued at \$200,000 pa, this is equivalent to an economic cost of \$2.5M present value at 7% discount rate.

##### **Domestic Firewood**

For the purpose of the analysis it is assumed that the reduction in domestic firewood collection approximates 2,600m<sup>3</sup> per annum. Applying an economic value of \$75/m<sup>3</sup> to this level of reduction in domestic firewood availability equates to an economic cost of \$195,000 per annum, or \$2.4M present value at 7% discount rate.

##### **Grazing Licence**

Under the VEAC recommendations the 44.8 ha of current grazing licences would cease. Applying a gross margin/ha/year of \$42.67 equates to an economic cost of \$1,920 per annum, or a \$24,000 present value at 7% discount rate.

##### **Recreation**

The VEAC recommendations would have minimal impact on the substantial horse riding activity that occurs in the forests in the Wellsford Block given that the final recommendations include a large Regional Park and National Park that would continue to allow horse riding. However the following would not be permissible:

- overnight horse riding and camping on the land proposed for national park, assumed 20 visits per annum
- the annual dogsledding event associated with an approximate 80 visits
- prospecting in the recommended national park, although it assumed to be negligible as this area is not considered good for prospecting
- recreational hunting assumed to be around 50 visits per annum

- dog walking assumed at once per week on average for those of the 100 or so properties adjoining the recommended national park. Many alternative dog walking opportunities exist.

Based on these assumptions, the unit economic values reported in Section 3 and the consideration of substitute sites, the recreation impacts are summarised in Table 4.3.

**Table 4.3 - Indicative Recreational Impacts of VEAC Recommendations in the Wellsford Block**

<b>Recreation Activity</b>	<b>Maximum Visits pa Impacted</b>	<b>Substitution Potential</b>	<b>Expected Visits pa Impacted</b>	<b>Cost per Annum</b>	<b>Costs Present Value (7%)</b>
Horse riding	20	Medium	10	\$200	\$2,482
Dogs - general	5,200	High	2,600	\$26,000	\$322,635
Dog - sledding	80	Low	64	\$12,800	\$158,836
Prospecting	0	High	0	\$0	\$0
Recreational hunting	50	High	10	\$900	\$11,168
<b>Total</b>	<b>5,330</b>			<b>\$39,900</b>	<b>\$495,121</b>

#### **Total Economic Costs in Wellsford Block**

A summary of the main potential economic costs in the Wellsford Block are summarised in Table 4.4.

**Table 4.4 - Total Economic Costs in the Wellsford Block**

<b>Economic Costs</b>	<b>Annual (\$)</b>	<b>Present Value (\$ at 7% discount rate)</b>
Reduction in Commercial Timber Production	\$200,000	\$2,481,808
Reduction in Commercial Firewood Collection	Included in Above	Included in Above
Reduction in Domestic Firewood Collection	\$195,000	\$2,419,763
Reduction in Grazing	\$1,920	\$23,829
Reduction in mining	NQ but negligible	NQ but negligible
Reduction in dog walking	\$26,000	\$322,635
Reduction in dog sledding event	\$12,800	\$158,836
Reduction in horseriding	\$200	\$2,482
Reduction in prospecting	\$0	\$0
Reduction in hunting	\$900	\$11,168
Cost of managing for conservation	NQ	NQ
<b>Total</b>	<b>\$436,820</b>	<b>\$5,420,521</b>

---

## 5. Mount Cole - Pyrenees Block

### 5.1 Introduction

The Mount Cole - Pyrenees Block covers 54,760 ha of public land, comprising:

- Pyrenees Range State Forest (14,765 ha)
- Mount Cole State Forest (8,909 ha)
- Landsborough Nature Reserve (3,380 ha)
- Mount Buangor State Park (2,498 ha)
- Ben Major State Forest (1,852 ha)
- Waterloo State Forest (1,695 ha)
- Glenmona State Forest (1,694 ha)
- Percydale Historic Reserve (1,457 ha)
- Mount Lonarch State Forest (1,161 ha)
- Landsborough Hill Nature Reserve (1,063 ha)
- Trawalla and Andrews State Forests (1,062 ha)
- Ben Major Nature Reserve (820 ha)
- Musical Gully and Camp Hill State Forests (833 ha).

### 5.2 Current Uses

#### **Aboriginal Values**

The Mount Cole - Pyrenees Block is an area of interest for several Traditional Owner groups including Dja Dja Wurrung, Wotjobaluk Peoples, Eastern Maar and Wadawurrung. The area contains cultural values related to creation, burials, stone, mound/occupations sites, routes, history and flora and fauna.

#### **Apiculture**

There are 110 bee sites in this block of either 800m or 1600m radius. There are 29 sites in the Pyrenees range, 25 sites at Mount Cole SF, 3 sites at Glenmona SF, 5 sites at Mount Lonarch SF, 4 sites at Waterloo SF. There are also sites at Mount Buangor State Park (5) and Landsborough Nature Conservation Reserve (7). The remaining sites are spread across state forests and major reserves in the area with 8 sites found in smaller bushland reserves or along stream frontages.

#### **Mining and Extractive Industry**

The famous goldfields region of north central Victoria extends into the northern slopes of the Pyrenees and this area was popular for gold mining in the second half of the 19th century. The Fiery Creek (Beaufort – Raglan) goldfield is also in the Investigation Area but much of that goldfield is now private land and its public land occurrence is mostly on small blocks and road reserves. Within the Block there are a small number of current mining licences covering a total area of approximately 500 ha of both public and private land.

The mining licences, prospecting licences and extractive industry tenements mostly occur in the north-east quarter of the Block around Amphitheatre, Avoca and the Percydale Historic Reserve. Two prospecting licences are also located near Beaufort in the southern part of the Block. There are four extractive industry tenements covering a total area of approximately 270 ha of mostly private land.



---

### Water Production

The southern half of the Mount Cole Range and nearby forests form part of the catchment for the Hopkins River, flowing south to Warrnambool. The eastern part of the range contains the Mount Cole reservoir which supplies town water to Ararat.

The three other catchment basins in the Block form part of the Murray - Darling system. The north east slopes of the Pyrenees range from part of the catchment for the Avoca River which contains the minor storages of Sugarloaf Reservoir and, in Glenmona forest, Lead Dam which supply town water to Avoca. The Avoca river flows into a series of international significant wetlands between Kerang and Swan Hill. The western side of the Pyrenees range and north half of the Mount Cole range form part of the Wimmera River catchment. The eastern side of this block forms a small part of the Bet Bet Creek catchment, itself a small part of the Loddon River catchment. The only major storages in this basin downstream of Bet Bet Creek is Laanecoorie Reservoir which contributes to maintaining summer flows for irrigation and stock and domestic use for the large areas downstream to around Kerang. The Loddon River is the second longest river in Victoria and provides important habitat for many threatened species.

### Commercial Wood Products

In 2013 the then Department of Environment and Primary Industries (DEPI) estimated the sustainable harvest levels of sawlogs at around 1,000 cubic metres per year for the Pyrenees and 1,500 cubic metres per year for Mount Cole and Mount Lonarch State Forests. In the last four years around 2,000 cubic metres of sawlogs have been harvested per year from these forests, mostly to supply the sawmill at Chute. VicForests also issues licenses for commercial firewood and other minor products both as residual from sawlog harvesting and silvicultural treatment.

