
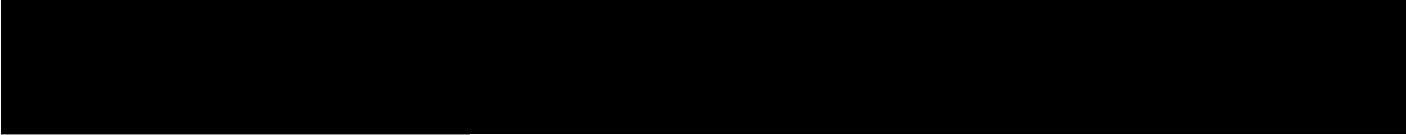


**Mount Buller and Mount
Stirling Alpine Resorts:
Environmental
Management Plan**

March 2007



Mount Buller and Mount Stirling Alpine Resorts: Environmental Management Plan

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ABBREVIATIONS

AAV	Aboriginal Affairs Victoria (Heritage Services Branch)
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
DEH	Department of the Environment and Heritage
DCNR	former Department of Conservation and Natural Resources
DSE	Department of Sustainability and Environment
DNRE	former Department of Natural Resources 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)
WWTP	Wastewater Treatment Plant

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1.0 INTRODUCTION

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 recently published *Alpine Resorts 2020 Strategy* (the strategy) (DSE 2004). This strategy was prepared by the Victorian government to guide the long term planning and management of Victoria's alpine resorts. The strategy identified a future vision for all Victorian alpine resorts of:

Four season, vibrant, sustainable resorts.

The strategy identifies that future management and development of alpine resorts will be undertaken within an ecologically sustainable framework. This EMP is consistent with the future vision and provides the basis for the sustainable ongoing management of the natural and cultural heritage values of the Resorts, and is aligned with the Corporate, Business, Strategic and Stormwater Management Plans for the Resorts, the Mount Stirling Environmental Effects Statement (EES) and the Recovery Plan for the Mountain Pygmy-possum on Mount Buller. These documents provide valuable background information and should be read in conjunction with this EMP.

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.

1.1 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.

1.2 Climate

The predominant precipitation bearing winds come from the west and south west. The average total annual precipitation, including snowfall and rain fall, is 1,580mm 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.

1.3 Land Use

The Resorts are utilised for a range of winter and summer recreation activities. Winter activities include: downhill and cross-country skiing, snowboarding and snowplay. Summer activities include: bushwalking, camping, mountain biking, horse riding and four wheel driving.

2.0 ENVIRONMENTAL POLICY

The Mount Buller and Mount Stirling Alpine Resort Management Board will strive to manage the Resort's natural and cultural values in an ecologically sustainable framework that protects, enhances and restores those values.

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 fulfil 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 performance and for the prevention of pollution through the implementation of this EMP.

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 the 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

5. Incorporating environmental provisions into business, planning and operating procedures and ensuring all costs associated with meeting environmental objectives and implementing actions are budgeted.

Consultation

6. 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

7. Communicating environmental programs to stakeholders by publishing and promoting this policy and annual objectives and actions.

Promotion

8. Promoting a greater understanding of the values of the Resorts through education and support of research.

3.0 ENVIRONMENTAL MANAGEMENT

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* and *Alpine Resorts (Management) Amendment Act 2004*. Under these acts 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.

To facilitate sustainable management of the Resorts, the EMP has been divided into four sections, natural heritage, cultural heritage, sustainability and community awareness and involvement. 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.

Legislative Framework –the relevant legislative acts and policies (Commonwealth and State) as they pertain to specific values within the Resorts.

Other Requirements – additional relevant policies or plans.

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.

(refer to Section 3.1 EMS Terms and Conditions)

Environmental management within the Resorts is to be governed by the objectives and actions presented in this EMP. The EMP is an important first step in gathering and distilling all the relevant background information for the Resorts and combining it into one plan, with common objectives, targets and actions. The EMP represents a focal point for environmental management within the Resorts and is to be used as a reference by all ARMB staff and the Resorts stakeholders.

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.

3.1 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).

EMS Terms and Definitions relevant to this EMP include:

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.

3.1.1 ARMB Aspects and Impacts

‘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 our own 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.

3.1.2 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 concerns (e.g. greenhouse, ESD, biodiversity conservation)	State	Some public concern (e.g. complaints). Possible media 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.

4.0 NATURAL HERITAGE

4.1 Geological and 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).

Legislative Framework

Planning and Environment Act 1987

The *Planning and Environment Act 1987* establishes a framework for planning use, development and protection of land in Victoria. 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.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Mount Stirling EES

Target

- All development applications adequately address the requirements of EMO1.

Actions

The ARMB will:

- (a) Seek the advice of geotechnical specialists where ARMB developments or other ARMB actions may impact upon significant geological sites.
- (b) 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.
- (c) Ensure that the application requirements of EMO1 (cl. 44.01-4) are applied to all development proposals where required.

4.2 Soil conservation

Objective

To conserve and manage the soil resources of 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).

Legislative Framework

Catchment and Land Protection Act 1994

Conservation Forests and Lands Act 1987

The *Catchment and Land Protection Act 1994* contains provisions relating to land management and noxious weeds, 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; and
- Conserve soil.

The *Conservation Forests and Lands Act 1987* 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.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Mount Stirling EES

Target

- Reduce bare earth, excluding tracks and roads, within the Resorts.

Actions

The ARMB will:

- (a) Seek the advice of soil specialists in cases where ARMB developments or other ARMB actions may impact upon the soil.
- (b) Discourage the importation of soil from outside the Resorts. If soil is to be imported weed-free certification must be provided.
- (c) 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.
- (d) Recommend that surplus topsoil excavated during approved works is stockpiled for use in subsequent works.
- (e) Recommend and promote the immediate repair of rehabilitated areas where these are damaged by storm events prior to or immediately following works completion.
- (f) Routinely address remedial measures for disturbed ARMB sites in annual environmental works program.

4.3 Rivers and catchments

Objectives

To manage all ARMB activities including development and maintenance works to conserve and enhance catchment values and water resources of the Resorts.

To enhance the ecological integrity of natural waterways within the Resorts and adjacent land.

To continue to provide high quality potable water for current and projected domestic use requirements within the Resorts.

To treat wastewater to a very high standard and to utilise it for snowmaking.

Background

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 that exist within the Mount Buller (Figure 2) Resort include:

- Delatite River tributaries:
 - Boggy Creek;
 - Buller Creek; and
 - Chalet Creek.
- Howqua River tributaries:
 - Black Dog Creek;
 - Cow Camp Creek;
 - Gin Creek;
 - Whisky Creek;
 - Little Buller Creek; and
 - South Buller Creek.

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 2005 identified the WWTP effluent as having a negligible effect on the Howqua River downstream from the confluence of Black Dog Creek. The Delatite River results were also within acceptable levels (McKelvie and Grace 2006).

Named waterways and/or headwaters that exist within the Mount Stirling (Figure 2) Resort include:

- Delatite River tributaries:
 - Falls Creek;
 - Baldy Creek;
 - Bluff Creek;
 - Razor Creek;
 - Brown Creek; and
 - Currajung Creek.
- Howqua River tributaries:
 - Dugout Creek;
 - Stanley Creek; and
 - Bindaree Creek.
- King River tributaries:
 - Gorge Creek; and
 - Stirling Creek.

Water supply for the Mount Stirling area of the Resort is sourced from Falls 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. The SMP identified that the receiving waterways and riparian environments of all five sub catchments are considered to be of high environmental, social and economic value. Threat types, the nature of pollution and the sources of pollution were identified for each sub catchment by the SMP. A risk assessment approach was used to evaluate the risk that stormwater poses to the identified values. 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.

Legislative Framework

Catchment and Land Protection Act 1994

Environment Protection Act 1970 – SEPP Waters of Victoria 2003

Heritage Rivers Act 1992

Water Act 1989

The *Catchment and Land Protection Act 1994* 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. The Act sets out the responsibilities of land managers (public and private), including the ARMB, stating that they must take all reasonable steps to:

- Protect water resources.

The *SEPP Waters of Victoria 2003* provides a legal framework for state and local government agencies, businesses and communities to work together to protect and rehabilitate Victoria's surface water environments. It establishes beneficial uses of waterways that require protection within the Highlands segment of Victoria. Those that are relevant to the Resorts include:

- Maintenance of natural aquatic ecosystems and aquatic wildlife.
- Passage of indigenous fish.
- Maintenance of indigenous riparian vegetation.
- Water based recreation
- Indigenous and non-indigenous cultural and spiritual values.
- Commercial and recreational use of edible fish, crustacea and molluscs.
- Agricultural water supply.
- Potable water supply.
- Other industrial and commercial use.

Impacts to surface water quality must not exceed water quality objectives specified to protect beneficial uses. Relevant clauses must be adhered to. Of particular relevance to the Resorts are clauses:

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

The *Heritage Rivers Act 1992* 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.

The *Water Act 1989* 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.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy
- Mount Stirling EES

Targets

- Compliance with EPA licence conditions for the WWTP.
- Water quality and biological indicators for the Highlands segment of the *SEPP Waters of Victoria 2003*.
- Continuing minimisation of potable water use per visitor per day.
- A fully functional system for water re-use should be completed by 2010.

Actions

The ARMB will:

- (a) Have regard for the Goulburn Broken and North Eastern Regional River Health Strategies (RRHS) and Catchment Management Strategies (CMS).
- (b) Protect the habitat of any identified threatened and endangered aquatic species and communities listed under the FFG Act 1988 and/or EPBC Act 1999, from inappropriate development.
- (c) 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.
- (d) Where absolutely necessary, support the minimal removal, and full rehabilitation of the extent and quality of native aquatic and riparian

vegetation.

