

Economic Assessment of Proposed Land Use Changes for Immediate Protection Areas in the Mirboo North and Strathbogie Ranges

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Table of Contents

Executive Summary.....	2
1. Introduction.....	6
1.1 Victorian Environmental Assessment Council	6
1.2 The Strathbogie Ranges and Mirboo North Immediate Protection Areas.....	6
2. Conceptual Models to Estimate Economic Values	8
2.1 Introduction	8
2.2 Economic Values and Cost Benefit Analysis.....	8
2.2.1 Total Economic Value Framework.....	8
2.2.2 Measures of Economic Value	12
2.2.3 Baseline Values & Impacts Versus Marginal Change.....	12
2.3 Regional Economic Impacts.....	13
3. General Application of CBA Framework to the Mirboo North and Strathbogie Ranges IPAs	15
3.1 Cost Benefit Analysis.....	15
3.2 Identification of the Base Case	15
3.3 Identification of the Alternatives to the Base Case	15
3.4 EPCE Recommendations.....	16
3.5 Consequences.....	17
3.6 Identification of Potential Economic Costs and Benefits.....	19
3.7 Valuation of Costs and Benefits	20
4. Mirboo North	28
4.1 Introduction	28
4.2 Main Current Uses.....	28
4.3 Final Recommendations	31
4.4 Consequences.....	31
4.5 Valuation of Impacts	32
5. Strathbogie Ranges.....	35
5.1 Introduction	35
5.2 Current Uses	35
5.3 Final Recommendations	39
5.4 Consequences.....	40
5.5 Valuation of Impacts	41
6. Regional Impacts.....	43
6.1 Introduction	43
6.2 Mirboo North.....	43
6.3 Strathbogie Ranges	43
7. References.....	45

Executive Summary

Introduction

In November 2019, the Victorian government announced that timber harvesting in Victoria's native forests would end by 2030. Alongside this announcement the Victorian government announced the immediate protection from commercial timber harvesting of 96,000 hectares of state forest in Immediate Protection Areas (IPAs). This included state forests at Mirboo North and the Strathbogie Ranges.

In November 2021, the Victorian government requested the Victorian Environmental Assessment Council (VEAC) carry out an assessment of the values in the Mirboo North and Strathbogie Ranges IPAs. The purpose of the VEAC assessment is (among other things) to:

- b) identify the cultural heritage, social and economic values of the specified area.
- e) assess the potential economic implications of proposed land use changes recommended by the Eminent Panel for Community Engagement (EPCE) and provided to the VEAC.

This economic assessment report aims to provide:

- a) 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 ES1.
- b) an assessment of the costs and benefits of the EPCE's proposed land use change recommendations provided to VEAC and how those costs and benefits are distributed.
- c) a qualitative description of the potential social implications of EPCE's recommendations, with attention to implications for regional townships and communities.

Table ES1 - Potential Industries and Recreation Activities in the Mirboo North and Strathbogie Ranges IPAs

	Sector or activity
Industries	tourism, mining, apiculture, water, public land grazing, outdoor education, commercial guiding
Recreational activities incl associated events	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
Other	domestic firewood collection, events, and festivals, altered property values

Economic Values and Economic Activity

Economic values are focused on the well-being of people as measured by the surpluses (consumer and producer surpluses) that accrue to people. Baseline economic values of the forests of the Mirboo North and Strathbogie Ranges IPAs may arise from use of the forest and its resources (use values) as well as nonuse values (values that accrue to people from just knowing that a forest resource is being protected).

Combined, all the economic values that can be obtained from a resource are referred to as Total Economic Value (TEV), although it needs to be recognised that some values that a resource is able to provide may be at least partially mutually exclusive e.g. timber harvesting and biodiversity conservation.

Changes in economic values (marginal values), relative to the base case, are the relevant measure for the evaluation of policy initiatives using the cost benefit analysis (CBA) method.

All activities that involve expenditure in a region provide some stimulus to economic activity in that region. Changes in these can be considered using the regional economic impact assessment framework.

These are the two frameworks used to consider the recommendations for Mirboo North and Strathbogie Ranges IPAs.

Cost Benefit Analysis Framework

From a CBA perspective, the current assessments and recommendations can be seen as the second stage of a land allocation decision making process. The first stage was the decision to protect the Mirboo North and Strathbogie Ranges forests from commercial timber harvesting.

The main costs and benefits of the two-stage process are attributable to this first stage decision. The costs are the foregone commercial timber values of the forest. The benefits relate to increased biodiversity conservation values, heritage protection and water quality and quantity regulation in the catchments, from cessation of harvesting.

The second stage in this land use allocation decision relates to the subsequent nomination of a land use classification that best matches the values of the forests. This will have some economic costs associated with the restriction of other forest uses and some additional economic benefits (incremental environment, heritage, and water regulation values) from the restriction of these additional forest uses. This second stage is the subject of the present assessment.

An uplift in ongoing funding for land management recommended by the EPCE may lead to expanded visitor opportunities and conservation outcomes. However, the level and nature of this funding uplift remains unspecified and therefore has not been assessed.

Base Case Economic Values

Economic values from the current management of the Mirboo North IPA are associated with:

- Management costs.
- Biodiversity conservation.
- Water quality and quantity regulation.
- Aboriginal cultural heritage protection.
- Apiculture.
- Recreation/tourism uses e.g. horse riding, four wheel driving, mountain and trail bike riding, walking, running etc.
- Access for grazing by domestic stock.

Economic values from the current management of the Strathbogie Ranges IPA are associated with:

- Management costs.
- Biodiversity conservation.
- Water quality and quantity regulation.
- Aboriginal cultural heritage protection.
- Apiculture.

- Mining and extractive industry.
- Recreation/tourism uses e.g. camping, horse riding, walking, running, cycling, trail bike and four wheel driving, hunting, prospecting etc.
- Education.
- Domestic firewood.
- Grazing by domestic stock.
- Telecommunications.

Recommendations of the EPCE

For Mirboo North IPA the recommended land use classification is Conservation Park. Permitted land uses exclude domestic firewood collection, recreational hunting, access for grazing by domestic stock, and recreational prospecting. Dog walking may be excluded or restricted to areas specified by the land manager such as visitor areas or along a limited number of specified tracks. There would also be a change in the approval process for extractive industry and mining. However, no legal firewood collection is currently permitted in the Mirboo North IPA and the land is unsuitable for recreational hunting. The land also has low prospectivity. Consequently, the main implication of the recommended land use is a restriction on access to grazing by domestic stock in a very small licensed area and restrictions on dog walking. Four-wheel driving and trail bike riding, where legally undertaken on publicly available formed roads and tracks, are unaffected by the proposed land use changes. Mountain biking and cycling on publicly available formed roads and tracks are also unaffected. Other unaffected activities are apiculture on licensed sites and horse riding on formed roads and tracks.

For Strathbogie Ranges IPA the recommended land use classification is an interim classification of Cultural Reserve, with further investigation of permitted activities to take place over the next one to three years. From the advice received from the EPCE, the main current uses of the land that may potentially be impacted are grazing by domestic stock and recreational prospecting. It is also assumed that extractive industry and mining would be prohibited, except where licences predate the reserve. Four-wheel driving and trail bike riding, where legally undertaken on publicly available formed roads and tracks, are unaffected by the proposed land use changes. Mountain biking and cycling on publicly available formed roads and tracks are also unaffected. Based on the information received by the EPCE for the preparation of this economic assessment, other unaffected activities are apiculture on licensed sites, dog walking on a lead, recreational hunting, camping in designated areas, and horse riding on formed roads and tracks.

The estimated additional economic costs of the recommendations for each IPA are summarised in Table ES2. For Strathbogie IPA, impacts for a three-year period and 30-year period are reported.

Table ES2 - Economic Costs EPCE Recommendations (Present Value @7% Discount Rate)

Mirboo North	\$ - 30 year impact	Strathbogie Ranges	\$ - 3-year impact	\$ - 30-year impact
Reduction in access for domestic stock grazing	\$500	Reduction in domestic stock grazing	\$30,000	\$145,000
Restrictions to dog walking	\$17,000	Reduction in recreational prospecting	\$17,000	\$82,000
		Reduction in extractive industry	NQ	NQ
		Reduction in mining	NQ	NQ
Total	\$17,500		\$47,000	\$227,000

The recommended land use classifications would also provide some conservation, heritage, and water regulation benefits from the restriction of impacting activities. In addition, there may also be some benefits to the community associated with security of tenure associated with allocating land to a public land use category and away from an interim protection status.¹ For Strathbogie Ranges IPA, there may also be potential nonuse benefits to the community associated with knowing that the land will be managed by Traditional Owners.² The abovementioned potential benefits remain unquantified in the analysis. Unquantified benefits would need to exceed \$17,500 for Mirboo North and up to \$227,000 for the Strathbogie IPA, for the economic benefits of the proposed land use classifications to exceed the economic costs.

