



Mount Buller & Mount Stirling Alpine Resorts Environmental Management Plan, 2013 - 2017.

**Prepared for the Mount Buller and Mount Stirling Alpine
Resorts Management Board.**

21 August 2012

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Forward

The Mount Buller and Mount Stirling Alpine Resorts Management Board's mission is to manage the Resorts in a socially, economically and environmentally sustainable manner.

'The Mount Buller and Mount Stirling Alpine Resort Management Board (ARMB) will manage the Resort's natural and cultural values in an ecologically sustainable framework that protects, enhances and restores those values. The ARMB aims to be a leader in environmental management and will strive to embrace new environmental technologies'

Mission statement from the Mount Buller and Mount Stirling Environmental Policy 2010

The ARMB has a long history of protecting and enhancing the environmental values of both the Mount Buller and Mount Stirling resort areas. The Environmental Management Plan (EMP) is an important part of the larger comprehensive environmental management framework, which sees the ARMB develop plans, programs, and projects to achieve environmental goals. The EMP gathers and distils relevant information from the larger framework and details environmental objectives, targets and actions proposed by the ARMB for a five year period from 2012. The EMP builds on past plans and demonstrates the ARMBs commitment to continuous improvement in environmental management of our unique alpine areas.

John Huber

Mount Buller and Mount Stirling Resort Management Board

Chief Executive Officer

Abbreviations

AAV	Aboriginal Affairs Victoria (Heritage Services Branch)
AACC	Alpine Resorts Coordinating Council
ARMB	Mount Buller and Mount Stirling Alpine Resort Management Board
AFD	Aquatic Fauna Database (DSE)
AHC	Australian Heritage Commission
AMG	Australian Map Grid
asl	Above Sea Level
ATSIC	Aboriginal and Torres Strait Islander Commission
AVW	Atlas of Victorian Wildlife (DSE)
BP	Before Present
CAMBA	China – Australia Migratory Bird Agreement
DDO	Design and Development Overlay
DSEWPac	Department of the Sustainability, Environment, Water Populations and Communities
DSE	Department of Sustainability and Environment
DOI	Department of Infrastructure
DPI	Department of Primary Industries
DVC	Department for Victorian Communities
EES	Environmental Effects Statement
EMO	Erosion Management Overlay
ESO	Environmental Significance Overlay
EVC	Ecological Vegetation Class
FIS	Flora Information System (DSE)
HV	Heritage Victoria (DSE)
ICOMOS	International Council on Monuments and Sites
IUCN	International Union for the Conservation of Nature
JAMBA	Japan - Australia Migratory Bird Agreement
LCC	Land Conservation Council
RNE	Register of the National Estate
SEPP	State Environment Protection Policy
SMP	Stormwater Management Plan
sp.	Species (one species)

spp.	Species (more than one species)
VAS	Victoria Archaeological Survey (now part of AAV and Heritage Victoria)
VBA	Victorian Biodiversity Atlas (DSE)
WWTP	Wastewater Treatment Plant

1. Review & Preparation

1.1 Review of the 2007 EMP

The Environmental Management Plan for the Resorts is a working document that requires review and amendment, as outlined in 2007 Environmental Management Plan (2007 EMP) a review and new plan should be prepared five years after commencement. The 2012 Environmental Management Plan (EMP) constitutes this review and therefore, replaces in full the 2007 EMP. The EMP review process is also a good way of ensuring continually improvement in the effectiveness of environmental management.

The review recognised the significant amount of work the ARMB has undertaken in the last five years, and consequently many targets and actions have changed as they have been met or exceeded during the period the 2007 EMP was in operation.

Highlights from the implementation of the 2007 Mount Buller and Mount Stirling Environmental Management Plan, include:

- Implementation of the world's first conservation and recycled water for snowmaking project. This project has the capacity to re-use 2.0 mega litres of Class A treated waste water per day.
- Implementation of key actions in the Mount Buller Recovery Plan for Mountain Pygmy-Possum, this including the re-creation of habitat.
- Resort-wide recycling services provided, leading to a recycling rate of 35% in 2010.
- Reduction of cigarette butt litter by 26% through targeted education campaigns.
- Reduction of CO₂ emissions by 599 tonnes for the 2008-2009 financial year through improved building, operation and activity efficiencies.
- 'Waster Wise' certification obtained in 2008.
- Full exclusion of cattle for the Mount Stirling resort area.

Awards:

- Winner, World Environment Day 2009, Recreation of Mountain Pygmy-possum habitat and increasing population estimates by 50%.
- Tidy Towns award 2009, for protection of the environment and conservation of water.
- Winner, World Environment Day 2002, Conservation and recycled water for snowmaking project.

1.2 Preparation of the 2012 EMP

To facilitate sustainable management of the Resorts, the EMP has been divided into six sections, natural heritage, cultural heritage, sustainability, visitor guidance and influence, community awareness and involvement and other issues. Each of these sections is then further divided into specific values/issues. Each value has been analysed in terms of its background (or status) and then a range of objectives, targets and actions have been prescribed.

Objectives – the overall environmental goal, consistent with environmental policy, that an organisation sets itself to achieve.

Background – the environmental condition or state of the value within the Resort(s), based on existing knowledge.

Target(s) – a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives, and that needs to be set and met in order to achieve those objectives.

Actions (Corrective and Preventative) – action to eliminate the cause of a detected or potential nonconformity.

This EMP takes a somewhat different approach than past EMPs, focusing on new actions and continued improvement as opposed to ongoing 'routine' management. While it is recognised that ongoing 'routine' management actions are critical and must be carried out, they are distilled into the annual environmental works plan (Appendix 3) and form the basis of annual planning.

The basis of this EMP therefore, is to provide a list of actions, targets and objectives to enhance the overall environmental performance of the Resorts. The introduction of environmental key performance indicators (KPIs) by the Alpine Resort Coordinating Council (ARCC) in 2008, coupled with data collection namely in areas of waste, energy and water has seen the collation of baseline information for environmental performance. This data provides the opportunity to set quantifiable targets and measure the success of actions implemented through this EMP. Actions and targets wherever possible they have been made measurable, taking note of the KPIs established by the ARCC.

The ARMB has established an Environmental Management Review Committee (EMRC) which consists of board members and key staff. The EMRC will review this EMP and the EMS component to ensure that the contents remain relevant. Reviews shall include assessing opportunities for improvement and the need for changes to the EMP, including the environmental policy and environmental objectives and targets. Records of the management reviews will be retained. The outputs from management reviews shall include any decisions and actions related to possible changes to environmental policy, objectives, targets and any elements addressing the development of an environmental management system, consistent with the commitment to continual improvement. It is recommended that the EMP be reviewed annually, with a major review and update completed every five years.

ISO 14001:2004 Environmental Management Systems

This EMP has attempted to address some of the requirements of a wider Environmental Management System (EMS). Aspects of environmental policy and legislation have been addressed with a view to future development of a comprehensive EMS. A preliminary Environmental Impacts and Aspects Register has been developed (Appendix 1). As well as a full list of EMS Terms and Definitions relevant to this EMP (Appendix 2).

'Significant' is defined as those aspects and impacts which the ARMB has direct control over. Significant ARMB aspects and impacts relate to:

- Water management (including stormwater);
- Sewage (waste water) treatment;
- Waste management;
- Roads (including snow clearing);
- Provision of transport services and car parking;
- ARMB development, construction and maintenance (including engineering); and
- Administration (including fleet and Mount Stirling ski patrol).

Apart from managing and improving the environmental management of its activities, the ARMB has a wider influence over the collective environmental impacts of the Resorts. Most importantly, the ARMB provides referral and educational services to stakeholders and the public as part of our statutory obligation to promote the environmental sustainability of the Resorts.

As the land manager, the impacts of ARMB activities are relatively limited, however the wider environmental impacts that may be attributable to the development of the Resorts and the visitation they attract may be significant and far-reaching. Therefore, priority environmental actions will extend beyond the aspects and impact types listed in the preliminary ARMB Aspects and Impacts Table (Table A1.1). Other priority areas include:

- Biodiversity;
- Land management;
- Ski field management;
- Summer recreational activities; and
- Development and construction.
- Scoring methodology

The Aspects and Impacts Register scoring is largely based on the methodology contained within the 2001 Mount Buller Alpine Resort EMP (MBRMB 2001) and is outlined below.

Score	Probability (P)	Consequence (C)	Scale (S)	Sensitivity (T)
5	Occurs continually or most of the time	Major impact on key environmental concerns (e.g. greenhouse, ESD, biodiversity conservation)	International	Public outrage or passionate support. Regulatory action (e.g. fines) or support/ agreement likely. Media coverage guaranteed. Impact has major implication for business success.
4	Occurs regularly	Major impact of key components of the environment (e.g. air & water quality, natural resources, threaten species)	National	Extensive public concern or support/agreement. Media coverage likely. Possible regulatory action. Implications for business success.
3	Occurs periodically	Moderate impact on key environmental	State	Some public concern (e.g. complaints). Possible media

		concerns (e.g. greenhouse, ESD, biodiversity conservation)		involvement. Regulatory authority involvement possible. Implications for business success.
2	Unlikely to occur	Moderate impact of key components of the environment (e.g. air & water quality, natural resources, threaten species)	Regional	Public complaints unlikely. Regulatory authority involvement unlikely. Implications for business operations.
1	Rarely or most unlikely to occur	Minor impact	Local	No worries, no plusses and no goals required.

The significance score for each impact is calculated using the formula:

$$P \times (C + S + T)$$

The significance rankings for each environmental impact are calculated as follows: scores between 3 and 34 are considered to be low; scores between 35 and 44 are considered to be medium and scores between 45 and 75 are considered to be high.

2. Introduction

The ARMB is established as the Crown Land Manager for the Mount Buller and Mount Stirling Alpine Resorts under the *Alpine Resorts (Management) Act 1997*. Under this Act the ARMB promotes the Resorts and provides services including garbage disposal, water supply, drainage, sewerage, roads and snow clearing as well as facilitating the provision of transport services and collection of fees. All of these functions are to be carried out in an environmentally sustainable manner.

This Environmental Management Plan (EMP) has been prepared by the Mount Buller and Mount Stirling Alpine Resort Management Board (ARMB) for the Mount Buller and Mount Stirling Alpine Resorts (the Resorts).

The EMP is designed to be consistent with the draft *Alpine Resorts Strategic Plan* (the Plan) (DSE 2012). The Plan was prepared by the Alpine Resort Coordinating Council (ARCC), and includes the findings from the ARCCs review of the *Alpine Resort 2020 Strategy*. The Plan proposes a new vision for all resorts:

'Victoria's alpine resorts will be vibrant, growing and sustainable places, delivering alpine recreational and tourism experiences that are available to all'

The Plan also outlines six strategic objectives for the future management and development of alpine resorts. One of which *'respecting the alpine environment'* has particular relevance to this EMP. The EMP is consistent with the future vision and provides the basis for the sustainable management of the natural and cultural heritage values of the Resorts.

The purpose of the EMP is:

- To state the Environmental Policy of the ARMB;
- To identify the key natural and cultural heritage values and sustainability components within the Resorts; and
- To describe and define key environmental performance targets, objectives and actions for each value.

This EMP has been developed and modified to begin to address the planning requirement of an Environmental Management System (EMS), based on AS/NZS ISO 14001:2004. In particular, the sections on Environmental Policy, Objectives, Targets and Actions and the Environmental Impacts and Aspects Register have been designed to partially align with ISO 14001 sections of Environmental Policy, Objectives, Targets and Programme(s) and Environmental Impacts and Aspects Register respectively. In addition, the sections on Legislative Framework begin to address the Legal and Other Requirements section of an EMS.

2.1 Location

The Resorts are located approximately 250 kilometres north east of Melbourne and cover approximately 4,933 hectares (Figure 1).

The Mount Stirling Alpine Resort rises from 630m asl at its western margin on the Delatite River, at Mirimbah to 1,749m asl at the summit of Mount Stirling. Prominent peaks within the Resort include The Monument at 1582m.

The Mount Buller Alpine Resort also rises from 630m asl at its western margin on the Delatite River, at Mirimbah to the summit of Mount Buller at 1,805m asl. Prominent peaks within the Resort include Corn Hill 1,630m asl. The Mount Buller village and ski field is located between 1,400 – 1,800m asl (Figure 2).

The Resort boundaries are generally defined by the 1,300 – 1,350m asl contour, with 67% (~3,296ha) of the Resorts above 1,300m asl. The Alpine National Park abuts the Mount Buller Alpine Resort to the south and southwest and it is surrounded by state forest to the north, east and northwest. A small parcel of crown land, is located on the north west boundary of the Mount Stirling Alpine Resort, on the northern side of the Delatite River at Mirimbah.

2.2 Climate

Temperatures and conditions vary according to elevation and aspect, with prevailing winds from north west to west direction (ARMB 2011c). The average total annual precipitation, including snowfall and rain fall, is 1,545mm per year at Mount Buller. The average extent, duration and depth of snow cover varies from year to year, with snow beginning to fall in April and the majority of snow falling in June through to September. The mean daily summer temperature is 11.1°C and the mean daily winter temperature is -0.6 °C at Mount Buller.

2.3 Land Use

Mount Buller

Mount Buller is utilised for a range of winter and summer recreation activities with approximately 16,000 people visiting the resort per day during the winter peak, of these up to 7,900 people are accommodated overnight within Mount Buller village (ARMB 2001c). Summer and winter activities include downhill and cross-country skiing, snowboarding, snowplay bushwalking, camping, mountain biking, horse riding and four wheel driving.

Mount Stirling

Mount Stirling offers a unique 'wilderness' experience, total visitor numbers estimated at 50,000 p/a with approximately 65% visiting during the summer months (ARMB 2011c). Mount Stirling is utilised for a range of winter and summer recreation activities, including cross-country skiing, snowboarding, snowplay, bushwalking, camping, mountain biking, horse riding and four wheel driving. Downhill skiing is prohibited on Mount Stirling.

3. Environmental Governance

3.1 Environmental Policy 2012

The Mount Buller and Mount Stirling Alpine Resort Management Board (ARMB) will manage the Resort's natural and cultural values in an ecologically sustainable framework that protects, enhances and restores those values. The ARMB aims to be a leader in environmental management and will strive to embrace new environmental technologies.

The ARMB is responsible for the protection, enhancement and restoration of the natural and cultural heritage of the Resorts. As such it is committed to sustainable management practices which achieve compatibility between the operation and development of the Resorts and the natural and culturally significant values of the local environment. To fulfill this commitment the ARMB ensures that proper consideration is given to the care and protection of the flora and fauna, land, water, air, cultural and landscape values of the Resorts by:

Implementation

1. Striving for continual improvement of environmental management and for the prevention of pollution through the implementation of this environmental policy. Incorporating environmental provisions into business, planning and operating procedures and ensuring all costs associated with meeting environmental objectives and implementing actions are budgeted.

Review

2. Annually reviewing environmental objectives and actions by applying a systematic environmental risk assessment procedure and developing annual programs for the implementation of those objectives and actions listed in this Environmental Management Plan (EMP).

Compliance

3. Complying with all relevant environmental legislation and regulations and with other requirements to which the ARMB formally subscribes.

Awareness

4. Promoting environmental awareness and improved performance by ensuring all ARMB personnel and contractors are aware of this policy and the actions outlined in the EMP.

Partnerships and Consultation

5. Consulting and involving the community in environmental management of the Resorts by entering into partnerships and fostering strong relationships with all stakeholders, including other relevant agencies, land managers and the wider community.

Communication

6. Communicating environmental programs and educating the public and stakeholders by publishing and promoting this policy and annual objectives and actions.

Promotion

7. Promoting a greater understanding of the values of the Resorts through education, interpretation and support of research.

3.2 Legislative Framework

Legislation (Commonwealth and State) that relates to specific values within the Resorts include:

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* provides protection for Aboriginal cultural property in Victoria. The Commonwealth has delegated specific powers and responsibilities to the Victorian Minister responsible for Aboriginal affairs. The legislation is administered by Aboriginal Affairs Victoria (AAV).

Alpine Resort (Management) Act 1997

The *Alpine Resorts (Management) Act 1997* (ARM Act) establishes the Alpine Resort Management Boards as the Crown Land managers of set Resort areas and establishes the Alpine Resort Coordinating Council (ARCC). The ARM Act requires (amongst other things) Alpine Resort Management Boards to carry out functions in a sustainable manner and produce Strategic Management Plans.

Archaeological and Aboriginal Relics Preservation Act 1972

With the exception of human remains interred after 1834, the Victorian *Archaeological and Aboriginal Relics Preservation Act 1972* provides legal protection for all the physical evidence of past Aboriginal occupation.

Biodiversity Conservation and Environment Protection Act 1999

The Commonwealth *Biodiversity Conservation and Environment Protection Act 1999* (EPBC Act) covers matters of national environmental significance and provides protection for listed species and communities, including listed flora species. Permits are required under the Act for all activities and/or actions that may affect listed species or communities.

Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act 1994* (CaLP Act) addresses environmental management on a catchment scale to enhance long-term land productivity and conservation of the environment. It contains provisions relating to catchment planning and land management stating that land managers must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- Prevent the spread of, and as far as possible eradicate, established pest animals;
- Conserve soil;
- Protect water resources; and
- Eradicate regionally prohibited weeds (Table 2) and prevent the growth and spread of regionally controlled weeds.

Note, the provisions relating to pest plants and animals under the CaLP Act are under review. It is anticipated during the life of this EMP pest plant and animal regulation will be included in an Invasive Species Management Act.

Conservation, Forests and Lands Act 1987

Conservation, Forests and Lands Act 1987 (CF&L Act) provides that public authorities (i.e. ARMB's) must submit a plan of works prior to the commencement of works involving soil or vegetation disturbance above 1220m asl.

Emergency Management Act 1986

The *Emergency Management Act 1986* gives the Office of the Emergency Services Commissioner (OESC) a broad role in emergency prevention planning including fire services. This Act also addresses recovery planning and management and includes specific responsibilities and obligations on the ARMB to plan for emergencies that may occur within their jurisdiction.

Environment Protection Act 1970

The *Environment Protection Act 1970* (EP Act) aims to prevent pollution and environmental damage. Under the EP Act littering is illegal and the EPA, local government, police and other litter enforcement agencies are given powers to take action against offenders.

The *State Environment Protection Policies (Waters of Victoria)* provides a legal framework for government agencies, businesses and communities to work together to protect and rehabilitate Victoria's surface water environments. Impacts to surface water quality must not exceed water quality objectives specified to protect beneficial uses. Particular relevance to the Resorts are clauses:

- 43- surface water management and works.
- 53 - vegetation protection and rehabilitation.
- 56 - construction activities

The *Environment Protection (Industrial Waste Resource) Regulations 2009* allow industrial waste resources to be managed within a risk-based regulatory system, with the key intent to improve the rates of reuse and recycling of industrial waste resources.

The *State Environment Protection Policies (Waste Management)* cover the full waste cycle – from generation and use through to disposal, treatment and reuse. WMPs may also allocate responsibility for industrial waste management operations and disposal.

The *Environment Protection (Residential Noise) Regulations 2008* apply to noise from residential premises and residential premises under construction. They list specific types of equipment and their prohibited times.

The *State Environment Protection Policies (Control of Music Noise from Public Places)* aims to protect residents from levels of music noise that may affect the beneficial uses of noise sensitive areas.

The *State Environment Protection Policies (Control of Noise from Commerce, Industry and Trade)* aims to protect people from the effects of noise in noise sensitive areas.

Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* (FFG Act) is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. The FFG Act also provides protection against the taking and trade of listed flora species and communities and listed fish. A permit is required (from DSE) for any collection of indigenous flora, or works or activities on public land that may kill, injure or disturb protected flora species.

Forests Act 1958

The *Forests Act 1958* (Forests Act) provides for fire prevention to be undertaken in state forest, national parks and protected public land. It also restricts the lighting of fires on these lands without authority.

Heritage Act 1995

The Victorian *Heritage Act 1995* (Heritage Act) details the statutory requirements for protecting historic buildings and gardens, historic places and objects, historical archaeological sites, and historic shipwrecks.

Heritage Rivers Act 1992

The *Heritage Rivers Act 1992* (Rivers Act) provides for the protection of public land in particular parts of rivers or river catchment areas which have significant recreation, nature conservation, scenic or cultural heritage attributes. The Howqua River, whose headwaters are located within the Mount Stirling Resort, is listed as a heritage river.

Planning and Environment Act 1987

The *Planning and Environment Act 1987* (P&E Act) establishes a framework for planning use, development and protection of land in Victoria. It provides for the creation of Planning Provisions, creation of and amendment of the Alpine Planning Scheme, creates a system for obtaining a planning permit and creates enforcement measures for breaches.

The Act provides for the creation of the Victorian Planning Provisions which contain Zones, Overlays, State Planning Policy Framework and Local Planning Policies. Within Alpine Resorts this includes clause 44.01 Erosion Management Overlay (EMO1) which covers the entire Mount Buller and Mount Stirling Alpine Resorts. The purpose of EMO1 is to protect areas prone to erosion, landslip or other land degradation processes, by minimising land disturbance and inappropriate development.

Clauses 11 and 15.09 in the State Planning Policy Framework provide the broad framework for considering native vegetation issues in the planning scheme. These clauses require planning and responsible authorities to have regard to *Victoria's Native Vegetation Management – A Framework for action* (the Framework) (DNRE 2002). With regard to native vegetation, clause 52.17 sets out the specific requirements for a planning permit, if required, to remove, destroy or lop native vegetation. This does not apply to exempt vegetation.

The Framework is State Government policy for the protection, enhancement and revegetation of native vegetation in Victoria. The primary goal of the Framework is:

“A reversal, across the whole landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain” (DNRE 2002, p. 14).

A three-step approach has been designed in the Framework for the achievement of a Net Gain (DNRE 2002);

Safe Drinking Water Act 2003

Including the *Safe Drinking Water Regulations 2005* and Drinking Water Regulation Guidance Note No.12 June 2011. *Safe Drinking Water Act 2003* recognises the role of the ARMB as a drinking water provider and defines the ARMB as a water supplier.

Wildlife Act 1975

The *Wildlife Act 1975* (Wildlife Act) is the primary legislation in Victoria for the protection and management of vertebrate wildlife (except fish). The Act aims to protect and conserve wildlife, to

prevent their extinction and to regulate activities such as trading in legally held species and hunting. Wildlife habitat is protected by the *Wildlife (Regulations) 2002*.

Water Act 1989

The *Water Act 1989* (Water Act) outlines the law relating to water in Victoria; it provides for the integrated management of all elements of the terrestrial phase of the water cycle and the protection of catchment conditions.

3.3 Policy & Other Requirements

There are a number of policies, strategies and plans that make up the larger environmental framework that governs and guides the management of the Resorts. These documents should be read in conjunction with the EMP as they each provide detailed information relating to particular aspects. The EMP where appropriate has incorporated information from these documents.