- (e) 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.
- (f) 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.
- (g) Promote minimisation of land disturbance, soil erosion and the ultimate discharge of sediments and other pollutants to surface waters for works undertaken within the Resorts. This can be achieved by implementing where applicable and promoting effective management practices consistent with EPA guidelines, including Environmental Guidelines for Major Construction Sites (1996) and Construction Techniques for Sediment Pollution Control (1991).
- (h) Seek funding for and implement the stormwater management strategies outlined within the SMP (WBM, 2005).
- (i) Continue to comply with conditions specified under any existing or future EPA licences (e.g. the Sewage Treatment Plant EPA discharge licence conditions and monitoring requirements).
- (j) 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. The quality of water within the Resorts should be maintained at or above these levels.
- (k) Encourage the reduction of potable water use per visitor per day.
- (l) Develop and implement a roads and tracks management strategy to minimise the amount of sediment discharged into the environment from vehicular movements within the Resorts.
- (m) Complete water for re-use pipeline by June 2007 and undertake trials during 2008/09.
- (n) Investigate jointly funded position by ARMB and DSE to enforce planning permit conditions and mitigate environmental impacts arising from developments within the Resorts.

4.4 Flora

4.4.1 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 ten Ecological Vegetation Classes (EVCs) and one mosaic within the Resorts (Table 1 and Figure 5).

Table 1. Ecological Vegetation Classes within the Mount Buller and Mount Stirling Alpine Resorts.

EVC#	Ecological Vegetation Class	Conservation Significance
29	Damp Forest	Least Concern
23	Herb-rich Foothill Forest	Least Concern
38	Montane Damp Forest	Least Concern
36	Montane Dry Woodland	Least Concern
41	Montane Riparian Thicket	Least Concern
156	Alpine Coniferous Shrubland#	Vulnerable
18	Riparian Forest	Least Concern
21	Shrubby Dry Forest	Least Concern
44	Sub-alpine Treeless Mosaic*	Vulnerable
43	Sub-alpine Woodland	Least Concern
30	Wet Forest	Least Concern

#Mapped as Sub-alpine Treeless Mosaic.

**This EVC is a mapping unit only, which comprises a number of EVCs that cannot be differentiated at the scale of mapping. Descriptions of EVCs within this unit are yet to be formalised and are still in draft form.*

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 *Burramys 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.

Legislative Framework

Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* provides for the management of threatened and potentially threatened flora species and communities. The FFG Act also provides for the listing of flora taxa and the flora of listed communities on a list of Protected Flora. 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.

Planning and Environment Act 1987

The *Planning and Environment Act 1987* establishes a framework for planning the use, development and protection of land in Victoria. It provides for the creation of Planning Provisions, creation of and amendment of Planning Schemes (for the Resorts the relevant scheme is the Alpine Resorts Planning Scheme), creates a system for obtaining a planning permit and creates enforcement measures for breach of the Act, planning schemes or a planning permit.

Clauses 11 and 15.09 in the State Planning Policy Framework provide the broad framework for considering native vegetation (viz. indigenous flora) 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).

The framework is available at www.dse.vic.gov.au/nativevegetation

A three-step approach has been designed in the Framework for the achievement

of a Net Gain (DNRE 2002);

1. Explore options to avoid adverse impacts;
2. If there are no options to avoid impacts, explore options to minimise impacts through appropriate consideration in planning processes and expert input to project design or management; and
3. Only after steps 1 and 2, identify appropriate offsets.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy
- Mount Stirling EES

Target

- Net Gain in the extent and quality of native vegetation within the Resorts.

Actions

The ARMB will:

- (a) Undertake detailed mapping and identification of the extant EVCs within the Resorts, particularly within the treeless areas covering the Mount Buller and Mount Stirling ski fields.
- (b) Prepare a Resorts Vegetation Management Plan that considers the requirements of *Victoria's Native Vegetation Framework* (DNRE 2002).
- (c) Recommend and facilitate the application of the Net Gain three-step process where development or other actions may impact upon indigenous flora.
- (d) Seek the advice of specialists where ARMB developments or other ARMB actions may impact upon indigenous flora.
- (e) Protect the habitats of rare or threatened flora and fauna.
- (f) Where approved works are being undertaken within the Resorts, assist DSE to ensure compliance with all conditions as required by agencies to minimise the disturbance of vegetation during construction.
- (g) Revegetate areas disturbed by ARMB works as soon as possible after

disturbance using locally indigenous plant stock (refer ARMB 2005a).

- (h) Investigate opportunities to permanently exclude cattle from straying into the Resorts.

4.4.2 Rare or threatened plants and 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 Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as potentially occurring 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 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.

Legislative Framework

Environment Protection and Biodiversity Conservation Act 1999

Flora and Fauna Guarantee Act 1988

The *Environment Protection and Biodiversity Conservation Act 1999* 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.

The *Flora and Fauna Guarantee Act 1988* provides for the management of threatened and potentially threatened flora species and communities. 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.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy
- Mount Stirling EES

Target

- Protect rare or threatened plants or plant communities.

Actions

The ARMB will:

- (a) Seek the advice of plant ecologists where ARMB developments or other ARMB actions may impact upon rare or threatened plants and plant communities.
- (b) 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.
- (c) Map and collate accurate up-to-date data on rare or threatened plants and

plant communities within the Resorts.

- (d) Undertake an early Spring survey to determine the status and extent of Alpine Marsh-marigold within the Resorts.
- (e) Recommend monitoring of rare or threatened plants or plant communities in areas subject to development. Monitoring results will be used to measure the success of management practices in maintaining or improving the conservation status of these species, and refining management practices as required.

4.4.3 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.

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.

Yarrow is also considered a very high threat as it has shown the potential to spread from disturbed areas into indigenous vegetation (Johnston and Pickering

2001).

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.

The status (including extent and viability) of exotic flora within the Resorts has not been accurately assessed, however a general exotic species list had been generated from the FIS (2005 version) and relevant surveys conducted within the Resorts (Table A2.4).

Legislative Framework

Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act 1994* contains provisions relating to land management and noxious weeds, stating that land managers must take all reasonable steps to:

- Eradicate regionally prohibited weeds (see Appendix 2.3); and
- Prevent the growth and spread of regionally controlled weeds.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy
- Mount Buller and Mount Stirling Planting Guide
- ARMB Exotic Plant Policy

Target

- Conduct 20 person days of weed control per annum.

Actions

The ARMB will:

- (a) Develop and implement a detailed weed control strategy incorporating weed mapping, population and threat assessments, monitoring, identification of new, priority and target species, and outline an annual weed management program.
- (b) Continue to implement its 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.
- (c) Investigate the feasibility of conducting a joint weed control program as part of the weed control strategy, with the Department of Sustainability and Environment, Parks Victoria and Goulburn Broken CMA, focussing on high priority weed species.
- (d) Support and recommend that disturbed areas are revegetated as soon as possible after disturbance using locally indigenous plants (refer ARMB 2005a).
- (e) Not permit the establishment of ornamental exotic flora within the Resorts, including all leased sites.
- (f) Investigate opportunities and collaborate where possible with Parks Victoria, DSE and GBCMA regarding integrated management of weed species.

4.5 Fauna

4.5.1 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 within the Resorts.

Legislative Framework

Flora and Fauna Guarantee Act 1988

Wildlife Act 1975

The *Flora and Fauna Guarantee Act 1988* provides for the listing of taxa and communities of fauna which are threatened, and potentially threatening processes. The Act also contains powers over the taking, trading and keeping of listed fish.

The *Wildlife Act 1975* 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*.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy
- Mount Stirling EES

Actions

The ARMB will:

- (a) Implement appropriate measures for the protection of indigenous fauna when undertaking approved ARMB works.
- (b) Seek the advice of specialists where ARMB developments or other ARMB actions may impact upon indigenous fauna.
- (c) Discourage the use of snap – traps and/or poison bait within the Resorts.

4.5.2 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. The Mountain Pygmy-possum was discovered on Mount Buller in 1996 (Heinze and Williams 1998).

The main habitat lies on the southern slopes and comprises the area from Fanny's Finish ski run to Standard ski run. Within this area, the best habitat is in the Fanny's Finish area, Wombat Bowl and Federation Bowl. There is also habitat on the northern slopes of the summit (Figure 6). This is largely outside the ski field, and appears to support a relatively significant proportion of the total Mount Buller population. In 1996 the population of Mountain Pygmy-possum at Mount Buller was estimated at 300 adult females. Recent surveys have seen this estimate drop to 150 in 2002, and to less than 100 in 2003 and 2004 (Heinze 2006).

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 level of impact has increased significantly since the 1980s with the development of a number of new ski runs and with more intensive management of the ski areas to maximise skiing capacity. The population at Mount Buller is now at

critically low levels and urgent management action is required to address this situation (see Recovery Plan (ARMB 2005b)).

Broad-toothed Rat

The near threatened *Mastacomys fuscus* Broad-toothed Rat 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. Breeding occurs in spring and summer and females usually produce two litters of one to three young during each breeding season (Menkhorst 1995).

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).

Other significant terrestrial 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 nationally endangered *Litoria verreauxii alpina* Alpine Tree Frog has not been recorded from the Mount Buller Resort since 1959 (AVW 2005) and may no longer persist. 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). The species now persists at only a few isolated sites near the Mount Hotham Resort and Dinner Plain and it is found in relatively deep, well-vegetated artificial water bodies at lower elevations (1300 – 1600m in Victoria) (Osborne and Hunter 2003; Osborne *et al.* 1999).

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 (1999) 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 (all are considered Vulnerable) have been detected within the Resorts (Appendix 3.1). One of these, a species of stonefly *Riekoperla isosceles* is thought to be endemic to an area near the summit of Mount Buller. The other species, *Thaumatoperla flaveola* Alpine (Mount Stirling) Stonefly and *Tamasia furcilla* a caddisfly, are also restricted to alpine areas but display slightly broader distributions. 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.