Additional recreation benefits may arise from active management of the subject lands for recreation activity. However, substantive additional recreation benefits would require additional investment, particularly in infrastructure. However, the level and nature of these infrastructure investments remain unspecified and therefore have not been assessed.

Additional conservation benefits may also arise from active conservation management of the subject lands. However, like recreation this is subject to additional investment. The nature and extent of this additional investment remains unspecified and therefore has not been assessed.

Economic Activity Impacts

Potential negative impacts of the land use recommendations on regional economies arise from:

- reduction in commercial activities that purchase inputs to production from the local economy and employ people who spend some of their income in the regional economy.
- 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 recommendations for Mirboo North IPA will potentially result in an inconsequential contraction in grazing economic activity in the region.

The recommendations for Strathbogie Ranges IPA will potentially result in a minor contraction in grazing activity. The recommendations will also prohibit extractive industry and mining, except where licences predate the reserve. The area is highly prospective. Extractive industry and mining projects can provide significant economic activity to regional economies. However, any future extractive industry and mining projects are highly uncertain and so the consequences for regional economic activity are also highly uncertain.

The EPCE's recommendations will also result in some reduction in regional economic activity associated with prospecting. However, the levels of this activity in the Strathbogie Ranges area are modest and the potential for these activities to be undertaken in other areas in the region, is medium to high.

¹ The nonmarket valuation literature shows that people value increases in certainty of environmental outcomes

²Nonmarket valuation studies have found community WTP for the protection of significant Aboriginal sites. These type of nonuse values may potentially extend to management of land by Traditional owners, although this has not been empirically tested.

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 Environment and Climate Action 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 Strathbogrie Ranges and Mirboo North Immediate Protection Areas

In November 2019 the Victorian government announced that timber harvesting in Victoria's native forests would end by 2030 following a managed 10-year transition to an entirely plantation-based timber supply. Alongside this announcement the Victorian government announced environmental protections including the immediate protection from commercial timber harvesting of 96,000 hectares of state forest in Immediate Protection Areas (IPAs). This included state forests in the Strathbogrie Ranges and Mirboo North.

In November 2021, the Victorian government requested VEAC to carry out an assessment of the values of state forests in the areas identified as Immediate Protection Areas (IPAs) in the Strathbogrie Ranges and Mirboo North. It also announced that community consultation will be undertaken by an Eminent Panel for Community Engagement (EPCE). The VEAC assessment will inform the work of the EPCE in its provision of advice and recommendations on the future uses of the IPAs.

The purpose of the VEAC assessment is to:

- a) identify the biodiversity, ecological and geological and geomorphological values of the specified area.
- b) identify the cultural heritage, social and economic values of the specified area.
- c) identify the current and likely future threats to those values, including climate change
- d) identify the typical land use categories commensurate with the identified values.
- e) assess the potential economic implications of proposed land use changes recommended by the EPCE and provided to the VEAC.

This economic assessment report aims to provide:

- a) socio-demographic profiles of the regions (see separate report).
- b) 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.
- c) an assessment of the costs and benefits of the EPCE's proposed land use change recommendations provided to VEAC and how those costs and benefits are distributed.
- d) a qualitative description of the potential social implications of EPCE's recommendations, with attention to implications for regional townships and communities.

Table 1 - Potential Industries and Recreation Activities in the Strathbogie Ranges and Mirboo North IPAs

	Sector or activity
Industries	tourism, mining, apiculture, water, public land grazing, outdoor education, commercial guiding
Recreational activities incl associated events	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
Other	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 IPAs is provided in Section 3. This framework is also used in Sections 4 and 5 to inform the consideration of the economic values associated with each of the IPAs and how these may change with the EPCE's recommendations. The application of the economic activity framework to the IPAs is provided in Section 6.

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 IPAs and how these may change with the EPCE's 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 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 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 Strathbogie Ranges and Mirboo North IPAs 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 Strathbogie Ranges and Mirboo North IPAs 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. Similarly, the magnitude of timber values may be diminished by increased forest management for conservation values.

The mechanisms that link resources to individual and community wellbeing are direct use of the resources (for example, commercial and noncommercial 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*³ 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 potentially apply to the forests of the Strathbogie Ranges and Mirboo North IPAs are presented diagrammatically in Figure 2.1.

³ 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.

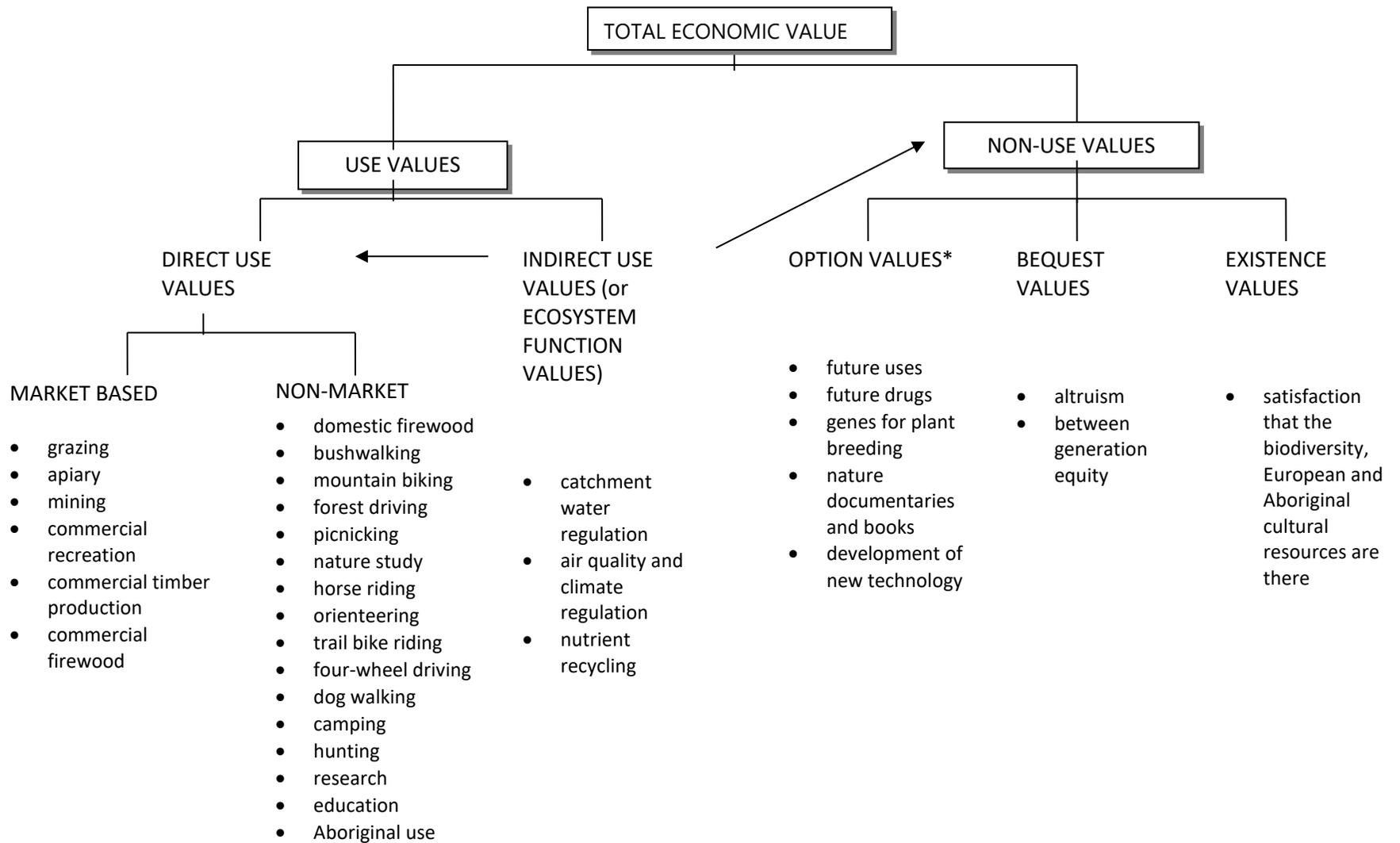


Figure 2.1 Potential Components of Total Economic Value of the Forests of Mirboo North and Strathbogie Ranges IPAs

* 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; and
- Supporting Services – services necessary for the production of all other ecosystem services (Pagiola *et al* 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 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.

Consumer surplus values are relevant to non-market uses e.g. all types of non-commercial recreational activity, as well as non-use values.⁴ 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 & Impacts Versus Marginal Change

The TEV of the forests of the Strathbogie Ranges and Mirboo North IPAs therefore relate 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 Strathbogie Ranges and Mirboo North IPAs where many current uses are unaffected by the recommendations of the EPCE.