VicForests identify the following sustainable yield from the Mount Cole - Pyrenees Block.

**Table 5.1 - Estimated Sustainable Yield and Revenue from Forests in Mount Cole - Pyrenees Block**

Year	2013	2014	2100
<b>Mt Cole Sustainable Sawlog Yield (m3)</b>	2,400	2,400	4,900
<i>Sawlog Value</i>	\$152,540	\$152,540	\$311,436
<i>Commercial Firewood Value</i>	\$31,584	\$31,584	\$64,484

### Domestic Firewood

In the Avoca district, which includes the Pyrenees and Glenmona State Forests, relatively small amounts of firewood were cut for domestic collection under the permit system that operated until 2011. An average of 400 cubic metres of timber was cut in Community Firewood Supply Areas in the years 2003 to 2008. Slightly lower volumes were recorded as having been made available under the domestic firewood permit system in its final three years of operation. Anecdotal evidence from people in the Avoca district suggests that there is now a high demand for free firewood, with many people accessing the allocated coupes early in the season although competition appears less intense than at Wellsford for example. Firewood has been provided for domestic collection from most of the forests in the Beaufort area. Prior to 2011 it was often a by-product of timber harvesting and followed commercial firewood harvesting from logging coupes. In recent years firewood collection has occurred in conjunction with silvicultural thinning of future logging coupes, and also from tracks where trees are removed in preparation for planned burns.

### Recreational Uses

Mount Cole State Forest is the most visited of the large forests in the block offering a wide range of recreation activities such as:

- 
- camping
  - bushwalking, especially along the popular Beeripmo Walk on the eastern side of the forest
  - mountain biking
  - four wheel driving, including by clubs and smaller groups from Melbourne and Ballarat. This can include camping for weekends in addition to holding annual events such as the 4WD Nav Challenge
  - trail-bike riding
  - horse riding including local horse clubs who run training events, camping weekends and large equestrian events in the forest. There are facilities for camping with horses at Chinamans Camp near the western edge of the forest
  - hang gliding from high peaks
  - hunting for invasive species (but not deer in the Mount Cole forests where there is a game sanctuary).

Adjoining the southern slopes of Mount Cole, Mount Buangor State Park offers three camp sites and 15 km of bushwalking trails.

The main area of interest for recreational prospectors in the southern half of this block is associated with the 'Fiery Creek diggings' that extends from around Beaufort through Raglan and north to Chute. Prospectors camp and go metal detecting at several sites in this area.

As well as attracting visitors from surrounding districts, Melbourne and Ballarat, the Pyrenees is popular with visitors from northern Victoria as the forests offer the closest hilly environments enjoyed by four wheel drivers, mountain bike and trail bike riders from as far away as Mildura. Activities in the Pyrenees also include:

- trekking along the 23.5 km Pyrenees Endurance trail with camping at the Cameron Track campground around halfway
- organised events such as the George Derrick Pyrenees Rush car rally and the Pyrenees after dark which is a four wheel drive navigational event
- hunting, often combined with four wheel driving and camping
- prospecting.

### **Tourism**

Any recreation activities that encourage visitors to stay overnight in the region would contribute to the local economy. The Pyrenees Shire tourism strategy for the region aims to improve visitor numbers through raising awareness of wineries and accommodation in the Pyrenees district and developing caravan parks in Beaufort, Avoca and Landsborough to encourage visitors to stay longer in the region. Many visitors to the Wineries also explore the nearby forests taking part in low impact activities such as cycling and bushwalking but the region does not have the destination drawn of other nearby areas such as the Grampians. Events such as car rallies etc, can attract people from outside the region.

### **Licensed Uses and Leases of Crown Land**

There are approximately 700 licences and leases in the Mount Cole-Pyrenees Block, covering some 2000 hectares of public land. 450 of these licences are issued on 1150 ha of unused roads in the area. 150 of these licences are water frontage licences that cover around 650 ha, with most permitting grazing. There are also a small number of current licences for utilities and communications.

---

### 5.3 Final Recommendations

The main recommendations for public land in the Mount Cole - Pyrenees Block are:

- a large new Pyrenees National Park covering 15,126 ha including the existing Landsborough Hill Nature Reserve and Landsborough Nature Reserve
- a new 2,016 ha Pyrenees Regional Park over the northern slopes of the Pyrenees Range incorporating areas of most intensive recreation
- additions to the existing Mount Buangor State Park to create new Mount Buangor National Park of 5,282 ha
- a new Ben Nevis Nature Reserve of 1,088ha that contains the rocky northern flanks and peaks of the Mount Cole range
- a new Glenmona Forest Bushland Reserve of 984 ha incorporating tow large old tree sites and significant native vegetation
- additions of Chute and Ben Major State Forests (2409 ha) to Ben Major Nature Reserve;
- a new Waterloo Nature Reserve of 1,695 ha over the small steep range containing important natural values
- retention of more than 35 per cent of existing state forest including some of the most productive forests for timber harvesting in the region.

**Table 5.2 - Major Land Use Changes in Mount Cole - Pyrenees Block from VEAC Recommendations**

Public Land Category	Current	Recommended	Change
<b>State Forest</b>	<b>32,529</b>	<b>11,901</b>	<b>-20,628</b>
National park, State Park	2,498	20,408	17,910
Conservation Park	0	0	0
Regional Park	0	2,016	2,016
Nature Reserve	5,523	6,343	820
Bushland Reserve	572	1,654	1,082
<b>Total</b>	<b>8,593</b>	<b>30,421</b>	

### 5.4 Consequences

The main consequences for permitted activities in the Mount Cole - Pyrenees Block are summarised in Table 5.3.

**Table 5.3 - Impact for Permissible Activities in the Mount Cole - Pyrenees Block**

Activity	Pyrenees and Mount Cole State Forests	Ben Nevis, Ben Major and Waterloo Nature Reserves	Mount Buangor and Pyrenees National Parks	Glenmona Forest Bushland Reserve	Pyrenees Regional Park
Mining	√	√	O <sup>1</sup>	√	√
Apiculture <sup>2</sup>	√	√	√	√	√
Bushwalking	√	√	√	√	√
Nature Observation	√	√	√	√	√
Four-wheel driving <sup>3</sup>	√	√	√	√	√
Trail bike riding <sup>4</sup>	√	√	√	√	√
Bicycle riding (including mountain biking) <sup>5</sup>	√	√	√	√	√
Camping <sup>6</sup>	√	O <sup>7</sup>	√	O <sup>7</sup>	√
Car rallies <sup>8</sup>	√	O	O	√	√
Horse riding <sup>9</sup>	√	X	√	√	√
Dogs	√	X	O <sup>10</sup>	√	√
Prospecting	√	X	X	√	√
Domestic firewood collection	√	X	O <sup>11</sup>	O <sup>11</sup>	O <sup>11</sup>
Grazing	√	X	X	X	X
Recreational hunting <sup>12</sup>	√	X	X	X	X
Timber Harvesting	√	X	X <sup>11</sup>	X	X
<b>Change in Area (ha)</b>	<b>-20,628</b>	<b>5,193</b>	<b>17,910</b>	<b>1,082</b>	<b>2,016</b>