Legislative Framework

Environment Protection and Biodiversity Conservation Act 1999

Flora and Fauna Guarantee Act 1988

The *Environment Protection and Biodiversity Conservation Act 1999* covers matters of national environmental significance and provides protection for listed species and communities, including listed fauna. Permits are required under the EPBC Act 1999 for all activities and/or actions that may have a significant impact on listed species or communities.

The *Flora and Fauna Guarantee Act 1988* provides for the management of

threatened and potentially threatened fauna species.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria’s Biodiversity Strategy
- Mount Stirling EES

Targets

- A Mountain pygmy-possum population within the Mount Buller Resort showing normal social function
- Protect rare or threatened fauna within the Resorts

Actions

The ARMB will:

- (a) Seek the advice of specialists where ARMB developments or other ARMB actions may impact upon rare or threatened fauna.
- (b) Implement and maintain appropriate measures as outlined in Action Statements (developed under the FFG Act 1988), conservation management plans and guidelines for rare or threatened fauna within the Resorts.
- (c) Ensure that general and site-specific management prescriptions and guidelines for the Mountain Pygmy-possum as outlined in the Mountain Pygmy Possum Recovery Plan are implemented and followed (refer ARMB 2005b).
- (d) Undertake monitoring, where appropriate, of rare or threatened fauna within the Resorts

4.5.3 Introduced fauna

Objective

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

Background

Nine introduced vertebrate fauna species have been recorded within the Resort including six mammals (i.e. Cattle, European Red Fox, Feral Cat, Feral Dog, Rabbit and Sambar Deer), one bird (European Goldfinch) and two fish (Brown Trout and Rainbow Trout). The species posing the most significant threat to biodiversity within the Resorts are the European Red Fox, Feral Cat and Rabbit.

The Rabbit is an introduced herbivore that threatens indigenous vegetation and the European Red Fox, Feral Cat and Feral Dog are introduced carnivorous predators that threaten native wildlife. European Red Foxes and Feral Cats within the Mount Buller Resort are known predators of the Mountain Pygmy-possum. Predation by European Red Foxes and Feral Cats on native wildlife is listed as a threatening process under the FFG Act 1988.

The ARMB has prepared and 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 Dog control is undertaken by an authorised Dog Trapper from DSE Mansfield.

The ARMB has also 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 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 trained for remote search and rescue handled by ARMB staff.

Domestic cats are not permitted within either of the Resorts.

Cattle stray from State Forest into the Mount Stirling Alpine Resort and damage ski trails and affect snow holding capacity. They damage ski trails by altering water drainage and increasing erosion. They also impact on the ability of ARMB staff to maintain ski trails by grazing on straw mulch and damaging planted tube stock.

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.

Legislative Framework

Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act 1994* contains provisions relating to pest animals, stating that land managers must take all reasonable steps to:

- Prevent the spread of, and as far as possible eradicate, established pest animals.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy
- ARMB Dog Policy
- ARMB Integrated Pest Animal Management Plan

Targets

- Continued implementation of the Pest Animal Control Program
- Less than 1% of introduced predator scats contain remains of the Mountain Pygmy-possum
- Permanent exclusion of cattle from the Mount Stirling Resort by 2008

Actions

The ARMB will:

- (a) Continue to implement the ARMB's Pest Animal Control Program within the Resorts (see ARMB 2005c). The plan should be reviewed annually based on the previous years results.
- (b) As a priority, develop and implement improved winter monitoring and control of European Red Foxes and Feral Cats.

- (c) Maintain the current policy of no domestic cats within the Resorts.
- (d) Implement and periodically review Policy Guideline 7.1. (Dogs)
- (e) 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.
- (f) Monitor, and manage where appropriate, the impact of Deer on revegetation or regeneration of Mountain Pygmy-possum habitat.
- (g) In collaboration with DSE will implement a strategy to ensure that cattle are excluded from the Mount Stirling Alpine Resort.
- (h) Investigate opportunities and collaborate where possible with Parks Victoria, DSE and GBCMA regarding integrated management of weed species.
- (i) Install improved signage and offer improved point-of-contact information regarding the entry of domestic pets into the Resorts.

4.6 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. The last major fire in the area was the ‘Governors – Bluff’ fire in 1988.

Legislative Framework

Country Fire Authority Act 1958

Emergency Management Act 1986

Forests Act 1958

The *Country Fire Authority Act 1958* establishes the Country Fire Authority (CFA) whose role is to provide for the more effective control, prevention and suppression of fires in regional Victoria (i.e. outside the Metropolitan Fire District). The duty of the CFA is to prevent and suppress fires for the protection of life and property. This is to be undertaken in conjunction with other relevant public agencies (e.g. DSE).

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.

The *Forests Act 1958* 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.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Victoria's Biodiversity Strategy

Target

- Completion and implementation of the Fire Management Plan.

Actions

The ARMB will:

- (a) Develop a Fire Management Plan in conjunction with DSE, Parks Victoria, the Country Fire Authority and Buller Ski Lifts. The Fire Management Plan should be developed in accordance with recommendations contained within the *Report of the Inquiry into the 2002-2003 Victorian Bushfires*.
- (b) The Fire Management Plan will protect identified sensitive areas, including the requirements set out in the Recovery Plan for the Mountain Pygmy-possum at Mount Buller (ARMB 2005b).
- (c) The Fire Management Plan will consider: building design, building materials, siting of buildings, supply and capacity of services such as electricity, gas and water, provision of asset protection zones, potential control lines and types and location of vegetation (indigenous and exotic).
- (d) The Fire Management Plan should consider the provision and use of alternative evacuation and access routes to and from the Resorts in the event of wildfire.
- (e) Implement the Fire Management Plan once it is approved.

5.0 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

5.1.1 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*.

5.1.2 Previous Aboriginal archaeological sites and studies

Mount Buller Alpine Resort

One pre-contact Aboriginal archaeological site (Table 2) 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 Figure 6).

Table 2: Previously recorded pre-contact Aboriginal archaeological sites within the Mount Buller Alpine Resort.

AAV Numbers	Site	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 3).

Table 3: 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.

5.1.3 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.

Legislative Framework

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

Archaeological and Aboriginal Relics Preservation Act 1972

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).

The Commonwealth act deals with Aboriginal cultural property in a broader sense. This cultural property includes any places, objects and folklore that ‘are of particular significance to Aboriginals in accordance with Aboriginal tradition’. There is no cut-off date and the Act may apply to contemporary Aboriginal cultural property as well as older sites.

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.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Mount Stirling EES

Target

- Protect aboriginal archaeological sites within the Resorts

Actions

The ARMB will:

- (a) 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.
- (b) Seek the advice of a qualified archaeologist wherever proposed ARMB developments or other ARMB ground disturbance activities may impact upon recorded Aboriginal archaeological sites and areas of Aboriginal archaeological potential in accordance with the above actions.
- (c) 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

5.2.1 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 down hill ski runs.

5.2.2 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 4.

Table 4: 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 Govenor 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 were listed on the Heritage Inventory at Heritage Victoria (Table 5) 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 5: Previously recorded post-contact archaeological sites at Mount Stirling.

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

The RNE was searched for sites with in or near Mount Stirling. The listed places

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

Table 6: Previously recorded pre-contact Aboriginal archaeological sites within a ten kilometre radius of Mount Stirling.

Place ID no.	Site Name	Location
103435	Lovicks Hut	6 km east of Mount Stirling
103465	The Bluff Hut and Range	10 km south of Mount Stirling
103384	Craigs 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.

5.2.3 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.

Legislative Framework

Heritage Act 1995

The Victorian *Heritage Act 1995* details the statutory requirements for protecting

historic buildings and gardens, historic places and objects, historical archaeological sites, and historic shipwrecks. The Act is administered by Heritage Victoria, Department of Sustainability and Environment.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Mount Stirling EES

Target

- Protect post-settlement archaeological sites within the Resorts.

Actions

The ARMB will:

- (a) 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.
- (b) Seek the advice of a qualified archaeologist wherever proposed ARMB developments or other ARMB ground disturbance activities may impact upon recorded historical archaeological sites and areas of historical archaeological potential in accordance with the above actions.
- (c) Recommend that any recorded historical archaeological sites that will be impacted by ground disturbance works will require a Consent to Disturb from the Director at Heritage Victoria.

6.0 SUSTAINABILITY

6.1 Waste Management

Objectives

To appropriately and sensitively dispose of all putrescible waste generated

To actively promote and undertake a recycling program to minimise wastes sent 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.

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 volume of waste generation fluctuates depending on visitation, which is linked to seasonal variations in snowfall.

Current initiatives undertaken by the contractor in collaboration with the ARMB and NevRwaste (where noted) include:

- The development of a Local Education Strategy (funded by NevRwaste);
- The conversion of waste oil into bio diesel ;
- The implementation of a Sustainable Public Place Recycling project (funded by NevRwaste);

- The implementation of a Sustainable Ski Field Recycling project (in collaboration with Buller Ski Lifts; funded by Sustainability Victoria); and
- The implementation of a Butt Free High Country project to reduce cigarette butt litter in the Victorian Alps (funded by the Butt Litter Trust and NevRwaste)

Legislative Framework

Environment Protection (Prescribed Waste) Regulations 1998

Industrial Waste Management Policy (Prescribed Industrial Waste) 2000

Environment Protection Act 1970

The *Environment Protection (Prescribed Waste) Regulations 1998*, defines prescribed wastes and the way in which they must be transported. Prescribed wastes may pose a risk to human health and the environment if managed inappropriately. A waste producer must obtain from the waste transporter, a Transport Certificate carrying information as per Part A of Schedule 2.

The *Industrial Waste Management Policy (Prescribed Industrial Waste) 2000* requires prescribed industrial waste generators to manage their waste in line with the policy principles and intent such as the waste hierarchy, and in a manner that achieves the best environmental outcome.