⁴ 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 base 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 the 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 if 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 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 Mirboo North and Strathbogie Ranges IPAs

3.1 Cost Benefit Analysis

CBA involves the following key steps:

1. Identification of the “do nothing” or base case.
2. Identification of alternatives to the base case.
3. Identification of the incremental costs and benefits of alternatives relative to the base case.
4. Physical quantification and valuation of the incremental benefits and costs.
5. Consolidation of value estimates using discounting to account for temporal differences.
6. Application of decision criteria to determine if the alternatives have incremental net benefits or costs.
7. Assessment of risk and uncertainty.
8. Consideration non-quantified benefits and costs.
9. Consideration of the distribution of costs and benefits.

3.2 Identification of the Base Case

In November 2019 the Victorian government announced a 10-year managed transition away from native forest harvesting and that state forests in the Strathbogie Ranges and Mirboo North would immediately be protected from commercial timber harvesting and placed in IPAs. Any future commercial harvesting of these areas is therefore inconsistent with the Victorian government’s announcement and so for this analysis, the “do nothing” or base case against which alternatives are compared is a continuation of this protection from commercial timber harvesting and a continuation of other forest activities and uses that are currently permitted.

The main permissible commercial industries in the IPAs are apiculture, mining, quarrying and licensed grazing.

The main recreational and domestic activities that extract resources from IPA land 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, and camping.

Even with continuation of protection from commercial timber harvesting, VEAC (2022a) identify a range of threatening processes and disturbances to the biodiversity values of Mirboo North. These include various recreation uses and extractive uses of the forest (intensified by future population growth), environmental weed invasion, introduced fauna species/predation/competition, climate change etc.

3.3 Identification of the Alternatives to the Base Case

The alternatives considered by the EPCE are around the assignment of public land to specific purposes and uses, and the naming of the resulting public land categories.

This involves considering the following matters:

- specific directions of government if any and legislative requirements.
- pattern and significance of values including natural values, Aboriginal and non-Aboriginal cultural values, resource uses and other economic activities, licensed uses, recreational uses.
- size of area and boundaries of area including shape (e.g. linear, fragmented) that may affect management viability.
- regional and local context including adjacent or nearby areas of public land; including their values and uses.
- the environmental, social, and economic implications of implementing land use changes.
- ease of public understanding e.g. avoiding unnecessary complexity in allowed uses or boundaries.
- where possible, avoiding foreclosure of future options for environmental protection.

Public land use categories for the areas under investigation or assessment are then identified.

Several activities are managed in the same way across all the public land use categories under consideration as follows:

- timber harvesting for sawlogs and pulpwood is not permitted.
- apiculture is allowed.
- the rules for four-wheel driving and trail bike riding are the same across parks, forests, and other public land.

The consequence of this definition of alternatives (and the base case identified earlier) is that the major implication of protecting forests from logging i.e. the economic cost associated with foregone commercial timber production, and the economic benefit associated with improved conservation outcomes that arise from protecting the forests from commercial timber production, are relevant costs and benefits to the previous decision made by the Victorian government to protect the forests from logging.

The VEAC assessment and the EPCE considerations do not revisit the values of the forests for timber production or consider options to reinstate timber production. Consequently, economic costs and benefits relate to the next stage of decision-making – which activities (other than commercial timber production) should be permissible within the already protected IPAs.

3.4 EPCE Recommendations

The EPCE recommendations across the two IPAs involved allocating the State Forest IPAs into the following public land categories as identified in Table 3.1:

- Conservation Park.
- Cultural Reserve.

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

Public Land Category	Mirboo North		Strathbogrie Ranges	
	Current	EPCE Recommended	Current	EPCE Recommended
State Forest IPA	444		25,200	
Cultural Reserve				25,200
Conservation Park		444		
Total	444	444	25,200	25,200

3.5 Consequences

The main potential consequences for permitted activities in each of the major land use classifications is provided in Table 3.2. The main potential activities impacted are those deeply shaded i.e. dog walking, grazing, prospecting, recreational hunting, domestic firewood collection, extractive industry and mining. Whether these activities are likely to be impacted, and the magnitude of the impact, depends on a more detailed consideration of each IPA in the Sections 4 and 5 of this report. This includes whether these activities take place in the subject land, the potential for these activities to take place in the future, and the availability of substitute sites.

Table 3.2 - Permissible Activities in Public Land Use Classifications⁵

Activity [^]	State Forest (IPA)	Conservation Park [*]	Cultural Reserve ^{**}
Bushwalking, nature observation and picnicking	Yes	Yes	Yes
Camping	Yes	Yes – in designated areas	Yes – in designated camping areas only
Car touring, including four-wheel driving on publicly available formed roads and tracks	Yes	Yes	Yes
Trail bike riding on publicly available formed roads and tracks	Yes	Yes	Yes
Mountain biking and cycling on publicly available formed roads and tracks	Yes	Yes	Yes
Horse riding on formed roads and tracks	Yes	Yes, as specified by the Land Manager	Yes – unless specified by the Land Manager
Dog walking	Yes	No, except as specified by the Land Manager	Yes
Apiculture at licensed sites	Yes	Yes	Yes
Grazing by domestic stock	Yes	No	No – except as specified by the Land Manager
Prospecting	Yes	No	No – except as specified by the Land Manager
Recreational hunting	Yes	No	Yes, controlled – where this applies to hunting of pest animals and deer within local regulations
Domestic firewood collection	Yes, within designated areas	No	Yes, within designated areas only
Extractive Industry	Yes, subject to Departmental approval	Yes, subject to National Parks Act minister's consent.	No, except where a licence predates the reserve
Exploration and mining	Yes, subject to Departmental approval	Yes, subject to National Parks Act minister's consent.	No, except where a licence predates the reserve

[^] These permitted uses generally apply for each public land use category. Exceptions may apply to specific parks and reserves in certain circumstances, which is generally determined through management planning.

^{*} Conservation Park land use classification and associated uses outlined in this table may be subject to change in accordance with the outcomes of the proposed public land legislation reforms.

^{**} Strathbogie Ranges Cultural Reserve uses outlined in this table may be subject to change following management review. All permissible uses will be consistent with the management purpose: to maintain, restore and heal Country and its cultural landscapes, protect Traditional Owners' biocultural values and knowledge and Traditional Owners' rights and interests in and connections to Country. Note, that in accordance with the Panel's recommendations, 'Land Manager' in this instance refers to the relevant governance function, such as Committee of Management, responsible for Strathbogie Cultural Reserve Area.

⁵ The permissible activities for Conservation Park and Cultural Reserve are as provided by the EPCE at the time of the preparation of this Economic Assessment.

3.6 Identification of potential economic costs and benefits

Table 3.3 identifies the potential costs and benefits of the two stages in the land use allocation decision for the IPAs. The Stage 1 decision involved the cessation of commercial timber harvesting and resulting conservation, heritage, and water regulation benefits. The main costs and benefits of the two-stage process are attributable to this Stage 1 decision. This is the stage where the main potential commercial land use (timber harvesting) of the subject forests that has impacts on the environment and heritage values of the forest was prohibited.

The second stage in this land use allocation decision relates to the allocation of the land use category that best matches the values of the forests and the input of the community through the EPCE consultation process. This will have some additional economic costs associated with the restriction of other forest uses and some additional economic benefits from incremental environment and heritage values associated with restricting impacting uses.⁶

At a broad level, the EPCE recommendations would have potential types of economic costs and benefits to the community shaded in Table 3.3.

Table 3.3 - Potential Economic Costs and Benefits of EPCE Recommendations

	Economic Costs	Economic Benefits
Stage 1. Decision to cease logging in IPAs	Foregone commercial timber harvesting	Increased conservation of native vegetation
		Increased conservation of fauna species
		Increased protection of Aboriginal and Historic heritage values
		Improved water quality and quantity regulation
Stage 2. Allocation of appropriate land use category	Reduction in domestic firewood collection	Increased conservation of native vegetation
	Reduction in grazing	Increased conservation of fauna species
	Reduction in potential extractive industry	Increased protection of Aboriginal and Historic heritage values
	Reduction in potential mining	Water quality and quantity regulation
	Restriction on nonmarket recreation in some locations – recreational hunting, prospecting, dog walking but availability of substitute sites for some activities	
	Cost of managing for conservation and other values	Cost saving from no longer managing as State Forest IPA

⁶ A third stage can also be envisaged where investment is made in active management of the land, including recreation infrastructure provision etc. The costs and benefits of this would depend on the nature of the management and investment which is not known at this time. Different types of investment may occur with different land use classifications.

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

3.7 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.