External policy documents and requirements

- Draft Alpine Resorts Strategic Plan, Alpine Resorts Coordinating Council.
- Alpine 2020 Strategy
- Alpine Resort Coordinating Council, Environmental Key Performance Indicators for Victoria's Alpine Resorts.
- Victorian Action Statement for the Mountain Pygmy-possum
- Towards Zero Waste Policy
- Buller Ski Lifts Company Environmental Policy/ Environmental Management System

Mount Buller and Mount Stirling policy documents and requirements

- Mount Stirling Environmental Effects Statement (EES)
- Mount Buller Recovery Plan for the Mountain Pygmy-possum.
- The Mount Buller and Mount Stirling Alpine Resort Management Board Annual Report.
- The Mount Buller and Mount Stirling Alpine Resort Management Board Resource Smart Strategy.
- The Mount Buller and Mount Stirling Alpine Resort Management Board Corporate Plan.
- The Mount Buller and Mount Stirling Alpine Resort Management Board Business Plan.
- The Mount Buller Strategic Management Plan.
- The Mount Stirling Strategic Management Plan.
- The Mount Buller and Mount Stirling Stormwater Management Plans.
- The Mount Buller and Mount Stirling Wildfire Management Plan.
- The Mount Buller and Mount Stirling Environmental Policy.
- The Mount Buller and Mount Stirling Roads and Tracks Management Strategy.
- The Mount Buller and Mount Stirling Dog Policy (Policy Guideline 7.1).

4. Natural Heritage

4.1 Geological & Geomorphological Features

Objectives

To protect sites of geological and geomorphic interest within the Resorts.

To maintain natural rates and magnitudes of change in geological and geomorphological features.

Background

The Resorts are located within the Dissected Eastern Upland geomorphic unit (Jenkin 1988) and are characterised by two easterly trending ridges, bisected by the headwaters of the Delatite River (Figure 4). Geological information for the Resort is limited to 1:250,000 mapping (VandenBerg 1997), although some dating and a number of unpublished petrological studies of the Mount Buller Intrusive Suite have been completed by Monash University students.

The geological mapping identifies five lithofacies outcropping within the Resorts (Figure 3). The Resorts' geology is dominated by the Mount Buller Intrusive Suite, including the Mirimbah and Mount Stirling hornblende granodiorites, constituting 84.8% of the Resorts area. These granitoids are middle Devonian, undeformed, high level intrusives with hornfels aureols (VandenBerg 2000). Ordovician and Silurian marine sediments were the basement that was intruded and contact metamorphosed by these granitoids. These crop out in the eastern and southern areas of the Resorts, constituting 13.6% of the Resorts.

The other three lithofacies are minor in abundance. In the east, the Mount Stirling Resort boundary passes into Upper Devonian Avon Group fluvial sediments that outcrop extensively to the south and east. Two small areas of preserved Oligocene basalts in the summit area of Mount Buller are remnants of a valley fill flow during the Oligocene. These highlight the erosional dissection of the eastern highlands during the Tertiary and Quaternary periods. The very limited abundance of Quaternary sediments and fluvial sediments occurring at only the lowest elevations of the Resorts, reflect the gross erosional setting of the area.

The Snowy Mountains Engineering Corporation (SMEC) has completed a review of geotechnical stability within the Mount Buller (SMEC 2000) and Mount Stirling (SMEC 1999) Alpine Resorts. The SMEC (1999; 2000) reviews had similar conclusions in that no evidence of deep seated sliding was evident and there were signs of several shallow landslides that have involved slumping from the steep upper slopes on the southern side of the ridge above the Howqua River and recent slope failures on the southern slopes of Mount Stirling. In addition, at Mount Buller, a slight risk of rockfall from basalt outcrops was observed (SMEC 2000).

Target

- All development applications adequately address the requirements of EMO1.

Actions

The ARMB will:

- Ensure that the location and siting of ARMB buildings has regard to drainage lines, subterranean water levels and movement, and no increased threat to ground stability.
- Ensure that the application requirements of EMO1 (cl. 44.01-4) are applied to all development proposals where required.

4.2 Soil Conservation, Rivers, Catchments & Water Management

Objectives

To conserve and manage the soil resources of the Resorts.

To manage all water resources within the Resort to ensure water demand are met without degrading the health of the rivers and creeks and to encourage water conservation practices throughout the Resorts.

Background

Detailed documentation of the soils of the Resorts has not been undertaken, however some comments have been provided for the Mount Stirling Resort by Interplan (1973). The low variation in bedrock and documented patterns of soil development in the eastern highlands (LCC 1977; Costin 1986) does allow for some extrapolation from this limited information base. On drier slopes shallow, friable, stony red and brown gradation soils are dominant (LCC, 1977). These correspond with the Lithosols described by Costin (1986). These soils are gradational from weathered bedrock and are largely mineral in character. Moist slopes, lower gradient areas and increasing altitude show progressively increasing amounts of organic material in the upper soil profile, passing through a transition into the Alpine Humus Soils described by Costin (1986). Local development of peats was noted in the eastern area of the Mount Stirling Resort by Interplan (1973).

Soil erosion can detrimentally impact on water quality (increased loads of sediment and nutrients) and the condition of Mountain Pygmy-possum critical habitat (via siltation of block streams and by increasing the chances of vegetation establishment and/or regeneration through nutrient loss, seed loss, and seedling destruction). Creation of bare earth increases the likelihood of weed invasion and establishment, and minimises the chances of establishment of native vegetation due to frost heave. Compaction of soil increases the likelihood for runoff, and reduces establishment rates of native vegetation (e.g. reduction in ability for roots to penetrate soil).

The Resorts are located at the headwaters of the Goulburn River and to a lesser extent the Ovens River basins. The Mount Buller Resort encompasses the headwaters of the Howqua and Delatite Rivers. The Mount Stirling Resort encompasses the headwaters of the Delatite River, the Howqua River and the King River. Named waterways and/or headwaters within the Mount Buller and Mount Stirling Resorts can be found in Map 2.

Water from Boggy Creek is pumped to reservoirs on Burnt Hut Spur and Baldy Spur to provide water supply for the Mount Buller Resort. A Waste Water Treatment Plant (WWTP) treats sewage and discharges to Black Dog Creek. The ARMB commissions annual independent water quality monitoring of the Delatite River, Black Dog Creek and the Howqua River, the most recent assessment in 2011 identified the WWTP effluent as having a negligible effect on the Howqua River downstream from the confluence of Black Dog. Water supply for the Mount Stirling area of the Resort is sourced from Falls Creek.

Mount Buller is heavily reliant on snowmaking to supplement natural snowfalls. The production of artificial snow using current snowmaking technology requires large volumes of water. A Class A Treatment Plant that can provide up to 2 million litres of recycled water for snowmaking per day has been installed on Mount Buller. The aim of this installation is to decrease volumes of effluent released into the environment, and decrease extraction of water for Boggy Creek.

Five urban sub catchments (including the ski fields) were identified in the Mount Buller and Mount Stirling Stormwater Management Plan (SMP) (WBM 2005). Four of these primarily drain to the Delatite

River catchment and one to the Howqua River catchment. Seven priority risk issues were identified and stormwater management strategies were formulated by combining management actions that were considered to provide the most cost-effective combination in response to each issue. Sedimentation was a common and significant component to all seven of the identified risk issues. Other threats common to a number of identified risk issues, were the input of pollutants, nutrients and litter, and increases in overland flows.

ARCC KPIs

In 2008, the ARCC developed a set of environmental, social and economic key performance indicators (KPIs) which will be used to measure the ARMB progress towards sustainability (ARCC 2008). These KPIs were established under four themes, one of which is water management.

The indicators for water management performance include:

- N1) % of compliance with licences for extraction, supply and discharge for water; and
- N2) a) annual portable water consumption excluding snow making, ML/ year/e. p.
b) total annual water consumption including snow making, ML/year.

In 2006/07 the ARMB began monitoring water usage (including and excluding snowmaking activities); results are shown in Figure 1 and Figure 2.

Figure 2.

Since 2006 the ARMB has achieved 100% compliance with licences for extraction, supply and discharge of water.

Figure 1- Annual total portable water consumption excluding snowmaking, measured in ML/ year/ equivalent person.

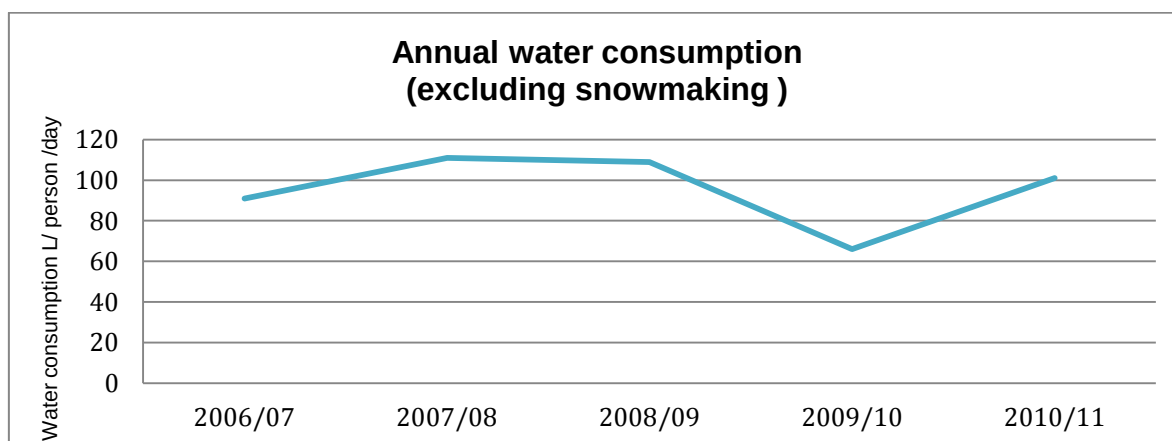
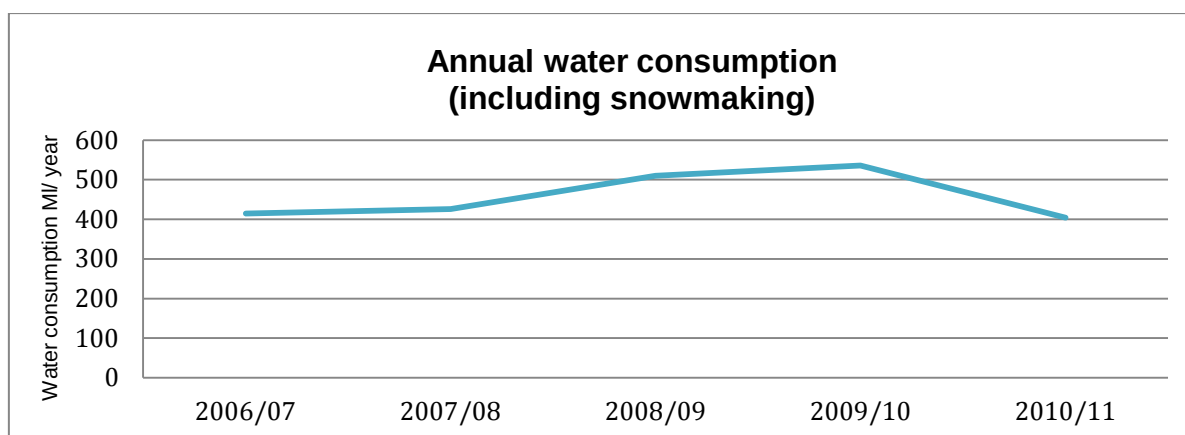


Figure 2- Annual total water consumption including snowmaking measured in ML/year.



Targets

- Reduce bare earth, excluding tracks and roads, within the Resorts.
- Continued 100% compliance with conditions of licences for extraction, supply and discharge of water per annum.
- Annual reduction in portable water usage excluding snow making.
- Annual reduction in portable water usage including snow making.

Actions

The ARMB will:

- Discourage the importation of soil from outside the Resorts. If soil is to be imported weed-free certification must be provided.
- Implement, maintain and promote where appropriate, measures to prevent sedimentation from areas of exposed and/or stockpiled soil due to rainfall and in particular, storm events, occurring during development works and prior to final site rehabilitation measures being completed.
- Recommend that surplus topsoil excavated during approved works is stockpiled for use in subsequent works.
- Recommend and promote the immediate repair of rehabilitated areas where these are damaged by storm events prior to or immediately following works completion.
- Purchase water-efficient appliances where possible.
- Continue to improve on-line monitoring system for Resort-wide reticulated water.
- Install and retrofit water-efficient plumbing at all facilities
- Continue water efficient cleaning practises to reduce water consumption
- Undertaken walk through audit of facilities to identify water leaks
- Maintain current system for reporting and repairing water leaks.
- Continue to install water tanks
- Continue to recycle water for snowmaking
- Investigate, plan and implement a storm water capture/reuse scheme.

- Develop and implement Village Beautification Plan (revegetating appropriate areas with native plants of local genetic provenance).
- Control ARMB works conducted within, adjacent to or near surface waters (including small unnamed drainage lines) to minimise environmental risks posed to aquatic ecosystems and to protect other beneficial uses.
- Where absolutely necessary, support the minimal removal, and full rehabilitation of the extent and quality of native aquatic and riparian vegetation.
- Manage ARMB works within or adjacent to surface waters so that unnatural erosion, sediment re-suspension and other environmental risks to aquatic habitats are minimised.
- Manage any new, or modifications to existing, in-situ ARMB structures (e.g. culverts, pipe crossings, bridges etc.) so that they do not pose a barrier to native fish movement.
- Continue to comply with conditions specified under any existing or future EPA licences.
- Continue monitoring water quality and apply the environmental quality objectives (both water quality and biological) for rivers and streams as detailed under the SEPP Waters of Victoria 2003 for the Highlands segment, as the standard for waterways within and adjacent to the Resorts.
- Encourage the reduction of potable water use per visitor per day.

4.3 Flora

4.3.2 Indigenous Flora

Objective

To protect and preserve all high quality indigenous flora within the Resorts and enhance all other indigenous flora.

To minimise impacts on indigenous flora within the Resorts.

Background

Three hundred and nineteen species of indigenous vascular and non-vascular plants have been recorded within the Resorts (FIS 2005) (Table A2.1). These species occur within the range of vegetation communities typical of the broad scale altitudinal gradients of the Victorian Alps bioregion. Broad scale vegetation mapping by DSE identifies nine Ecological Vegetation Classes (EVCs) and one mosaic within the Resorts (Table 1 and Figure 5). An EVC is contains one of more plant plants communities and represent a grouping of similar environments.

Sub-alpine Treeless Mosaic occurs on the summit areas, particularly Mount Buller, Mount Stirling and Baldy, where tree growth is limited by climatic extremes. This mosaic is composed of a range of treeless EVCs including Alpine Coniferous Shrubland, Sub-alpine Wet Heathland, Sub-alpine Wet Sedgeland, Alpine Grassland, Sub-alpine Shrubland, Alpine Rocky Outcrop Heathland and Alpine Grassy Heathland. Mapping and/or identification of these EVCs has not yet been completed for the Resorts.

Alpine Coniferous Shrubland formerly known as *Podocarpus* Heathland is the preferred habitat of the *Burrumys parvus* Mountain Pygmy Possum. It is typically a low open heathland restricted to rocky sites in boulder-fields and basalt block streams at altitudes ranging from 1400m through to 1780m. The dominant species is *Podocarpus lawrencei* Mountain Plum-pine.

Higher elevation ridges and upper slopes support Sub-alpine Woodland dominated by *Eucalyptus pauciflora* Snow Gum. Downslope, these woodlands intergrade into montane forests mostly dominated by *Eucalyptus delegatensis* ssp. *delegatensis* Alpine Ash and *Eucalyptus dalrympleana* ssp. *dalrympleana* Mountain Gum (e.g. Montane Dry Woodland, Montane Damp Forest, Shrubby Dry Forest).

In areas dominated by Montane Damp Forest and Montane Dry Woodland, some sheltered gullies support Wet Forest and Montane Riparian Thicket (Montane Riparian Thicket also occurs within Sub-alpine Woodland).

Damp Forest and Wet Forest are located on lower southern slopes within the Resorts. Damp Forest is dominated by a tall eucalypt tree layer to 30m, over a medium to tall dense shrub layer of broad-leaved species typical of wet forest mixed with elements from dry forest types. The ground layer includes herbs and grasses as well as a variety of moisture dependent ferns. Wet Forest is restricted to protected moist sites in gullies. It is characterised by a tall eucalypt overstorey with scattered understorey trees over a broad-leaved shrubby understorey and a moist, shaded, fern-rich ground layer that is usually dominated by tree-ferns.

Herb-rich Foothill Forest occupies lower slopes and gullies within the Resorts. It consists of a medium to tall open forest or woodland to 25m tall with a small tree layer over a sparse to dense shrub layer. A high cover and diversity of herbs and grasses in the ground layer characterise this EVC.

Riparian Forest is located along the Delatite River within the Resorts. It is a tall forest located on fertile alluvium soils that are regularly inundated and permanently moist. It is dominated by tall eucalypts to 30m, but also has an open sparse secondary tree layer of wattles and scattered dense patches of shrubs, ferns, grasses and herbs.

The non-vascular flora of the Resorts have been poorly surveyed. This includes mosses, liverworts, lichen and fungi. Mosses and liverworts within the Victorian Alps bioregion are reasonably well documented with some 270 species recorded (FIS 2005), although the majority of these records are for the Bogong High Plains.

ARCC KPIs

As outlined in section 4.2 Rivers, Catchments and Water Management, the ARCC has established a number of KPIs for environmental performance. In 2010, the ARMB commissioned a report to determine baseline information for the KPI N7) '*extent of good quality habitat within the Resorts*' (ARMB 2011). The ARMBs performance against this indicator is measured in Habitat Hectares per EVC, and number and extent of environmental weeds and pest animals across the Resorts (see exotic flora section 4.3.4 and introduced animals sections 4.4.4).

The results of the Report are outlined in Table 1, it is intended that the baseline information will be refined further through ground-truthing and additional data collection over the next few years.

Table 1-Estimated habitat hectares per Ecological Vegetation Class within the Resorts.

EVC	Ecological Vegetation Class	Conservation Significance	Habitat hectares with the Resorts
18	Riparian Forest	Least Concern	47.93
21	Shrubby Dry Forest	Least Concern	104.13
23	Herb-rich Foothill Forest	Least Concern	69.39
29	Damp Forest	Least Concern	125.02
30	Wet Forest	Least Concern	40.76
36	Montane Dry Woodland	Least Concern	1,236.73
38	Montane Damp Forest	Least Concern	326.32
41	Montane Riparian Thicket	Least Concern	45.83
43	Sub-alpine Woodland	Least Concern	971.92
44	Sub-alpine Treeless Vegetation Mosaic	Rare	54.37
		Total	3,022.41

** Information contained in this table is taken from ARMB 2011.*

A detailed description of the above listed EVCs can be found in Appendix 4, Table 4.2

Target

- Net Gain in the extent and quality of native vegetation (measured in habitat hectares/ EVC) within the Resorts.
- Protect the habitats of rare or threatened flora and fauna.
- Increased knowledge on the location and extent of current 'unmapped' EVCs that are known or thought to occur within the Resorts.

Actions

The ARMB will:

- Ground-truthing and further data collection to confirm and improve the quality of information contained in Table 1.
- Collection of information on the location and extent of current 'unmapped' EVCs.
- Continue to implement the Resorts Vegetation Management Plan as appropriate.
- Review, update and distribute the Mount Buller and Mount Stirling Planting Guide.
- Application of the Net Gain three-step process where development or other actions may impact upon indigenous flora.
- Revegetate areas disturbed by ARMB works as soon as possible after disturbance using locally indigenous plant stock (refer ARMB 2005a).

4.3.3 Rare or Threatened Plants & Plant Communities

Objective

To ensure that management programs conserve and where possible enhance the environment for rare or threatened plants and plant communities.

Background

A total of 38 rare or threatened vascular plants and two threatened plant communities have been recorded within the Resorts (Table A2.2 and A2.3). *Glycine latrobeana* Clover Glycine is also listed under the EPBC Act and could potentially occur within the Resorts.

Alpine Bog Community and *Caltha introloba* Herbland Community are listed under Schedule 2 of the State *Flora and Fauna Guarantee Act 1988*. Vegetation conforming to that described as Alpine Bog Community has been recorded within the Resorts, with Wet Alpine Heathland recorded by Walsh *et al.* (1986) in the Mount Buller Resort and Wet Sub-alpine Heathland recorded by Meredith *et al.* (1996) within the Mount Stirling Resort. More recently, Whinam *et al.* (2003) described the bogs on Mount Buller as Relic Sub-alpine Sphagnum Peatlands. These are located in the headwaters of Boggy Creek and have been affected by ski trail development and associated maintenance (Whinam *et al.* 2003). The distinguishing species for this community were *Richea continentis* Candle Heath, with *Epacris paludosa* Swamp Heath, *Oreobolus distichus* Fan Tuft-rush and *Baeckea gunniana* Alpine Baeckea. *Sphagnum cristatum* Peat Moss cover was low and a high number of weeds were recorded (Whinam *et al.* 2003).

Vegetation with affinities to that described as *Caltha introloba* Herbland (SAC 1992) was recorded within the Mount Buller Resort by Scott (1974). This community typically grows in areas of late-lying snow with *Caltha introloba* Alpine Marsh-marigold flowering at the edge of receding snow-drifts. More recent observations have revealed that although populations of Alpine Marsh-marigold still exist within each of the Resorts, it is not growing in association with other species that are characteristic of this community (Harvey *pers. obs.*). Therefore its status and extent within the Resorts is uncertain.

The status of some rare or threatened plants within the Resorts is not well known. Future environmental management actions are designed to increase the ARMB's knowledge and understanding of these plants and plant communities..

ARCC KPIs

As outlined in previous sections of the EMP the introduction of KPIs in 2008 by the ARCC has seen monitoring of environmental performance in a number of areas, including Biodiversity Management. This indicator is measured in N6) 'the number of activities implemented as a proportion of the total number specified in relevant statutory provisions or as otherwise specified in an approved plan' (measured as a %) (ARCC 2008). The ARMBs performance against this indicator has been measured since 2006/2007, the results can be seen in Rare & Threatened Fauna Section 4.4.3 - Figure 3.

Target

- Protect rare or threatened plants or plant communities.
- Improved knowledge on distribution of and threats to threatened and significant flora species within the Resorts.
- No known population extinction of significant plants or plant communities from the Resorts.

Actions

The ARMB will:

- Implement the provisions outlined in Recovery Plans (as developed under the EPBC Act), Action Statements (as developed under the FFG Act), conservation management plans and guidelines for rare or threatened plants and plant communities within the Resorts.
- Map and collate accurate up-to-date data on rare or threatened plants and plant communities within the Resorts.
- Monitoring of rare or threatened plants or plant communities in areas subject to disturbance (e.g fire, development or grazing). Monitoring results will be used to measure the success of current and refine future management practices.

4.3.4 Exotic Flora

Objectives

To limit the extent and spread of all non-indigenous flora within the Resorts.

To use appropriate indigenous flora in all revegetation projects within the Resorts.

Background

Historically, many exotic (weed) plants have been introduced to the Resorts through cattle grazing, horse riding and other recreational activities as well as soil stabilisation purposes. Combined with more recent disturbances via construction and development, as well as summer and winter recreation and tourism activities, there has been an increase in the exotic flora of the Resorts. The majority of these species do not extend far into native vegetation however some species pose a serious threat.