Under Victoria's *Environment Protection Act 1970*, littering is illegal. The Environment Protection Act authorises the EPA, local government, police and other litter enforcement agencies to take action against offenders.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- ARMB Waste Wise Education Strategy

Targets

- Develop an effective data system to measure waste to landfill per visitor and aim to reduce visitor waste going to landfill to 1.25 kg/per visitor by October 2010.
- Continual increase in percentage of waste recycled with corresponding

decrease in waste to landfill.

Actions

The ARMB will:

- (a) Ensure waste collection, transportation and disposal facilities are operated and maintained in accordance with EPA requirements.
- (b) Ensure all future waste collection and disposal facilities and procedures within the Resorts are carried out with minimal environmental impact.
- (c) Actively promote and support a recycling program throughout the Resorts.
- (d) Encourage all commercial accommodation and restaurant establishments to store used cooking oils appropriately for transport off-mountain and EPA approved disposal.
- (e) Investigate options for the improved disposal of organic wastes generated within the Resorts.
- (f) Investigate opportunities and collaborate where possible with Mansfield Shire Council for improved waste management projects, education and communication.

6.2 Energy Efficiency and 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 including:

- Adoption of 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;
- The identification of energy savings that may be made via retrofitting of ARMB properties and modification of various activities; and
- Submission of an application to the Sustainability Fund (Sustainability Victoria) to implement Resorts-wide sustainability initiatives.

Sustainability Victoria (combining the Sustainable Energy Authority Victoria and EcoRecycle Victoria) is the key government agency driving sustainable energy use.

To minimise impacts on air quality within the Resorts, all new wood heaters installed within the Resorts are required to comply with Australian Standards. Smoke from wood heaters and open fireplaces is a significant source of air pollution in Victoria during autumn and winter months due to the small particles and gases that are released into the atmosphere when wood is burned.

Legislative Framework

SEPP (*Air Quality Management*) 2001

SEPP (*Ambient Air Quality*) 1999

The standards in the SEPP- *Ambient Air Quality 1999* are used for control of air

pollution that spreads over a wide geographic area. The indicators in the *Air Quality Management 2001* SEPP have local effects, relatively close to the emission source. These SEPPs cover all the major pollutants as well as specific industrial pollutants discharged out of chimneys. The Air SEPPs determine the appropriate air quality indicators and set the appropriate standards and goals for each indicator for different periods (i.e. one hour, eight hours or 24 hours).

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Keep Winter Cool Charter

Targets

- Develop and implement a system to measure the ARMB's energy use.
- Undertake an energy audit for key ARMB properties and implement measures to reduce energy use of these properties.
- Annual reductions in energy use per annum.

Actions

The ARMB will:

- (a) Work with Sustainability Victoria to develop and implement a sustainable energy use program for ARMB properties.
- (b) Develop an education program to encourage Resorts-wide reduction of energy use
- (c) Conduct an audit of energy use attributable to ARMB activities and develop a plan for reducing emissions.
- (d) Develop an energy management policy.
- (e) 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.
- (f) Support the national reduction of greenhouse gas emissions.
- (g) Continue monitoring the impacts of climate change by assisting the Bureau of Meteorology to monitor and collect data.
- (h) Ensure compliance with the State Environment Protection Policy *Ambient Air Quality* 1999.
- (i) Increase awareness of residents/visitors in the correct installation, maintenance and operation of wood heaters to avoid creating excess smoke.
- (j) Ensure that ARMB mobile equipment (including passenger vehicles) and plant are adequately serviced and maintained to minimise air pollution.

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.

Legislative Framework

Planning and Environment Act 1987

The *Planning and Environment Act 1987* establishes the Victorian Planning Provisions which contains Overlays (e.g. DDO1) that address visual amenity.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme
- Mount Stirling EES

Target

- No formal complaints of visual character within the Resorts and

surrounding Crown Land.

Actions

The ARMB will:

- (a) Apply the design objectives of Design and Development Overlay 1 (DDO1) to the assessment of all development applications within the Mount Buller Village.
- (b) Consider the requirements of DDO3 for the assessment of all applications within the Mount Buller ski field.
- (c) 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.
- (d) 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.

Legislative Framework

SEPP Control of Noise from Commerce, Industry and Trade. No N-1

SEPP Control of Music Noise from Public Premises No. N-2

Environment Protection Act 1970

Environment Protection (Residential Noise) Regulations 1997

The SEPP *Control of Noise from Industry, Commerce and Trade No. N-1* prescribes noise limits for commercial, industrial and trade premises. The SEPP aims to protect people from the effects of noise in noise sensitive areas. The policy is also used as a planning tool and requires new and proposed industries to be designed so as to not exceed the noise limits outlined in the SEPP.

The SEPP *Control of Music Noise from Public Premises No. N-2* was developed to protect ‘noise sensitive areas’ (e.g. homes) throughout Victoria from music noise from indoor and outdoor venues. Indoor venues have stringent noise criteria set to protect the normal domestic amenity of neighbours and to protect sleep at night. Outdoor venues are allowed to produce a noise level (65 dB(A)) measured outdoors at a residential premises (or 55 dB(A) when measured indoors). This protects “normal conversation” as the beneficial use. To balance the loud nature of outdoor concerts and their intrusion on normal domestic activities, only six concerts per year are permitted. SEPP N-2 limits outdoor venue operations to no later than 11 pm (or 10 pm if the concert runs for more than 5 hours).

According to Section 48A of the Environment Protection Act 1970 it is an offence to create unreasonable noise on residential premises at any time of the day.

The *Environment Protection (Residential Noise) Regulations 1997* stipulate the noise requirements for equipment such as lawnmowers, air conditioners, power tools, vehicles, televisions and radios.

Other Requirements

Additional relevant policies and plans include:

- Alpine Resorts 2020 Strategy
- Alpine Resorts Planning Scheme

Target

- No formal noise complaints per annum.

Actions

The ARMB will:

- (a) 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*.
- (b) 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*.
- (c) 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.

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.

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

- A co-operative plan for sustainable visitor capacity is being implemented.

Actions

The ARMB will:

- (a) Develop a brief to steer the visitor capacity project and invite input from neighbouring land managers and key stakeholders.
- (b) Undertake a visitor survey and visitor capacity audit to determine sites under environmental pressure, related timing of visitation, visitor behaviours and expectations.
- (c) 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.

7.0 COMMUNITY AWARENESS AND INVOLVEMENT

Objectives

To provide suitable opportunities for environmental training.

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

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:

- (a) 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.
- (b) 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.
- (c) Continue to send staff to the Alpine Ecology and Alpine Rehabilitation Courses.
- (d) 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.).
- (e) Encourage all Resort stakeholders to incorporate appropriate environmental awareness staff training into their induction and annual staff training programs.
- (f) Disseminate environmental information through its website.
- (g) Continue to include environmental issues in staff induction (e.g. ARMB employee handbook and Mountain Host Program).
- (h) Continue to provide regular Mountain Pygmy-possum updates on the Mount Buller web page and through newsletters.
- (i) Continue public education through the guided walk program.
- (j) Develop a secondary school information kit including information

relating to the Mountain Pygmy-possum at Mount Buller.

- (k) 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.
- (l) Review, update and distribute the Mount Buller and Mount Stirling planting guide.
- (m) Investigate opportunities and collaborate where possible with Parks Victoria, DSE and Mansfield Shire Council regarding common land management issues.

APPENDICES

APPENDIX 1

Environmental Impacts and Aspects Register

A1.1 Environmental Impacts and Aspects Register for the Mount Buller and Mount Stirling Alpine Resorts

Table A1.1 Environmental Aspects and Impacts Register for the Mount Buller and Mount Stirling Alpine Resorts (positive or beneficial impacts are shown in green).

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 <small>(including waste water)</small>		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	
			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	
	Education (Mountain Host Program)		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 <small>(including car parking)</small>	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	
	Helicopter use		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 <small>(including workshops and emergency response)</small>	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	

Externally Controlled Activities over which the Mount Buller and Mount Stirling Alpine Resort Management Board may have some influence	Aspect	Activity	Impact	Prob P	Cons C	Scale S	Sens T	Overall Score
	DEVELOPMENT, CONSTRUCTION & MAINTENANCE <small>(including workshops and emergency response)</small>	Building operation and maintenance	Loss of visual amenity		3	1	1	2
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
ADMINISTRATION		Energy use	Depletion of resources		5	4	2	2
	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	

Aspect	Activity	Impact	Prob P	Cons C	Scale S	Sens T	Overall Score	
SUMMER RECREATIONAL ACTIVITIES	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		
DEVELOPMENT, CONSTRUCTION & MAINTENANCE <small>(including emergency response)</small>	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	
Gas - supply and use		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	
		Loss of visual amenity	3	2	1	2	15	
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	
		Natural resource use	4	3	2	3	32	
	Water use	Reduction in stream flows	3	2	2	3	21	
		Loss of visual amenity	5	2	1	2	25	