- √ Allowed  
X Not allowed  
O Conditionally allowed (see notes)

Notes:

- 1 Continuation of operations within existing permits and licences is permitted.
- 2 Apiculture at licensed sites, subject to the 2013 Apiculture (beekeeping) on public land policy and operating procedure.
- 3 Four wheel driving in registered vehicles on formed roads that are open to the public and on other formed roads and tracks as specified through management planning; off road driving is illegal on public land.
- 4 Trail bike riding by licensed riders on registered vehicles on formed roads that are open to the public and on other formed roads and tracks as specified through management planning; off road riding is illegal on public land.
- 5 Bicycle riding (including mountain biking) on formed roads that are open to the public and on other roads, tracks and trails as specified through management planning
- 6 Camping in designated areas where provided and in other areas (i.e. dispersed forest camping) as specified through management planning.
- 7 Camping may not be provided in smaller reserves, where there is high day visitor use or where there are ample camping opportunities on adjacent land.
- 8 Competitive sections of car rallies generally not allowed in national parks and nature reserves; transport sections through these areas allowed subject to events policy and procedures.
- 9 Horse riding on specified formed roads that are open to the public and on other roads and tracks as specified through management planning; overnight camping with horses not allowed in national parks, allowed in regional parks as specified through management planning.
- 10 Dogs may be allowed on lead in visitor areas or along a limited number of tracks as specified through management planning; no overnight camping with dogs.
- 11 Current domestic firewood coupes at Pyrenees National Park, Pyrenees Regional Park and Glenmona Forest Bushland Reserve (where wood is cut and on the ground) will be allowed to be completed.  
The recommended revocation of the sanctuary will allow for deer hunting in the Mount Cole State Forest.
- 12 Recreational hunting for pest animals will be allowed on other public land if part of an authorised control program at the discretion of the land manager.

---

The main impact of these recommendations are:

- the cessation of most commercial timber harvesting (sawlogs and minor forest products including commercial firewood)
- reduction in areas available for recreational hunting to all but 11,901 ha State Forest
- removal of licensed grazing from a total of 17 ha
- a reduction in the availability of domestic firewood, although current domestic firewood coupes at Pyrenees National Park and Glenmona Bushland Reserve will be allowed to be completed
- reduction of the area where prospecting is permissible by 18,857 ha
- cessation of horseriding from 820 ha of the proposed nature reserve net additions.

#### 4.5 Valuation of Impacts

##### **Mining**

Around 13,467 ha of State Forest is proposed as National Park where exploration and mining would be prohibited, other than a continuation of operations within existing permits and licences, as approved. However, none of these areas are identified as having high prospectivity. An area of moderate prospectivity with no current exploration or mining licences is impacted by the proposed Pyrenees National Park.

An area of high prospectivity with some existing permits or licences, Waterloo State Forest and Ben Major State Forest, is proposed to be changed to Nature Reserve. However, exploration and mining for minerals is permitted in Nature Reserves subject to the consent of the Crown land minister. Other areas of high prospectivity e.g. part of Glenmona State Forest are subject to existing licences and proposed for Bushland Reserves where mining would not be prohibited.

Large areas of high prospectivity and existing licences occur to the east of the Block.

##### **Commercial Timber**

The recommendations would result in a reduction in timber supply from the Mount Cole - Pyrenees Block. Prorating the impact for the Mount Cole - Pyrenees Block based on area of reduction in State Forest i.e. 20,628 ha, equates to an economic cost of \$118,846 per annum or \$1.5M present value at 7%.

##### **Domestic Firewood**

For the purpose of the analysis it is assumed that the reduction in domestic firewood collection approximates 400m<sup>3</sup> per annum. Applying an economic value of \$75/m<sup>3</sup> to this level of reduction in domestic firewood availability equates to an economic cost of \$30,000 per annum, or \$372,000 present value at 7% discount rate.

##### **Grazing Licence**

Under the VEAC recommendations the 17 ha of current grazing licences would cease. Applying a gross margin/ha/year of \$42.67 equates to an economic cost of \$725 per annum, or a \$9,000 present value at 7% discount rate.

##### **Recreation**

The VEAC recommendations would mean that the following recreation activities would not be permissible:

- prospecting in part of the forest least used for this activity, assumed to be 165 visits per annum. This is based on an assumed 500 prospecting visits per annum and with the best

prospecting areas to remain available for prospecting, the recommendations are assumed to potentially impact one third of these visits

- recreational hunting assumed to be around 500 visits per annum
- horseriding in 820 ha of forests that are recommended as Nature Reserves assumed to impact 100 visits per annum.

Most neighbours to impacted forests are farms rather than rural residential so it is assumed that there is negligible demand for in-forest dogwalking.

Based on these assumptions, the unit economic values reported in Section 3 and the consideration of substitute sites, the recreation impacts are summarised in Table 5.4.

**Table 5.4 - Indicative Recreational Impacts of VEAC Recommendations**

<b>Recreation Activity</b>	<b>Max Visits pa Impacted</b>	<b>Substitution Potential</b>	<b>Expected Visits pa Impacted</b>	<b>Cost per Annum</b>	<b>Costs Present Value (7%)</b>
Horse riding	100	Medium	50	\$1,000	12,409
Dogs - general	0	0	0	\$0	0
Prospecting	165	High	33	\$10,890	135,134
Recreational hunting	500	High	100	\$9,000	111,681
<b>Total</b>	<b>765</b>		<b>183</b>	<b>\$20,890</b>	<b>\$259,225</b>

#### **Total Economic Costs in Mount Cole - Pyrenees Block**

A summary of the main potential economic costs in the Mount Cole - Pyrenees Block are summarised in Table 5.5.

**Table 5.5 - Total Economic Costs in the Mount Cole - Pyrenees Block**

<b>Economic Costs</b>	<b>Annual (\$)</b>	<b>Present Value (\$ at 7% discount rate)</b>
Reduction in Commercial Timber Production	\$118,846	\$1,489,538
Reduction in Commercial Firewood Collection	Included in Above	Included in Above
Reduction in Domestic Firewood Collection	\$30,000	\$372,271
Reduction in Grazing	\$725	\$9,002
Reduction in mining	NQ but negligible	NQ but negligible
Reduction in dog walking	\$0	\$0
Reduction in horseriding	\$1,000	\$12,409
Reduction in prospecting	\$10,890	\$135,134
Reduction in hunting	\$9,000	\$111,681
Cost of managing for conservation	NQ	NQ
<b>Total</b>	<b>\$170,461</b>	<b>\$2,130,036</b>

---

## 6. Wombat - Macedon Block

### 6.1 Introduction

The Wombat - Macedon Block covers 99,115 ha of public land, comprising:

- Wombat State Forest (45,170 ha)
- Lerderderg State Park (20,470 ha)
- Hepburn Regional Park (3,105 ha)
- Cobaw State Forest (2,530 ha)
- Macedon Regional Park (2,160 ha)
- Bungal State Forest (675 ha)
- Long Forest Nature Conservation Reserve (610 ha)
- Mount Charlie Flora Reserve (385 ha)
- Dry Diggings State Forest (230 ha).