Hieracium aurantiacum Orange Hawkweed, *Juncus ensifolius* Sword Rush, *Juncus effusus* Soft Rush, *Achillea millefolium* Yarrow and *Rubus fruticosus* spp. agg. Blackberry are considered serious threats to the biological diversity of the Resorts. Ornamental species planted within the Mount Buller Resort such as *Alstroemeria* spp. *Alstroemeria*, *Aquilegia vulgaris* Columbine and *Mentha* spp. Mint have the potential to naturalise native vegetation within the Resorts. All of these species have the potential to spread from disturbed areas into native vegetation. Other exotic species such as *Hypochoeris radicata* Cat's Ear and *Acetosella vulgaris* Sheep Sorrel are ubiquitous throughout the Resorts. Yarrow is considered a very high threat as it has shown the potential to spread from disturbed areas into indigenous vegetation (Johnston and Pickering 2001).

Orange Hawkweed is a very high threat which has been listed on the Federal Government's Alert List for Environmental Weeds. It was first recorded within the Mount Buller Resort in 2004. In 2012, it was reported that *Hieracium pilosella* Mouse-ear Hawkweed was found in Pretty Valley (near Mount Hotham). The entire *Hieracium* (hawkweed) genus is declared under CaLP Act as a State prohibited weed. There is concern that this weed could spread via the movement of trail riding horses from Pretty Valley to the Resorts. Mouse-ear Hawkweed is currently not known to occur within the Resorts.

Waterways and wet areas are susceptible to invasion by Sword Rush, Soft Rush and *Salix cinerea* Grey Willow. Sword Rush is a recent record within the Mount Buller Resort and was first recorded in 2002. It has also been recorded within the Mount Baw Baw Alpine Resort (FIS 2005). It is likely that it was introduced to the Mount Buller Resort through machinery, and has been observed invading wetter areas such as drainage lines. Grey Willow is a weed of National Significance (Agricultural and Resource Management Council of Australia and New Zealand 2001) and has the potential to infest downstream waterways.

ARCC KPIs

As outlined in section 4.2 Rivers, Catchment and Water Management, the ARMBs performance against the ARCC indicator for N7) 'extent of good quality habitat' takes into account the number and extent of environmental weed sites and/or extent of populations of pest animal species across the resort per annum (see introduced fauna section 4.4.4 and indigenous flora section 4.3.2). As with the extent of EVC mapping in section 4.3, it is intended that the baseline information will be refined further through ground-truthing and additional data collection over the next few years.

Table 2- Environmental weeds known to occur in the Mount Buller and Mount Stirling Alpine Resort Areas

Common name	Scientific name	Weed of National Significance	National Environmental Alert List	Status under the CaLP Act
Sycamore	<i>Acer pseudoplatanus</i>	☐	☐	
Milfoil	<i>Achillea millefolium</i>	☐	☐	
Spear Thistle	<i>Cirsium vulgare</i>	☐	☐	Restricted
English Broom	<i>Cytisus scoparius</i>	☐	☐	Regionally Controlled
English Ivy	<i>Hedera helix</i>	☐	☐	
Orange Hawkweed	<i>Hieracium aurantiacum</i>	☐	✓	State Prohibited
Tutsan	<i>Hypericum androsaemum</i>	☐	☐	
St John's Wort	<i>Hypericum perforatum</i> <i>subsp. veronense</i>	☐	☐	
Holly	<i>Ilex aquifolium</i>	☐	☐	
Soft Rush	<i>Juncus effusus</i>	☐	☐	
Sword Rush	<i>Juncus ensifolius</i>	☐	☐	
Apple	<i>Malus pumila</i>			
Musk Monkey-flower	<i>Mimulus moschatus</i>	☐	☐	
Creeping Buttercup	<i>Ranunculus repens</i>	☐	☐	
Sweet Briar	<i>Rosa rubiginosa</i>	☐	☐	Regionally Controlled
Blackberry	<i>Rubus fruticosus</i> spp. agg.	✓	☐	Regionally Controlled
Raspberry	<i>Rubus idaeus</i>	☐	☐	
Willow	<i>Salix</i> spp.	✓	☐	Restricted
Blue Periwinkle	<i>Vinca major</i>	☐	☐	

Target

- Increased knowledge on the location and extent of environmental weed infestations through the Resorts.
- Reduction in the extent and spread of known environmental weed infestations within the Resorts.
- No establishment of new environmental weed infestations.

Actions

The ARMB will:

- Collect information on the location and extent of known and unknown environmental weed infestations within the Resorts.
- Continue to implement the *Weed Control Strategy* and annual weed management program to reduce the extent of the existing pest plant infestation. This program will include the identification of exotic species, and use of appropriate control methods.
- Disturbed areas are revegetated as soon as possible after disturbance using locally indigenous plants (refer ARMB 2005a).
- Not permit the establishment of ornamental exotic flora within the Resorts, including all leased sites.
- Investigate and where appropriate mitigate against known contributors to environmental weed spread and infestation (linked to visitor experiences (e.g mountain biking, horse riding), neighbours (spread from other properties) and pest animals (moving around the seeds and causing soil disturbance) sections).

4.4 Fauna

4.4.2 Indigenous Fauna

Objectives

To maintain healthy and viable populations of native fauna within the Resorts.

To ensure that management programs conserve and enhance the environment for indigenous fauna within the Resorts.

Background

Indigenous vertebrate fauna recorded within 5 km of the Resorts comprises 26 mammal, 56 bird, eight reptile and five frog taxa (Table A3.1). The distribution of these species throughout the area is largely related to the distribution of native vegetation. Vegetation provides foraging opportunities, shelter and breeding sites. Vegetation type is also a useful indicator of other variables such as topography, soil type and temperature regime which may also influence species distribution.

No fish species have been recorded from within the Resorts however one native species, the *Galaxias fuscus* Barred Galaxias has been recorded from nearby downstream reaches of both Bindaree and Stanley Creeks which originate from within the Mount Stirling and Mount Buller Resorts, respectively. Five, seven and nine indigenous fish species have been recorded from connected downstream reaches of the Delatite, Howqua and King Rivers, respectively (AFD 2003).

The invertebrate fauna of the Resorts are poorly known. The most well-known invertebrate species within the Resorts is *Agrotis infusa* Bogong Moth. The Bogong Moth migrates to the Victorian Alps and Snowy Mountains in Spring from the inland plains of eastern Australia, to aestivate in rock crevices and periglacial block streams (Green *et al.* 2001). It forms an important part of the *Burramys parvus* Mountain Pygmy-possum diet and is heavily exploited, especially by females, during the breeding season (Mansergh *et al.* 1990).

Target

- Protect indigenous fauna and their habitat within the Resorts.
- Increased knowledge of location, extent and population numbers of key native fauna species.
- Increased understanding and responsiveness to biodiversity issues.

Actions

The ARMB will:

- Implement appropriate measures for the protection of indigenous fauna when undertaking approved ARMB works.
- Discourage the use of snap – traps and/or poison bait within the Resorts.
- Maintain and expand interpretive signage to improve biodiversity awareness.
- Develop and distribute primary and secondary school kit information.
- Continue educational biodiversity walks.

4.4.3 Rare or Threatened Fauna

Objectives

To ensure that management programs conserve and where possible, enhance habitat for threatened fauna.

To implement the Recovery Plan for the Mountain Pygmy-possum.

Background

Eight rare or threatened terrestrial vertebrate fauna have been recorded within the Resort and an additional 14 have been recorded within 5kms (Table A3.2). The Mountain Pygmy-possum is probably the most well-known of these.

Mountain Pygmy-possum

In Victoria, the nationally endangered Mountain Pygmy-possum is restricted to four isolated populations: Mount Buller (Heinze and Williams 1998), between Mount Loch and Mount Higginbotham, Mount Bogong and the Bogong High Plains (Mansergh *et al.* 1989). The population of the Mountain Pygmy-possum on Mount Buller is the most southern and isolated, and is the most genetically distinct (Osborne *et al.* 2000). Although not the largest in total area, the boulder-field habitat on Mount Buller is one of the largest single connected areas of boulder-field habitat known, and extends to lower altitudes than at most other sites (Figure 6). The Mountain Pygmy-possum was discovered on Mount Buller in 1996 (Heinze and Williams 1998).

In 1996, the population of the Mountain Pygmy-possum at Mount Buller was estimated at 300 adult females. Since then surveys have shown a steady decline in population size. For example, in 2002, it was estimated that 150 adult females were present in the population, then less than 100 in 2003 and 2004 and between 50 – 100 in 2006 (Heinze 2005, Heinze 2006, 2006a; Menkhorst *et al.* 2010). The most recent estimates suggest the populations may be as low as 20 - 30 total individuals, including males and females (Heinze pers. comm. 2011). This sudden and dramatic decline is of great concern and suggests that this population is at risk of becoming extinct.

There are a range of potential factors that may have contributed to the decline of the Mountain Pygmy-possum on Mount Buller, but it is clear that the largest impact has been the loss, degradation and fragmentation of habitat on the southern slopes associated with the development of these areas for skiing. The population at Mount Buller is now at critically low levels and urgent management action is required to address this situation.

In 2009, the ARMB carried out a habitat restoration and improvement project that constructed two boulderfields each of approximately 0.25ha in size and using in excess of 2000 cubic metres of rock. Revegetation within these areas of habitat has also occurred involving the establishment of over 50,000 plants.

The Mountain Pygmy-possum is listed as 'endangered' under the EPBC Act, 'threatened' under the FFG Act, and is listed as 'critically endangered' on the International Union for the Conservation of Nature-2008 Red List of Threatened Species (IUCN 2008).

For more information relating to specific Mountain Pygmy-possum recovery actions including the role the ARMB plays in the recovery of the Mount Buller population refer to the Mount Buller Mountain Pygmy-possum Recovery Plan (ARMB 2012).

Broad-toothed Rat

The Broad-toothed Rat *Mastacomys fuscus* has been recorded from a wide range of vegetation communities within alpine and sub-alpine environments (Gullan and Norris 1981; Menkhorst 1995). However, it is usually recorded along drainage lines where shrubs are absent or sparse and there is a dense cover of sedges, grasses, other herbs and mosses (Menkhorst 1995).

The Broad-toothed Rat is adapted to stable environments and has a conservative life-history strategy characterised by small litters, slow growth, low fecundity, low mortality and high adult and juvenile survival. The Broad-toothed Rat is a specialist herbivore that feeds on the stem and leaf tissue of a narrow range of plants, principally, from the Poaceae (grasses) and Cyperaceae (Sedges) families (Menkhorst 1995). It also eats small amounts of seeds and fungi (Green and Osborne 1994).

In 2009, the ARMB commissioned Deakin University to prepare a preliminary study of the distribution and habitat requirements of the Broad-toothed Rat in the Mount Buller Alpine Resort. This report found Broad-toothed Rat in several locations, primarily in areas of southern aspects. These locations comprised areas of lush grass with either dense heath cover or boulders adjacent (Whisson 2009).

The Broad-toothed Rat is listed as 'data deficient' in the 2007 Threatened Vertebrate Fauna Advisory List (DSE 2007). Listing of the Broad-toothed Rat in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification (DSE 2007).

Alpine Tree-frog

The Alpine Tree Frog *Litoria verreauxii alpina* has been recorded at Mount Buller only once in 1959. A single record from 2001 also exists from approximately five kilometres north of Mount Buller. The subspecies is considered to be locally extinct at Mount Buller (Clemann 2008). The preferred breeding habitat of the Alpine Tree Frog has been identified as permanent or near permanent water bodies and non-breeding habitat may include Sub-alpine Woodland, Wet Tussock Grassland and Alpine Bog (Bezuijen *et al.* 2000).

Alpine Bog Skink

The Alpine Bog Skink *Pseudemoia cryodroma* has been recorded within the Resorts (Clemann 2002a; 2008; Biosis Research 2009a), as follows:

- **East of Burnt Hut Spur Triple Chair:** Sub-alpine Woodland with low shrub understorey and some boulders (N. Clemann pers. comm.).
- **Boggy Creek:** Patches of Sub-alpine Wet Heathland, some with scattered Snow Gums (Biosis Research 2008; 2009a; Clemann 2008).
- **Mount Buller Village:** (A. Harvey pers. Obs.); and one specifically at the Chamois Road and Stirling Rd junction. (I. Smales pers. obs.).

The Alpine Bog Skink has also been recorded at Corn Hill from several records in grassy Sub-alpine Woodland (Biosis Research 2008); in Alpine Grassland, Sub-alpine Wet Sedgeland and Sub-alpine Wet Heathland at Mount Stirling (Biosis Research 1996; 2009b) and was found associated with rock outcrops in the Stanley Bowl area at Mount Stirling (I. Smales pers. obs.).

Black Falcon

The Black Falcon *Falco subniger* has been recorded once each within the Mount Buller Alpine Resort and at Mount Stirling during two weeks in 1996. The species stronghold is in arid and semi-arid zones

generally below 500m ASL. (Marchant and Higgins 1993; Olsen 1995) where typical habitat is open woodland, open plains and undulating land with large tracts of low vegetation such as grasslands, pasture, crops, herbfields and saltbush (Marchant and Higgins 1993).

Brown Toadlet

A single 1960 record of Brown Toadlet *Pseudophryne bibronii* is documented on the Victorian Biodiversity Atlas from 1300m ASL and the location is described as “Valley below Mount Buller”. The species appears never to have been reported from the Mount Buller Alpine Resort area and is not mentioned by Clemann (2008).

Mountain Skink

The Mountain Skink *Liopholis montana* is an extremely rare species confined to Victoria, with all records from a very few highest elevation locations in the Victorian Alps. The Mountain Skink is found on Mount Stirling in the Stanley Bowl area. Searches thus far have not detected it at Mount Buller (Clemann 2008) however, outcropping granite similar to habitat found on Mount Stirling exists within the Mount Buller Alpine Resort (I. Smales pers. obs.). Granite outcrops that include rocks in contact with the soil are a primary microhabitat requirement for the species as it constructs burrows under surface rocks. It is possible that further survey may detect the species in appropriate habitat at Mount Buller.

Fish

Of the eleven indigenous fish species recorded from creeks and rivers that originate from within the Resort, three are listed under the EPBC Act as Endangered and one is listed as Vulnerable.

The Endangered *Galaxias fuscus* Barred Galaxias has been recorded in Bindaree and Stanley Creek, both of which are tributaries of the Howqua River (Figure 2). Given this distribution there is some potential for the species to occur within the boundaries of the Resorts. The existence of the species may be threatened by the presence of the introduced Brown and Rainbow Trout, which have been shown to prey upon Galaxias species and which occupy niches that would previously have been occupied by native fish (Frankenberg 1969; Fletcher 1979; Rosengren *et al.* 1996).

Two further Endangered species, the Trout Cod (King River only) and the Macquarie Perch (Delatite, Howqua and King Rivers) and one Vulnerable species the Murray Cod (Delatite, Howqua and King River) have been recorded at lower elevations within the catchment. None of these species are likely to occur within the boundaries of the Resorts.

Invertebrates

Invertebrate species within the Resorts are less well known. Nevertheless, three species of state significance have been detected within the Resorts (Appendix 3.1). A report produced by the Arthur Rylah Institute (ARI) (written by Di Crowther and Phil Papas) in 2008 uncovered several records of invertebrates in the Resort areas. While this survey was focused on threatened invertebrate species response to fire, it also provided a number of records of invertebrates within the Resort areas.

Austropetalia tonyana a Gondwanan and alpine dragonfly considered ‘near threatened’ on the DSE Advisory List (DSE 2009), was found in the ARI 2008 survey at a number of sites, including Whisky Creek, Delatite River tributary and King River tributary all within the Resort areas (ARI 2008).

Thaumatoperla flaveola Mount Stirling Stonefly, listed as ‘threatened’ under the FFG Act and ‘vulnerable’ on the DSE Advisory List (DSE 2009). The ARI 2008 survey uncovered nymphs in at 10 sites in the upper watershed region, sites were at a range of altitudes (all above 1000 m) and vegetation types. All nymphs were found under larger substrate (cobblestones) at sites with narrower streams (ARI 2008).

Thaumatoperla alpina Alpine Stonefly, listed as 'threatened' under the FFG Act and considered to be 'vulnerable' on the DSE Advisory List (DSE 2009) has previously been recorded in the Resorts (Crowther 2008).

Riekoperla isosceles a stonefly, listed as 'threatened' under the FFG Act and considered 'critically endangered' on the DSE Advisory List (DSE 2009). This species is thought to be endemic to an area near the summit of Mount Buller and has previously been recorded in the Resorts in 1984 (DSE 2005).

Tamasia furcilla a caddisfly, listed as 'threatened' under the FFG Act, and considered to be 'vulnerable' on the DSE Advisory List (DSE 2009). It was previously been recorded within the Resorts in 1972 (DSE 2005).

A fourth species of invertebrate *Spathula tryssa* (a flatworm or planarian) was formerly listed, but has had its status downgraded because subsequent surveys for freshwater flatworms indicated that it is more widespread than previously thought (St Clair *et al.* 1999).

No threatened crustaceans have been recorded from the Resorts. One species considered Vulnerable under IUCN criteria (IUCN 2001), *Eustacus armatus* Murray River Crayfish (King River) has been recorded at lower elevations within the catchment.

Other significant vertebrate fauna

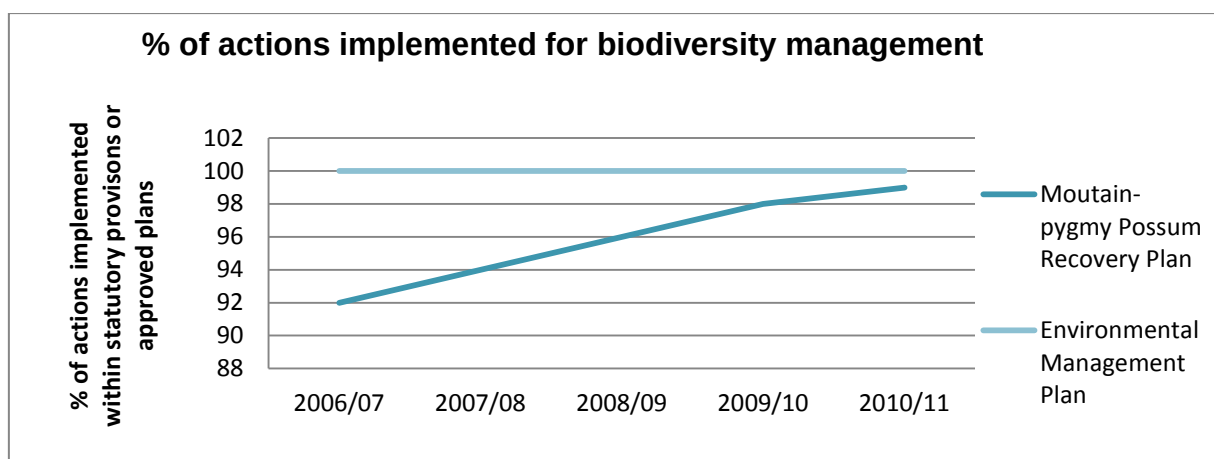
The nationally endangered *Dasyurus maculatus* Spot-tailed Quoll has not been recorded in the Resorts (AVW 2005). Thus, while there are a number of Victorian records of the Spot-tailed Quoll at elevations greater than 1000m asl (Maximum 1680 m asl; AVW 2005) it is unlikely to regularly inhabit areas within the Resorts.

The upper Delatite and other valleys within the resorts dominated by mature Alpine Ash are suspected to contain *Petauroides volans* Greater Glider populations. The Greater Glider is the largest of the gliding possums. In Victoria, it is found in high-rainfall forested areas of the east, north-east and the midlands southeast of Ballarat (Menkhorst 1995) Greater Glider populations decline post fire and take a very long time to recover (DSE 2011).

ARCC KPIs

As outlined in previous sections of the EMP the introduction of KPIs in 2008 by the ARCC has seen monitoring of environmental performance in a number of areas, including Biodiversity Management. This indicator is measured in N6) '*the number of activities implemented as a proportion of the total number specified in relevant statutory provisions or as otherwise specified in an approved plan*' (measured as a %) (ARCC 2008). The ARMBs performance against this indicator has been measured since 2006/07, the results can be seen in Figure 3.

Figure 3- % of activities completed as specified in relevant statutory provisions or in an approved plan.



Targets

- Improved knowledge on distribution of threatened and significant fauna species within the Resort.
- No known population extinction of significant fauna species from the Resorts.
- A Mountain Pygmy-possum population within the Mount Buller Resort showing normal social function
- Protect rare or threatened fauna and their habitats within the Resorts

Actions

The ARMB will:

- Implement and maintain appropriate measures as outlined in Action Statements, conservation management plans and guidelines for rare or threatened fauna within the Resorts.
- Ensure that general and site-specific management prescriptions, actions and guidelines for the Mountain Pygmy-possum as outlined in the Mountain Pygmy-possum Recovery Plan are implemented and followed (refer to ARMB 2012).
- Undertake monitoring, where appropriate, of significant fauna within the Resorts.

4.4.4 Introduced Fauna

Objective

To minimise the impact and distribution of all introduced fauna within the Resorts.

Background

Eleven introduced vertebrate fauna species have been recorded within the Resort (Table 3) including eight mammals, one bird and two fish.

Table 3- Introduced vertebrate fauna species recorded within the Resorts.

Common name	Scientific name
Wild Dog	<i>Canis familiaris</i>
Red Fox	<i>Canis vulpes</i>
Sambar Deer	<i>Cervus unicolor</i>
Feral Cat	<i>Felis catus</i>
European Rabbit	<i>Oryctolagus cuniculus</i>
House Mouse	<i>Mus musculus</i>
Black Rat	<i>Rattus rattus</i>
Cattle	<i>Bos primigenius</i>
Goldfinch	<i>Carduelis carduelis</i>
Brown Trout	<i>Salmo trutta</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>

The species posing the most significant threat to biodiversity within the Resorts are the Red Fox, Feral Cat and Rabbit.

Foxes, Feral Cats and Rabbits

The Rabbit is an introduced herbivore that threatens indigenous vegetation and the Red Fox, Feral Cat and Feral Dog are introduced carnivorous predators that threaten native wildlife. Red Foxes and Feral Cats within the Mount Buller Resort are known predators of the Mountain Pygmy-possum. Predation by Red Foxes and Feral Cats on native wildlife is listed as a threatening process under the FFG Act.

The ARMB is implementing a Pest Animal Control Program (ARMB 2005c). This program targets the European Red Fox (year-round baiting), Feral Cats (summer shooting and targeted year-round trapping) and Rabbits. Summer baiting of Rabbits is only undertaken in priority areas as the impact on Mountain Pygmy-possums should Rabbit numbers decline in suitable Mountain Pygmy-possum habitat is unknown.

Feral Dogs

Feral Dog control is undertaken in areas adjacent to the Resorts by an authorised Dog Trapper from DSE Mansfield. Where required, Feral Dog control is undertaken within the Resorts where an individual or number of feral dogs are actively impacting upon visitor experience and safety.