APPENDIX 2

Flora Results

A2.1 Flora of the Mount Buller and Mount Stirling Alpine Resorts

Table A2.1 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 spp.</i>	Sheep's Burr
<i>Aciphylla glacialis</i>	Snow Aciphyll
<i>Agrostis muelleriana</i>	Mueller's Bent
<i>Agrostis parviflora s.l.</i>	Hair Bent
<i>Agrostis parviflora s.s.</i>	Hair Bent
<i>Agrostis s.l. spp.</i>	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 s.l.</i>	Pale Vanilla-lily
<i>Asperula conferta</i>	Common Woodruff
<i>Asperula euryphylla var. 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 spp.</i>	Woodruff
<i>Asplenium flabellifolium</i>	Necklace Fern
<i>Asterolasia trymalioides</i>	Alpine Star-bush
<i>Atherosperma moschatum</i>	Southern Sassafras
<i>Australina pusilla subsp. 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 s.l.</i>	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>hyssofolia</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. agg.	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. agg.	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 s.l.</i>	Austral Cranesbill
<i>Gonocarpus micranthus subsp. micranthus</i>	Creeping Raspwort
<i>Gonocarpus montanus</i>	Mat Raspwort
<i>Gonocarpus spp.</i>	Raspwort
<i>Gonocarpus tetragynus</i>	Common Raspwort
<i>Goodenia hederacea</i>	Ivy Goodenia
<i>Goodenia hederacea subsp. 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 subsp. victoriae</i>	Royal Grevillea
<i>Grimmia macroperichaetialis</i>	Sun Grimmia
<i>Grimmia pulvinata var. africana</i>	Blunt-beak Grimmia
<i>Grimmia trichophylla</i>	Hair-pointed Grimmia
<i>Helichrysum aff. rutidolepis (Alps)</i>	Pale Everlasting
<i>Helichrysum rutidolepis s.l.</i>	Pale Everlasting
<i>Helichrysum rutidolepis s.s.</i>	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 spp.</i>	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 var. cernua</i>	Nodding Club-sedge
<i>Isolepis montivaga</i>	Fog Club-sedge
<i>Isolepis spp.</i>	Club Sedge
<i>Isolepis subtilissima</i>	Mountain Club-sedge
<i>Juncus alexandri subsp. alexandri</i>	Mountain Rush
<i>Juncus bufonius</i>	Toad Rush
<i>Lachnagrostis aemula s.s.</i>	Leafy Blown-grass
<i>Lagenophora stipitata</i>	Common Bottle-daisy
<i>Leionema phyllicifolium</i>	Alpine Leionema
<i>Leptinella filicula</i>	Mountain Cotula
<i>Leptorhynchos spp.</i>	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 macraei</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 calytratus</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 spp. agg.</i>	Tiny Violet
<i>Viola spp.</i>	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

A2.2 Rare and threatened flora of the Mount Buller and Mount Stirling Alpine 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 A2.2 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	
<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	

Name	Common Name	Source	EPBC Act	State	FFG Act
State Significance					
<i>Hakea lissosperma</i> ¹	Mountain Needlewood	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.

A2.3 Rare and threatened plant communities of the Mount Buller and Mount Stirling Alpine Resorts

Table A2.3 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

A2.4 Exotic flora within the Mount Buller and Mount Stirling Alpine Resorts

Table A2.4 Exotic flora recorded within the Mount Buller and Mount Stirling Alpine 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 3

Fauna recorded within the Mount Buller and Mount Stirling Alpine Resorts

Table A3.1 Fauna recorded within the Mount Buller and Mount Stirling Alpine 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>

Common Name	Scientific Name
Birds cont.	
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>
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>

Common Name	Scientific Name
Mammals cont.	
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>
* 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>

Common Name	Scientific Name
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 sp1 (RSC)</i>

Table A3.2. Terrestrial vertebrate and invertebrate fauna of national or state significance recorded, or predicted to occur, within 5 kilometres of the Mount Buller and Mount Stirling Alpine Resorts.

Source: DSE Atlas of Victorian Wildlife, DEH database

Status of species:

CR	critically endangered	DD	data deficient (insufficient known)
EN	endangered	CD	conservation dependent
VU	vulnerable	NT	near threatened
R	rare or insufficiently known		
L	listed under Flora and Fauna Guarantee Act		

Sources used to derive species status:

EPBC Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

DSE Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2003b)

FFG Flora and Fauna Guarantee Act 1988 (Victoria)

Action Plans: Maxwell et al. (1996) for marsupials and monotremes, Duncan et al. (1999) for bats, Lee (1995) for rodents, Garnett and Crowley (2000) for birds, Cogger et al. (1993) for reptiles, Tyler (1997) for amphibians.

Species in bold were recorded in the study area during the present assessment.

denotes species predicted, or with habitat predicted, to occur in the local area (DEH database), but not recorded in the local area on AVW.

Common Name	Scientific Name	Last Record	AVW	EPBC	DSE	FFG	Action Plan
National Significance							
Australian Painted Snipe	<i>Rostratula australis</i>	#		VU	CR	L	VU
Swift Parrot	<i>Lathamus discolor</i>	#		EN	EN	L	EN
Regent Honeyeater	<i>Xanthomyza phrygia</i>	#		EN	CR	L	EN
Spot-tailed Quoll	<i>Dasyurus maculatus</i>	#		EN	EN	L	VU
Yellow-bellied Glider	<i>Petaurus australis</i>	1995					NT
Mountain Pygmy-possum	<i>Burramys parvus</i>	1999		EN	EN	L	EN
Long-footed Potoroo	<i>Potorous longipes</i>	#		EN	EN	L	EN
Smoky Mouse	<i>Pseudomys fumeus</i>	#		EN	EN	L	R
Spotted Tree Frog	<i>Litoria spenceri</i>	#		EN	CR	L	EN
Growling Grass Frog	<i>Litoria raniformis</i>	#		VU	EN	L	VU
Alpine Tree Frog	<i>Litoria verreauxii alpina</i>	1959		VU	CR	L	VU
Barred Galaxias	<i>Galaxias fuscus</i>	#		EN	CR	L	CR
Murray Cod	<i>Maccullochella peelii peelii</i>	#		VU	EN	L	
Macquarie Perch	<i>Macquaria australasica</i>	#		EN	EN	L	EN
State Significance							
Latham's Snipe	<i>Gallinago hardwickii</i>	#			NT		
Great Egret	<i>Ardea alba</i>	#			VU	L	
White-bellied Eagle	<i>Haliaeetus leucogaster</i>	#			VU	L	
Black Falcon	<i>Falco subniger</i>	1996			VU		
Powerful Owl	<i>Ninox strenua</i>	2003			VU	L	
Broad-toothed Rat	<i>Mastacomys fuscus</i>	1995			NT		
Alpine Bog Skink	<i>Pseudemoia cryodroma</i>	2001			EN	L	
Brown Toadlet	<i>Pseudophryne bibronii</i>	1960			EN		DD
Stonefly sp.	<i>Thaumatoperla flaveola</i>	1990			VU		
Stonefly sp.	<i>Riekoperla isosceles</i>	1984			VU		
Caddisfly sp.	<i>Tamasia furcilla</i>	1972			VU		

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Relevant Legislation and Policy

Commonwealth

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

Environment Protection and Biodiversity Conservation Act 1999

State

Alpine Resorts (Management) Act 1997

Alpine Resorts (Management) Amendment Act 2004

Alpine Resorts 2020 Strategy, DSE 2004

Archaeological and Aboriginal Relics Preservation Act 1972

Catchment and Land Protection Act 1994

Conservation Forests and Lands Act 1987

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Planning and Environment Act 1987