Road reserves make up an additional 8,560 ha of public land and more than 6,000 ha of public land are set aside for water production.

### 6.2 Current Uses

#### **Aboriginal Values**

The Wombat - Macedon Block is an area of interest for several Traditional Owner groups including Dja Dja Wurrung, Taungurung, Wurundgeri and Wadawurrung. Dja Dja Wurrung hold Aboriginal title over Hepburn Regional Park, jointly managed in partnership with the State.

The Wombat - Macedon Block contains cultural values related to creation, burials, stone, mound/occupations sites, routes, history and flora and fauna.

#### **Apiculture**

There are 143 bee sites located in the Wombat-Macedon Block. Bee sites are densely distributed across the block except for plantation land, Lerderberg State Park and Macedon Regional Park.

#### **Mining and Extractive Industry**

Within the block there are a small number of current mining licences (10 covering mostly 124ha of mostly public land), extractive industry tenements (13 almost exclusively on private land) and prospecting licences covering a total area of 1,033ha of public and private land.

There are also eight exploration licences (current and pending) with a total area of around 40,000 ha of private and public land.

#### **Water Production and Supply**

The Wombat-Macedon Block makes significant contributions to water production, catchment and supply for the surrounding regional towns and for agricultural and horticultural industries. The Block contains the headwaters of six major rivers five catchment basins - Loddon River, Campaspe, Maribyrnong, Werribee and Moorabool River catchment basins.

---

### Commercial Wood Products

In 2013 the then Department of Environment and primary Industries (DEPI) estimated the sustainable harvest levels of sawlogs at around 10,600 cubic metres per year through to 2035 with the volume gradually increasing to around 22,000 cubic metres per year by the end of the century. VicForests advises that at the 10,600 cubic metres per year volume, the forests could support one or more small sawmills similar to that currently operating with timber sources from Mount Cole area. However, VicForests' submissions states that currently Wombat State forest is only producing firewood generated by thinning forests that have regenerated following previous timber harvesting and wildfire. While only firewood is currently produced, VicForests has been approached to supply a small quantity of sawlog for a local sawmill as well as another high value adding business.

VicForests advises that currently the Wombat State Forest sustains a number of commercial firewood cutting operations, varying in scale from 200 to 1,000 cubic metres per annum, currently taken from regrowth coupes across the forests using thinning systems. The VicForests submission suggests the Wombat State Forest is currently producing approximately 3,000 cubic metres per year in total.

VicForests identify the following estimated sustainable yield and potential revenue from the Wombat - Macedon forests of investigation area.

**Table 6.1 - Estimated Sustainable Yield and Revenue from Forests in the Wombat - Macedon Block**

Year	2013	2014	2100
<b>Wombat Sustainable Sawlog Yield (m3)</b>	10,000	11,700	21,700
<i>Sawlog Value</i>	\$635,584	\$743,635	\$ 1,379,216.24
<i>Commercial Firewood Value</i>	\$131,600	\$153,972	\$311,436

### Domestic Firewood

Coupes in the Wombat Forest have been thinned for silvicultural purposes and to produce firewood for commercial markets and domestic uses for decades. Since the cessation of the domestic firewood permit system in 2011, anecdotal evidence from land managers and local residents suggest there has been a large increase in the volumes taken from domestic firewood coupes.

### Recreational Uses

The Wombat - Macedon Block is used for a range of recreational activities:

- dog walking
- camping
- bushwalking
- nature study
- picnicking
- prospecting
- trail bike riding
- four wheel driving
- mountain biking
- horse riding
- hunting.

Organised events are held regularly on public land in the Wombat-Macedon Block, especially in Wombat State Forest, including:



- orienteering or mountain bike events, or a combination of the two
- mountain bike endurance events e.g. the Wombat 100
- car rallies e.g. the Eureka car rally
- four wheel drive events
- music or dance festivals
- wilderness experience and training
- defence force training
- horse riding events
- local pony club events
- scout group events.

### **Tourism**

Any recreation activities that encourage visitors to stay overnight in the region would contribute to the local economy. These can compliment other attractions to the region including mineral springs, historic buildings and mining heritage, wineries, farmstays etc.

### **Licensed Users and Leases of Crown Land**

There are a range of licensed uses and leases of public land in the Block including:

- 90 water frontage licences totalling around 250 ha, which mostly allow grazing
- 460 unused road licences covering 510 ha, most of which are for primary production
- 5 water supply licences covering 20 ha
- 8 licences and 1 lease for radio, television and telecom sites
- 3 rubbish depot licences covering 10 ha
- two scout group licences.

### **6.3 Final Recommendations**

The main recommendations for public land in the Wombat - Macedon Block are:

- a large national park (comprising the existing Lerderberg State Park and much of the existing Wombat State Forest)
- two new conservation parks (one north of Daylesford and the other for the existing Cobaw State Forest)
- three new regional parks that include areas of the existing Wombat State Forest around Trentham and Blackwood, around Woodend and Bullengarook, and near Spargos Creek
- a small addition to Macedon Regional Park and a substantial addition to Hepburn Regional Park.

**Table 6.2 - Major Land Use Changes in Wombat - Macedon Block from VEAC Recommendations**

<b>Public Land Category</b>	<b>Current</b>	<b>Recommended</b>	<b>Change</b>
<b>State Forest</b>	<b>48,611</b>	<b>0</b>	<b>-48,611</b>
National park, State Park	20,469	49,553	29,084
Conservation Park	0	5,246	5,246
Regional Park	5,264	19,028	13,764
Nature Reserve	1,180	1,709	529
Bushland Reserve	475	1,154	679
<b>Total</b>	<b>27,388</b>	<b>76,691</b>	

## 6.4 Consequences

The main consequences for permitted activities are summarised in Table 6.3.