In 2008, the Dingo *Canis lupis dingo* was listed as a threatened species under the FFG Act and consequently became protected wildlife under the Wildlife Act. Prior to this, Dingoes were classified as established pest animals under the CaLP Act. Dingoes, Dingo hybrids and feral dogs can be difficult to accurately distinguish between. There are legislative provisions under the Wildlife Act for the protection of Dingoes and the Resorts integrated pest animal control program is responsive to this whereby feral dog control is only undertaken in response to improving visitor safety.

Domestic Dogs and Cats

The ARMB implemented a Dog Policy (Policy Guideline 7.1) that has been accepted as a bylaw under the *Alpine Resort (Management) Regulations 1988*. The intention of the regulations is to dissuade people from bringing dogs into the Mount Buller Resort as they pose risks to the public, hygiene and visual issues as well as a danger to wildlife. The owner of a dog must apply to bring in and allow a dog to remain in the Mount Buller Resort. Generally domestic dogs belonging to full-time year round or full-time ski season residents are permitted within the Mount Buller Resort provided they are registered with the ARMB. Dogs are not permitted at any time within the Mount Stirling Resort with the exception of dogs transiting through the Resort into State Forest (dogs must remain in vehicles during transit). The policy excludes Guide and Assistance Dogs in active duty.

Domestic cats are not permitted within either of the Resorts.

Sambar Deer

Sambar Deer are known to use the more remote and inaccessible areas of the Resorts therefore, options for detection are limited (ARMB 2011). Throughout the year shooting sessions are undertaken by fully qualified contractors to reduce the impact Sambar Deer have on the Resorts. Although Sambar Deer are not indigenous to Australia, they are afforded protection under the Wildlife Act and therefore appropriate licences must be held by anyone undertaking destruction activities.

Cattle

Full cattle exclusion to prevent the stray from neighbouring State Forest into the Mount Stirling Alpine Resort was completed 2011. Areas within the Mount Stirling Resort were previously subject to pressures introduced by stay cattle (namely trampling, grazing and weed infestation). ARMB Environmental staff continue to work with DSE and local lessees to proactively manage the exclusion of cattle from Mount Stirling and are undertake periodic monitoring of Alpine March Marigold sites on Mount Stirling to identify positive impacts resulting from exclusion.

Fish

No native fish species have been recorded from within the Resorts however both the introduced Rainbow Trout and Brown Trout have been recorded from nearby downstream reaches of Bindaree, Stanley and Stirling Creeks that originate within the Resorts. Introduced trout may threaten Barred Galaxias populations should this species occur within the Resorts.

ARCC KPIs

As outlined in section 4.2 Rivers, Catchment and Water Management, the ARMBs performance against the ARCC indicator for N7) '*extent of good quality habitat*' takes into account the number and extent of environmental weed sites and/or extent of populations of pest animal species across the resort per annum (see exotic flora section 4.3.4 and indigenous flora section 4.3.2). Little is known about actual population numbers of pest animals in the Resort areas.

Targets

- Knowledge on the number of populations and extent of pest animal species.
- Annual reduction in the number of populations for European Red Foxes, Feral Cats, Feral Dogs, Sambar Deer and Rabbit within the Resort area.
- Cattle remain permanently excluded from Mount Stirling.
- Less than 1% of introduced predator scats contain remains of the Mountain Pygmy-possum
- Increased understanding of prey switching by European Red Foxes and Feral Cats (triggered by Rabbit population decline).
- Increased understanding of the impacts Deer have on habitat of the Mountain-pygmy Possum.

Actions

The ARMB will:

- Establish and implement an annual monitoring protocol to estimate the population numbers and extent of pest animals.
- Continue to review and implement the ARMB's Pest Animal Control Program within the Resorts (see ARMB 2005c).
- Carry out annual monitoring to determine the number of populations per year of priority pest animal species.
- Carry out Rabbit and Sambar Deer control programs as appropriate.
- Continue to apply the established predator monitoring program (including scat and gut content analysis) in conjunction with Rabbit control to assess impact, if any, of prey switching by European Red Foxes and Feral Cats should Rabbit numbers decline. Particular attention should be paid to the potential for increased predation of Mountain Pygmy Possums and Broad-toothed Rats.
- Monitor, and manage where appropriate, the impact of Deer on revegetation or regeneration of Mountain Pygmy-possum habitat.
- Continue to work with DSE to ensure cattle are excluded from Mount Stirling.
- Monitor regeneration of key areas post cattle exclusion.

4.5 Fire Management

Objective

To manage fire in an ecologically sustainable manner, whilst ensuring the safety of human lives and the Resorts infrastructure.

To manage fire within the Resorts in an ecologically sustainable manner that ensures the diversity and abundance of indigenous flora and fauna and protects water quality and quantity.

Background

Fire on a landscape scale is an infrequent occurrence in the alpine and sub alpine environment of Australia. However its extent appears to have increased with European settlement (Esplin 2003). Although fire is an uncommon event in alpine and sub-alpine environments it is part of a natural cycle of disturbance, which also includes insect attack, wind, frost and extreme climatic events. As such, alpine and sub-alpine plants (and to a lesser degree animals) have the capacity to cope with fire due to vegetative reproduction, the presence of perennating buds close to the ground and seedling germination. In summer, the wildfire hazard within the Resorts is low to medium. The forested areas at lower elevations tend to be a higher hazard due to the frequency of lightning strikes. A fire lookout is located on the summit of Mount Buller, as part of an extensive network of fire lookouts located throughout the state.

Large wildfires moved toward the Resorts in the summer of 2002-2003. The summer wildfires of 2006-2007 burnt extreme areas within the Mt Stirling Resort but caused no damage to buildings (ARMB 2011c). The prior to this last major fire in the area was the 'Governors – Bluff' fire in 1988.

The ARMB has accepted the roles and responsibilities of a municipal council as described under in the *Emergency Management Act 1986*. Consequently the ARMB along with key stakeholders produced the Resorts Emergency Management Policy which outlines arrangements for the prevention of, the response to, and the recovery from emergencies that could occur (ARMB 2011c).

In 2011, the Alpine resorts were identified as a fire prone area and the Wildfire Management Overlay (WMO) was introduced into the Alpine Resorts Planning Scheme (ARCC 2012). As acknowledged in the draft *Alpine Resort Strategic Plan 2012* difficulty has been experienced in meeting the planning requirements of the Country Fire Authorities due to vegetation surrounding villages, slope of the land and ability to create defensible space.

Target

- Protect human lives and Resort infrastructure.
- Fire management activities and treatments are undertaken in such a way as to have regard for and protect or enhance the natural and cultural values of the Resorts.
- Increased understanding of how alpine ecosystems respond to fire.

Actions

The ARMB will:

- Review the Fire Management Plan, the review will take into consideration ecologically sustainable treatments and where possible ensure the protection and enhancement of natural and cultural values.

- Where the opportunity presents (through fire management treatments or wildlife) undertake monitoring to increase understanding of alpine ecosystem response to fire.
- Incorporate information on location, extent, response to fire and significance of natural and cultural heritage values into the fire management planning processes.

5. Cultural Heritage

Objectives

To identify and protect all culturally significant Aboriginal and historical sites within the Resorts.

To improve the understanding of Aboriginal and historical use of the Resorts through increased site assessment.

Background

The following includes a summary of background information relating to past environment, Aboriginal and historical history and previous archaeological sites and studies located within the Resorts. Additional supporting information is available in a supplementary report.

Environmental information is important in understanding the presence and formation of archaeological sites within a region. It is also important in understanding past environments and their suitability for habitation by Aboriginal people and early Europeans.

The highlands region is generally considered a harsh environment with extremely cold winters and mild summers. Despite this climate, the region would have provided an abundance of resources for the Aboriginal people to exploit. This included stone sources for the manufacture of tools, and conditions which provided an abundance of animal and plant life for food and materials. The region also provided an environment for early Europeans to graze cattle.

5.1 Aboriginal Cultural Heritage

Aboriginal Ethnohistory

There is little ethnographic information relating to the Aboriginal people that once inhabited the Resorts. The evidence for Aboriginal groups and tribal boundaries that does exist regarding the Resorts is largely based on observations and records made by Europeans during the period of contact and early settlement, as well as the presence of Aboriginal archaeological sites.

The Resorts lie in the traditional territory of the *Daung wurrung* (also spelt *Taungarung*) language group, which spread across much of the central region of Victoria. (n.b. this, and other language group names are spelt in a number of ways in contemporary literature). The ethnographic sources suggest that this group was composed of nine clans, occupying the Broken, Delatite, Goulburn, Coliban and Campaspe watersheds (Barwick 1984; Clark 1990).

According to Clark (1990) the lands around Mount Buller and Mount Stirling appear to have been occupied by the *Yowung-illam balug* clan of the *Daung wurrung*. This clan was known to have occupied land near the Howqua River quarry (*Youang-illum* stone quarry), Mount Battery, Alexandra, the Upper Goulburn River at Mansfield, sources of the Goulburn River and Hunter and Watson's 'Wappan' Run (Clark 1990; Barwick 1984).

The clan estates, including historical and archaeological sites, of the Resorts are currently the responsibility of the Camp Jungai Aboriginal Co-operative Limited. However, there are also a number of people who claim to be traditional descendants of the *Daung wurrung*.

Previous Aboriginal archaeological sites and studies

Mount Buller Alpine Resort

One pre-contact Aboriginal archaeological site (Table 4) has been recorded at Mount Buller, a multiple feature site Mount Buller Cow Camp (AAV8123/0003), that is noted to comprise edge-ground axes and grinding stones in an area that would have been a suitable campsite (see Map 6).

Table 4- Previously recorded pre-contact Aboriginal archaeological sites within the Mount Buller Alpine Resort.

AAV Site Numbers	Site Types (%)	Location
AAV8123/0003	Multiple Feature Site	Located at Cow Camp, Mount Buller

No post-contact Aboriginal sites have been previously recorded within the study area.

Regional and Localised Studies

Most recently, Marshall *et al.* (1999) undertook an Aboriginal Heritage Management Study for the Mount Buller Alpine Village that involved background research, targeted sample survey and sub-surface investigations. From this work an Aboriginal heritage management plan was devised, indicating sensitive areas that would require further archaeological investigation if developed. These areas of archaeological potential indicated those areas where sub-surface archaeological cultural material is most likely to be located.

A small number of localised Aboriginal archaeological studies have been conducted within the Mount Buller Alpine Resort. The majority of these studies have been completed in response to the development of accommodation and ski field infrastructure. No Aboriginal archaeological sites have been identified during these assessments; however areas of Aboriginal archaeological potential were identified (Murphy 2001; Murphy 1999; Cusack 1998; Clark 1997).

Mount Stirling Alpine Resort

Seven pre-contact Aboriginal archaeological sites have been recorded in the Mount Stirling Alpine Resort, including four multiple feature sites and five stone artefact scatter sites (Table 5).

Table 5 -Previously recorded pre-contact Aboriginal archaeological sites within the Mount Stirling Alpine region.

AAV Site Numbers	Site Types (%)	Location
AAV8123/0014	Artefact Scatter	Mount Stirling
AAV8123/0015	Artefact Scatter	Mount Stirling
AAV8123/0016	Artefact Scatter	Mount Stirling
AAV8123/0019	Artefact Scatter	Mount Stirling
AAV8123/0020	Artefact Scatter	Mount Stirling

AAV8123/0021	Artefact Scatter	Mount Stirling
AAV8123/0022	Artefact Scatter	Mount Stirling
AAV8123/0023	Artefact Scatter	Mount Stirling
AAV8123/0024	Artefact Scatter	Mount Stirling

No post-contact Aboriginal sites have been previously recorded within the study area.

Regional and Localised Studies

Only one regional Aboriginal archaeological study has been completed that encompasses the Mount Stirling Alpine Resort. No localised studies have been undertaken.

Muhlen-Schulte, *et al.* (1995) completed a large scale cultural heritage assessment for Mount Stirling, as part of an Environmental Effects Statement (EES) evaluating a range of options for the development of winter recreation facilities at Mount Stirling. The report concluded that Aboriginal people had frequently visited a number of locations on Mount Stirling to undertake various activities.

Aboriginal archaeological site discussion

The recorded background information concerning the Resorts indicate that it is highly likely that Aboriginal archaeological sites will be recorded within the area despite the dramatic seasonal weather fluctuations. Aboriginal people frequented these areas during summer months to exploit resources, such as the Bogong Moth *Agrotis infusa* and a variety of plants, primarily tubers.

There is a significant difference in the number of recorded Aboriginal archaeological sites between the Resorts. This has been attributed to the variation in the natural environment at either location and to levels of ground disturbance. Although ground disturbance often allows Aboriginal archaeological sites to become exposed and visible for recording, it can also disturb, displace and bury Aboriginal cultural material. It is therefore more likely that sites of significance will occur in areas that have seen minimal disturbance although these will not be visible until exposed via sub-surface archaeological investigation.

Target

- Protect aboriginal archaeological sites within the Resorts
- Increased knowledge and understanding of archaeological sites within the Resorts.

Actions

The ARMB will:

- Undertake an Aboriginal site reconnaissance survey of the Resorts with the aim of providing a greater understanding and knowledge of the potential for Aboriginal sites within the Resorts. This would include provision of updated background documentation and mapping of all previously recorded and newly recorded Aboriginal sites and areas of Aboriginal archaeological potential within the Resorts.

-
- Recommend that any recorded Aboriginal archaeological site that will be impacted by ground disturbance works will require a Consent to Disturb from the Camp Jungai Co-operative Limited. Any sites identified during ground disturbance works will also require a Consent to Disturb from the Camp Jungai Co-operative Limited.

5.2 Post-settlement Cultural Heritage

Post-Contact History

The peak and slopes of Mount Buller and Mount Stirling were first noted by Hume and Hovell in 1824. However, it was not until 1835 that Major Mitchell named Mount Buller in honour of Charles Buller of the Colonial Office in London (Mansfield Historical Society 1995). The first European to ascend Mount Buller was Baron Von Mueller in 1853. Von Mueller was a botanist and his early account describes the alpine landscape as being similar to that found in Tasmania. Von Mueller collected twenty-six flora species, one third of which were previously unknown. Mount Stirling was originally named after botanist and geologist James Stirling (Blake 1977).

The post-contact settlement of Mount Buller and Mount Stirling would have commenced following early explorations by squatters and cattle graziers. However the steep slopes and thick Snow Gum Woodland would have deterred many early settlers. These high country graziers constructed a number of alpine huts for shelter and refuge during mustering.

The development of the mountain as a tourist attraction for skiing saw the end of the high-country grazing era. As early as 1913, the Klingsporn family had improved the track leading to Mount Buller to make it more accessible (Dillon 1989). As development increased at nearby Mount Buller, recreational activities also increased at Mount Stirling.

By 1948, the Mount Buller Alpine Reserve Committee of Management was in control of tourism, quickly developing the area with a number of ski lodges and downhill ski runs.

Previous Historical archaeological sites and studies

Mount Buller Alpine Resort

No historical archaeological sites have been registered at Mount Buller on the Heritage Victoria Inventory or the Heritage Register at Heritage Victoria at Mount Buller. No historical places or features are listed under the Alpine Resorts Planning Scheme at Mount Buller. One historical place has been listed on the register of National Trust Victoria and a number of places are listed on the Register of the National Estate (RNE) within a ten-kilometre radius of the study area.

The listed places include both natural and historical features and are described in Table 6.

Table 6 - Sites on the Register of the National Estate within a ten-kilometre radius of Mount Buller.

Site ID no.	Site Name	Location
103663	Tomahawk Hut	10 km north of Mount Buller
103465	The Bluff Hut and Range	9 km south east of Mount Buller
103384	Craig's Hut	8 km north of Mount Buller
103372	Bindaree Hut	10 km south east of Mount Buller
103373	Bindaree Falls & Creek	8 km east of Mount Buller

4500	The Governor Area	3 km south west of Mount Buller Village
4499	The Bluff – Mount Clear Area	10 km south east of Mount Buller Village
18901	Habitat of the Mount Stirling Stonefly	Around the Mount Buller Village area

Localised Studies

Whilst no regional archaeological studies have incorporated Mount Buller, a small number of localised historical archaeological studies have been completed. However, none of these studies identified new historical archaeological sites, however previously recorded sites were re-recorded. Due to high levels of disturbance, no areas of historical potential were identified.

Mount Stirling Alpine Resort

Two historical archaeological sites are listed on the Heritage Inventory at Heritage Victoria (Table 7) that are located at Mount Stirling. These include the archaeological remains of two huts: Howqua Gap Hut (H8123/0014) and Mansfield Cross Country Ski Hut (H8123/0015).

Table 7 -Previously recorded post-contact archaeological sites at Mount Stirling.

HV Site Numbers	Site Types (%)	Location
H8123/0014	Graziers Hut	100 m east of Circuit Road, Mount Stirling
H8123/0015	Graziers Hut	Stanley Bowl, Mount Stirling

Table 8- Previously recorded pre-contact Aboriginal archaeological sites within a ten kilometre radius of Mount Stirling.

Place ID no.	Site Name	Location
103435	Lovick's Hut	6 km east of Mount Stirling
103465	The Bluff Hut and Range	10 km south of Mount Stirling
103384	Craig's Hut	6 km north west of Mount Stirling
103372	Bindaree Hut	5 km south east of Mount Stirling
103373	Bindaree Falls & Creek	5 km south of Mount Stirling
4499	The Bluff – Mount Clear Area	10 km south east of Mount Stirling Village
18901	Habitat of the Mount Stirling Stonefly	Around the Mount Stirling Village area

Regional Studies

As part of an EES, Muhlen-Shulte, *et al.* (1995) completed a heritage investigation at Mount Stirling. The study encompassed a five-kilometre radius from the summit of Mount Stirling. This included the completion of a background historical report for Mount Stirling that outlined the post-contact history of land-use on the mountain. During the field survey, two historical archaeological sites were recorded, including Howqua Gap Hut (H8123/0014) and Mansfield Cross-Country Ski Hut (H8123/0015). Both of these sites still contain some archaeological evidence and are considered to be of moderate to high local and scientific significance. No small-scale localised historical archaeological investigations have been completed at Mount Stirling.

Historical archaeological site discussion

The documented history of Mount Buller and Mount Stirling and previously recorded historical sites clearly identify the region as being of historical significance. The remains of a number of early grazier and refuge huts are still present within the present study area. Although impacts have occurred over the past 100 years, evidence from early grazing, logging and tourism are still present.

Target

- Protect post-settlement archaeological sites within the Resorts.
- Increased knowledge and understanding of historical sites within the Resorts.

Actions

The ARMB will:

- Undertake a historical site reconnaissance survey of the Resorts with the aim of providing a greater understanding and knowledge of the potential for historical sites to occur. This would include provision of updated background documentation and mapping of all previously recorded and newly recorded historical sites and areas of historical archaeological potential within the Resorts.
- Recommend that any recorded historical archaeological sites that will be impacted by ground disturbance works will require Consent to Disturb from the Director at Heritage Victoria.

6. Sustainability

6.1 Waste Management

Objectives

To move towards zero waste in the Resort- by consistently reducing the amount of solid waste per capita disposed to landfill.

Background

Similar to municipal shires, the Mount Buller and Mount Stirling Alpine Resorts generate considerable volumes of waste. Waste disposal in public areas (e.g. car parks, village square, etc.) is managed by the ARMB and elsewhere by an ARMB appointed contractor via a co-mingled system. The volume of waste generation fluctuates depending on visitation, which is linked to seasonal variations in snowfall.

Waste management at Mount Buller and Mount Stirling is complicated by many additional factors. These include that:

- The ARMB does not operate a landfill facility, so all waste must be transported off the mountain to a suitable landfill;
- Snow, ice and low temperatures for several months of the year make waste operations difficult;
- Most of the waste and litter is generated by visitors to the mountain, rather than from local residents; and
- Waste generation is seasonal, with winter generation far greater than that generated in summer.

The ARMB is a leader in alpine waste management in Victoria. Innovative programs are in place for the collection and re-use of recyclable and organic materials. All programs are implemented in accordance with Victoria's waste policy 'Towards Zero Waste' with support obtained via membership of NevRwaste (North East Regional Waste Management Group).

In 2010, the ARMB resort-wide recycling services lead to a recycling rate of 35%. This was the highest recorded recycling rate of any Victorian alpine resort.

ARCC KPIs

As mentioned in previous sections of this EMP, in 2008 the ARCC introduced KPIs for monitoring environmental performance, the N5) '*solid waste disposed to landfill*' indicator is of most relevance to the waste management section of the EMP. Since 2006/07 the ARMB has recorded the total waste disposed to landfill/year/per equivalent person and recycling/year/equivalent person. Results are outlined in Figure 4.

Figure 4- Waste disposed per annum per equivalent person at Mount Buller and Mount Stirling.



Targets

- Resort wide reduction in kilograms of waste produced per equivalent person per year.
- 40% active recycling diversion rate.
- 50% diversion of organics from general waste stream.
- 10% or less waste delivered to landfill
- 100% of printer cartridges to be recycled (or reused).
- 100% of batteries to be collected and recycled.
- 100% of mobile phones recycled (or reused)
- Eliminate recyclable paper from landfill waste bins through office recycling program (ARMB office only).

Actions

The ARMB will:

- Continue to implement the WasteWise Strategy to:

Reduce

- Collate and use single-sided office paper.
- Maintain 'think before you print' principle
- Rationalise and where appropriate consolidate printing hardware.
- Encourage staff to bring lunches in reusable containers
- Maintain worm farm

Reuse

- Test recycled printer cartridges
- Return work mobiles to stationary room for reuse
- Reuse material obtained from organisational projects in new works
- Reuse surplus topsoil excavated during works for stockpiling and use in subsequent projects

- Provide staff with reusable mugs/glasses
- Reuse incoming cartons for outgoing goods or for storage
- Reuse film canisters as personal ashtrays and distribute free of charge.

Recycle

- Improve education and awareness of stakeholder, contractors and staff on best practice waste management and disposal.
- Arrange dedicated cardboard recycling areas across the organisation
- Recycle all non-working mobile phones
- Non-working equipment, send for repair or arrange proper disposal
- Maintain current recycling systems for major waste streams:
 - *Paper and cardboard*
 - *Organics*
 - *Bottles and cans*
- Recycle batteries used by the organisation and offer free Resort-wide battery recycling collection.
- Recycle printer cartridges (if reuse is not an option)
- Conduct visual inspection of the office bin contents to assess contamination.
- Modify/refresh signage on recycling bins to promote correct recycling
- Recycle or reuse where appropriate electronic or IT equipment following replacement.

Monitor

- Maintain requirement for waste contractor to provide annual breakdown of waste and recycling collected.
- Conduct waste audit/assessment of offices to measure amount of material being recycled and landfilled.

6.2 Energy Efficiency & Air Quality

Objectives

To improve the Resorts energy efficiency and reduce non-renewable energy consumption.

To minimise negative impacts on the Resorts air quality and reduce greenhouse gas emissions.

Background

The Resorts various activities consume considerable amounts of energy and generate greenhouse gas emissions primarily through fossil fuel use. A number of initiatives have been undertaken to reduce energy use and minimise greenhouse gas contributions over the last five years, the short term effects of these initiatives can be seen with a saving of approximately 600 tonnes of CO₂ emissions in the 2008-2009 financial year.