Planning and Environment Act 1987 – Alpine Resorts Planning Scheme Amendment C6

Victoria’s Native Vegetation Management – A Framework for Action, NRE, 2002

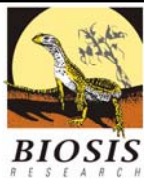
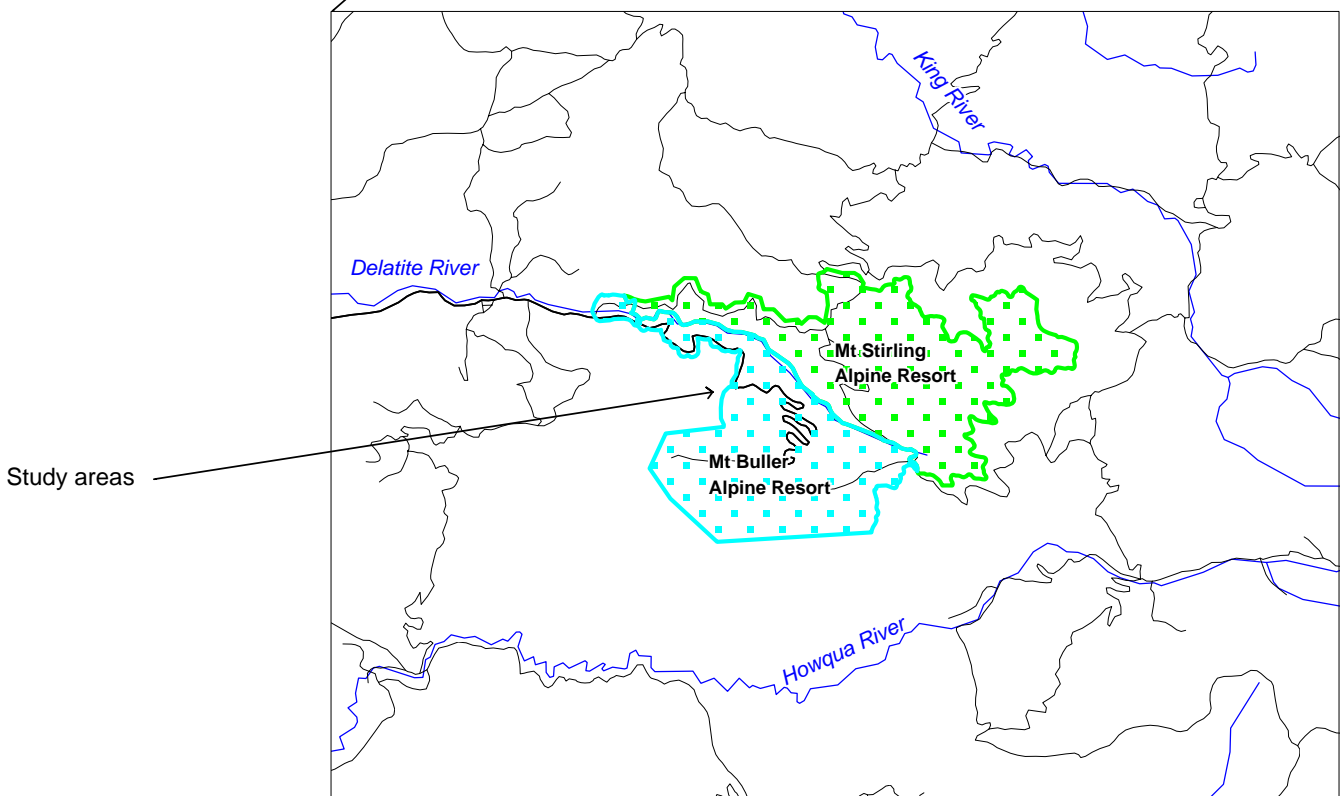
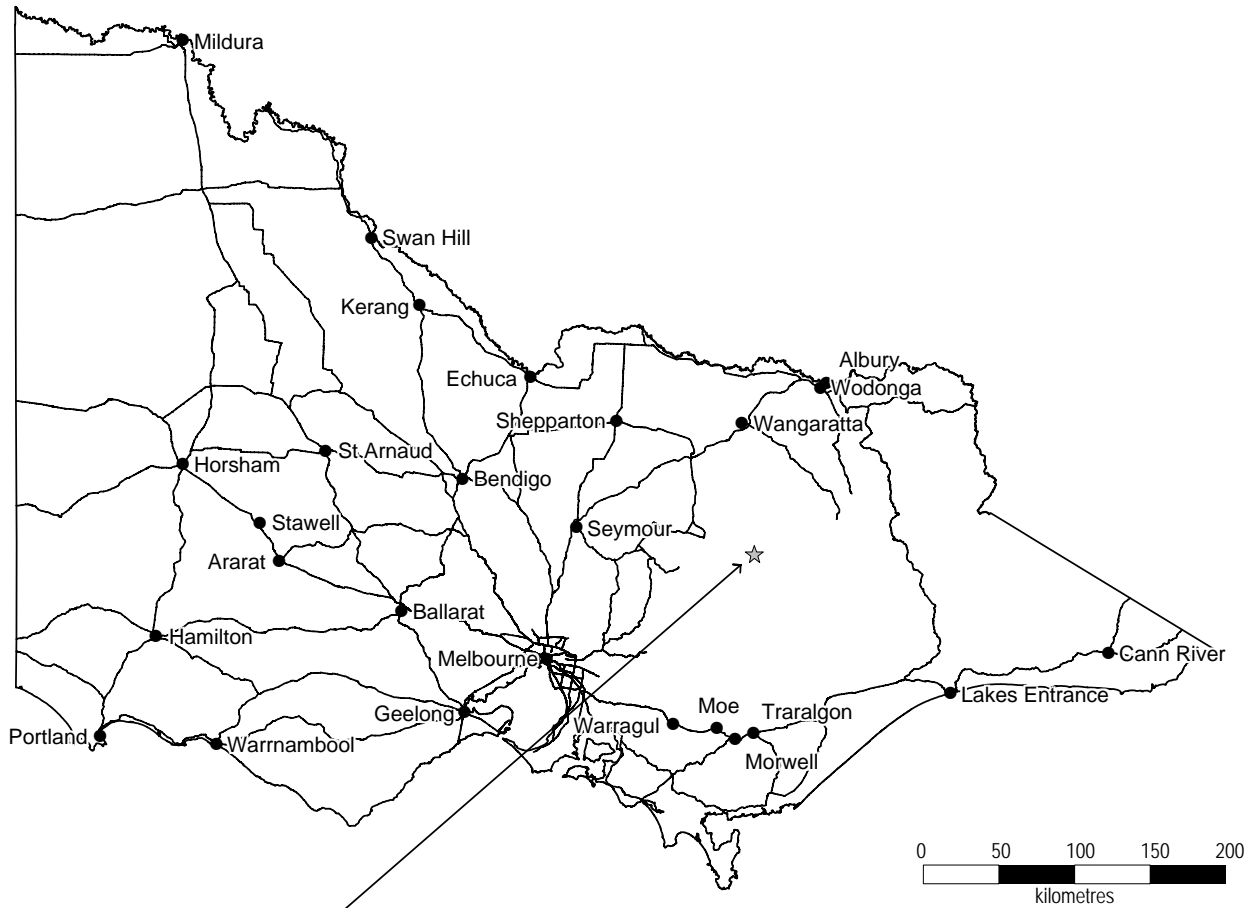
Victoria’s Biodiversity Strategy, NRE, 1997

Water Act 1989

Wildlife Act 1975

Wildlife (Regulations) 2002

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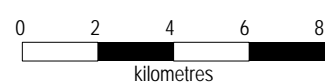
Figure 1: Regional locality plan for the Mount Buller and Mount Stirling Alpine Resorts.

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Scale:



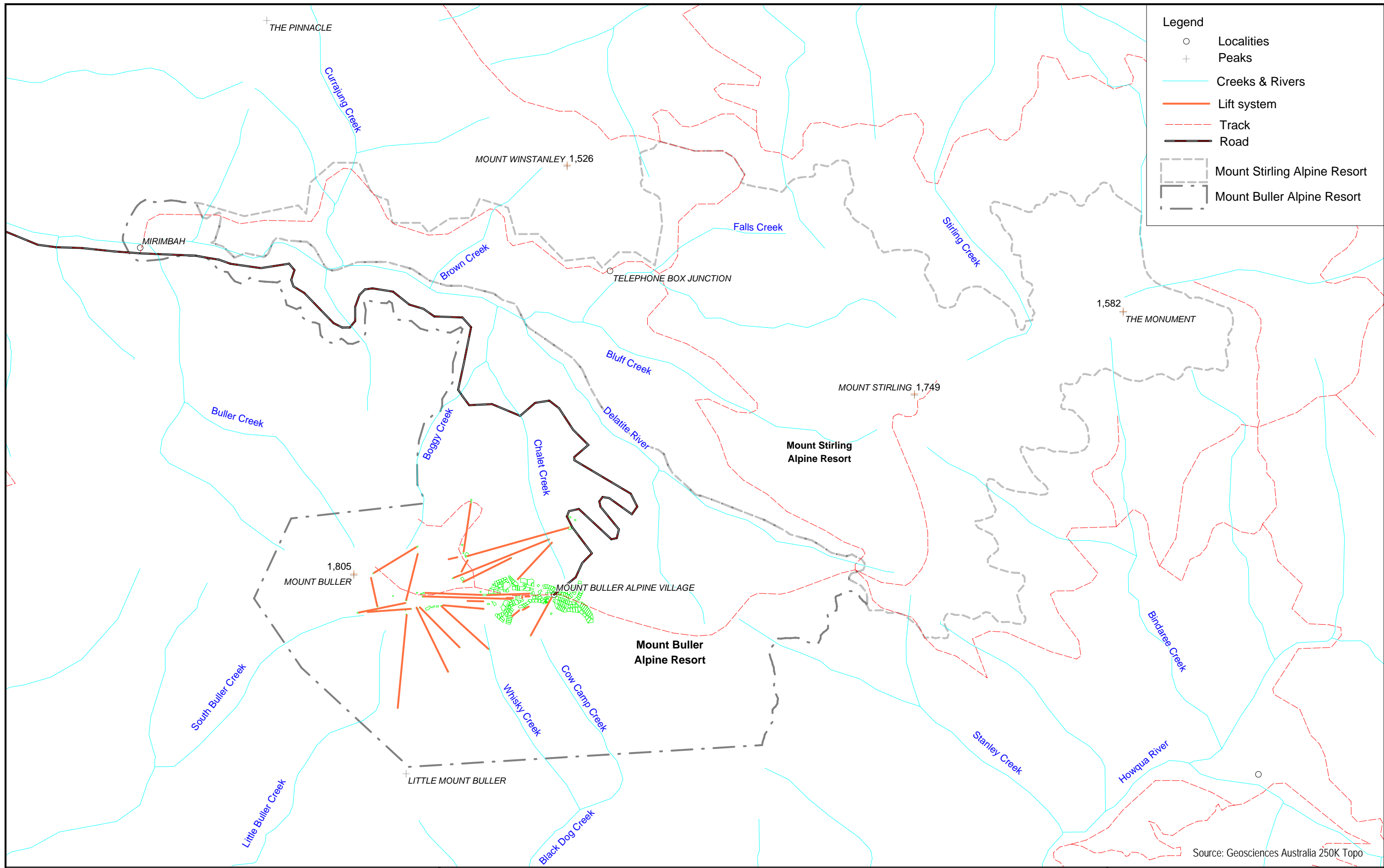


Figure 2: The Mount Buller and Mount Stirling Alpine Resorts (major rivers and creeks, roads, localities and ski lifts).