**Table 6.3 - Impact for Permissible Activities in the Wombat - Macedon Block**

Activity	State Forest	Nature Reserves	Hepburn and Cobaw Conservation Park <sup>1</sup>	Wombat - Lerderderg National Park	Bushland Reserve	Hepburn, Wombat and Macedon Regional Parks
Mining	√	√	O <sup>2</sup>	O <sup>2</sup>	√	√
Apiculture <sup>3</sup>	√	√	√	√	√	√
Bushwalking	√	√	√	√	√	√
Nature Observation	√	√	√	√	√	√
Four-wheel driving <sup>4</sup>	√	√	√	√	√	√
Trail bike riding <sup>5</sup>	√	√	√	√	√	√
Bicycle riding (including mountain biking) <sup>6</sup>	√	√	√	√	√	√
Camping <sup>7</sup>	√	O <sup>8</sup>	√	√	O <sup>8</sup>	√ X <sup>9</sup>
Car rallies <sup>10</sup>	√	O	O	O	√	√
Horse riding <sup>11</sup>	√	X	√	√	√	√
Dogs	√	X <sup>13</sup>	O <sup>12</sup>	O <sup>12</sup>	√	√
Prospecting	√	X	X	X	√	√
Domestic firewood collection	√	X	X	X	X	X <sup>14</sup>
Grazing	√	X	X	X	X	X
Recreational hunting <sup>15</sup>	√	X	X	X	X	X
Timber Harvesting	√	X	X	X	X	X
<b>Change in Area (ha)</b>	<b>-48,611</b>	<b>529</b>	<b>5,246</b>	<b>29,084</b>	<b>679</b>	<b>13,764</b>

- √ Allowed  
 X Not allowed  
 O Conditionally allowed (see notes)

**Notes:**

- This column summarises the allowed activities for the recommended additions to Hepburn Regional Park. The existing Hepburn Regional Park (over which Aboriginal title has been granted) is managed according to the Joint Management Plan for the Dja Dja Wurrung Parks.
- Continuation of operations within existing permits and licences is permitted.
  - Apiculture at licensed sites, subject to the 2013 Apiculture (beekeeping) on public land policy and operating procedure.
  - Four wheel driving in registered vehicles on formed roads that are open to the public and on other formed roads and tracks as specified through management planning; off road driving is illegal on public land.
  - Trail bike riding by licensed riders on registered vehicles on formed roads that are open to the public and on other formed roads and tracks as specified through management planning; off road riding is illegal on public land. The Cobaw trail bike visitor area will be retained.
  - Bicycle riding (including mountain biking) on formed roads that are open to the public and on other roads, tracks and trails as specified through management planning.
  - Camping in designated areas where provided and in other areas (i.e. dispersed forest camping) as specified through management planning.
  - Camping may not be provided in smaller reserves, where there is high day visitor use or where there are ample camping opportunities on adjacent land.
  - Camping not currently provided in Macedon Regional Park.

- 
- |    |  |
|----|--|
| 10 | Competitive sections of car rallies generally not allowed in national parks, conservation parks and nature reserves; transport sections through these areas allowed subject to events policy and procedures.   |
| 11 | Horse riding on specified formed roads that are open to the public and on other roads and tracks as specified through management planning; overnight camping with horses not allowed in national and conservation parks, allowed in regional parks as specified through management planning. |
| 12 | Dogs may be allowed on lead in visitor areas or along a limited number of tracks as specified through management planning; no overnight camping with dogs.   |
| 13 | Dogs on lead will continue to be allowed at the Bacchus Marsh Trench Nature Reserve.   |
| 14 | Domestic firewood collection will be phased out over ten years and should be in areas where it will promote the growth of large trees and improve ecological condition, and be targeted to local communities most reliant on the resource.   |
| 15 | Recreational hunting for pest animals will be allowed on public land if part of an authorised control program at the discretion of the land manager  |

The main impacts of these recommendations are:

- the cessation of commercial timber harvesting (sawlogs and minor forest products including commercial firewood)
- reduction in recreational hunting, apart from hunting for pest animals as part of authorised control programs at the discretion of the land manager
- removal of licensed grazing
- a reduction in the availability of domestic firewood, except some in Wombat Regional Park
- cessation of prospecting across almost 80% of the State Forest area
- cessation of dog walking and horseriding in 529 ha of nature reserves.

#### 4.5 Valuation of Impacts

##### **Mining**

Around 29,000ha of State Forest is proposed as National Park where exploration and mining would be prohibited, other than a continuation of operations within existing permits and licences, as approved.

A highly prospective area west of Korweinguboorra, containing no existing licences, is proposed as addition to the Wombat-Lerderderg National Park and hence this area will be impacted by the recommendations. However, large areas of high prospectivity occur to the north and west of the Block.

A highly prospective area south of Trentham that is proposed for addition to the Wombat - Lerderderg National Park is already covered by licences. This highly prospective area also covers a large area of proposed Regional Park where mining would be permitted and an existing area of National Park where mining is already exempt.

The proposed Hepburn Conservation Park which has high prospectivity is mostly covered by existing licences but would permit mining and hence the VEAC recommendations will have no impact.

##### **Commercial timber**

The recommendations would result in cessation of potential timber supply from the Wombat - Macedon Block. Based on the estimated sustainable yield and revenue (rather than current levels), this equates to an economic cost of \$800,000 per annum (increasing over time) or \$10.6M present value at 7%.

---

### Domestic Firewood

For the purpose of the analysis it is assumed that the reduction in domestic firewood collection approximates 3,000m<sup>3</sup> per annum. Applying an economic value of \$75/m<sup>3</sup> to this level of reduction in domestic firewood availability equates to an economic cost of \$225,000 per annum, or \$2.8M present value at 7% discount rate.

### Grazing Licence

Under the VEAC recommendations the 126ha of current grazing licences would cease. Applying a gross margin/ha/year of \$42.67 equates to an economic cost of \$5,377 per annum, or a \$67,000 present value at 7% discount rate.

### Recreation

The VEAC recommendations would mean that the following recreation activities would not be permissible:

- prospecting in around two thirds of the forest area, assumed to be 1,500 visits per annum;
- recreational hunting assumed to be around 1,000 visits per annum;
- horseriding in 529ha of forests that are recommended as Nature Reserves assumed to impact 100 visits per annum (noting that many adjoining properties have forested land on them);
- dog walking in nature reserves, with some limits in conservation parks and national parks, assumed to impact 200 visits per annum .

Based on these assumptions, the unit economic values reported in Section 3 and the consideration of substitute sites, the recreation impacts are summarised in Table 6.4.

**Table 6.4 - Indicative Recreational Impacts of VEAC Recommendations**

Recreation Activity	Max Visits pa Impacted	Substitution Potential	Expected Visits pa Impacted	Cost per Annum	Costs Present Value (7%)
Horse riding	100	Medium	50	\$1,000	\$12,409
Dogs – general	200	Medium	100	\$1,000	\$12,409
Prospecting	1,500	High	300	\$99,000	\$1,228,495
Recreational hunting	1,000	High	200	\$18,000	\$223,363
<b>Total</b>	<b>2,800</b>		<b>650</b>	<b>\$119,000</b>	<b>\$1,476,676</b>

### Total Economic Costs in Wombat - Macedon Block

A summary of the main potential economic costs in the Wombat - Macedon Block are summarised in Table 6.5.