The first step is the domain of scientists while the second step is the domain of economists. Both steps are associated with uncertainty. However, for the Mirboo North and Strathbogie Ranges 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 EPCE 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 EPCE's recommendations could potentially be valued. The approach is then applied in Sections 4 and 5 for Mirboo North and Strathbogie Ranges.

Domestic Firewood Collection

DELWP conducts two domestic firewood collection 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

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)⁷. 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 to the full replacement cost value of the firewood. A reasonable estimate of the economic value of domestic

⁷ They may also derive some utility from visiting the forest and undertaking physical activity. However, for simplicity this is ignored here.

firewood collection is therefore half the replacement cost of the firewood. Firewood sells for around \$150/m³, so a reasonable economic value to domestic firewood collectors is \$75/m³.

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 a value of \$75/m³ is applied to reductions in firewood availability

Grazing

Grazing takes place on public land under licences administered by the DELWP. Grazing is not permitted in Cultural Reserves and Conservation Parks. It is unlikely that all areas where grazing is currently permitted are used for grazing. Notwithstanding, actual use there is a potential opportunity cost from the EPCE's recommendations.

The economic value of grazing activities on public lands is the revenue gained from the stock less the costs of management. Gross margin (GM) 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 \$67.20 for coastal weaners - unimproved pasture to \$173.81/ha for feeder steers. These gross margins are based on a stocking rate of 4 dry sheep equivalent (DSE) per ha. However, the stocking rate would be considerably lower on forested land. For this analysis a stocking rate of 1 DSE/ha is assumed for the subject forests. This implies a GM/ha/year of up to \$43.45/ha/year.

Mining

There are two mining licences within the Strathbogie Ranges IPA covering small areas of 1 ha (for crystals) and 5ha (for crystals and gypsum). There are also two current exploration licences, one for gold and antimony and the other for gold, antimony, and quartz.

The Geological Survey of Victoria (GSV) has identified potential in the southern part of the Strathbogie IPA for tin, tantalum, lithium, and gold. The southern parts of the VEAC assessment area lies under active Mineral Exploration licences for orogenic gold.

The GSV identify the potential undiscounted gross value that mineral resources may be worth. However, this is not relevant to an economic analysis of land use options. The economic value of the minerals resource relates to the **potential** producer surplus from mining the resource i.e. present value of expected revenue less expected cost, not the undiscounted gross value of the resource. If a mining activity already existed, then the economic value of the mining activity could be calculated from the life of mine plan and financial analysis of the mining project. However, where no actual mine exists or is currently proposed then the potential producer surplus from future mining needs to be discounted for timing of any future mining and adjusted for the multiplicative probabilities that:

- exploration occurs; and
- a financially viable deposit is found; and
- a proposal for mining is developed that proceeds to a development application; and
- the development application is approved; and
- finance is obtained; and

- mining proceeds;
- mining is profitable.

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 (a proxy for producer surplus) to Victoria for 10 years.

Further, assume the following probabilities⁸:

- 50% probability that a proponent obtains a licence in the particular area; and
- 50% probability that exploration occurs; and
- 25% probability that a potentially financial viable deposit is found; and
- 80% probability that a proposal for mining is developed that proceeds to a development application; and
- 80% probability that the development application is approved; and
- 100% probability that finance is obtained; and
- 100% probability mining proceeds;
- 90% probability mining is actually profitable;
- mining commences in 10 years' time and provides \$30M per annum in royalties (proxy for producer surplus) to the Victorian government for 10 years.

This potential development has an expected economic value of \$4M present value. This type of analysis is relevant for the proposed Cultural Reserve land use classification proposed for the Strathbogie IPA which prohibits future exploration and mining (except where a licence predates the reserve).

However, the Conservation Park designation proposed by the EPCE for Mirboo North does not prohibit mining. The Conservation Park designation requires mining to be approved at the Ministerial level rather than Department level under the existing State Forest IPA designation. So, the question becomes, how the different approval pathways add to costs of seeking approval and or change the probabilities of getting approval. If there is no change then there are no economic costs. If there is a 10% decrease in the probability that mining would be permitted under a Ministerial approval pathway compared to a departmental approval pathway, then the economic cost of Conservation Park land use designation for the above hypothetical example is \$0.4M.

The complexity of the estimation of impacts on gold and mineral mining is such that this impact remains unquantified in the analysis in Sections 4 and 5. However, with the likely probabilities involved and distance into the future that any potential development would occur (and hence the impacts of discounting), the expected cost of EPCE recommendations for mining are likely to be modest.

Extractive Industry

The value of existing and potential extractive industry resources is conceptually valued the same as above for mining. The main difference is that extractive industry products tend to be of lower economic value than mineral resources.

⁸ The probabilities will be impacted by the availability of substitutes inside and outside State Forests.

Tourism and Recreation

There is a range of recreational activities undertaken in the IPAs. These recreational activities can be undertaken by the local population or tourists.⁹ 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 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 IPAs. 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., 2019) 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 payoffs 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 a mix of adjoining landholders (with a lower consumer surplus value per visit) and campers (with an assumed higher consumer surplus);
- visitation for prospecting and recreational hunting is drawn from further distances and hence associated with higher consumer surpluses per visit.

For this analysis, the following consumer surplus estimates per visit have been assumed for activities that have been identified as potentially being restricted by the EPCE's recommendations.

- Dog walking adjacent - \$10/visit;
- Dog walking non-adjacent (with camping) - \$20/visit;
- Recreation hunting nonadjacent - \$90/visit;
- Prospecting - \$330/visit;

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

⁹ A tourist is someone who is travelling away from home. Domestic Day Trip visitors are those who have travelled for a round trip distance of at least 50km, are away from home for at least 4 hours and do not spend a night away from home as part of their travel. Domestic Overnight Visitors are those who have taken a trip away from home for at least one night (and less than one year), at a place at least 40km from home. A person is a visitor to a location if they stay one or more nights in the location while travelling.

However, the proposals for the public land in the IPA can be 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); and
- 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 the IPAs 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.
- 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.

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 (Pv) is a function of the structural (S), access (A) and environmental (E) attributes it provides (Abelson, 1996) i.e:

$$Pv = P(S, A, E)$$

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 major urban centers e.g. 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; and
- 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 measurable using nonmarket valuation methods such as 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 IPAs are currently used illegally e.g. domestic firewood collection. The people undertaking these activities obtain a consumer surplus from them. These illegal activities may be more constrained or controlled under the EPCE's 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 subject forests are currently managed by DELWP within a fixed budget. The entity responsible for future management of these lands may have a different management focus reflecting the changed land use classification. However, for simplicity, it is assumed that the cost of managing the forests as a Conservation Park or Cultural Reserve would be roughly equal to the current management costs. Expansion in funding or new investment in infrastructure etc. is outside the scope of this analysis. The focus is on the change in land use classification rather than future investment.

Recreation and Tourism Benefit of Additional Protected Lands

One of the main benefits of the EPCE's recommendations relate to the potential for expanded recreational activities and visitation levels. The economic benefit of this is the consumer surplus that people derive. Where commercial recreation opportunities arise then there is also a producer surplus benefit.

Different land use classifications have different permissible recreation activities and hence some may be more suitable for facilitating enhanced recreation activity. Notwithstanding, the differences in permissible recreation activities between Conservation Park, Cultural Reserve, and continued management of the forests as state forest IPA is modest. Furthermore, as identified by Heagney et al. (2018) in a study of the recreation values of 728 protected areas in the state of New South Wales there is 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.

Consequently, the difference between land use classifications for the subject land relative to continuation of management of the lands as state forest IPA is likely to be modest. Infrastructure investment decisions are a separate issue that should be the subject of separate economic analysis.

Benefits of Increased Conservation

The decision already taken by the Victorian government to cease logging in the IPAs resulted in the protection of the IPAs from future logging. This has an economic value equivalent to what the community is willing to pay for the conservation outcomes. These types of values can be elicited using stated preference techniques such as choice modelling.

However, the economic value from protecting the subject land from future logging is relevant to the previous decision-making process.

The land use allocation decisions considered by the EPCE 's decisions will have minor additional conservation benefits relative to conservation benefits of protecting the forests from commercial logging.

These additional conservation benefits come at the potential expense of some restrictions on other activities and uses in the forests.

Benefits of Protection of Aboriginal Heritage Values

Similarly, protection of the forests from future logging has economic benefits to both the Aboriginal and broader community. For instance, 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). Monetisation of benefits for the Aboriginal community is problematic as it requires a property right assumption that may confound respondents to a contingent valuation or choice modelling questionnaire i.e. they have to be willing to pay to preserve their own heritage.