The current initiatives to reduce CO₂ emissions include:

- Implementation and monitoring of the ARMB Resource Smart Strategy;
- Continued commitment to the Keep Winter Cool campaign including commitment to the Keep Winter Cool Charter;
- Provision of promotional and educational materials to encourage the reduction of non-renewable resource use across the Resorts; and
- The identification of energy savings that may be made to ARMB properties and modification of various activities.
- To minimise impacts on air quality within the Resorts, all new wood heaters installed within the Resorts are required to comply with Australian Standards.

ARCC KPIs

As outlined in previous sections the ARCC have established a series of KPIs to measure environmental performance. Energy and Greenhouse Gas Emission Management is a theme, and gives the objective *to reduce net greenhouse gas emissions within the Resorts by 60% of the levels in 2000, by the year 2050 and encourage Resorts businesses to do the same* (ARCC 2008). There are two KPIs to measure the ARMBs performance in this area.

N3) Total renewal energy purchased as a % of total energy consumption

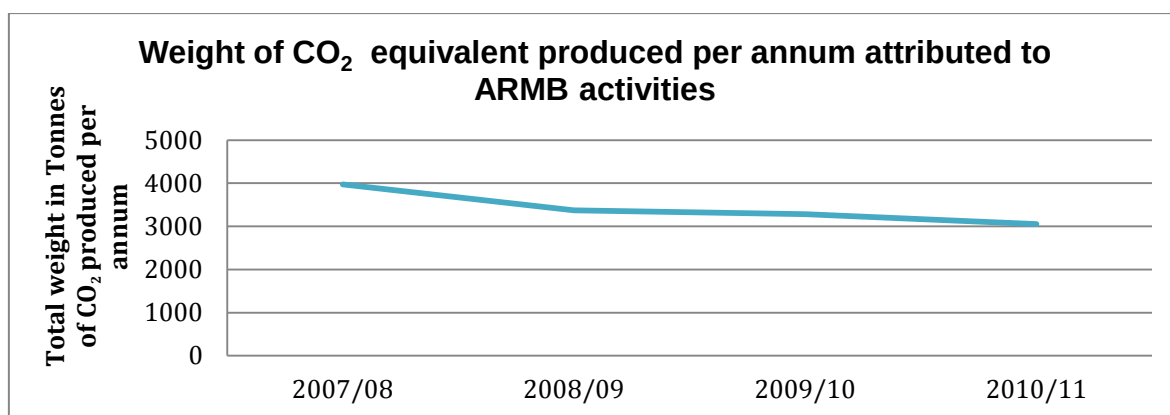
N4) a) Total weight of CO₂ equivalent produced by Board activities per annum

b) Total weight of CO₂ equivalent produced from major greenhouse producing activities within the Resort per equivalent person

Since 2007/08 the ARMB has recorded weight of CO₂ equivalent produced by the ARMB activities per annum, results are outlined in Figure 5.

No green energy purchasing has occurred to date, and there has not been consistent monitoring of CO₂ contributions from major greenhouse producing activities within the Resorts.

Figure 5 - Total weight of CO₂ per annum produced by ARMB activities.



Targets

- Annual reduction in CO₂ emissions produced by the Boards activities.
- Annual reduction in CO₂ emissions produced from major greenhouse gas producing activities.
- Purchase at least 10% Green Power of total electricity usage.
- Increased awareness of the inter-relationships between greenhouse gas emissions, climate change and snow conditions.

Actions

The ARMB will:

- Continue to monitor energy use attributed to ARMB activities.
- Annually monitoring of the total CO₂ produced from major greenhouse gas contributing activities (in line with ARCC KPI N4b).
- Implement energy reduction initiatives for buildings, services and activities based upon audit results and recommendations
- Develop, implement, monitor and review an Energy Management Policy for the Resorts
- Continue monitoring the impacts of climate change by assisting the Bureau of Meteorology to monitor and collect data
- Support national reduction in greenhouse gas emissions
- Replace lighting with more efficient technology where appropriate
- Utilise lux meter to identify opportunities for de-lamping
- Ensure replacement of lamps are energy efficient
- Install timer systems to ensure HVAC and all relevant equipment is switched off after business hours
- Enable energy efficiency settings on relevant office equipment
- Use Powermate to monitor energy consumption of key equipment
- Ensure minimum appliance standards are met
- Review operation of HVAC machinery to ensure it is performing efficiently;
- Adjust temperature settings to 20°C (where possible)

- Provide suitable uniforming and encourage staff to wear appropriate clothing for the building
- Increase awareness of residents/visitors in the correct installation, maintenance and operation of wood heaters to avoid creating excess smoke
- Investigate potential for localised renewable energy generation at facilities (e.g. micro hydro)
- Install solar lights on all garbage huts through the village
- Purchase 10% or more total electricity consumption.
- Continue to improve and monitor CO₂ emissions of fleet vehicles.
- Continue to provide staff buses and car pooling arrangements for staff;
- Ensure that ARMB mobile equipment (including passenger vehicles) and plant are adequately serviced and maintained to minimise air pollution
- Investigate use of alternative technologies to reduce air travel (e.g. video conference)
- Investigate use of biofuels in fleet or operations (ethanol petrol and biodiesel);
- Monitor and report fuel efficiency of fleet vehicles to staff and encourage staff to use vehicles that are 'fit for purpose'.
- Continue participation in the Keep Winter Cool campaign to assist in the protection of the environment from the possible impacts of climate change by developing partnerships and programs to:
 - *Raise visitor, staff and industry awareness about the inter-relationships between greenhouse gas emissions, climate change and snow conditions;*
 - *Reduce or offset greenhouse gas emissions and increase the energy efficiency ARMB enterprises and activities by altering the way the ARMB currently operates; and*
 - *Inform visitors and staff on how they can help reduce greenhouse gas emissions.*

6.3 Visual Amenity

Objectives

To maintain and enhance the aesthetic environment and landscape values of the Resorts.

To ensure that existing and future development and activities do not compromise the visual amenity of the surrounding Alpine National Park.

Background

Mount Buller and Mount Stirling are outlying peaks at the south-western end of the Victorian Alps. Vistas from the summit of both mountains are generally of high scenic quality due to the high quality of undisturbed scenery.

Mount Buller and to a lesser degree Mount Stirling are prominent in views from the Alpine National Park.

Developments and activities within the Mount Buller Alpine Resort may provide a focus of activity to views from Mount Stirling, or from the Australian Alpine Walking Track.

A Design and Development Overlay (DDO) Schedule 3 has recently been put forward (as part of the C15 planning scheme amendment) to provide guidelines for development proposed in the ski fields, to ensure visual amenity and the landscape area addressed.

Target

- No formal complaints of visual character within the Resorts and surrounding Crown Land.

Actions

The ARMB will:

- Apply the design objectives of Design and Development Overlay 1 (DDO1) to the assessment of all development applications within the Mount Buller Village.
- Consider the requirements of DDO3 for the assessment of all applications within the Mount Buller ski field.
- Where appropriate, assess proposed developments and activities within the Resorts for their potential impact on views from the surrounding Alpine National Park and State Forest, particularly the significant viewing areas of the Bluff, Mount Howitt and the Australian Alps Walking Track.
- Invest in capital works to improve the amenity of the garbage sheds.

6.4 Noise Amenity

Objectives

To preserve the natural ambience of the alpine environment.

To limit the impact of industrial and recreational noise within the Resorts.

Background

The alpine environment is characteristically quiet and peaceful. Noise from residential, commercial and industrial sources can disturb this peaceful environment.

The ARMB is authorised to enforce noise regulations for residential properties and the EPA investigates noise issues from commercial and industrial premises.

Target

- No formal noise complaints per annum.

Actions

The ARMB will:

- Request the Environment Protection Authority undertake short-term monitoring of noise emissions from plant and equipment where there is concern about compliance with the requirements of SEPP – *Control of Noise from Commerce, Industry and Trade No. N-1*.
- Where warranted by observation or complaint, request the Environment Protection Authority undertake short-term monitoring of noise from entertainment venues (music venues) to ensure compliance with the requirements of SEPP – *Control of Music Noise from Public Premises No. N-2*.
- Ensure that all municipal and industrial waste collections are conducted in accordance with the requirements and time prescriptions of the *EPA Noise Control Guidelines, TG 302/92*.

6.5 Visitor Capacity

Objectives

To minimise negative impacts on the Resorts by concentrated visitor numbers at a number of sites in intensive time periods.

To manage and improve sites considered under pressure from visitor numbers.

Background

The Resorts experience large fluctuations in visitation across summer and winter. Visitation can be concentrated on a number of sites and in intensive time periods across both Mount Buller and Mount Stirling Resorts in all seasons.

Mount Stirling (taken from ARMB 2011c)

On Mount Stirling, summer visitation exceeds that of winter. Key sites are placed under pressure from high numbers of visitors and the visitor experience is diminished. Mt Stirling is visited all year round by people seeking a 'wilderness' experience. Total visitor numbers is estimated at 50,000 with approximately 65% visiting during the summer months and the remainder during the snow season. Summer visitors comprise of mainly four wheel drivers (57%), and sightseers (25%). The remainder of Summer visitors comprise of horse riders, bushwalkers, school groups, orienteerers and mountain bike riders. Winter visitors participate in cross country skiing and snow play. There is a significant but unquantified amount of through traffic during summer with the traffic either going to Craig's Hut, neighbouring state forest or the Alpine National Park.

Excluding the ski patrol accommodation, there is no permanent accommodation on Mt Stirling; however people (including school groups) regularly camp on the resort in summer and winter.

Mount Buller (taken from ARMB 2011c)

During the ski season, the population within the Mt Buller Alpine Resort can increase to approximately 16,000 on a daily basis with up to 7,900 people accommodated overnight within Mt Buller village. The remainder are day visitors who leave the resort each evening.

While numbers visiting the resort can vary dramatically depending on the length of the snow season or natural events such as wild fire, the ten year average number of visitors in the:

Snow season: (June – Sept) 240,245 (ARCC Victorian Alpine Resorts Entry Statistics 2009)

Non snow season: (Oct – May) approximately 150,000

The issues surrounding sustainability of visitor capacity within the Resorts are the responsibility of the ARMB.

The responsibility regarding destination management and visitor capacity across the whole of destination (Mansfield, Mount Buller and the High Country) is shared across the relevant land managers and key stakeholders.

An approach to the identification of issues surrounding visitor capacity in summer and winter will be important in achieving solutions which may include increasing facilities, introducing capacity controls, increasing the number of sites and dispersing visitation over the calendar.

Current initiatives include construction of toilets at key sites on Mt Stirling including Cricket Pitch and Howqua Gap.

Targets

- Continued implementation of a co-operative programs and projects for sustainable visitor capacity.
- Enhanced environmental outcomes and visitor experience through sustainable visitor capacity.
- Increased understanding of summer through traffic travelling to Craig's Hut, neighbouring State Forest and the Alpine National Park.

Actions

The ARMB will:

- Develop a brief to steer the visitor capacity project and invite input from neighbouring land managers and key stakeholders.
- Undertake survey to quantify summer traffic travelling to Craig's Hut, neighbouring state forest or the Alpine National Park.
- Undertake a visitor survey and visitor capacity audit to determine sites under environmental pressure, related timing of visitation, visitor behaviours and expectations.
- Develop and implement a plan to manage sustainable visitor capacity, in collaboration with neighbouring land managers including Department of Sustainability and Environment, parks Victoria and Mansfield Shire Council.

7. Environmental Awareness & Involvement

Objectives

To provide suitable opportunities for environmental training.

To create a vibrant and ecologically aware community within the Resorts.

7.1 Environmental Awareness

ARMB staff participate in a range of environmental training activities including off-site courses such as the Alpine Ecology and Alpine Rehabilitation Courses, and on-site training such as the induction held at the start of each snow season. The induction covers standard protocols and recent developments including environmental issues. In addition to the induction, 'lodge packs' are distributed at the start of the snow season and contain comprehensive information regarding environmental awareness (including significant flora and fauna, weeds, pest animals, rare and/or threatened plants/communities and animals, recycling, littering and garbage collection, etc.).

The ARMB uses a range of mechanisms to communicate to the local community including:

- The Resorts websites - www.mtbuller.com.au and www.mtstirling.com.au;
- Publication of a quarterly newsletter, flyers, posters, stickers and coasters;
- The provision of guided walks for the public;
- Meeting with the Chamber of Commerce and Ratepayers Association;
- Public meetings, forums and lodge nights; and
- The provision of a formal complaints register.

The primary method used for communicating with the local community is via the websites, which receive in excess of 600,000 visitors per annum. The websites are regularly used to disseminate a range of information including: weather conditions, upcoming activities, ARMB policies and publications, and accommodation details. The ARMB has a section on the Mount Buller website dedicated to the environment (www.mtbuller.com.au/environment/index.html). Relevant publications including environmental topics and information on natural and cultural environment of the Mount Buller Resort are made available on this site.

These activities listed above, together with effective use of the Resorts' websites, provide an opportunity for the ARMB to educate and empower the local community and ensure that their activities have a minimal impact on the environment.

Targets

- Develop and implement an environmental communication and education plan for the Resorts.
- Facilitate two community environmental awareness days per annum.

Actions

The ARMB will:

- Develop a standard Environmental Management Code of Practice and an Environmental Management Operations manual for use by all staff and contractors operating within the Resort.

- Hold a bi-annual program (summer and winter) of workshops on key environmental management issues, for staff and relevant Resort stakeholders, to be held at the start of the summer construction season and at the start of the winter ski season.
- Continue to send staff to the Alpine Ecology and Alpine Rehabilitation Courses.
- Conduct regular environmental management staff training days. These training days should cover a wide range of topics (e.g. cultural heritage, catchment management, introduced flora, etc.).
- Encourage all Resort stakeholders to incorporate appropriate environmental awareness staff training into their induction and annual staff training programs.
- Disseminate environmental information through its website.
- Continue to include environmental issues in staff induction (e.g. ARMB employee handbook and Mountain Host Program).
- Continue to provide regular Mountain Pygmy-possum updates on the Mount Buller web page and through newsletters.
- Continue public education through the guided walk program.
- Develop a secondary school information kit including information relating to the Mountain Pygmy-possum at Mount Buller.
- Develop a comprehensive *Knowledge Management System* at the ARMB offices that includes a maintained and regularly up-dated Geographic Information System (GIS), reference library, hard-copies of relevant Commonwealth and State legislation and policies, maps and other pertinent documentation.
- Review, update and distribute the Mount Buller and Mount Stirling planting guide.

APPENDIX 1- Environmental Impacts and Aspects Register

Note: The significance rankings for each environmental impact are calculated as follows: scores between 3 and 34 are considered to be low; scores between 35 and 44 are considered to be medium and scores between 45 and 75 are considered to be high.

INTERNALLY CONTROLLED MOUNT BULLER AND MOUNT STIRLING ALPINE RESORT MANAGEMENT BOARD ACTIVITIES	Aspect	Activity	Impact	Prob P	Cons C	Scale S	Sens T	Overall Score
	WATER MANAGEMENT	Storage	Erosion and sedimentation	1	2	1	2	5
			Flooding	1	2	1	2	5
			Leakage from storage	2	2	1	2	10
		Supply	Natural resource use	5	3	1	2	30
			Reduction in stream flows	5	3	2	2	35
			Leakage from reticulation	3	2	1	2	15
			Research	3	2	2	2	18
		Storm water/Snowmelt Collection and distribution	Erosion and sedimentation	4	3	2	2	28
			Flooding	1	2	2	1	5
			Contamination	3	3	2	3	24
			Redistribution of melt	4	2	2	2	24
	WASTE MANAGEMENT (including waste water)	Wastewater treatment plant and sewage system	Effluent/detergent spills (contamination)	3	3	1	2	18
			Odour	4	1	1	3	20
			Chemical spills	2	2	1	2	10
			Tank Failure	2	4	3	4	22
		Solid Wastes	Litter	3	2	1	3	18
			Odour	2	2	1	3	12
			Landfill	4	2	2	3	28
			Research	3	3	2	2	21
		Recycling	Reduction in resource use	5	4	2	3	45
			Reduction in litter	4	3	1	2	24
		Education (Mountain Host Program)	Reduction in water use	4	4	2	3	36
			Reduction in phosphorous discharge	4	4	2	3	36
			Reduction in grease discharge	4	4	2	3	36
			Reduction in litter	4	3	2	3	32
	ROADS	Construction	Vegetation/habitat removal	3	3	1	3	21
			Fragmentation of habitat	3	3	1	2	18
			Erosion and sedimentation	3	3	2	3	24
			Dust	3	2	1	2	15
			Noise & vibration	3	1	1	2	12
		Maintenance (incl. snow clearing & ice treatment)	Spill threats	3	3	2	3	24
			Noise	4	2	1	2	20
			Chemical use including impacts on adjacent vegetation	4	3	2	3	32
	TRANSPORT SERVICES (including car parking)	Buses	Reduction of parking space requirements	4	3	1	3	28
			Noise, traffic, air pollution, oil spills	4	3	1	3	28
		Cars	Parking space requirements, noise, traffic, air pollution, oil spills	4	3	1	3	28
			Noise	3	1	1	2	12
			Vegetation removal for helipads	2	2	1	2	10
			Loss of 'remoteness', aesthetics in areas over flown	3	2	1	2	15
		Earth moving	Erosion, compaction, sedimentation	3	3	2	3	24
		Vegetation removal and plantings	Loss/modification of vegetation	4	3	1	2	24
		Visual management	Loss of visual amenity	3	2	1	2	15
	DEVELOPMENT, CONSTRUCTION & MAINTENANCE (including workshops and emergency response)	Vegetation removal	Loss/modification of habitat	3	4	2	3	27
		Earth moving	Erosion, compaction, sedimentation & dust	3	3	2	3	24
		Operation of equipment	Noise, vibration, dust and disturbance	4	2	1	2	20
		Material use	Depletion of resources	4	3	2	2	28
			Loss of visual amenity	4	2	1	2	20
		Grease trap management	Pollution of ground/water	2	1	1	2	8
		Drainage	Effects on vegetation due to altered water regimes	3	3	1	3	21
		Energy use	Depletion of resources	4	3	2	2	28
		Water use	Natural resource use	4	3	2	3	32
			Reduction in stream flows	4	4	2	3	36
		Building construction	Loss of visual amenity	4	3	1	3	28
			Waste disposal	4	2	2	3	28
	Aspect	Activity	Impact	Prob P	Cons C	Scale S	Sens T	Overall Score
	OPERATION & MAINTENANCE	Building operation and maintenance	Loss of visual amenity	3	1	1	2	12
			Fuel storage & use (spills)	2	2	2	3	14
			Chemical storage & use (spills)	2	2	2	3	14

EXTERNALLY CONTROLLED ACTIVITIES OVER WHICH THE MOUNT BULLER AND MOUNT STIRLING ALPINE RESORT MANAGEMENT BOARD MAY HAVE SOME INFLUENCE	ADMINISTRATION		Energy use	5	2	2	2	30
		Landscaping	Habitat and aesthetic improvement	4	3	2	3	32
				Introduction of non-indigenous species	3	3	1	3
		Hydrocarbon management	Soil and water contamination	2	4	2	4	20
		Waste disposal	Landfill, pollution of soil and water	3	4	2	3	27
		Visual management	Loss of visual amenity	5	2	1	2	25
		Preventative mechanisms	Loss of visual amenity	3	3	1	2	18
			Vegetation removal	3	3	1	2	18
		Response tools	Spill threats	2	4	2	4	20
		Clean-up tools	Ground and water contamination	2	4	2	4	20
			Waste disposal to landfill	3	3	2	3	24
	ADMINISTRATION	Energy use	Depletion of resources	5	4	2	2	40
		Paper use	Depletion of resources	5	3	2	2	35
			Generation of waste	5	2	2	2	30
			Recycling	4	3	2	2	28
		Use & disposal of office consumables	Depletion of resources	4	3	2	2	28
			Waste to landfill	4	3	2	2	28
			Recycling	4	3	2	2	28
		Purchasing	Depletion of resources	4	1	2	2	20
			Purchase of goods produced in an unsustainable manner	3	1	3	2	18
		Water use	Natural resource use	4	3	2	3	32
		Training (external and internal)	Increased environmental awareness and practice	4	2	1	2	20
		Brochures, information provision	Increased environmental awareness and practice	4	3	1	2	24
BIODIVERSITY	Native flora	Increase in carbon sink	5	3	5	3	55	
		Improved aesthetics	5	4	1	4	45	
		Increase in habitat value	4	4	1	4	36	
		Increase in viability	4	4	1	4	36	
		Introduced flora (weeds)	Spread of weeds threaten biodiversity values	4	4	2	2	32
			Loss of aesthetics	4	3	1	2	24
		Native fauna	Increase in habitat availability and suitability	4	5	2	5	48
			Increase in viability	4	4	2	3	36
			Improved aesthetics	5	3	1	2	30
		Introduced fauna (pests)	Contribute to weed infestation	4	4	2	2	32
			Detrimental impacts on native flora and fauna	5	5	2	3	50
		Threatened fauna	Habitat alteration/destruction	4	5	1	5	44
			Habitat improvement/creation	4	5	1	5	44
			Research	4	4	4	4	48
		Threatened flora	Habitat improvement/creation	4	5	1	5	44
			Habitat alteration/destruction	4	5	1	5	44
	LAND MANAGEMENT	Soils	Erosion, nutrient depletion, compaction	4	4	2	4	40
		Geology	Land slips and rock falls	3	4	1	5	30
			Research	4	3	2	4	36
		Landscaping	Loss of visual amenity	3	2	1	3	18
			Erosion and sedimentation	3	2	1	3	18
			Loss of native vegetation	3	3	1	3	21
			Habitat alteration/disturbance	3	3	1	3	21
Bushfire mitigation		Habitat alteration/disturbance	4	2	2	1	20	
	Loss of visual amenity	3	2	2	1	15		
AIR MANAGEMENT	Wood fire emissions	Deterioration in immediate air quality	4	3	2	4	36	
		Enhanced Greenhouse contributions	4	3	5	4	48	
		Natural resource use	5	2	2	1	25	
		Habitat destruction	3	3	2	2	21	
	Gas fire and cooking emissions	Deterioration in immediate air quality	3	4	2	3	27	
		Odour	2	2	1	2	10	
	Burning of rubbish	Deterioration in immediate air quality	2	4	2	4	20	
Combustion engines/generators etc	CO ² emissions - enhanced greenhouse contributions	4	3	2	2	28		
SUMMER RECREATIONAL ACTIVITIES	Equestrian services	Loss of visual amenity	3	2	1	2	15	
		Erosion and sedimentation	4	3	2	3	32	
		Odour	2	1	1	2	8	
		Spread of weeds through provision of hay & equine defecation	3	3	1	3	21	
		Trampling of native vegetation	4	3	1	3	28	
	Walking tracks	Erosion and sedimentation	2	3	1	2	12	
		Trampling of native vegetation by those that go off-track	3	2	1	2	15	
	Bicycle tracks	Erosion and sedimentation	4	4	1	3	32	
		Crushing of native vegetation by those that go off-track	3	3	1	3	21	
SUMMER RECREATIONAL ACTIVITIES	Aspect	Activity	Impact	Prob P	Cons C	Scale S	Sens T	Overall Score
	Recreational motor vehicles	Erosion and sedimentation		4	5	2	4	44
		Noise		3	3	1	3	21
		Crushing of native vegetation by those that go off-track		4	4	1	3	32
	Camping and camping facilities	Litter		4	4	2	3	36