**Table 6.5 - Total Economic Costs in the Wombat - Macedon Block**

<b>Economic Costs</b>	<b>Annual (\$)</b>	<b>Present Value (\$ at 7% discount rate)</b>
Reduction in Commercial Timber Production	\$800,999	\$10,580,951
Reduction in Commercial Firewood Collection	Included in Above	Included in Above
Reduction in Domestic Firewood Collection	\$225,000	\$2,792,034
Reduction in Grazing	\$5,377	\$66,720
Reduction in mining	NQ but negligible	NQ but negligible
Reduction in dog walking	1000	\$12,409
Reduction in horseriding	\$1,000	\$12,409
Reduction in prospecting	\$99,000	\$1,228,495
Reduction in hunting	\$18,000	\$223,363
Cost of managing for conservation	NQ	NQ
<b>Total</b>	<b>\$1,150,375</b>	<b>\$14,916,382</b>

## 7. Regional Impacts

### 7.1 Introduction

Impacts of VEAC recommendations on regional economies arise from:

- reduction in commercial activities such as timber milling, commercial firewood etc, that purchase inputs to production from the local economy and employ people who spend some of their income in the region economy
- any impacts on tourism sites or activities depending on timber from the region e.g. Sovereign Hill and the sport of woodchopping and sawing
- displaced recreation activities (where there is no substitution) undertaken by people travelling from outside the region into the region i.e. tourists, and spend money in the region on accommodation, food and inputs into their recreation activity.

Each of these is discussed below.

### 7.2 Timber

Gillespie Economics and Midas Consulting (2018) examines the economic significance of the timber industry in the Central West Investigation Area. Three regional economies were used:

- Greater Bendigo Local Government Area (LGA) which contains the Wellsford State Forest
- Pyrenees and Central Goldfields LGAs which contain the Landsborough, Pyrenees Range, Mount Cole, Ben Major, and Waterloo State Forests; and the Mount Buangor State Park
- Hepburn, Moorabool and Macedon Ranges LGAs which contain the Cobaw and Wombat State Forests, and the Lerderderg State Park.

A summary of the direct employment data by each sector within each region sourcing timber from the Central West Investigation Area is shown in Table 7.1.

**Table 7.1 - Direct Employment by Industry Data, by Region for Timber Licensees**

IO Sector	4-Digit Industry Sector	Greater Bendigo	Pyrenees and Central Goldfields	Hepburn, Moorabool and Macedon Ranges
Forestry and Logging	Forestry			
	Logging			
	<b>Sub-total</b>	<b>0</b>	<b>36</b>	<b>12</b>
Agriculture, Forestry and Fishing Support Services	Forestry Support Services			
	<b>Sub-total</b>	<b>0</b>	<b>0</b>	<b>0</b>
Sawmill Product Manufacturing	Log Sawmilling and Timber Dressing, nfd			
	Log Sawmilling			
	Wood Chipping			
	Timber Resawing and Dressing			
	<b>Sub-total</b>	<b>1</b>	<b>12</b>	<b>0</b>
Other Wood Product Manufacturing	Other Wood Product Manufacturing, nfd			
	Prefabricated Wooden Building Manufacturing			
	Wooden Structural Fitting and Component Manufacturing			
	Veneer and Plywood Manufacturing			
	Reconstituted Wood Product Manufacturing			
	Other Wood Product Manufacturing nec			
	<b>Sub-total</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>Total</b>	<b>1</b>	<b>48</b>	<b>12</b>

Note: Addition

errors are due to rounding

Assuming the same employment to output and expenditure relationships for licensees as indicated by the IO sectors within which they are categorised, the direct, flow-on and total effects of these licencees on the economies of the three regions are reported in the following sections. These Tables provide an upper bound for the regional economic impacts of the VEAC recommendations.

## Greater Bendigo

**Table 7.2 Direct and Indirect Impact of the Sawmill Product Manufacturing Sector**

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT	% Direct	% Total
<b>OUTPUT (\$M)</b>	0.50	0.28	0.14	0.43	0.93	0.002%	0.004%
<i>Type 11A Ratio</i>	1.00	0.57	0.28	0.85	1.85		
<b>VALUE-ADDED (\$M)</b>	0.14	0.13	0.08	0.21	0.36	0.002%	0.005%
<i>Type 11A Ratio</i>	1.00	0.92	0.57	1.49	2.49		
<b>INCOME (\$M)</b>	0.06	0.06	0.03	0.10	0.16	0.002%	0.005%
<i>Type 11A Ratio</i>	1.00	1.03	0.55	1.59	2.59		
<b>EMPLOYMENT (No.)</b>	1.00	0.84	0.57	1.42	2.42	0.002%	0.006%
<i>Type 11A Ratio</i>	1.00	0.84	0.57	1.42	2.42		

## Pyrenees and Central Goldfields

**Table 7.3 Direct and Indirect Impact of the Forestry and Logging Sector**

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT	% Direct	% Total
<b>OUTPUT (\$M)</b>	20.68	7.86	1.84	9.70	30.38	0.75%	1.10%
<i>Type 11A Ratio</i>	1.00	0.38	0.09	0.47	1.47		
<b>VALUE-ADDED (\$M)</b>	11.23	3.44	1.13	4.57	15.81	1.50%	2.12%
<i>Type 11A Ratio</i>	1.00	0.31	0.10	0.41	1.41		
<b>INCOME (\$M)</b>	1.74	0.99	0.35	1.35	3.09	0.58%	1.03%
<i>Type 11A Ratio</i>	1.00	0.57	0.20	0.77	1.77		
<b>EMPLOYMENT (No.)</b>	36.00	21.42	8.89	30.31	66.31	0.64%	1.17%
<i>Type 11A Ratio</i>	1.00	0.60	0.25	0.84	1.84		

**Table 7.4 Direct and Indirect Impact of the Sawmill Product Manufacturing Sector**

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT	% Direct	% Total
<b>OUTPUT (\$M)</b>	6.01	4.29	0.91	5.20	11.21	0.22%	0.41%
<i>Type 11A Ratio</i>	1.00	0.71	0.15	0.87	1.87		
<b>VALUE-ADDED (\$M)</b>	1.73	2.10	0.57	2.67	4.40	0.23%	0.59%
<i>Type 11A Ratio</i>	1.00	1.21	0.33	1.54	2.54		
<b>INCOME (\$M)</b>	0.75	0.60	0.17	0.77	1.52	0.25%	0.51%
<i>Type 11A Ratio</i>	1.00	0.80	0.23	1.03	2.03		
<b>EMPLOYMENT (No.)</b>	12.00	11.80	4.44	16.22	28.22	0.21%	0.50%
<i>Type 11A Ratio</i>	1.00	0.98	0.37	1.35	2.35		

**Table 7.5 Direct and Indirect Impact of Total Timber Industry Sectors**

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT	% Direct	% Total
<b>OUTPUT (\$M)</b>	20.22	9.69	2.18	11.87	32.09	0.73%	1.16%
<i>Type 11A Ratio</i>	1.00	0.48	0.11	0.59	1.59		
<b>VALUE-ADDED (\$M)</b>	9.45	4.47	1.34	5.81	15.27	1.27%	2.04%
<i>Type 11A Ratio</i>	1.00	0.47	0.14	0.61	1.61		
<b>INCOME (\$M)</b>	1.95	1.28	0.41	1.70	3.65	0.65%	1.22%
<i>Type 11A Ratio</i>	1.00	0.66	0.21	0.87	1.87		
<b>EMPLOYMENT (No.)</b>	36.74 <sup>9</sup>	26.52	10.55	37.06	73.80	0.65%	1.31%
<i>Type 11A Ratio</i>	1.00	0.72	0.29	1.01	2.01		