However, the economic value from protecting Aboriginal heritage values from future logging is relevant to the previous decision-making process. The land use allocation decisions considered by the EPCE are associated with identifying an appropriate land use designation. In this respect, it is noted that GLaWAC has previously expressed a preference for retaining Mirboo North to continue to be managed under existing State legislation rather than under the National Parks Act so as not to preempt the Victorian government process of reviewing public land. TLaWC has previously expressed a preference for the creation of a Forest Park under the *Forests Act 1958* and appointment of TLaWC as a Committee of Management to improve Taungurung rights to govern areas within the Strathbogie Cultural Landscape while navigating planned legislative change.

Water Quality and Quantity Regulation

Forested land, vegetated stream frontages and wetlands improve water quality by filtering water, thereby reducing the amount of soil, 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 (e.g. logging), trampling, overgrazing, weed invasion, introduction of pathogens or large-scale fires, water quality can be reduced.

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 EPCE's recommendations compared to "without" them. In the absence of this modelling, it is not possible to place an economic value on the potential benefits.

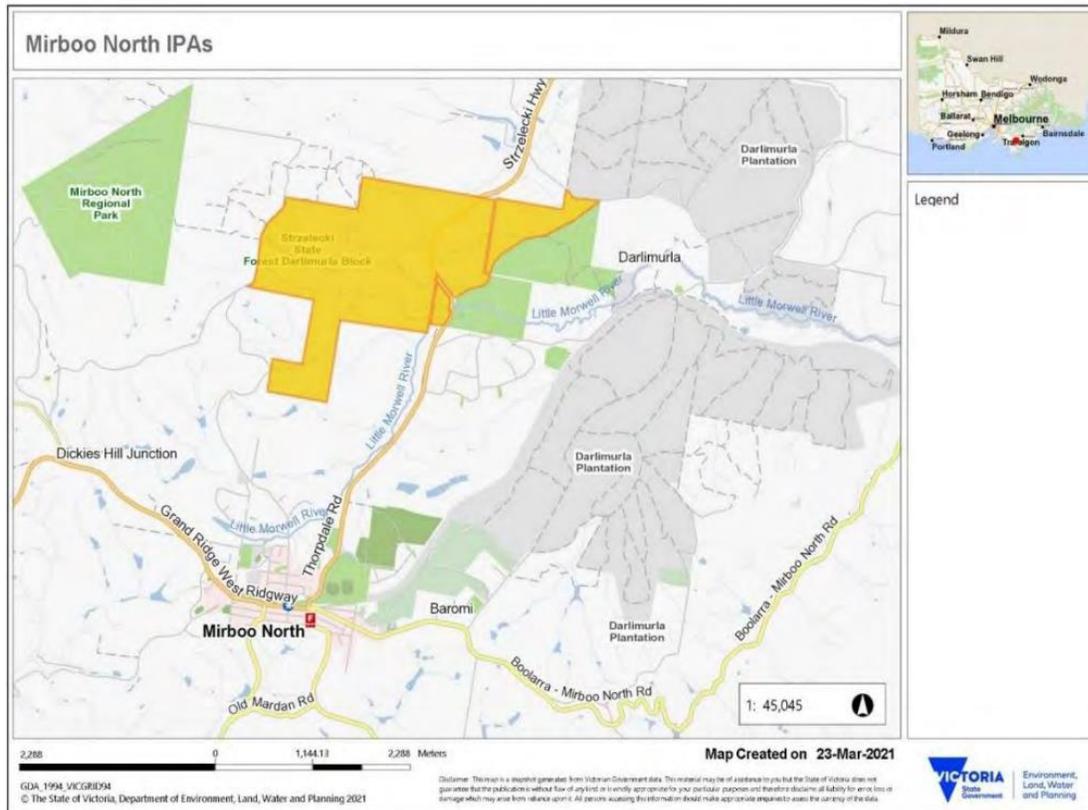
However, the subject forests are already protected from logging and hence potential future clearing of part or all the lands. Consequentially, the relevant comparison regarding water quality and quantity regulation and subsequent impacts is between forested areas being managed under different land use categories relative to continued management as an IPA. Incremental impacts of different land use allocations are therefore likely to be modest and remain unquantified in the analysis.

4. Mirboo North

4.1 Introduction

Mirboo North IPA is made up of 444 ha of the Strzelecki Darlimurla Block State Forest. Located north of the Mirboo North township, the IPA lies approximately 130 kilometres southeast of Melbourne in the Strzelecki Ranges.

Figure 4.1 –Mirboo North IPA



Source: VEAC 2022a

The analysis focuses on the proposed changes to uses of the Mirboo North Forest.

4.2 Main Current Uses

Aboriginal Values

Mirboo North is situated entirely in the Gunaikurnai Recognition and Settlement Agreement area. The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is the prescribed body corporate on behalf of the Gunaikurnai people. The Recognition and Settlement Agreement affords Gunaikurnai people rights relating to the use of public land within their agreement area including Mirboo North.

The Mirboo North IPA is extremely important to the Gunaikurnai people, just as all of Country is important. The Strzelecki Ranges have not been well surveyed for Traditional Owner cultural heritage values, tangible, or intangible. Regardless, the area is known as culturally very significant, including as a central part of the

Gunaikurnai creation storyline. Mirboo North is also a known journey route from the Latrobe Valley to the coast. Just 3.5 kilometres from the Mirboo North IPA, is a site that anecdotally was an old fish trap on the Little Morwell River, and a gathering place a bit further along toward Stony Creek. The stones are not on the river anymore but are still on the adjacent property.

GLaWAC has previously expressed a preference for retaining Mirboo North to continue to be managed under existing State legislation rather than under the National Parks Act so as not to preempt the Victorian government process of reviewing public land.

Non-Aboriginal Cultural Heritage

There are no recorded historic sites in the IPA on the Victorian Heritage Register or the Victorian Heritage Inventory.

Apiculture

There is one bee site located in the IPA near the western boundary. It is a category one bee site which has a smaller bee forage area or bee range (1.6 kilometre diameter) than category two sites (3.2 kilometres).

Apiculture utilises public land for both production of honey and to rest bees before undertaking pollination of private agricultural crops, particularly almond orchards near Robinvale. For this reason, public land close to Robinvale, or within a day's drive of the almond orchards, is typically densely covered by bee sites so bees can be rested nearby to the crops. Given the distance from Mirboo North to the almond orchards near Robinvale, this is not the case in the IPA.

Mining and Extractive Industry

Within the Mirboo North IPA, there are no current mining licences, exploration licences, prospecting licences or work authorities. There is no record of historical mining activity in the Mirboo North IPA although prior to 1992 there were: small bauxite mines on the southern margin of the IPA and some distance further to its north. The bauxite was used to boost aluminium content in cement manufacture. GSV advises the probable economic significance of any bauxite deposit in the IPA would be moderate to low, that there are around 40 known occurrences of bauxite in the wider region, and that there is generally low prospectivity for other minerals in the IPA.

Water Production

Approximately 80 per cent of the Mirboo North IPA is covered by a designated water supply catchment area for Mirboo North. The catchment area (approximately 895 hectares) consists of both forested land (mostly public land but some private land immediately north of the IPA) and cleared land (private land). Water from this catchment area flows into the Little Morwell River and Mirboo North's water supply is taken from the Little Morwell River.

The quality and quantity of water entering the Little Morwell River is important to the ongoing supply of Mirboo North's water. The water supply reserve and treatment plant are on the southern edge of the IPA boundary. There is a delegated management reserve over the Mirboo North Water Treatment Plant. The treatment plant is managed by Gippsland Water and the reserve covers 0.5 hectares on the west side of the Strzelecki Highway near the southeast boundary of the IPA.

Commercial Wood Products

Since the announcement of the IPAs by the Victorian government in 2019, there has been no timber harvesting in the Mirboo North IPA.

Domestic Firewood

There are no designated firewood collection areas in the Mirboo North IPA for the current Autumn 2022 season and, according to land managers, there have not been any firewood collection areas in the IPA in recent years. Across most of Victoria, there are few data available on firewood collection volumes since 2011 when Victoria's permit system was ceased. Illegal firewood collection from forests within and surrounding the IPA have been reported. Current season firewood collection areas closest to Mirboo North include three areas north of Moe at Willow Grove, Erica, and Tyers, and two areas at Won Wron and Alberton, near Yarram.

Recreational Uses

The Mirboo North IPA does not have any recreation infrastructure such as day visitor areas, campgrounds or walking trails. However, there is good access throughout the IPA with several major tracks and roads (such as Samson Road, Old Thorpdale Road, School Road and Ricardo Road).

There are moderate levels of use for horse-riding and four-wheel driving, and higher and possibly increasing levels of mountain and trail bike riding, including many new unplanned and illegal 'single' (i.e. one tyre width) tracks. These illegal tracks are initiating considerable soil disturbance and destruction of ground vegetation and are a significant emerging threat to the biodiversity of the IPA.