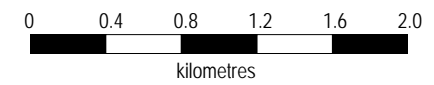
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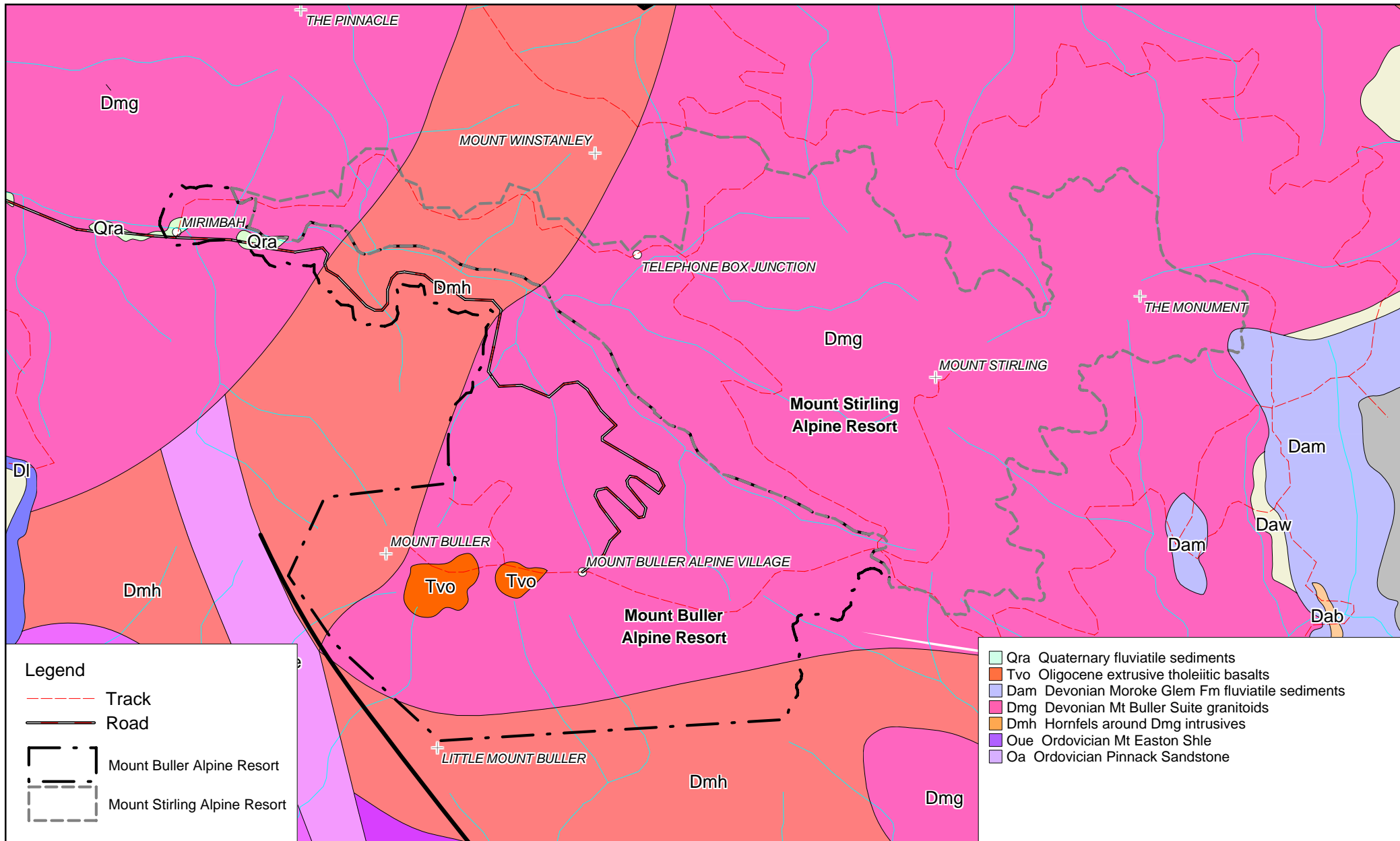
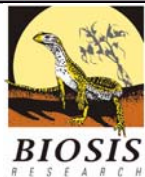


Figure 3: Geological mapping of the Mount Buller and Mt Stirling Alpine Resorts.



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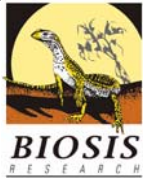
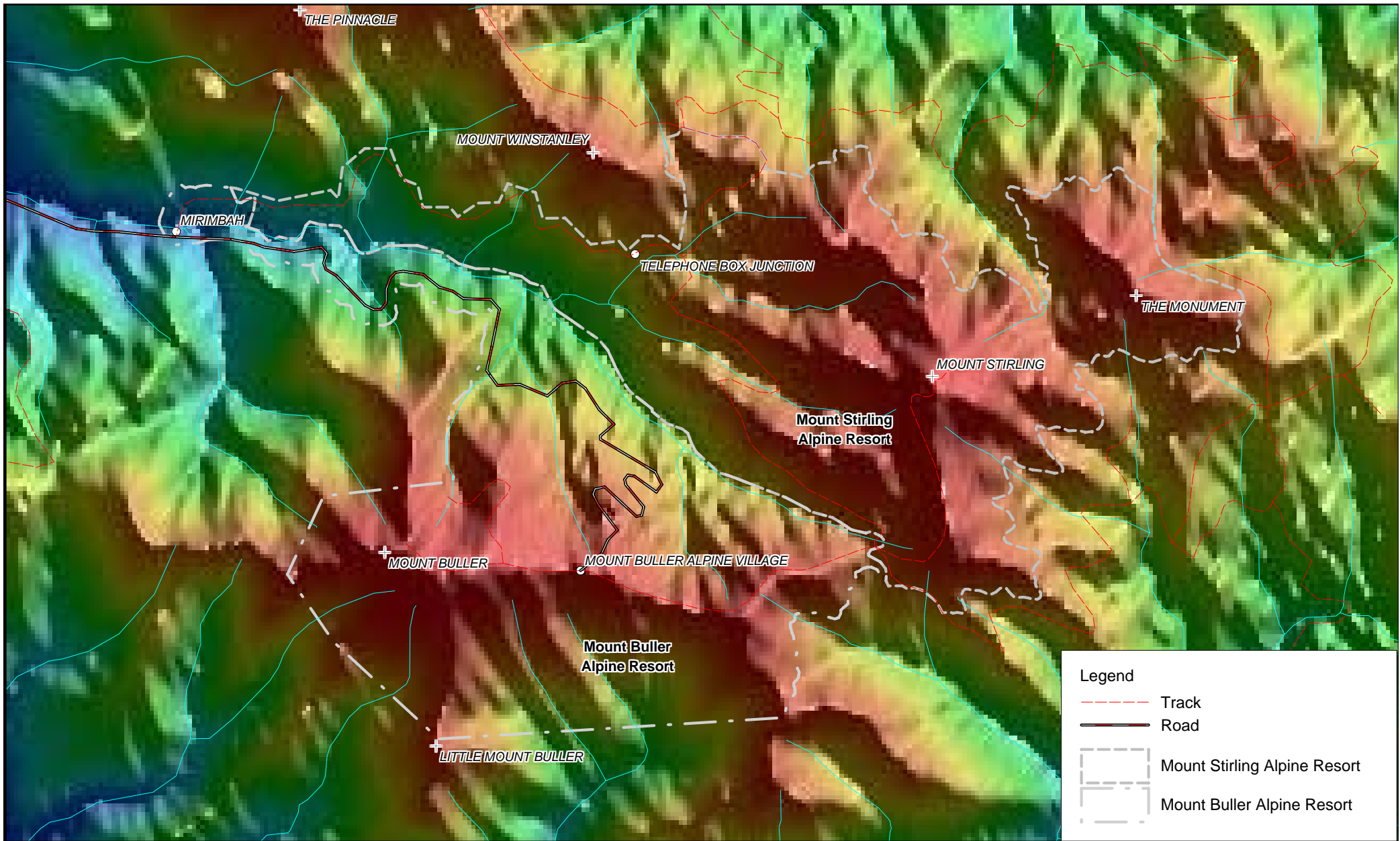
Location: ...MRG 5300s\5320\Mapping\5320 Fig 3.wor

Scale:

0 0.6 1.2 1.8 2.4 3

kilometres





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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

DATE: 3 July 2006

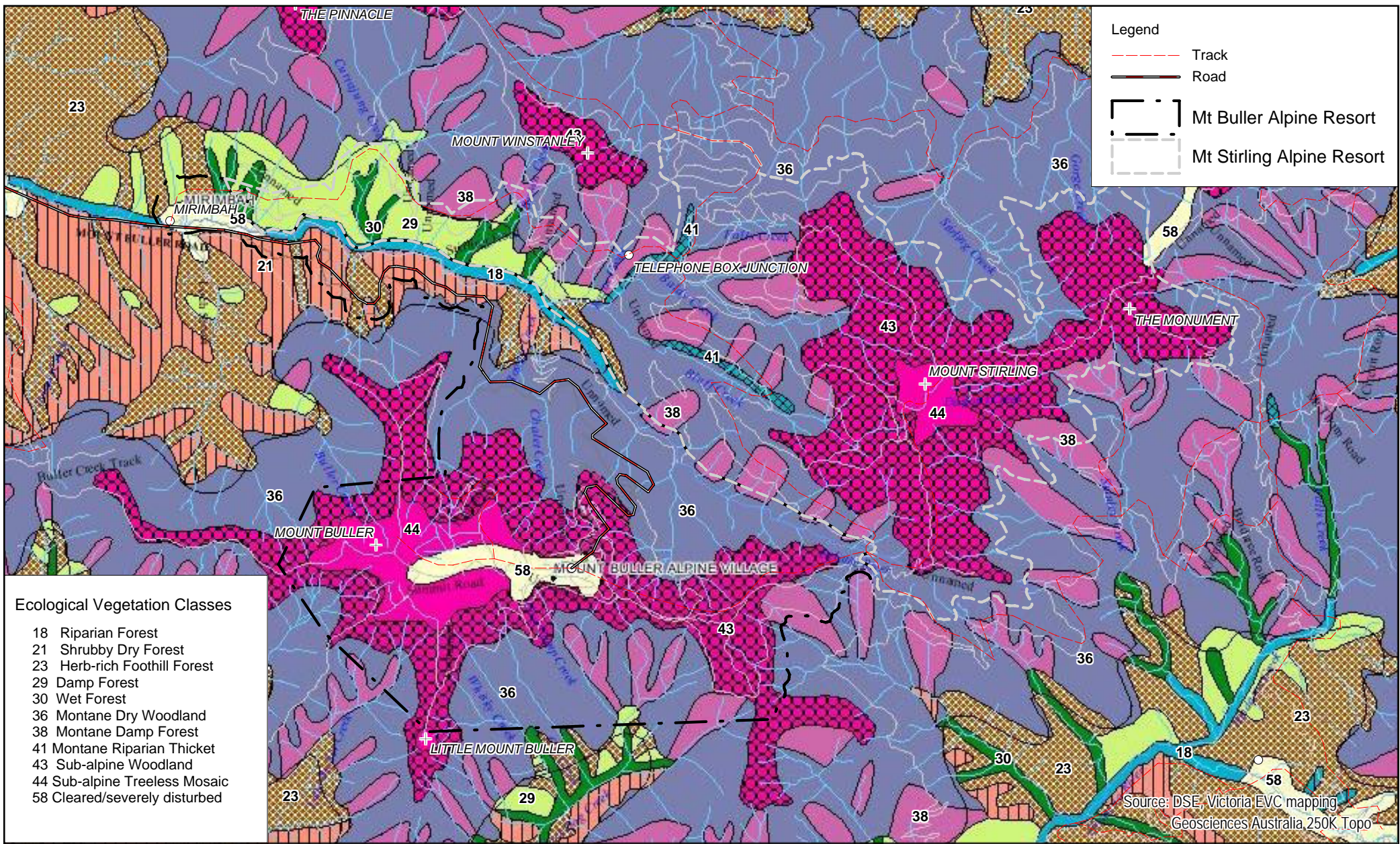
Checked by: AJH

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Location: ...MRG 5300s15320\Mapping\5320 Fig 4.wor