**Hepburn, Moorabool and Macedon Ranges****Table 7.6 Direct and Indirect Impact of the Forestry and Logging Sector**

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT	% Direct	% Total
<b>OUTPUT (\$M)</b>	6.88	2.91	1.43	4.34	11.22	0.03%	0.05%
<i>Type 11A Ratio</i>	1.00	0.42	0.21	0.63	1.63		
<b>VALUE-ADDED (\$M)</b>	3.74	1.27	0.82	2.08	5.82	0.06%	0.09%
<i>Type 11A Ratio</i>	1.00	0.34	0.22	0.56	1.56		
<b>INCOME (\$M)</b>	1.03	0.50	0.30	0.80	1.83	0.03%	0.06%
<i>Type 11A Ratio</i>	1.00	0.49	0.29	0.78	1.78		
<b>EMPLOYMENT (No.)</b>	12.00	7.86	6.25	14.11	26.11	0.03%	0.06%
<i>Type 11A Ratio</i>	1.00	0.66	0.52	1.18	2.18		

Based on the above, the Pyrenees and Central Goldfields region has the potential to be most impacted by resource allocation decisions. The study found that the Pyrenees and Central Goldfields region has the greater absolute number of timber industry employment, and proportion of regional employment, reliant on native forests of the Investigation Area.

Sixty-one direct timber industry jobs across the three regions of Greater Bendigo LGA; Pyrenees and Central Goldfields LGAs; and Hepburn, Moorabool and Macedon Ranges LGAs, are partly reliant on the timber from the Central West Investigation Area and may be impacted by the VEAC recommendations. However, only some of these jobs would be impacted by the recommendations because many operators source wood from beyond the investigation area, and because VEAC is recommending some of the most productive areas of state forest that are currently harvested remain available. This total direct employment accounts for 0.08% of regional employment and, as indicated the impacts of the VEAC recommendations would be much less than that.

There will also be some dispersed flow-on impacts to businesses that supply inputs to timber production and the goods and services demand by timber industry employment. Again, only some of the total (direct and indirect) employment in the relevant LGAs (102 jobs) would be impacted by VEAC's recommendations so the impact would be considerably less than the 0.14% of regional employment that these jobs represent.

<sup>9</sup> Some direct employment from Table 7.3 is now located in the production-induced flow-ons of the total timber industry.



---

### 7.3 Sovereign Hill and Sport of Woodchopping and Sawing

#### **Sovereign Hill**

Sovereign Hill is an outdoor museum that re-creates Ballarat's first ten years after the discovery of gold in 1851. Set on 25 acres of an original mining site, Sovereign Hill is a goldfields town with shops, hotels, a theatre, schools, factories, a gold diggings and underground mines to explore. Activities include a range of shows and tours. Sovereign Hill sources minor quantities of timber from the Investigation Area for maintenance of buildings and structures.

Minor quantities of timber will still be able to be sourced from remaining State Forests in the Investigation Area as well as some forests allocated to Regional Parks. Notwithstanding, it is difficult to envisage any significant impacts on the operation of, and visitation to, Sovereign Hill if timber needed to be sourced from alternative locations.

#### **Woodchopping and Sawing**

Forests of the Central West Investigation Area are a source of timber for Midlands Axemens Associated and Wimmera Axemens Association.

Minor quantities of timber will still be able to be sourced from remaining State Forests in the Investigation Area. For the small quantities involved there are also likely to be alternative sources from outside the Investigation Area. Minimal impacts are envisaged on these associations apart from some potential additional costs of sourcing alternative supplies.

### 7.4 Recreation and Tourism Impacts

There will be minimal regional economic impacts associated with impacts of VEAC recommendations on:

- displaced recreation uses of the forests by adjoining landowners or locals since these activities are not associated with any significant expenditure in the regional economy; and
- displaced uses by tourists if substitute sites in the region are available for their activity.

The main regional economic impacts will arise from any tourist activities that are displaced, with no alternatives or substitute sites available, and hence instead of visiting the region and spending money in the economy, these tourists stay home or visit other regions. However, major tourism events are likely to continue under the VEAC recommendations.

Some low key tourism activities will be impacted by the VEAC recommendations. However, activities such as hunting which will become not permissible in large areas of forest, will still be allowed in some areas, but are unlikely to be associated with significant spending in the regional economy. These activities by tourists would be associated with low key forest camping and the purchase of basic supplies at least partly outside the region pre-trip. A study by RMCG, EconSearch and DBM Consultants (2014) identified the following total regional economic impacts of all hunting in Victoria by local government areas. This impact is associated with hunting on both public and private land, locals and tourists, by locals and tourists, off-trip expenditure (items purchased prior to going on a hunting trip) and on-trip expenditure (items purchased while on a hunting trip).

**Table 7.7 - Economic impact of hunting by LGA, all animal groups, 2013**

Region	Expenditure		Gross Regional Product (\$m)			Employment (fte)			Employment (Total)			Household Income (\$m)			Population	
	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total	Direct	Flow-on	Total	Direct	Flow-on	Total		Total
Melbourne	166.6	40%	68.4	93.4	161.8	622	636	1,258	687	663	1,350	41.5	52.6	94.0		3,714
Wellington	25.8	6%	9.6	3.3	12.9	75	26	101	85	29	114	4.5	1.8	6.3		195
Latrobe	18.5	4%	6.5	3.2	9.7	56	24	80	70	27	97	3.6	1.8	5.4		132
Baw Baw	16.8	4%	6.2	3.8	10.0	72	34	106	82	38	120	3.7	2.2	5.9		234
Greater Bendigo	16.5	4%	5.6	3.7	9.3	57	33	90	69	36	104	3.1	2.0	5.1		184
Mansfield	14.6	3%	5.4	2.1	7.5	65	21	87	75	24	99	2.8	1.2	4.0		141
Greater Shepparton	14.0	3%	5.1	3.2	8.3	64	31	95	74	33	107	3.1	1.8	4.9		174
Greater Geelong	13.5	3%	4.9	3.6	8.5	54	30	83	62	33	95	3.0	2.0	5.0		165
Mitchell	12.4	3%	4.0	1.8	5.8	42	16	58	50	18	68	2.3	1.0	3.3		115
East Gippsland	10.9	3%	4.0	1.8	5.8	42	18	60	48	20	69	2.0	1.0	3.0		111
Gannawarra	10.4	2%	4.1	1.6	5.6	56	17	73	58	19	77	2.2	0.8	3.0		147
Murrindindi	10.2	2%	4.3	1.5	5.8	46	14	59	53	15	68	2.4	0.8	3.2		91
Wodonga	8.4	2%	2.9	1.6	4.5	29	14	43	33	15	48	1.6	0.9	2.5		97
Macedon Ranges	6.8	2%	2.6	1.8	4.4	19	13	33	25	15	40	1.4	1.0	2.4		124
Campaspe	5.9	1%	2.1	0.9	3.0	22	9	30	25	9	34	1.1	0.5	1.6		60
Wangaratta	5.7	1%	1.9	1.1	3.0	21	11	32	26	12	38	1.0	0.6	1.7		64
Golden Plains	5.4	1%	1.9	0.6	2.5	18	5	23	31	5	36	1.0	0.3	1.4		57
Mildura	5.0	1%	2.0	0.5	2.5	10	5	15	12	6	17	0.5	0.3	0.8		27
Ballarat	4.7	1%	1.5	1.2	2.7	17	10	27	20	11	32	1.0	0.7	1.6		63
Alpine	3.8	1%	1.4	0.5	2.0	14	5	19	16	6	21	0.6	0.3	0.9		29
Other <sup>a</sup>	41.2	10%	32.6	130.8	163.4	196	911	1,108	186	914	1,100	17.8	73.6	91.5		1,726
<b>Total Victoria</b>	<b>416.9</b>	<b>100%</b>	<b>177.0</b>	<b>262.0</b>	<b>439.0</b>	<b>1,598</b>	<b>1,882</b>	<b>3,480</b>	<b>1,787</b>	<b>1,948</b>	<b>3,735</b>	<b>100.2</b>	<b>147.3</b>	<b>247.5</b>		<b>7,649</b>