Heatmaps from the fitness-tracking app Strava for the area indicate low use of the Mirboo North IPA by both walkers/runners and bike riders.

Due to the small size of the IPA and its proximity to dwellings, recreational hunting is limited.

Nearby recreation attractions include:

- the Lyrebird Forest Walk which is a popular walking trail located just outside of the IPA in the adjacent Mirboo North Regional Park (south of Ricardo Road, east of the Strzelecki Highway). The walking trail is well-used, particularly by locals but also by visitors to the area. It is a pleasant 4.8-kilometre return (with a shorter 3-kilometre return option) walking track with mostly flat terrain through native forest. It follows the Little Morwell River for a stretch and has views of surrounding farmland.
- Grand Ridge Rail Trail which stretches 13 kilometres along the former railway route between Mirboo North and Boolarra. While the rail trail is well used by both walkers/runners and bike riders, few riders use the regional park and even fewer riders use the IPA.

Tourism

Any recreation activities that encourage visitors to stay overnight in the region would contribute to the local economy. Tourism attractions include the Grand Ridge Rail Trail and Lyrebird Forest Walk – both located outside the IPA – that are well used by locals but are also popular attractions for day and overnight visitors. Other attractions include cafes and restaurants as well as a craft beer brewery.

There are no licensed tour operators currently using the Mirboo North IPA.

Given low usage of the North Mirboo IPA, with at least part of this low usage attributed to local residents, the contribution of North Mirboo IPA to local tourism is likely to be minor.

Grazing Licences

There are no grazing licences or water frontage licences in the Mirboo North IPA. There is one unused road licence (for primary production) covering 0.8ha on the northern boundary of the IPA that is available to be used for domestic stock grazing by the licence holder.

4.3 Final Recommendations

The EPCE has recommended the land use category for the IPA as Conservation Park. This land use category continues protection for the high natural values from sawlog and pulpwood harvesting, while accommodating low levels of recreation activities.

Table 4.1 - Major Land Use Changes in Mirboo North from EPCE Recommendations

Public Land Category	Current	Recommended	Change
IPA	444	0	-444
Conservation Park	0	444	444
Total	444	444	444

4.4 Consequences

The main consequences of the above recommendations for permitted activities is summarised in Table 4.2.

Table 4.2 - Impact for Permissible Activities in Mirboo North ¹⁰

Activity [^]	State Forest (IPA)	Conservation Park*
Bushwalking, nature observation and picnicking	Yes	Yes
Camping	Yes	Yes – in designated areas
Car touring, including four-wheel driving on publicly available formed roads and tracks	Yes	Yes
Trail bike riding on publicly available formed roads and tracks	Yes	Yes
Mountain biking and cycling on publicly available formed roads and tracks	Yes	Yes
Horse riding on formed roads and tracks	Yes	Yes, as specified by the Land Manager
Dog walking	Yes	No, except as specified by the Land Manager
Apiculture at licensed sites	Yes	Yes
Access for grazing by domestic stock	Yes	No
Prospecting	Yes	No
Recreational hunting	Yes	No
Domestic firewood collection	Yes, within designated areas	No
Extractive Industry	Yes, subject to Departmental approval	Yes, subject to National Parks Act minister's consent.
Exploration and mining	Yes, subject to Departmental approval	Yes, subject to National Parks Act minister's consent.

[^]These permitted uses generally apply for each public land use category. Exceptions may apply to specific parks and reserves in certain circumstances, which is generally determined through management planning.

*Conservation Park land use classification and associated uses outlined in this table may be subject to change in accordance with the outcomes of the proposed public land legislation reforms.

The main impact of these recommendations are:

- potentially limiting domestic firewood collection.
- removal of access for licensed grazing (0.8 ha in total).
- cessation of recreational hunting, prospecting and restricting dog walking.
- change in approval process for extractive industry and mining.

4.5 Valuation of Impacts

Domestic Firewood

There has not been any legal extraction of domestic firewood in Mirboo North in recent years. For this analysis, it is assumed that this current state would have continued with management as an IPA and hence a Conservation Park designation would have no material impact on domestic firewood collection.

¹⁰ The permissible activities for Conservation Park are as provided by the EPCE at the time of the preparation of this Economic Assessment.

Grazing Licence

There is one unused road licence (for primary production) covering 0.8ha on the northern boundary of the IPA that is used for domestic stock grazing. If included in the proposed Conservation Park this grazing opportunity would cease. Applying a gross margin/ha/year of \$43.45 equates to an economic cost of \$34.76 per annum, or a \$431 present value at 7% discount rate.

Recreation

The EPCE recommendations would prohibit recreational hunting and prospecting and restrict dog walking.

However, due to the small size of the Mirboo North forests and proximity to dwellings the subject land is not suitable for recreational hunting and so the level of recreational hunting is likely to be negligible. Consequently, the Conservation Park land use classification is not likely to have any material impacts on the economic values of recreational hunters.

The GSV has identified that Mirboo North has low gold prospectivity. It is therefore not a focus of recreational prospecting. Consequently, the Conservation Park land use classification is not likely to have any material impacts on the economic values of recreational prospectors.

There is no available data on dog walking in Mirboo North. However, recreation activity is generally low. For the purpose of the assessment, it is assumed that EPCE recommendations would prevent 700 local dog walking visits per year at an economic cost of \$10/visit i.e. \$7,000 per annum or \$87,000 present value at 7% discount rate. However, the existence of substitutes is considered to be high and hence the expected cost is \$17,000 present value.

Mining and Extractive Industry

There is no current mining or extractive industry in the Mirboo North forests and the GSV has identified that Mirboo North has low prospectivity other than for bauxite, any deposits of which would be a moderate-low economic significance and additional to around 40 already known occurrences in the region. Consequently, a change in approval process for extractive industry and mining from a Conservation Park land use classification would have no material impact on mining and extractive industry.

Economic Costs and Benefits in Mirboo North

The declaration of the IPA imposed an economic cost associated with the cessation of all future commercial logging from the subject lands. This would result in conservation benefits as well as benefits for water quality and quantity regulation, and potentially heritage protection.

The recommended land use classification for Mirboo North i.e. Conservation Park, would have very minor additional economics costs i.e. \$17,500 present value at 7% discount rate, associated with restriction on grazing and dog walking. The restriction on grazing and dog walking would also provide some minor incremental conservation, heritage, and water quality benefits.¹¹ In addition, there may also be some benefits to the community associated with security of tenure associated with allocating land to a public land

¹¹ Any attempt to value these benefits would first need specific biological information on how restriction of grazing and dog walking in the areas where this occurs would translate into changes in biophysical outcomes. These changes in biophysical outcomes would need to be described in terms of final outcomes that the community has been shown to value in the nonmarket valuation literature.

use category and away from an interim protection status.¹² These potential benefits remain unquantified in the analysis but would only need to exceed \$17,500 present value at 7% discount rate, for the benefits to outweigh the costs.

Table 4.3 – Summary of Economic Costs and Benefits

	Economic Costs		Economic Benefits	
	Change	\$ (present value 7%)	Change	\$ (present value 7%)
Stage 1. Decision to cease logging in IPAs	Foregone commercial timber harvesting		Increased conservation of native vegetation	
			Increased conservation of fauna species	
			Increased protection of Aboriginal and Historic heritage values	
			Water quality and quantity regulation	
Stage 2. Allocation of appropriate land use category	Reduction in domestic firewood collection	\$0	Increased conservation of native vegetation	NQ
	Reduction in recreational hunting	\$0	Increased conservation of fauna species	NQ
	Reduction in access for grazing	\$500	Increased protection of Aboriginal and Historic heritage values	NQ
	Reduction in recreational prospecting	\$0	Water quality and quantity regulation	NQ
	Restriction on nonmarket recreation (dog walking)	\$17,000	Increased recreation opportunities	Subject to infrastructure provision
	Reduction in potential extractive industry	\$0		
	Reduction in potential mining	\$0		
	Cost of managing for conservation and other values	NQ		Cost saving from no longer managing as State Forest IPA

¹² The nonmarket valuation literature shows that people value increases in certainty of environmental outcomes.

name 'Yowung-illam-baluk' means 'stone camp people': yowung meaning stone; (w)illam camp; and -baluk people. Taungurung cultural heritage is a core part of identity and connection to Country. It can be found in tangible and intangible evidence such as the mountains, waterways, art sites and trees that form Country, and their links to creation and other stories about Taungurung way of life, before and after dispossession. Tangible evidence can be found in the Garden Range art complex known to encompass four rock shelters. Two shelters containing art are within the Mount Wombat Garden Range Flora and Fauna Reserve and two are on property owned by TLaWC. Archaeological excavations undertaken at the Garden Range rock art sites indicate people have used the sites since at least the end of the last ice age 11,000 year ago

Non-Aboriginal Cultural Heritage

While there are no recorded historic sites in the IPA on the Victorian Heritage Register or the Victorian Heritage Inventory, the IPA is rich in history associated with the mining of gold, particularly alluvial mining, and early Chinese settlement.