			Increased risk of bushfires	3	4	3	3	30
			Vegetation clearing	4	3	1	4	32
			Trampling of vegetation in the vicinity	4	3	1	4	32
		Track construction and maintenance	Erosion and sedimentation	3	3	1	3	21
			Destruction of native vegetation	3	3	1	2	18
	(including emergency response)	Vegetation removal	Loss/modification of habitat	3	4	2	3	27
		Earth moving	Erosion, compaction, sedimentation & dust	3	3	2	3	24
		Operation of equipment	Noise, vibration, dust and disturbance	4	2	1	2	20
		Material use	Depletion of resources	4	3	2	2	28
			Loss of visual amenity	4	2	1	2	20
		Grease trap management	Pollution of ground/water	2	1	1	2	8
		Drainage	Effects on vegetation due to altered water regimes	3	3	1	3	21
		Energy use	Depletion of resources	4	3	2	2	28
		Water use	Natural resource use	4	3	2	3	32
			Reduction in stream flows	4	4	2	3	36
		Building construction	Loss of visual amenity	4	3	1	3	28
			Waste disposal	4	2	2	3	28
		Building operation and maintenance	Loss of visual amenity	3	1	1	2	12
			Fuel storage & use (spills)	2	2	2	3	14
			Chemical storage & use (spills)	2	2	2	3	14
			Energy use	5	2	2	2	30
		Landscaping	Habitat and aesthetic improvement	4	3	2	3	32
			Introduction of non-indigenous species	3	3	1	3	21
		Hydrocarbon management	Soil and water contamination	2	4	2	4	20
		Waste disposal	Landfill, pollution of soil and water	3	4	2	3	27
		Visual management	Loss of visual amenity	5	2	1	2	25
		Preventative mechanisms	Loss of visual amenity	3	3	1	2	18
			Vegetation removal	3	3	1	2	18
		Response tools	Spill threats	2	4	2	4	20
		Clean-up tools	Ground and water contamination	2	4	2	4	20
			Waste disposal to landfill	3	3	2	3	24
	UTILITIES MANAGEMENT	Electricity - supply and use	Natural resource use	5	4	3	3	50
			Contribution to enhanced greenhouse effect	5	4	4	4	60
			Loss of visual amenity	3	2	1	2	15
			Oil spill threats	3	5	2	5	36
			Bushfire threats	4	3	2	2	28
			Loss of native vegetation (where applicable)	3	3	1	3	21
			Natural resource use	5	4	3	3	50
			Contribution to enhanced greenhouse effect	5	3	4	4	55
			Erosion, sedimentation, vegetation removal	2	4	1	3	16
		Gas - supply and use	Loss of visual amenity	3	2	1	2	15
			Loss of native vegetation (where applicable)	3	4	1	4	27
		Telecommunications	Loss of native vegetation (where applicable)	3	4	1	4	27
	CONCRETE BATCHING PLANT	Machinery use	Noise, dust and vibration	4	2	1	2	20
		Water use	Natural resource use	4	3	2	3	32
			Reduction in stream flows	3	2	2	3	21
		Visual amenity	Loss of visual amenity	5	2	1	2	25

Appendix 2 – EMS Terms and Definitions

Continual improvement – recurring process of enhancing the environmental management system (or plan in this case) in order to achieve improvements in overall environmental performance consistent with the organisation's environmental policy.

Corrective action – action to eliminate the cause of a detected nonconformity.

Environment – surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

Environmental aspect – element of an organisation's activities or products or services that can interact with the environment.

Environmental impact – any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.

Environmental management system – part of an organisation's management system used to develop and implement its environmental policy and manage its environmental aspects.

Environmental objective – overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.

Environmental performance – measurable results of an organisation's management of its environmental aspects.

Environmental policy – overall intentions and direction of the organisation related to its environmental performance as formally expressed by top management.

Environmental target – detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.

Preventive action – action to eliminate the cause of a potential nonconformity.

APPENDIX 3 – Ongoing Environmental Works Plan

- Compliance with EPA licences and requirements.
- Consultation with experts in natural and cultural heritage to seek advice as required regarding matters of environmental significance.
- Fostering relationships and investigation of 'value adding' opportunities with local and State Government bodies to build further on ARMB environmental programs.
- Ensuring works conducted in the Resort area have the smallest environmental impact possible and operate in line with best practice environmental standards.
- Minimisation of land disturbance, soil erosion and the ultimate discharge of sediments and other pollutants to surface waters for works undertaken within the Resorts.
- Routinely address remedial measures for disturbed ARMB sites.
- Implementation, monitoring and revision of relevant ARMB strategies, policies, plans and procedures as required.
- Have regard for the Goulburn Broken and North Eastern Regional River Health Strategies (RRHS) and Catchment Management Strategies (CMS).

APPENDIX 4 - Flora of the Resorts

A4.1 Flora of the Mount Buller and Mount Stirling Alpine Resorts

Table A4.1 Flora within the Mount Buller and Mount Stirling Alpine Resorts.

Scientific Name	Common Name
<i>Acacia dealbata</i>	Silver Wattle
<i>Acacia melanoxylon</i>	Blackwood
<i>Acacia obliquinervia</i>	Mountain Hickory Wattle
<i>Acacia siculiformis</i>	Dagger Wattle
<i>Acaena novae-zelandiae</i>	Bidgee-widgee
<i>Acaena ovina</i>	Australian Sheep's Burr
<i>Acaena</i> spp.	Sheep's Burr
<i>Aciphylla glacialis</i>	Snow Aciphyll
<i>Agrostis muelleriana</i>	Mueller's Bent
<i>Agrostis parviflora</i> s.l.	Hair Bent
<i>Agrostis parviflora</i> s.s.	Hair Bent
<i>Agrostis</i> s.l. spp.	Bent/Blown Grass
<i>Agrostis venusta</i>	Misty Bent
<i>Ajuga australis</i>	Austral Bugle
<i>Andreaea australis</i>	Lantern Moss
<i>Andreaea nitida</i>	Lantern Moss
<i>Arthropodium milleflorum</i> s.l.	Pale Vanilla-lily
<i>Asperula conferta</i>	Common Woodruff
<i>Asperula euryphylla</i> var. <i>euryphylla</i>	Broad-leaf Woodruff
<i>Asperula gunnii</i>	Mountain Woodruff
<i>Asperula pusilla</i>	Alpine Woodruff
<i>Asperula scoparia</i>	Prickly Woodruff
<i>Asperula</i> spp.	Woodruff
<i>Asplenium flabellifolium</i>	Necklace Fern
<i>Asterolasia trymalioides</i>	Alpine Star-bush
<i>Atherosperma moschatum</i>	Southern Sassafras
<i>Australina pusilla</i> subsp. <i>muelleri</i>	Shade Nettle
<i>Austrodanthonia alpicola</i>	Crag Wallaby-grass
<i>Austrodanthonia eriantha</i>	Hill Wallaby-grass
<i>Austrodanthonia penicillata</i>	Slender Wallaby-grass
<i>Austrodanthonia pilosa</i>	Velvet Wallaby-grass
<i>Baeckea gunniana</i>	Alpine Baeckea
<i>Baeckea latifolia</i>	Subalpine Baeckea
<i>Baeckea utilis</i> s.l.	Mountain Baeckea
<i>Bartramia ithyphylla</i>	Common Apple-moss
<i>Bartramia mossmaniana</i>	Tall Apple-moss

Scientific Name	Common Name
<i>Blechnum fluviatile</i>	Ray Water-fern
<i>Blechnum minus</i>	Soft Water-fern
<i>Blechnum nudum</i>	Fishbone Water-fern
<i>Blechnum penna-marina</i> subsp. <i>alpina</i>	Alpine Water-fern
<i>Boronia nana</i> var. <i>hyssopifolia</i>	Dwarf Boronia
<i>Brachyscome aculeata</i>	Branching Daisy
<i>Brachyscome nivalis</i>	Snow Daisy
<i>Brachyscome rigidula</i>	Leafy Daisy
<i>Brachyscome scapigera</i>	Tufted Daisy
<i>Brachyscome spathulata</i> subsp. <i>spathulata</i>	Spoon Daisy
<i>Brachythecium paradoxum</i>	Feather Moss
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss
<i>Bryum blandum</i> var. <i>blandum</i>	Rosy Silver-moss
<i>Bulbine bulbosa</i>	Bulbine Lily
<i>Caladenia alpina</i>	Mountain Hood
<i>Caladenia</i> spp.	Caladenia
<i>Caltha introloba</i>	Alpine Marsh-marigold
<i>Cardamine gunnii</i> s.l.	Common Bitter-cress
<i>Cardamine lilacina</i> s.l.	Lilac Bitter-cress
<i>Carex appressa</i>	Tall Sedge
<i>Carex breviculmis</i>	Common Grass-sedge
<i>Carex hebes</i>	Mountain Sedge
<i>Carex jackiana</i>	Carpet Sedge
<i>Carex</i> spp.	Sedge
<i>Carpha</i> spp.	Flower Rush
<i>Cassinia aculeata</i>	Common Cassinia
<i>Celmisia asteliifolia</i> spp. <i>agg.</i>	Silver Daisy
<i>Celmisia costiniana</i>	Carpet Snow-daisy
<i>Celmisia latifolia</i>	Victorian Snow-daisy
<i>Celmisia tomentella</i>	Silver Snow-daisy
<i>Chiloglottis gunnii</i> s.l.	Common Bird-orchid
<i>Chiloglottis</i> spp.	Bird Orchid
<i>Chiloscyphus semiteres</i>	Common Crestwort
<i>Chionogentias muelleriana</i> subsp. <i>willisiana</i>	Mt Buller Snow-gentian
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Clematis aristata</i>	Mountain Clematis
<i>Coprosma hirtella</i>	Rough Coprosma
<i>Coprosma nitida</i>	Shining Coprosma
<i>Coprosma quadrifida</i>	Prickly Currant-bush
<i>Correa lawrenceana</i>	Mountain Correa
<i>Cotula alpina</i>	Alpine Cotula
<i>Craspedia glauca</i> spp. <i>agg.</i>	Common Billy-buttons
<i>Craspedia jamesii</i>	Green Billy-buttons
<i>Craspedia</i> spp.	Billy Buttons
<i>Crassula helmsii</i>	Swamp Crassula
<i>Crassula sieberiana</i> s.l.	Sieber Crassula

Scientific Name	Common Name
<i>Cystopteris tasmanica</i>	Brittle Bladder-fern
<i>Danthonia s.l. spp.</i>	Wallaby Grass
<i>Daucus glochidiatus</i>	Australian Carrot
<i>Daviesia latifolia</i>	Hop Bitter-pea
<i>Daviesia mimosoides s.l.</i>	Blunt-leaf Bitter-pea
<i>Daviesia ulicifolia</i>	Gorse Bitter-pea
<i>Derwentia derwentiana</i>	Derwent Speedwell
<i>Deyeuxia brachyathera</i>	Short Bent-grass
<i>Deyeuxia crassiuscula</i>	Thick Bent-grass
<i>Deyeuxia frigida</i>	Forest Bent-grass
<i>Deyeuxia rodwayi</i>	Tasman Bent-grass
<i>Deyeuxia spp.</i>	Bent-grass
<i>Dianella tasmanica</i>	Tasman Flax-lily
<i>Dichelachne crinita</i>	Long-hair Plume-grass
<i>Dichondra repens</i>	Kidney-weed
<i>Dicksonia antarctica</i>	Soft Tree-fern
<i>Dipodium punctatum s.s.</i>	Purple Hyacinth-orchid
<i>Ditrichum rufoaureum</i>	Alpine Ditrichum
<i>Doodia australis</i>	Common Rasp-fern
<i>Elymus scaber var. scaber</i>	Common Wheat-grass
<i>Empodisma minus</i>	Spreading Rope-rush
<i>Epacris breviflora</i>	Drumstick Heath
<i>Epacris paludosa</i>	Swamp Heath
<i>Epacris spp.</i>	Heath
<i>Epilobium billardierianum</i>	Variable Willow-herb
<i>Epilobium gunnianum</i>	Gunn's Willow-herb
<i>Epilobium spp.</i>	Willow Herb
<i>Erigeron bellidioides</i>	Hairy Fleabane
<i>Erigeron paludicola</i>	Swamp Fleabane
<i>Erigeron pappocromus spp. agg.</i>	Violet Fleabane
<i>Eucalyptus dalrympleana subsp. dalrympleana</i>	Mountain Gum
<i>Eucalyptus delegatensis subsp. delegatensis</i>	Alpine Ash
<i>Eucalyptus pauciflora</i>	Snow Gum
<i>Eucalyptus pauciflora subsp. niphophila</i>	Alpine Sally
<i>Eucalyptus perriniana</i>	Spinning Gum
<i>Euchiton collinus s.s.</i>	Creeping Cudweed
<i>Euchiton involucratus s.s.</i>	Star Cudweed
<i>Euchiton umbricola</i>	Cliff Cudweed
<i>Euphrasia collina</i>	Purple Eyebright
<i>Euphrasia lasianthera</i>	Hairy Eyebright
<i>Euryomyrtus ramosissima</i>	Rosy Baeckea
<i>Fallaciella gracilis</i>	Creeping Mound-moss
<i>Galium australe</i>	Tangled Bedstraw
<i>Gastrodia sesamoides s.s.</i>	Cinnamon Bells
<i>Gaultheria appressa</i>	Wax-berry
<i>Gentianella diemensis s.l.</i>	Mountain Gentian

Scientific Name	Common Name
<i>Geranium potentilloides</i>	Cinquefoil Cranesbill
<i>Geranium solanderi</i> s.l.	Austral Cranesbill
<i>Gonocarpus micranthus</i> subsp. <i>micranthus</i>	Creeping Raspwort
<i>Gonocarpus montanus</i>	Mat Raspwort
<i>Gonocarpus</i> spp.	Raspwort
<i>Gonocarpus tetragynus</i>	Common Raspwort
<i>Goodenia hederacea</i>	Ivy Goodenia
<i>Goodenia hederacea</i> subsp. <i>alpestris</i>	Ivy Goodenia
<i>Grammitis billardierei</i>	Common Finger-fern
<i>Grammitis poeppigiana</i>	Alpine Finger-fern
<i>Grevillea australis</i>	Alpine Grevillea
<i>Grevillea victoriae</i> subsp. <i>victoriae</i>	Royal Grevillea
<i>Grimmia macroperichaetialis</i>	Sun Grimmia
<i>Grimmia pulvinata</i> var. <i>africana</i>	Blunt-beak Grimmia
<i>Grimmia trichophylla</i>	Hair-pointed Grimmia
<i>Helichrysum</i> aff. <i>rutidolepis</i> (Alps)	Pale Everlasting
<i>Helichrysum rutidolepis</i> s.l.	Pale Everlasting
<i>Helichrysum rutidolepis</i> s.s.	Pale Everlasting
<i>Helichrysum scorpioides</i>	Button Everlasting
<i>Hierochloe redolens</i>	Sweet Holy-grass
<i>Hovea heterophylla</i>	Common Hovea
<i>Hovea montana</i>	Alpine Rusty-pods
<i>Huperzia australiana</i>	Fir Clubmoss
<i>Hydrocotyle algida</i>	Mountain Pennywort
<i>Hydrocotyle hirta</i>	Hairy Pennywort
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
<i>Hydrocotyle sibthorpioides</i>	Shining Pennywort
<i>Hydrocotyle</i> spp.	Pennywort
<i>Hymenophyllum peltatum</i>	Alpine Filmy-fern
<i>Hypericum japonicum</i>	Matted St John's Wort
<i>Hypnum cupressiforme</i>	Common Plait-moss
<i>Hypolepis rugosula</i>	Ruddy Ground-fern
<i>Isolepis aucklandica</i>	New Zealand Club-sedge
<i>Isolepis cernua</i> var. <i>cernua</i>	Nodding Club-sedge
<i>Isolepis montivaga</i>	Fog Club-sedge
<i>Isolepis</i> spp.	Club Sedge
<i>Isolepis subtilissima</i>	Mountain Club-sedge
<i>Juncus alexandri</i> subsp. <i>alexandri</i>	Mountain Rush
<i>Juncus bufonius</i>	Toad Rush
<i>Lachnagrostis aemula</i> s.s.	Leafy Blown-grass
<i>Lagenophora stipitata</i>	Common Bottle-daisy
<i>Leionema phyllicifolium</i>	Alpine Leionema
<i>Leptinella filicula</i>	Mountain Cotula
<i>Leptorhynchos</i> spp.	Buttons
<i>Leptospermum grandifolium</i>	Mountain Tea-tree
<i>Leptostigma reptans</i>	Dwarf Nertera

Scientific Name	Common Name
<i>Leucochrysum albicans</i>	Hoary Sunray
<i>Leucopogon fraseri</i>	Sharp Beard-heath
<i>Leucopogon gelidus</i>	Drooping Beard-heath
<i>Leucopogon hookeri</i>	Mountain Beard-heath
<i>Leucopogon maccraei</i>	Subalpine Beard-heath
<i>Libertia pulchella</i>	Pretty Grass-flag
<i>Linum marginale</i>	Native Flax
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
<i>Lomatia fraseri</i>	Tree Lomatia
<i>Lotus spp.</i>	Trefoil
<i>Luzula meridionalis</i>	Common Woodrush
<i>Luzula meridionalis var. densiflora</i>	Common Woodrush
<i>Luzula meridionalis var. flaccida</i>	Common Woodrush
<i>Luzula modesta</i>	Southern Woodrush
<i>Luzula novae-cambriae</i>	Coarse Woodrush
<i>Luzula spp.</i>	Woodrush
<i>Lycopodium fastigiatum</i>	Mountain Clubmoss
<i>Lycopodium scariosum</i>	Spreading Clubmoss
<i>Melicytus dentatus s.l.</i>	Tree Violet
<i>Mentha australis</i>	River Mint
<i>Mentha laxiflora</i>	Forest Mint
<i>Mentha spp.</i>	Mint
<i>Microlaena stipoides var. stipoides</i>	Weeping Grass
<i>Microseris scapigera spp. agg.</i>	Yam Daisy
<i>Microseris sp. 2</i>	Alpine Yam-daisy
<i>Microtis spp.</i>	Onion Orchid
<i>Mirbelia oxylobioides</i>	Mountain Mirbelia
<i>Myosotis australis</i>	Austral Forget-me-not
<i>Neopaxia australasica</i>	White Purslane
<i>Nertera granadensis</i>	Matted Nertera
<i>Notelaea ligustrina</i>	Privet Mock-olive
<i>Olearia erubescens</i>	Moth Daisy-bush
<i>Olearia lirata</i>	Snowy Daisy-bush
<i>Olearia megalophylla</i>	Large-leaf Daisy-bush
<i>Olearia phlogopappa</i>	Dusty Daisy-bush
<i>Olearia phlogopappa var. flavescens</i>	Dusty Daisy-bush
<i>Olearia phlogopappa var. subrepanda</i>	Dusty Daisy-bush
<i>Oreomyrrhis ciliata</i>	Fringed Caraway
<i>Oreomyrrhis eriopoda</i>	Australian Caraway
<i>Orites lancifolia</i>	Alpine Orites
<i>Orthotrichum tasmanicum</i>	Bristle Moss
<i>Oxalis exilis</i>	Shady Wood-sorrel
<i>Oxalis perennans</i>	Grassland Wood-sorrel
<i>Ozothamnus secundiflorus</i>	Cascade Everlasting
<i>Ozothamnus sp. 1</i>	Kerosene Bush
<i>Ozothamnus stirlingii</i>	Ovens Everlasting

Scientific Name	Common Name
<i>Ozothamnus thyrsoides</i>	Sticky Everlasting
<i>Phebalium squamulosum</i>	Forest Phebalium
<i>Phebalium squamulosum subsp. alpinum</i>	Alpine Phebalium
<i>Philonotis scabrifolia</i>	Apple Moss
<i>Philotheca myoporoides</i>	Long-leaf Wax-flower
<i>Picris angustifolia</i>	Native Picris
<i>Picris spp.</i>	Picris
<i>Pimelea alpina</i>	Alpine Rice-flower
<i>Pimelea axiflora</i>	Bootlace Bush
<i>Pimelea ligustrina</i>	Tall Rice-flower
<i>Pimelea ligustrina subsp. ciliata</i>	Fringed Rice-flower
<i>Plantago antarctica</i>	Mountain Plantain
<i>Plantago euryphylla</i>	Broad Plantain
<i>Plantago spp.</i>	Plantain
<i>Platylobium formosum</i>	Handsome Flat-pea
<i>Poa costiniana</i>	Bog Snow-grass
<i>Poa ensiformis</i>	Sword Tussock-grass
<i>Poa fawcettiae</i>	Horny Snow-grass
<i>Poa hiemata</i>	Soft Snow-grass
<i>Poa hothamensis</i>	Ledge Grass
<i>Poa hothamensis var. hothamensis</i>	Ledge Grass
<i>Poa labillardierei</i>	Common Tussock-grass
<i>Poa spp.</i>	Tussock Grass
<i>Podocarpus lawrencei</i>	Mountain Plum-pine
<i>Podolepis robusta</i>	Alpine Podolepis
<i>Podolobium alpestre</i>	Alpine Podolobium
<i>Pohlia cruda</i>	Opal Thread-moss
<i>Pohlia mielichhoferia</i>	Thread Moss
<i>Pohlia nutans</i>	Nodding Thread-moss
<i>Polyscias sambucifolia</i>	Elderberry Panax
<i>Polystichum proliferum</i>	Mother Shield-fern
<i>Polytrichastrum alpinum</i>	Alpine Haircap
<i>Polytrichum juniperinum</i>	Juniper Haircap
<i>Poranthera microphylla</i>	Small Poranthera
<i>Prostanthera cuneata</i>	Alpine Mint-bush
<i>Prostanthera lasianthos</i>	Victorian Christmas-bush
<i>Pteridium esculentum</i>	Austral Bracken
<i>Pterostylis spp.</i>	Greenhood
<i>Racomitrium crispulum var. crispulum</i>	Common Fringe-moss
<i>Ranunculus graniticola</i>	Granite Buttercup
<i>Ranunculus gunnianus</i>	Gunn's Alpine Buttercup
<i>Ranunculus lappaceus</i>	Australian Buttercup
<i>Ranunculus pimpinellifolius</i>	Bog Buttercup
<i>Ranunculus plebeius s.l.</i>	Forest/Hairy Buttercup
<i>Ranunculus scapiger</i>	Hairy Buttercup
<i>Ranunculus spp.</i>	Buttercup

Scientific Name	Common Name
<i>Rhodanthe anthemoides</i>	Chamomile Sunray
<i>Richea continentis</i>	Candle Heath
<i>Rubus parvifolius</i>	Small-leaf Bramble
<i>Rumex brownii</i>	Slender Dock
<i>Rumex spp.</i>	Dock
<i>Rytidosperma nudiflorum</i>	Alpine Wallaby-grass
<i>Sambucus gaudichaudiana</i>	White Elderberry
<i>Schistidium apocarpum</i>	Sessile Grimmia
<i>Schizymerium bryoides</i>	Copper Moss
<i>Schoenus calypttratus</i>	Alpine Bog-sedge
<i>Scleranthus biflorus s.l.</i>	Twin-flower Knawel
<i>Scleranthus singuliflorus</i>	Mossy Knawel
<i>Senecio glomeratus</i>	Annual Fireweed
<i>Senecio gunnii</i>	Mountain Fireweed
<i>Senecio hispidulus s.l.</i>	Rough Fireweed
<i>Senecio linearifolius</i>	Fireweed Groundsel
<i>Senecio minimus</i>	Shrubby Fireweed
<i>Senecio pinnatifolius</i>	Variable Groundsel
<i>Senecio quadridentatus</i>	Cotton Fireweed
<i>Senecio spp.</i>	Groundsel
<i>Senecio tenuiflorus s.l.</i>	Slender Fireweed
<i>Senecio vagus subsp. vagus</i>	Saw Groundsel
<i>Senecio velleioides</i>	Forest Groundsel
<i>Sphagnum cristatum</i>	Peat Moss
<i>Sphagnum spp.</i>	Peat Moss
<i>Stackhousia monogyna</i>	Creamy Stackhousia
<i>Stackhousia viminea</i>	Slender Stackhousia
<i>Stellaria flaccida</i>	Forest Starwort
<i>Stellaria pungens</i>	Prickly Starwort
<i>Stuartina muelleri</i>	Spoon Cudweed
<i>Stylidium graminifolium s.l.</i>	Grass Triggerplant
<i>Tasmannia lanceolata</i>	Mountain Pepper
<i>Tasmannia xerophila</i>	Alpine Pepper
<i>Tasmannia xerophila subsp. xerophila</i>	Alpine Pepper
<i>Thuidiopsis furfurosa</i>	Golden Weft-moss
<i>Tortula rubra</i>	Screw Moss
<i>Trachymene humilis</i>	Alpine Trachymene
<i>Trachymene humilis subsp. breviscapa</i>	Alpine Trachymene
<i>Trisetum spicatum subsp. australiense</i>	Bristle Grass
<i>Trochocarpa clarkei</i>	Lilac Berry
<i>Uncinia flaccida</i>	Mountain Hook-sedge
<i>Uncinia tenella</i>	Delicate Hook-sedge
<i>Urtica incisa</i>	Scrub Nettle
<i>Veronica notabilis</i>	Forest Speedwell
<i>Veronica serpyllifolia</i>	Thyme Speedwell
<i>Viola betonicifolia</i>	Showy Violet

Scientific Name	Common Name
<i>Viola hederacea sensu Willis (1972)</i>	Ivy-leaf Violet
<i>Viola sieberiana</i> spp. agg.	Tiny Violet
<i>Viola</i> spp.	Violet
<i>Wahlenbergia gloriosa</i>	Royal Bluebell
<i>Westringia senifolia</i>	Alpine Westringia
<i>Xerochrysum bracteatum</i>	Golden Everlasting
<i>Xerochrysum subundulatum</i>	Orange Everlasting

APPENDIX 5 - Mapped Ecological Vegetation Classes found within the Resorts.