Scale:







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

DATE: 3 July 2006	Scale: 0 0.6 1.2 1.8 2.4 3.0 kilometres
Checked by: AJH	File number: 5320
Location: ...MRG 5300s15320\Mapping\5320 Fig 5.wor	



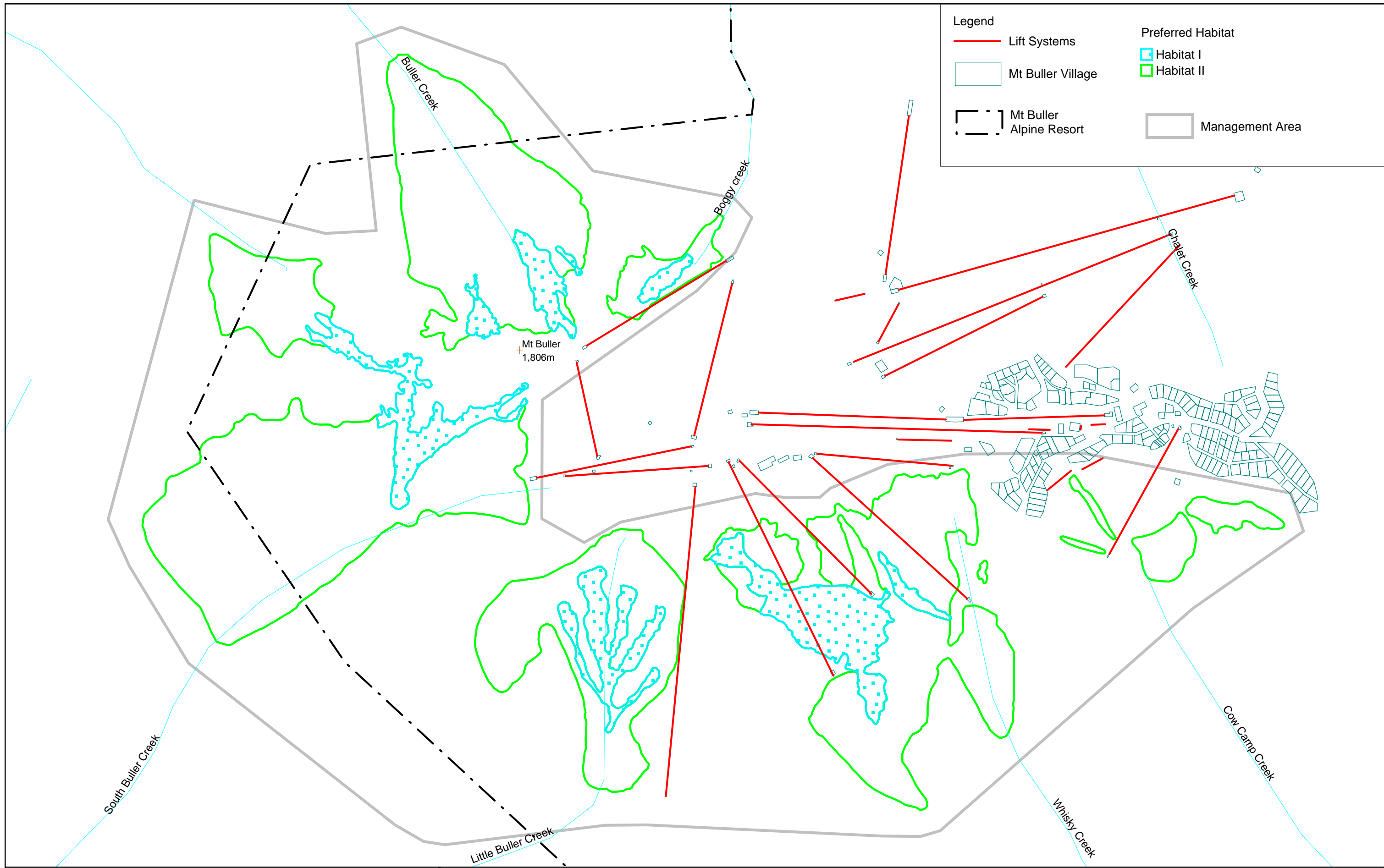


Figure 6: Mountain Pygmy-possum habitat within the Mount Buller Alpine Resort.

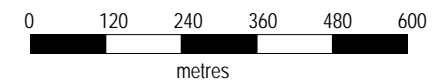
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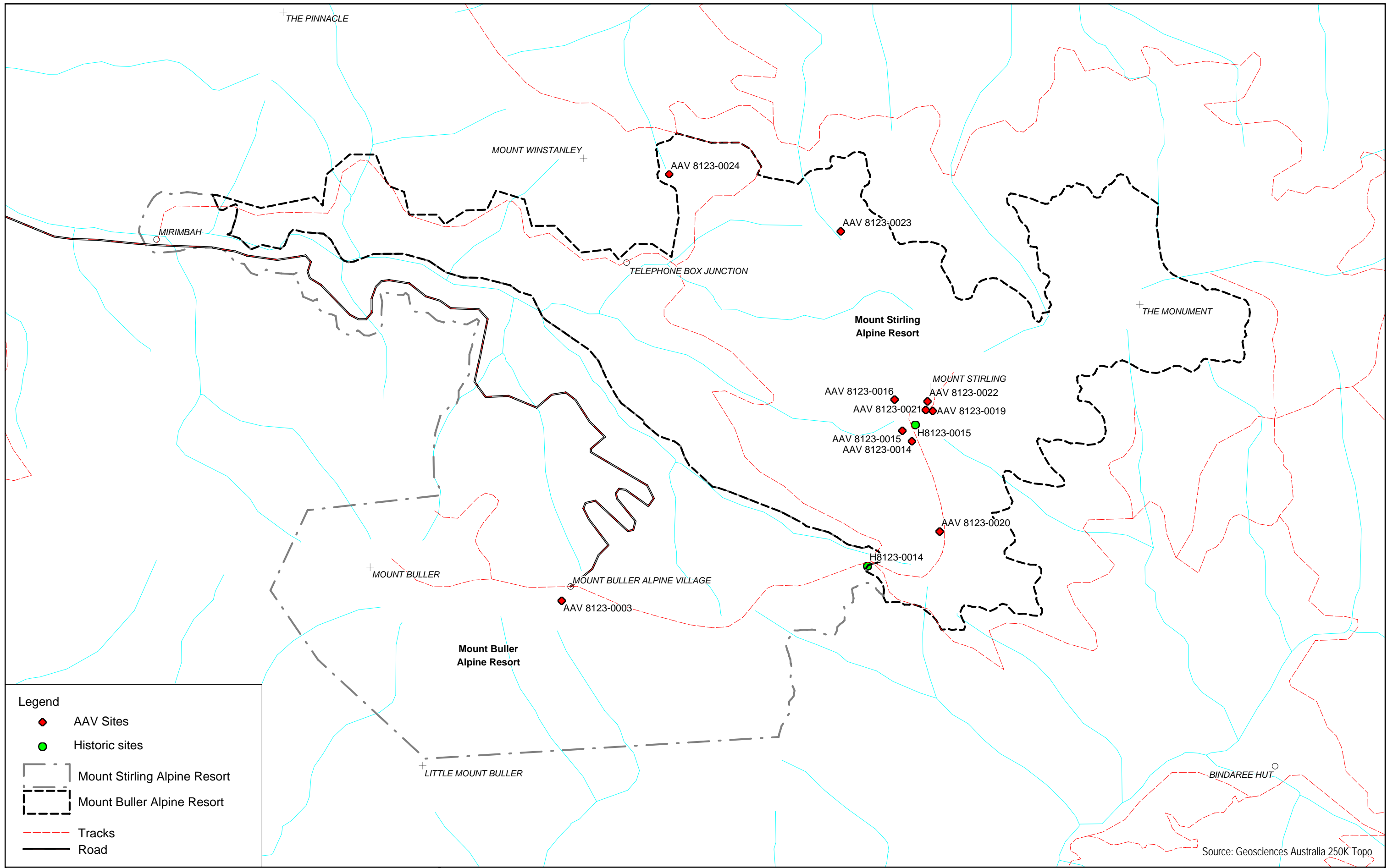
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Source: Geosciences Australia 250K Topo

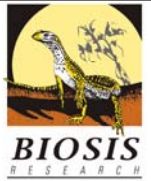
Legend

- ◆ AAV Sites
- Historic sites
- Mount Stirling Alpine Resort
- Mount Buller Alpine Resort
- Tracks
- Road

Figure 7: Recorded Aboriginal and historical archaeological sites within the Mount Buller and Mount Stirling Alpine Resorts.

DATE: 3 July 2006
 Checked by: AJH
 Location: ...MRG 5300s\5320\Mapping\5320 Fig 7.wor

Scale:  kilometres

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