<sup>a</sup> 'Other' expenditure and direct GRP and direct employment estimates occur in other LGAs in the state. The flow-on GRP and flow-on employment estimates occur across all regions in the state, a significant proportion of which will be in the Melbourne region.

Three LGAs associated with the Central West Investigation Area are in the top 20 LGAs for hunting impacts:

- Greater Bendigo LGA (which contains the Wellsford Block)
- Macedon Ranges LGA which is in the Wombat-Macedon Block
- Ballarat LGA which is between the Wombat - Macedon Block and the Mount Cole - Pyrenees Block.

RMCG, EconSearch and DBM Consultants (2014) further split hunting regional impacts for these LGAs between game species and pest species. This indicates that hunting economic activity in the Greater Bendigo LGA is 61% related to duck and quail shooting and 34% pest shooting. Hence most hunting is not related to shooting activity that will be impacted in the Wellsford Block.

Hunting economic activity in the Macedon Ranges LGA is 95% related to pest shooting. This type of shooting will be impacted by the VEAC recommendations. However, the regional economic impact will be small given the small contribution of all hunting on private and public lands by locals and tourists to this regional economy.

Hunting economic activity in the Ballarat LGA is 63% related to deer shooting. This type of shooting will be impacted by the VEAC recommendations. However, the regional economic impact will be small given the small contribution of all hunting on private and public lands by locals and tourists to this regional economy.

Prospecting will also become not permissible in large areas of forest. There is some local specialisation in sale of prospecting equipment and supplies and hence this activity, which attracts tourists, is likely to be associated with a greater level of spending than other forest based recreation activities. However, areas of

---

higher prospectivity have been retained in Regional Parks, where prospecting remains permissible. Hence impacts on regional economic activity are not likely to be significant.

Dog sledding will be prohibited in the Wellsford Block where it currently occurs. It is not evident that alternative substitute sites exist in the region. Hence, any regional expenditure associated with this activity may be lost. However, the nature of the event i.e. low key camping in forest with dogs, means that the level of regional expenditure is likely to be low.

---

## References

- Abelson (1996) *Project Appraisal and Valuation of the Environment*, Macmillan Press, London.
- Bennett, J. (2008) Defining and Managing Environmental Flow: Inputs from Society, *Australian Economics Papers*, 27 (2), 167-183.
- Department of Environment, Sports and Territories, Department of Finance and Resource Assessment Commission (1995) *Techniques to Value Environmental Resources: An Introductory Handbook*, AGPS, Canberra.
- Environment Conservation Council (2001) *Box-Ironbark Forests & Woodlands Investigation*, Environment Conservation Council, Victoria.
- Department of Environment and Primary Industries (2013) *Review of Commercial Forestry Management in Western Victoria: Timber Resources Harvest Levels, Silviculture, and Systems and Processes*.
- Fabri, E. (2018) Mining in Victoria: Good as Gold, *The Australian Mining Review*, <http://australianminingreview.com.au/mining-in-victoria-good-as-gold/>
- Gillespie Economics (2008) *Managing the Impacts of a Mine in the Southern Coalfield: A Survey of Community Attitudes*, Prepared for Helensburgh Coal Pty Ltd.
- Gillespie Economics (2009a) *Economic Assessment of the Warkworth Project*, Prepared for Coal and Allied Pty Ltd.
- Gillespie Economics (2009b) *Socio-economic assessment: Bulli Seam Operations*, Prepared for BHP Billiton Pty Ltd.
- Gillespie Economics and Midas Consulting (2018) *Economic Contribution of the Timber Industry in the Central West Investigation Area – Input-Output Analysis*, Prepared for: Victorian Environmental Assessment Council.
- Heagney, E., Rose, J., Ardeshiri, A. and Kovac, M. (2018) Optimising recreation services from protected areas - Understanding the role of natural values, built infrastructure and contextual factors, *Ecosystem Services*, Vol. 31, Part C, pp. 358-370.
- Heagney, E.C., Rose, J., Ardeshiri, A. and Kovac, M. (in press) *The economic value of tourism and recreation across a large protected area network*.
- James, D. and Gillespie, R. (2002) *Guidelines for Economic Effects and Evaluation in EIA*, prepared for NSW Department of Urban Affairs and Planning.
- Macedon Ranges Shire Council (undated) *Macedon Ranges Horse Trail Riding Guide*.
- Macedon Ranges Shire Council (undated) *Draft Macedon Ranges Visitor Economy Future Directions Paper 2017-2027*.
- MacroPlanDimasi (2018) *Forest Mountain Bike Trails: Economic Cost Benefit Analysis Final Report*, prepared for Colac Otway Shire.
- Mazur, K. and Bennett, J. (2009) *A Choice Modelling Survey of Community Attitudes to Improvements in Environmental Quality in NSW Catchments*, Environmental Economics Research Hub Research Reports.
- Morrison, M. (2000) Aggregation Biases in Stated Preference Studies, *Australian Economic Papers*, 39, 215-230
- Pagiola, S., Ritter, K., and Bishop, J. (2004) *Assessment the Economic Value of Ecosystem Services*, World Bank Environment Department Paper No. 101.

---

RMCG, EconSearch and DBM Consultants (2014) *Estimating the economic impact of hunting in Victoria in 2013*, The State of Victoria Department of Environment and Primary Industries 2014

Rolfe, J., Windle, J., Bennett, J. and Mazur, K. (2013) *Calibration of values in benefit transfer to account for variations in geographic scale and scope: Comparing two choice modelling experiments*, Contributed paper presented at the 57th Australian Agricultural and Resource Economics 2013 Annual conference, 5-8 February 2013, Sydney, Australia.

Van Bueren, M. and Bennett, J. (2001) *Estimating Community Values for Land and Water Degradation Impacts*, draft report prepared for the National Land and Water Resources Audit Project.

VEAC (2018) *Central West Investigation: Draft Proposals Paper*, The State of Victoria.

Young, M. (1992) *Sustainable Investment and Resource Use: Equity, Environmental Integrity and Economic Efficiency*, Unesco, Paris and Parthenon Publishing Group.