Information taken from the Draft Environmental Key Performance Indicators for Mt Buller and Mt Stirling Alpine Resorts, Extent of Good Quality Habitat 2011.

Riparian Forest EVC 18

Characteristics: A tall forest located on fertile alluvium soils that are regularly inundated and permanently moist. It is dominated by tall eucalypts to 30m, but also has an open sparse secondary tree layer of wattles and scattered dense patches of shrubs, ferns, grasses and herbs. Riparian Forest is located along the Delatite River within the Resorts. Between 600 and 1000m ASL.

Shrubby Dry Forest EVC 21

Characteristics: A low, open forest to 25m tall characterised by the diversity and variability of the eucalypts. The understorey often lacks a secondary tree layer but contains a well-developed medium to low shrub layer. The ground layer is often very sparse with tussock-forming graminoids being the dominant life form.

Herb-rich Foothill Forest EVC 23

Characteristics: A medium to tall open forest or woodland to 25m tall with a small tree layer over a sparse to dense shrub layer. A high cover and diversity of herbs and grasses in the ground layer characterise this EVC. Herb-rich Foothill Forest occupies lower slopes and gullies within the Resorts.

Damp Forest EVC 29

Characteristics: Dominated by a tall eucalypt tree layer to 30m, over a medium to tall dense shrub layer of broad-leaved species typical of wet forest mixed with elements from dry forest types. The ground layer includes herbs and grasses as well as a variety of moisture dependent ferns.

Wet Forest EVC 30

Characteristics: A tall eucalypt overstorey with scattered understorey trees over a broad-leaved shrubby understorey and a moist, shaded, fern-rich ground layer that is usually dominated by tree-ferns. Like Damp Forest, Wet Forest is also located on lower south facing slopes within the Resorts. Wet Forest is restricted to protected moist sites in gullies.

Montane Dry Woodland EVC 36

Characteristics: The overstorey trees vary from an open forest to an open woodland, 15m to 25m in height. Characteristic species at the lower elevations include Broad-leaf Peppermint and Mountain Gum, while Alpine Ash is often present at higher altitudes. Shrubs tolerant of montane conditions can occur in sparse to dense cover. Montane Dry Woodland is present on the drier, more exposed aspects of the mid to upper mountain slopes, at elevations greater than 100m, often extending onto the ridges.

Montane Damp Forest EVC 38

Characteristics: Dominated by a tall eucalypt tree layer to 30m tall over a medium to tall dense shrub layer of broad-leaved species typical of wet forest mixed with elements from dry forest types. The

ground layer includes herbs and grasses as well as a variety of moisture dependent ferns.

Montane Riparian Thicket EVC 41

Characteristics: Occurs along streams and drainage lines. The canopy is dominated by Mountain Tea-tree *Leptospermum grandifolium* which creates a dense cover. The understorey is not diverse and is dominated by tall sedges with a sparse cover of shrubs, ferns and herbs.

Sub-alpine Woodland EVC 43

Characteristics: Sub-alpine Woodland occurs on the higher elevation ridges and upper slopes. It is dominated by White Sallee *Eucalyptus pauciflora* subsp. *pauciflora* to eight metres in height. The understorey variously consists of a rich suite of grasses and herbs, or a dense layer of woody shrubs, depending on soil fertility.

Sub-alpine Treeless Mosaic EVC 44

Characteristics: This EVC has been mapped in areas where refinement has not yet been completed for the Resorts. It is intended that all areas mapped as this mosaic EVC will be refined to one of the individual EVC classifications by the end of 2011.

Sub-alpine Treeless Mosaic occurs on the summit areas, particularly Mount Buller, Mount Stirling and Baldy, where tree growth is limited by climatic extremes. This mosaic is composed of a range of treeless EVCs, but those known to occur within the Resorts include:

- Sub-alpine Shrubland EVC 42
- Alpine Coniferous Shrubland EVC 156
- Sub-alpine Wet Heathland EVC 210
- Alpine Grassland EVC 1001
- Alpine Grassy Heathland EVC 1004

APPENDIX 6 - Rare and threatened plants and plant communities of the Resorts

Australian status:

V Listed under EPBC Act as vulnerable

Victorian status:

v Vulnerable in Victoria

r Rare in Victoria

Flora and Fauna Guarantee Act 1988:

L Listed under the Act

Source of record:

FIS: Recorded within 5 km of centre of study area, DSE Flora Information System

DEH: Species predicted to occur in local area, EPBC Act Protected Matters Search Tool

Table A6.1 Flora of national or state significance recorded, or predicted to occur, within the Mount Buller and Mount Stirling Alpine Resorts.

Name	Common Name	Source	EPBC Act	State	FFG Act
National Significance					
<i>Glycine latrobeana</i>	Clover Glycine	DEH	V	v	L
State Significance					
<i>Acacia daviesii</i> ¹	Timbertop Wattle	FIS		v	
<i>Aciphylla glacialis</i>	Snow Aciphyll	FIS		r	
<i>Agrostis muelleriana</i>	Mueller's Bent	FIS		r	
<i>Austrodanthonia alpicola</i>	Crag Wallaby-grass	FIS		r	
<i>Baeckea latifolia</i>	Sub-alpine Baeckea	FIS		r	
<i>Caltha introloba</i>	Alpine Marsh-marigold	FIS		r	
<i>Carex jackiana</i>	Carpet Sedge	FIS		r	
<i>Celmisia costiniana</i>	Carpet Snow-daisy	FIS		r	
<i>Celmisia latifolia</i>	Victorian Snow-daisy	FIS		r	
<i>Celmisia tomentella</i>	Silver Snow-daisy	FIS		r	
<i>Chionogentias muelleriana</i> subsp. <i>willisiana</i>	Mount Buller Snow-gentian	FIS		r	
<i>Colobanthus affinis</i> ¹	Alpine Colobanth	FIS		r	
<i>Craspedia jamesii</i>	Green Billy-buttons	FIS		r	
<i>Craspedia</i> sp. 1 ¹	Mountain Forest Billy-buttons	FIS		r	
<i>Craspedia</i> sp. B ¹	Sticky Billy-buttons	FIS		r	
<i>Cystopteris tasmanica</i>	Brittle Bladder-fern	FIS		r	
<i>Deyeuxia crassiuscula</i>	Thick Bent-grass	FIS		r	
<i>Eucalyptus perriniana</i>	Spinning Gum	FIS		r	
<i>Euchiton umbricola</i>	Cliff Cudweed	FIS		r	

Name	Common Name	Source	EPBC Act	State	FFG Act
State Significance					
<i>Hakea lissosperma</i> ¹	Mountain Needlewood	FIS		r	
<i>Euphrasia lasianthera</i>	Hairy Eyebright	FIS		r	
<i>Grammitis poeppigiana</i>	Alpine Finger-fern	FIS		r	
<i>Grevillea victoriae</i> subsp. <i>victoriae</i>	Royal Grevillea	FIS		R	
<i>Huperzia australiana</i>	Fir Clubmoss	FIS		r	
<i>Isolepis montivaga</i>	Fog Club-sedge	FIS		r	
<i>Lycopodium scariosum</i>	Spreading Clubmoss	FIS		r	
<i>Olearia phlogopappa</i> var. <i>flavescens</i>	Dusty Daisy-bush	FIS		r	
<i>Olearia phlogopappa</i> var. <i>subrepanda</i>	Dusty Daisy-bush	FIS		r	
<i>Ozothamnus stirlingii</i>	Ovens Everlasting	FIS		r	
<i>Phebalium squamulosum</i> subsp. <i>alpinum</i>	Alpine Phebalium	FIS		r	
<i>Pimelea ligustrina</i> subsp. <i>ciliata</i>	Fringed Rice-flower	FIS		r	
<i>Ranunculus eichlerianus</i> ¹	Eichler's Buttercup	FIS		r	
<i>Ranunculus gunnianus</i>	Gunn's Alpine Buttercup	FIS		r	
<i>Scleranthus singuliflorus</i>	Mossy Knawel	FIS		r	
<i>Trachymene humilis</i>	Alpine Trachymene	FIS		r	
<i>Trochocarpa clarkei</i>	Lilac Berry	FIS		r	
<i>Westringia senifolia</i>	Alpine Westringia	FIS		r	

¹ - Species lodged at the National Herbarium, not recorded within the FIS.

Table A6.2 Plant communities of national or state significance recorded within the Mount Buller and Mount Stirling Alpine Resorts.

Name	FFG Act
Alpine Bog Community	L
<i>Caltha introloba</i> Herbland Community	L

APPENDIX 7- Exotic flora within the Resorts

Recorded within 5 km of centre of study area, DSE Flora Information System (FIS 2005)

*Regionally controlled within the Goulburn Broken CMA region

Additional Species:

- ¹ - Species lodged at the National Herbarium, not recorded within the FIS.
- ² - Species listed by Mount Buller Resort Management (2004).
- ³ - Species listed by Aberystwyth Professional Services (1997).

Family	Taxon	Common Name
MONOCOTYLEDONS		
Juncaceae		
	<i>Juncus articulatus</i>	Jointed Rush
	<i>Juncus effusus</i> ²	Soft Rush
	<i>Juncus ensifolius</i>	Sword Rush
Poaceae		
	<i>Agrostis capillaris</i>	Brown-top Bent
	<i>Alopecurus pratensis</i>	Meadow Fox-tail
	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
	<i>Dactylis glomerata</i>	Cocksfoot
	<i>Festuca rubra</i>	Red Fescue
	<i>Holcus lanatus</i>	Yorkshire Fog
	<i>Lolium perenne</i>	Perennial Rye-grass
	<i>Phleum pratense</i> ¹	Timothy Grass
	<i>Poa annua</i>	Annual Meadow-grass
	<i>Poa pratensis</i>	Kentucky Blue-grass
	<i>Vulpia bromoides</i> ³	Squirrel-tail Fescue
DICOTYLEDONS		
Aceraceae		
	<i>Acer pseudoplatanus</i> ²	Sycamore Maple
Apiaceae		
	<i>Pastinaca sativa</i> ¹	Parsnip
Asteraceae		
	<i>Aster novi-belgii</i> ¹	Michaelmas Daisy
	<i>Achillea millefolium</i>	Yarrow
	<i>Cirsium vulgare</i>	Spear Thistle
	<i>Crepis capillaris</i>	Smooth Hawksbeard
	<i>Crepis</i> spp.	Hawksbeard
	<i>Hieracium aurantiacum</i>	Orange Hawkweed
	<i>Hypochoeris radicata</i>	Cat's Ear
	<i>Leucanthemum maximum</i>	Shasta Daisy
	<i>Taraxacum officinale</i>	Garden Dandelion
	<i>Tanacetum parthenium</i> ³	Feverfew
Boraginaceae		
	<i>Echium plantagineum</i> ^{3*}	Paterson's Curse
	<i>Echium vulgare</i> ³	Viper's Bugloss
Caryophyllaceae		
	<i>Cerastium fontanum</i> subsp. <i>vulgare</i>	Common Mouse-ear Chickweed
	<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed
	<i>Dianthus barbatus</i>	Sweet William
	<i>Stellaria media</i>	Chickweed

Family	Taxon	Common Name
DICOTYLEDONS		
Clusiaceae		
	<i>Hypericum perforatum</i> subsp. <i>veronense</i> *	St John's Wort
Fabaceae		
	<i>Cytisus scoparius</i> *	English Broom
	<i>Lathyrus latifolius</i> ¹	Everlasting Pea
	<i>Lotus corniculatus</i> ³	Bird's-foot Trefoil
	<i>Lupinus</i> sp. ³	Lupin
	<i>Trifolium repens</i> var. <i>repens</i>	White Clover
Lamiaceae		
	<i>Mentha pulegium</i> ¹	Pennyroyal
	<i>Prunella vulgaris</i>	Self-heal
Onagraceae		
	<i>Epilobium ciliatum</i>	Glandular Willow-herb
Plantaginaceae		
	<i>Plantago lanceolata</i> ³	Ribwort
Polygonaceae		
	<i>Acetosella vulgaris</i>	Sheep Sorrel
	<i>Polygonum aviculare</i>	Hogweed
	<i>Rumex crispus</i>	Curled Dock
	<i>Rumex obtusifolius</i> subsp. <i>obtusifolius</i>	Broad-leaf Dock
	<i>Rumex pulcher</i> subsp. <i>pulcher</i>	Fiddle Dock
Ranunculaceae		
	<i>Aquilegia vulgaris</i>	Columbine
	<i>Ranunculus repens</i>	Creeping Buttercup
Rosaceae		
	<i>Aphanes arvensis</i>	Parsley Piert
	<i>Malus</i> spp.	Apple
	<i>Prunus cerasifera</i> ¹	Cherry Plum
	<i>Rosa rubiginosa</i> *	Sweet Briar
	<i>Rubus fruticosus</i> *	Blackberry
	<i>Rubus idaeus</i> ³	Raspberry
Salicaceae		
	<i>Salix</i> spp.	Willow
Scrophulariaceae		
	<i>Mimulus moschatus</i>	Musk Monkey-flower
	<i>Mimulus guttatus</i>	Monkey Musk
	<i>Verbascum virgatum</i> ²	Twiggy Mullein
Violaceae		
	<i>Viola arvensis</i>	Field Pansy

APPENDIX 8 - Terrestrial vertebrate and invertebrate fauna recorded within the Resorts

Key:

* introduced species

Common Name	Scientific Name
Birds	
Wonga Pigeon	<i>Leucosarcia melanoleuca</i>
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>
Wedge-tailed Eagle	<i>Aquila audax</i>
Black-shouldered Kite	<i>Elanus axillaris</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Black Falcon	<i>Falco subniger</i>
Brown Falcon	<i>Falco berigora</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
Southern Boobook	<i>Ninox novaeseelandiae</i>
Powerful Owl	<i>Ninox strenua</i>
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>
Australian King-Parrot	<i>Alisterus scapularis</i>
Crimson Rosella	<i>Platycercus elegans</i>
Eastern Rosella	<i>Platycercus eximius</i>
Tawny Frogmouth	<i>Podargus strigoides</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>
Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>
Superb Lyrebird	<i>Menura novaehollandiae</i>
Grey Fantail	<i>Rhipidura fuliginosa</i>
Satin Flycatcher	<i>Myiagra cyanoleuca</i>
Scarlet Robin	<i>Petroica multicolor</i>
Flame Robin	<i>Petroica phoenicea</i>
Pink Robin	<i>Petroica rodinogaster</i>
Rose Robin	<i>Petroica rosea</i>
Eastern Yellow Robin	<i>Eopsaltria australis</i>
Golden Whistler	<i>Pachycephala pectoralis</i>
Rufous Whistler	<i>Pachycephala rufiventris</i>
Olive Whistler	<i>Pachycephala olivacea</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>
Striated Thornbill	<i>Acanthiza lineata</i>
Brown Thornbill	<i>Acanthiza pusilla</i>
White-browed Scrubwren	<i>Sericornis frontalis</i>
Pilotbird	<i>Pycnoptilus floccosus</i>
Superb Fairy-wren	<i>Malurus cyaneus</i>
White-throated Treecreeper	<i>Cormobates leucophaeus</i>
Spotted Pardalote	<i>Pardalotus punctatus</i>
Silvereye	<i>Zosterops lateralis</i>
White-naped Honeyeater	<i>Melithreptus lunatus</i>

	Common Name	Scientific Name
	Birds cont.	
	Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>
	Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>
	Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>
	White-eared Honeyeater	<i>Lichenostomus leucotis</i>
	Crescent Honeyeater	<i>Phylidonyris pyrrhoptera</i>
	Red Wattlebird	<i>Anthochaera carunculata</i>
	Noisy Friarbird	<i>Philemon corniculatus</i>
	Richard's Pipit	<i>Anthus novaeseelandiae</i>
	Zebra Finch	<i>Taeniopygia guttata</i>
	Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>
	Pied Currawong	<i>Strepera graculina</i>
	Grey Currawong	<i>Strepera versicolor</i>
	Bassian Thrush	<i>Zoothera lunulata</i>
	Australian Raven	<i>Corvus coronoides</i>
	Little Raven	<i>Corvus mellori</i>
	Striated Pardalote	<i>Pardalotus striatus</i>
*	European Goldfinch	<i>Carduelis carduelis</i>
	Mammals	
	Platypus	<i>Ornithorhynchus anatinus</i>
	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>
	Agile Antechinus	<i>Antechinus agilis</i>
	Dusky Antechinus	<i>Antechinus swainsonii</i>
	Long-nosed Bandicoot	<i>Perameles nasuta</i>
	Common Brushtail Possum	<i>Trichosurus vulpecula</i>
	Mountain Brushtail Possum	<i>Trichosurus caninus</i>
	Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>
	Greater Glider	<i>Petauroides volans</i>
	Yellow-bellied Glider	<i>Petaurus australis</i>
	Sugar Glider	<i>Petaurus breviceps</i>
	Eastern Pygmy-possum	<i>Cercartetus nanus</i>
	Mountain Pygmy-possum	<i>Burramys parvus</i>
	Common Wombat	<i>Vombatus ursinus</i>
	Black Wallaby	<i>Wallabia bicolor</i>
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>
	White-striped Freetail Bat	<i>Tadarida australis</i>
	Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>
	Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>
	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>
	Chocolate Wattled Bat	<i>Chalinolobus morio</i>
	Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>
	Southern Forest Bat	<i>Vespadelus regulus</i>
	Large Forest Bat	<i>Vespadelus darlingtoni</i>
	Bush Rat	<i>Rattus fuscipes</i>
	Broad-toothed Rat	<i>Mastacomys fuscus</i>
*	European Rabbit	<i>Oryctolagus cuniculus</i>
	Dingo/Dog (feral)	<i>Canis familiaris</i>
*	Red Fox	<i>Canis vulpes</i>

	Common Name	Scientific Name
	Mammals cont.	
*	Cat (feral)	<i>Felis catus</i>
	unidentified Eptesicus	<i>Eptesicus</i> sp.
	unidentified deer	Deer sp.
	Freetail Bat (eastern form)	<i>Mormopterus</i> sp. EG
	Reptiles	
	Delicate Skink	<i>Lampropholis delicata</i>
	Coventry's Skink	<i>Niveoscincus coventryi</i>
	Spencer's Skink	<i>Pseudemoia spenceri</i>
	White-lipped Snake	<i>Drysdalia coronoides</i>
	Southern Water Skink	<i>Eulamprus tympanum tympanum</i>
	Highland Copperhead	<i>Austrelaps ramsayi</i>
	unidentified scincid	<i>Scincidae</i> sp.
	Alpine Bog Skink	<i>Pseudemoia cryodroma</i>
	Tussock Skink	<i>Pseudemoia pagenstecheri</i>
	unidentified grass skink	<i>Pseudemoia</i> sp.
	Victorian Smooth Froglet	<i>Geocrinia victoriana</i>
	Brown Toadlet	<i>Pseudophryne bibronii</i>
	Common Froglet	<i>Crinia signifera</i>
	Plains Brown Tree Frog	<i>Litoria paraewingi</i>
	Alpine Tree Frog	<i>Litoria verreauxii alpina</i>
	Fish	
*	Rainbow Trout	<i>Oncorhynchus mykiss</i>
*	Brown Trout	<i>Salmo trutta</i>
	Invertebrates	
	Stonefly (5001)	<i>Thaumatoperla flaveola</i>
	Stonefly (5020)	<i>Riekoperla isosceles</i>
	Caddisfly (5022)	<i>Tamasia furcilla</i>
	Planarian (5052)	<i>Spathula tryssa</i>
	Planarian sp1	<i>Planarian</i> sp1 (RSC)

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Relevant Legislation & Policy

Commonwealth

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State

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Archaeological and Aboriginal Relics Preservation Act 1972

Catchment and Land Protection Act 1994

Conservation Forests and Lands Act 1987

Country Fire Authority Act 1958

Emergency Management Act 1986

Environment Protection Act 1970

Safe Drinking Water Act 2003

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State Environment Protection Policy – Air Quality Management 2001