The Strathbogie forests have also been a source of millable timbers since the late 1800s. Several mills were established within the forest to supply the demand for timber for mining, construction, and railway building.

Apiculture

There are 44 bee sites in the Strathbogie Ranges IPA of either 1,600 metres or 3,200 metres diameter. An additional six bee sites are located just outside of the IPA but have base ranges that overlap with the IPA. Approximately 60 per cent of the IPA is covered by these base ranges and sites are reasonably evenly distributed with some clustering of sites around some of the main access tracks in the southern part of the IPA such as Barjarg Road and Ferraris Road. The areas without bee sites include the reference areas and areas that are steep and difficult to access.

Mining and Extractive Industry

Historical gold mining activity in the Strathbogie Ranges is limited with historic mining leases occurring north of the IPA in Reef Hills State Park and mapped goldfields covering the Tallangallook-Dry Creek Historic Reserve and a small area at the south of the IPA.

There are two mining licences within the Strathbogie Ranges IPA. One is located south of Goldsworthys campground near the corner of Dry Creek Road and Ruoaks Road and is for crystals and gypsum. The other mining licence (the Crystal King mine) is located off Barjarg Road south of the Ferraris timber harvesting coupe and is for crystals. Both licences cover small areas of 5 and 1 hectares respectively.

There are two current exploration licences covering parts of the southern end of the IPA near Merton (for gold and antimony) and near the Tallangallook-Dry Creek Historic Reserve (for gold, antimony, and quartz). One exploration licence application covering the eastern edge of the IPA was recently lodged but has since been withdrawn. There are no prospecting licences or work authorities within the IPA. There are two current work authorities (for granite) that are outside of the IPA but in the adjacent plantation land near Boho South. These allow the authority holder (Hancock Victorian Plantations Pty Limited) to extract stone resources in the work authority area. There are no mapped extractive industry interest areas located within or nearby to the Strathbogie Ranges IPA.

Prospectivity in the Strathbogie Ranges IPA is focused mostly on the potential for minerals in the southern parts of the IPA including a variety of mineral and stone resources including industrial feldspar resources,

gemstone-quality quartz in pegmatite dykes, and cassiterite (Tin) mineralization. There is also potential for mineral deposits (such as gold) to be found in the rocks adjacent to the Strathbogie Ranges granite and for mineral deposits (such as lithium, tantalum, and tin) to be found in the Strathbogie Ranges granite

Water Production

The southern and western areas of the Strathbogie Ranges IPA are covered by parts of four designated water supply catchment areas for Violet Town (Honeysuckle Creek), Euroa (Seven Creeks), the Upper Goulburn and Lake Nillahcootie.

Water is also harvested to support stock and domestic supply as well as irrigated agriculture.

Commercial Wood Products

Since the creation of the IPAs by the Victorian government in 2019, there has been no timber harvesting in the Strathbogie Ranges IPA.

Plantation Land

There is a small area of plantation land within the Strathbogie Ranges IPA covering 16 hectares in the north of the IPA near Boho. This land appears to be native forest consistent with the state forest to its north.

Domestic Firewood

Information provided by land managers shows that since 2017, the number of firewood collection areas made available each season (spring and autumn) in the Strathbogie Ranges IPA has varied between five and ten areas and many of these areas have been carried over multiple years. The areas are reasonably evenly distributed across the IPA and where possible, have been located opportunistically to take advantage of 'salvage' wood (such as allowing collection in areas prior to a planned burn, or fallen timber associated with weather events and forest management activities). In previous years, VicForests timber harvesting coupes would have also been made available for the public collecting logging debris post-harvest.

While there are no data available to quantify the volumes of timber collected since 2011 and the cessation of the permit system, land managers report increasing pressure on the forests of the Strathbogie Ranges because of declining supply west of the Hume Highway and accessibility issues in many of the forests to its east.

Tourism and Recreation

The Strathbogie Ranges IPA contains a number of specific campsites and recreation sites and is used for a range of recreation activities.

Campsites and recreations sites include:

- three formal campsites (Ruoaks, Goldsworthys and James Reserve which includes horse yards to facilitate lunch or overnight stops while horse riding in the forest.
- numerous other clearings throughout the forest that are utilized for camping such as a clearing near Gum Drop and White Gum Gully.

- two new campsites that are being established near Rocky Ned falls and a short walking trail that will lead from the campsites to the waterfall.
- day visitor areas include Lima East and Tallangalok Road picnic areas and Hells Hole
- two feature walking tracks – Lima Falls and Rocky Ned walking track.

Heatmaps from the fitness-tracking app Strava for the IPA indicate relatively low recreation use of the Strathbogie Ranges IPA. However, recreation activities include:

- walking/running/hiking with the highest usage around the northeast lobe of the IPA between Warrenbayne and Lima (particularly around Mount Buggaree and Hoskin Hill), as well as Rocky Ned walking track and lookout, Lima Falls walking track, Sandy Creek Falls and Wild Dog Rocks.
- cycling with most usage concentrated around some of the major access roads such as Lima East Road, Police Track, Tames Road and Barjarg Road. Similarly, usage appears higher in the southeast of the IPA near a visitor accommodation provider with facilities for large groups and an extensive track network on their property.
- trail bike riding and four-wheel driving - key areas include Lightning Ridge for four-wheel driving and a windy track near Sandy Creek for trail bike riding.
- hunting especially in the north around Umbrella Hill.
- horse riding.
- mountain bike riding.
- occasional large organised recreational events such as charity motorcycle rides, car rallies and four-wheel driving tours.

There is little information on or evidence of recreational prospecting or fossicking in the IPA. Anecdotally parts of the IPA are of casual interest to gem collectors and gold panning may be an occasional use, particularly near the boundary of or in the adjacent historic area.

The above activities are undertaken by both local residents and tourists. With respect to tourists, the Strathbogie Ranges IPA is well positioned close to the Hume Freeway and is around two hours from Melbourne and between one to two hours' drive from surrounding regional centres such as Shepparton, Wangaratta, Bendigo, and Wodonga. Tourist attractions include cafes and restaurants, Lake Eildon, the Great Victorian Rail Trail and various tracks and trails in the IPA.

There are eight licensed tour operators operating within the Strathbogie State Forest. The licences are for various activities including outdoor education, four-wheel driving, trail bike riding and bushwalking.

Education

The Strathbogie Ranges IPA contains one education area (approximately 275 hectares), the Lima South Education Area. It is located on the eastern side of the IPA, near Lake Nillahcootie. Land managers advise that the education area is used by one outdoor education provider. There are several outdoor education providers based nearby to the IPA, including Auscamp's Charnwood Outdoor Centre which is located on private land that is fully surrounded by the IPA. According to land managers, Auscamp is the main outdoor education camp that is using the Strathbogie Ranges IPA.

Grazing Licences

There are five current grazing licences in the Strathbogie IPA covering 270 hectares in total. All five grazing licences are in the northern half of the IPA with the largest licence located in the northwest corner just east

of Boho and covering 199 hectares. Three licences are located near Warrenbayne and cover areas of 5, 5 and 60 hectares each. The smallest licence (1.5 hectares) is located on the west side of Lima East Road just before entering the Strathbogie State Forest.

Unused road licences

There are eight unused road licences that fall either entirely (two licences) or partly (six licences) within the Strathbogie Ranges IPA. The two unused road licences that are entirely within the IPA are located on the eastern side near Lake Nillahcootie. Both licences are small with one covering a total area of half a hectare (0.57 hectares) and the other less than a quarter of a hectare (0.16 hectares). For the six unused road licences that are partly within the IPA, only small amounts of each licence are in the IPA.

Water frontage licences

There are no water frontage licences within the IPA. At the southern end of the IPA, there is one water frontage licence that abuts the IPA along North Creek

Utilities and other occupations

There is a telecommunications licence over a small area (0.1 hectares) northwest of Mount Strathbogie. The licence is held by Goulburn Valley Region Water Corporation and the site includes a tower and a tank.

5.3 Final Recommendations

For Strathbogie Ranges IPA the recommended land use classification is Cultural Reserve, with further investigation of cultural heritage values of the land. The implication of this for current land uses is unclear. However, for the purpose of this analysis the implication is assumed to be as identified in Table 4.2.

Table 5.1 - Major Land Use Changes in Strathbogie Ranges from EPCE Recommendations

Public Land Category	Strathbogie	
	Current	EPCE Recommended
State Forest IPA	25,200	
Cultural Reserve		25,200
Total	25,200	25,200

5.4 Consequences

The assumed main potential consequences of the above recommendations for permitted activities is summarised in Table 4.2.

Table 4.2 - Impact for Permissible Activities in Strathbogie Ranges IPA ¹³

Activity [^]	State Forest (IPA)	Cultural Reserve ^{**}
Bushwalking, nature observation and picnicking	Yes	Yes
Camping	Yes	Yes - in designated camping areas only
Car touring, including four-wheel driving on publicly available formed roads and tracks	Yes	Yes
Trail bike riding on publicly available formed roads and tracks	Yes	Yes
Mountain biking and cycling on publicly available formed roads and tracks	Yes	Yes
Horse riding on formed roads and tracks	Yes	Yes – unless specified by the Land Manager
Dog walking	Yes	Yes
Apiculture at licensed sites	Yes	Yes
Grazing by domestic stock	Yes	No - except as specified by the Land Manager
Prospecting	Yes	No - except as specified by the Land Manager
Recreational hunting	Yes, controlled – where this applies to hunting of pest animals and deer within local regulations.	Yes, controlled – where this applies to hunting of pest animals and deer within local regulations.
Domestic firewood collection	Yes, within designated areas	Yes, within designated areas only & no commercial firewood collection.
Extractive Industry	Yes, subject to Departmental approval	No, except where a licence predates the reserve
Exploration and mining	Yes, subject to Departmental approval	No, except where a licence predates the reserve

[^]These permitted uses generally apply for each public land use category. Exceptions may apply to specific parks and reserves in certain circumstances, which is generally determined through management planning.

^{**} Strathbogie Ranges Cultural Reserve uses outlined in this table may be subject to change following management review. All permissible uses will be consistent with the management purpose: to maintain, restore and heal Country and its cultural landscapes, protect Traditional Owners' biocultural values and knowledge and Traditional Owners' rights and interests in and connections to Country. Note, that in accordance with the Panel's recommendations, 'Land Manager' in this instance refers to the relevant governance function, such as Committee of Management, responsible for Strathbogie Cultural Reserve Area.

It is assumed that the main potential impact of these recommendations is that some or all of the following activities are not permissible, at least for an interim period (assumed to be 3-years) pending further consideration:

- grazing.
- prospecting.

¹³ The permissible activities for Conservation Park are as provided by the EPCE at the time of the preparation of this Economic Assessment.

- extractive industry.
- exploration and mining.

5.5 Valuation of Impacts

Grazing Licence

If grazing were prohibited this would impact 270 ha of grazing licences. Applying a gross margin/ha/year of \$43.45 equates to an economic cost of \$12,000 per annum, or \$30,800 present value at 7% discount rate for a 3-year impact or a \$145,000 present value at 7% discount rate for a 30-year impact.

Recreational Prospecting

If recreational prospecting activities were to be prohibited, this is assumed to impact in the order of 100 visits per annum at an economic value of \$330/visit. However, there is considered to be high potential for the use of substitution sites. On this basis, the potential impacts on recreational prospecting are summarised in Table 5.3.

Table 5.3 - Indicative Recreational Prospecting Impacts of EPCE Recommendations

Recreation Activity	Max Visits pa Impacted	Substitution Potential	Expected Visits pa Impacted	Cost per Annum	Costs Present Value (7% for 3 years)	Costs Present Value (7% for 30 years)
Prospecting	100	High	20	\$6,600	\$17,320	\$81,900

Mining and Extractive Industry

Some of the Strathbogie IPA is highly prospective. A number of mining and exploration licences exist in the IPA. It is assumed that potential mining in these licence areas would not be impacted by the EPCE's recommendations. However, extractive industry and mining in other areas would be prohibited. This could potentially impose opportunity cost to society. The expected value of these opportunity costs has not been quantified in this analysis. However, as identified in Section with 3.2.1, with the likely probabilities involved and distance into the future that any potential development would occur (and hence the impacts of discounting), the current day expected cost of the EPCE's recommendations for extractive industry and mining are likely to be modest.

Economic Costs and Benefits of Strathbogie Ranges IPA Recommendations

The declaration of the IPA imposed an economic cost associated with the cessation of all future commercial logging from the subject lands. However, this would result in conservation benefits as well as benefits for heritage protection and water quality and quantity regulation.

The EPCE's recommendations may have additional economic costs summarised in Table 4.4 i.e. \$47,000 to \$227,000 present value at 7% discount rate depending on the time-period of impact. The recommended land use classification for Strathbogie Ranges IPA would also provide some minor conservation, heritage, and water regulation benefits from the restriction of forest uses. In addition, there may also be some benefits to the community associated with security of tenure associated with allocating land to a public land use category and away from an interim protection status.¹⁴ There may also be potential nonuse benefits to

¹⁴ The nonmarket valuation literature shows that people value increases in certainty of environmental outcomes

the community associated with knowing that the land will be managed by traditional owners.¹⁵ These potential benefits remain unquantified in the analysis but would need to exceed \$47,000 to \$227,000 present value at 7% discount rate, for the benefits to outweigh the costs.

Table 4.4 – Summary of Economic Costs and Benefits

	Economic Costs			Economic Benefits	
	Change	\$ (present value 7% for 3 years)	\$ (present value 7% for 30 years)	Change	\$ (present value 7%)
Stage 1. Decision to cease logging in IPAs	Foregone commercial timber harvesting			Increased conservation of native vegetation	
				Increased conservation of fauna species	
				Increased protection of Aboriginal and Historic heritage values	
				Water quality and quantity regulation	
Stage 2. Allocation of appropriate land use category	Reduction in grazing	\$30,000	\$145,000	Increased conservation of native vegetation	NQ
	Reduction in prospecting	\$17,000	\$82,000	Increased conservation of fauna species	NQ
	Reduction in potential extractive industry	NQ	NQ	Increased protection of Aboriginal and Historic heritage values	NQ
	Reduction in potential mining	NQ	NQ	Water quality and quantity regulation	NQ
				Increased recreation opportunities	Subject to infrastructure provision
	Cost of managing for conservation and other values	NQ	NQ	Cost saving from no longer managing as State Forest IPA	NQ
	Additional cost	\$47,000	\$227,000		

¹⁵ Nonmarket valuation studies have found community WTP for the protection of significant Aboriginal sites. These type of nonuse values may potentially extend to management of land by Traditional owners, although this has not been empirically tested.

6. Regional Impacts

6.1 Introduction

Potential negative impacts of the EPCE's recommendations on regional economies arise from:

- reduction in commercial activities that purchase inputs to production from the local economy and employ people who spend some of their income in the regional economy.
- 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 for the two IPAs.

6.2 Mirboo North

Commercial Activities

Commercial activities potentially impacted by the EPCE's recommendations for Mirboo North include grazing, extractive industry, and mining.

In Mirboo North the gross margin of potentially¹⁶ displaced grazing is estimated at \$34.76 per annum. This is associated with a gross revenue of \$202/ha or \$161 per annum for the impacted land. This potential contraction of economic activity for the regional economy is inconsequential.

There is no current extractive industry or mining in Mirboo North and low prospectivity. Consequently, no regional economic impacts are likely because of the EPCE's recommendations.

Recreation Activities

While recreational hunting and domestic firewood collection will not be permissible in the proposed Conservation Park, there has not been any legal extraction of domestic firewood in recent years and the subject land is not suitable for recreational hunting. Consequently, no regional economic impacts are envisaged.

6.3 Strathbogie Ranges

Commercial Activities

Commercial activities potentially impacted by the EPCE's recommendations for Strathbogie Ranges include grazing, extractive industry, and mining.

In Strathbogie Ranges the gross margin of potentially¹⁷ displaced grazing is estimated at \$11,732 per annum. This is associated with a gross revenue of \$202/ha or \$54,463 per annum for the impacted land. This potential contraction of economic activity for the regional economy is inconsequential.

¹⁶ It is potentially displaced as land may not actually be being used for grazing.

¹⁷ It is potentially displaced as land may not actually be being used for grazing.

There is no current extractive industry or mining development in Strathbogie Ranges IPA. However, the area is highly prospective. Extractive industry and mining projects can provide significant economic activity to regional economies. However, any future extractive industry and mining projects are highly uncertain and so the consequences for regional economic activity are also highly uncertain.

Recreation Activities

Prospecting would not be permissible in the proposed Cultural Reserve. Any reduction in spending of prospecting tourists in the regional economy will adversely affect the regional economy. However, the level of recreational prospecting in the proposed Strathbogie Ranges is modest and the potential for this activity to be undertaken in other areas in the region is high. Consequently, regional economic impacts will be modest.

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