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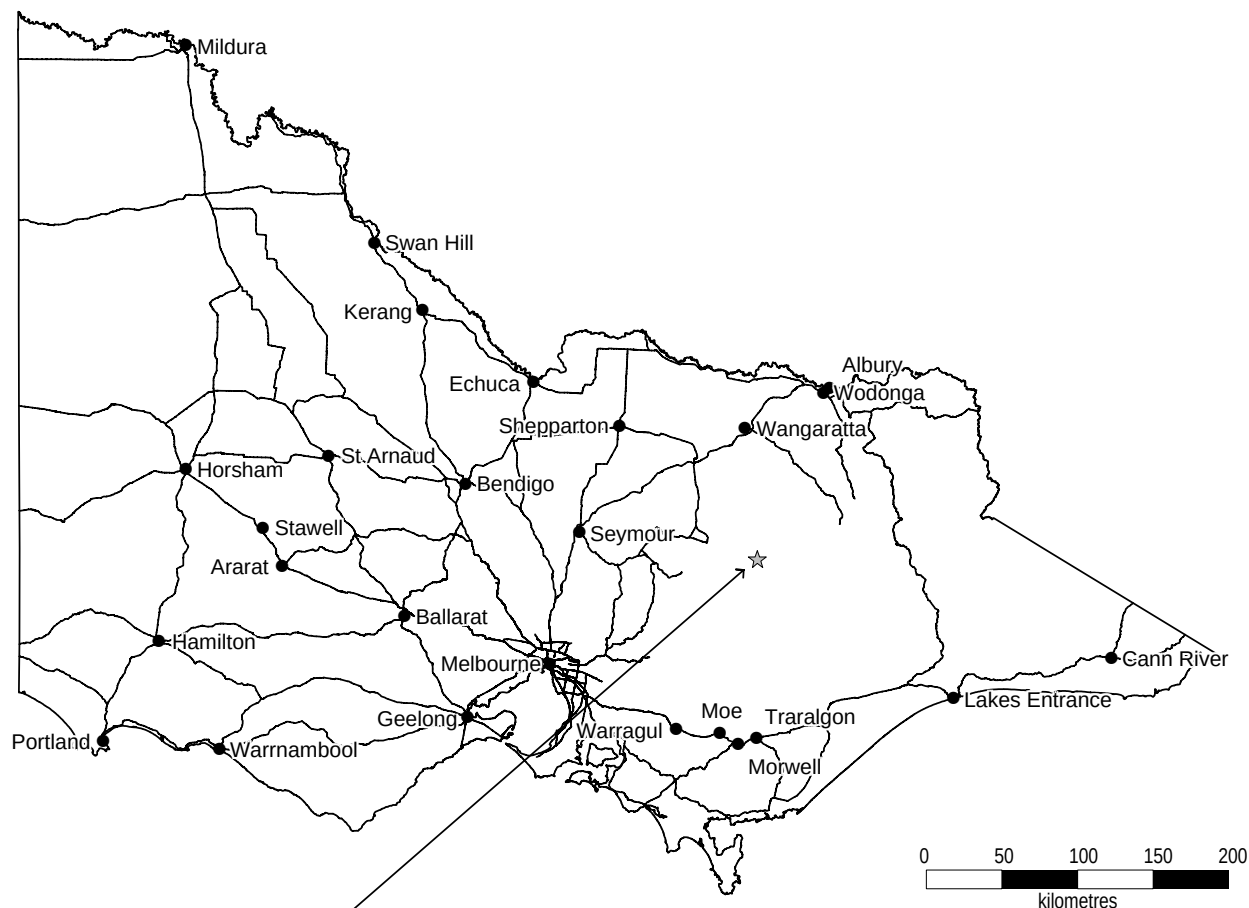
Victoria's Biodiversity Strategy, NRE, 1997

Water Act 1989

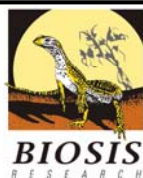
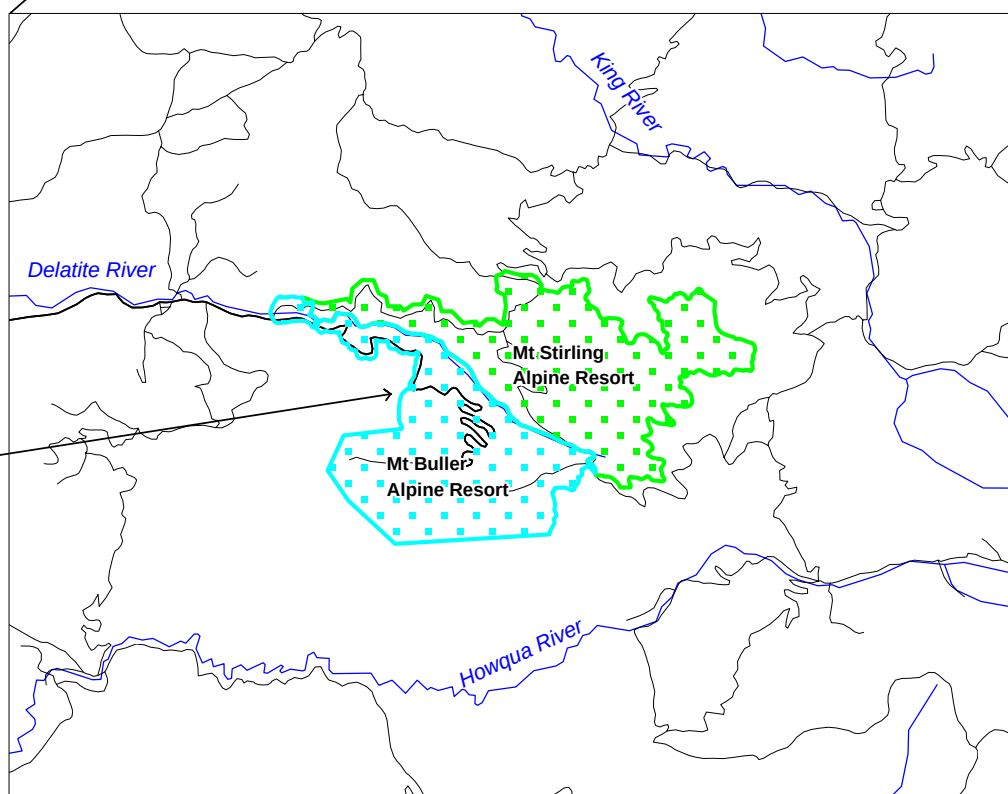
Wildlife Act 1975

Wildlife (Regulations) 2002

Maps



Study areas



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Figure 1: Regional locality plan for the Mount Buller and Mount Stirling Alpine Resorts.

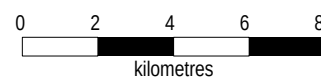
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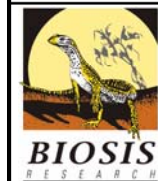
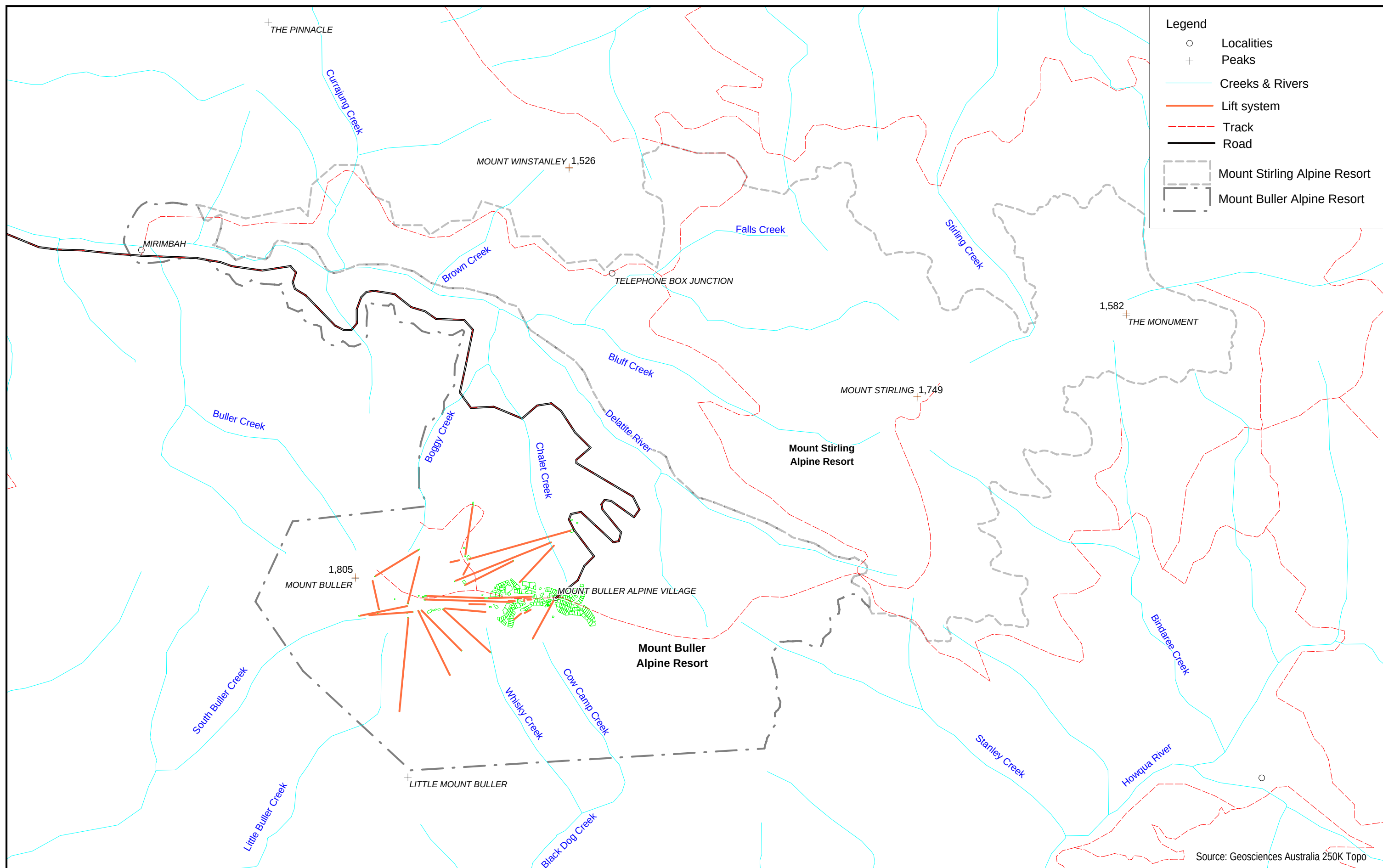
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Figure 2: The Mount Buller and Mount Stirling Alpine Resorts (major rivers and creeks, roads, localities and ski lifts).

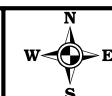
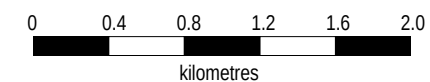
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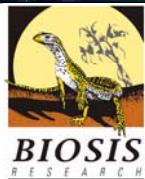
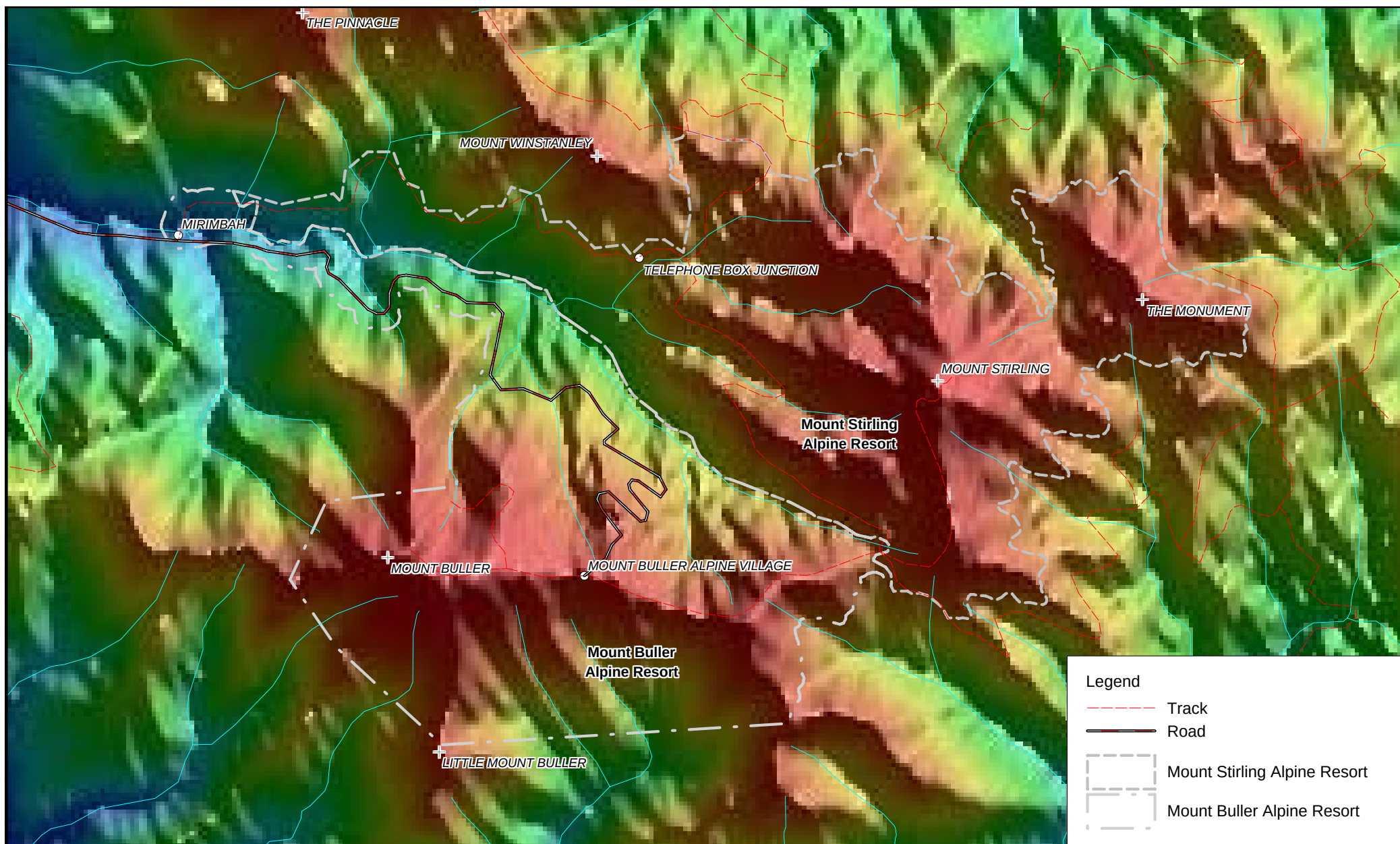
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Figure 4: Digital terrain model of the Mount Buller and Mount Stirling Alpine Resorts.

Source: DSE, Victoria gridded DTM data
Geosciences Australia 250K Topo

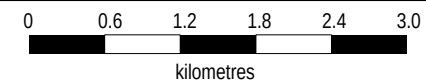
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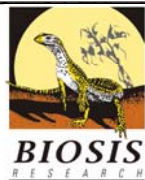
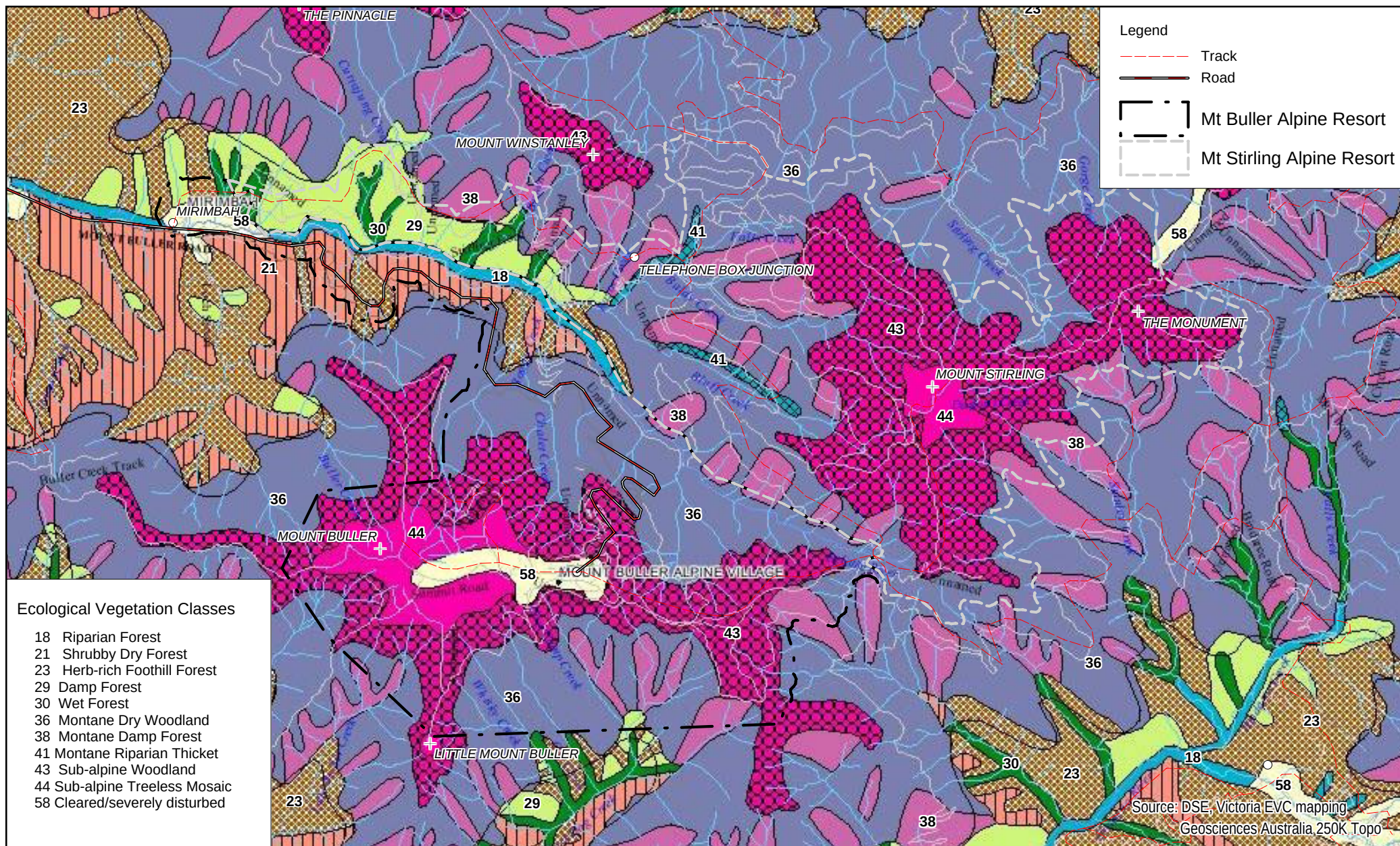
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Figure 5: Extant Ecological Vegetation Classes within the Mount Buller and Mount Stirling Alpine Resorts.

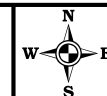
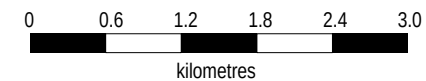
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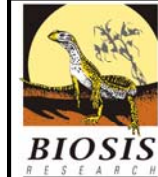
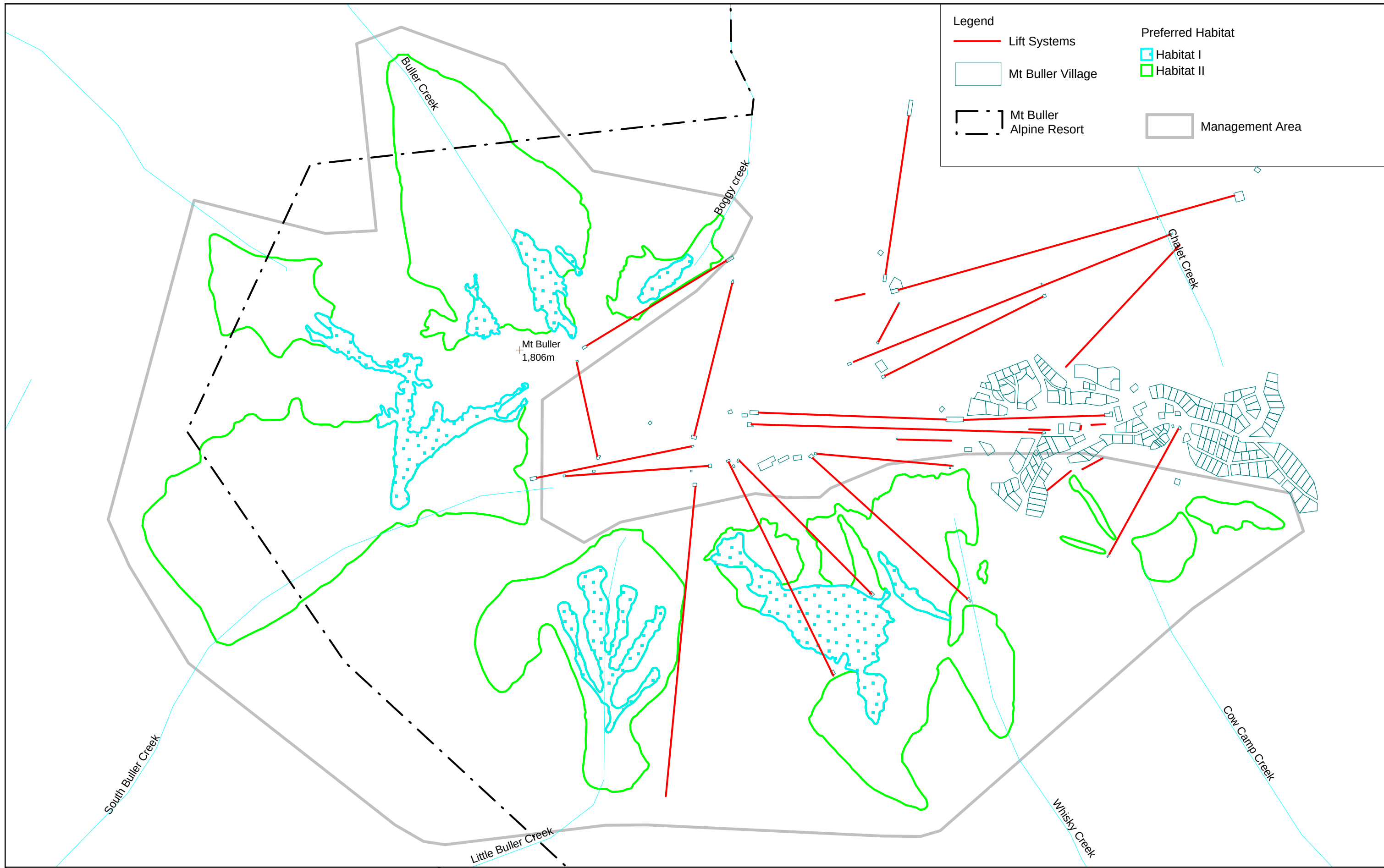
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Figure 6: Mountain Pygmy-possum habitat within the Mount Buller Alpine Resort.

DATE: 3 July 2006

Checked by: AJH

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Location: ...MRG 5300s\5320\Mapping\5320 Fig 6.wor

Scale:

