

Recovery Plan for the Mountain Pygmy-Possum *Burramys parvus* **on Mt Buller, Victoria**

December 2005



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1.0 INTRODUCTION

This Recovery Plan for the endangered Mountain Pygmy-possum *Burramys parvus* on Mount Buller, Victoria, has been prepared by the Mount Buller and Mount Stirling Alpine Resort Management Board (ARMB). The ARMB manages the Crown land reserve that includes the Mount Buller and Mount Stirling Alpine Resorts, and provides the infrastructure services to the Resorts. There are two areas within the Victorian Alps in which the Mountain Pygmy-possum occurs, the Mount Bogong-Mount Higginbotham area, and the Mount Buller area (Map 1). The Mount Buller Alpine Resort contains all the known habitat for the Mountain Pygmy-possum in the Mount Buller area.

This Recovery Plan is the document that will guide the ARMB and other stakeholders, including the skifield operator, Buller Ski Lifts (BSL) and the Department of Sustainability and Environment (DSE), in ensuring the long term survival of the Mountain Pygmy-possum on Mount Buller.

The Recovery Plan provides a brief overview of the species on Mount Buller, sets recovery goals, and sets out the actions that will be required to reach these goals. The Plan has a five-year timeframe, 2005-2010, and an updated Plan will be required after this period. The progress of the Plan will also be reviewed annually, with an evaluation of progress against goals and indicators, and an analysis of the actions undertaken and any improvements needed to adapt to new learning and experience.

2.0 LEGISLATIVE AND POLICY CONTEXT

2.1 State Legislation and Policy

2.1.1 Alpine Resorts Planning Scheme

The Victorian Minister for Planning is the Responsible and Planning Authority for the Mount Buller Alpine Resort.

The Alpine Planning Team, within the Department of Sustainability and Environment (DSE), administers the Alpine Resorts Planning Scheme on behalf of the Minister for Planning. The relevant legislation is the *Planning and Environment Act 1987*. The Alpine Planning Team considers proposals to use or develop land and ensures that land is not used or developed in conflict with the requirements of the Act or the Alpine Resorts Planning Scheme.

The ARMB acts as the Crown's representative for leasing and other land management functions and also provides services such as water, sewerage and other municipal services. The ARMB is notified of all applications for planning permits and is given the opportunity to formally comment as the Land Manager. It is the referral authority for permit applications that involve the utility services they provide.

2.1.2 Alpine Resorts 2020 Strategy

The Alpine Resorts 2020 Strategy has been prepared by the Victorian Government to guide the long term planning and management of all Victoria's alpine resorts, including Mount Buller. The Strategy sets out a vision of "four season, vibrant, sustainable resorts", and sets out key directions for proactively dealing with climate change, continuing to provide for winter and summer recreational use and resort development, economic viability, with a commitment to sustainable environmental management and stewardship of public land.

2.1.3 Flora and Fauna Guarantee Act 1988

The primary State legislation dealing with biodiversity conservation and sustainable use of native flora and fauna is the *Flora and Fauna Guarantee* Act 1988 (FFG Act). The Mountain Pygmy-possum is listed under the FFG Act. Critical Habitat can be declared under the Act for a species, but there have been no areas of Critical Habitat declared for the Mountain Pygmy-possum in Victoria.

A permit is required from DSE to 'take' (kill, injure, disturb or collect) listed flora species, flora species that are members of listed communities or protected flora from public land. A permit is not required to 'take' listed fauna or members of a listed fauna community under the FFG Act. Controls in relation to protection of fauna are provided under the Wildlife Act 1975 and the Wildlife Regulations 2002.

A FFG Act Action Statement for the Mountain Pygmy-possum has been prepared (DSE 1991). Action Statements are not legally binding documents but are a statement of DSE policy.

The Mountain Pygmy-possum is listed as "endangered" in Victoria by DSE (DSE 2003).

2.1.4 Native Vegetation Management Framework

Victoria's Native Vegetation Management – A Framework for Action (NRE 2002) sets out State Government policy for the protection, enhancement and revegetation of native vegetation across Victoria. The policy is implemented through the Planning and Environment Act 1987, under Amendment VC 19 to the Victoria Planning Provisions. In association with the Draft Regional Native Vegetation Plans, which have been prepared by each Catchment Management Authority, the Framework provides decision-making tools for native vegetation management. The policy has adopted the principle that there should be a net gain in the extent/quality of native vegetation throughout the state, whereby, there 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 (NRE 2002).

Actions that impact on native vegetation will need to consider the Net Gain policy as part of the permit process.

2.2 Commonwealth Legislation

Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), actions, unless exempt, require approval from the Australian Government Minister for Environment and Heritage if they are likely to significantly impact on a 'matter of national environmental significance'. There are currently seven matters of national environmental significance, but the relevant matter in relation to the Mountain Pygmy-possum is "nationally listed threatened species and ecological communities". The Mountain Pygmy-possum is listed under the Act as "endangered".

Any person proposing to take an action that may, or will, have a significant impact on a matter of national environmental significance must refer the action to the Australian Government Minister for Environment and Heritage for determination as to whether the action is a 'controlled action'. If this is the case, the Minister will determine the type of environmental assessment and reporting that is required and make a decision on whether to approve the taking of the action.

Under the Commonwealth's assessment guidelines,

... an action has, will have, or is likely to have a significant impact on an endangered species if it does, will, or is likely to:

- lead to a long-term decrease in the size of a population, or
- reduce the area of occupancy of the species, or
- fragment an existing population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of a population, or
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, or
- interfere with the recovery of the species.

Under these guidelines, almost any action that has the potential to impact directly or indirectly on Mountain Pygmy-possum habitat at Mount Buller, including many of the actions set out in this Recovery Plan, will be referrable to the Minister under the Act.

The EPBC Act contains several compliance and enforcement mechanisms, including court injunctions, required environmental audits, strict civil and criminal penalties (which include fines up to \$550,000 for an individual or \$5.5 million for a body corporate, and jail terms of up to seven years), remediation of environmental damage, liability of executive officers, publicising contraventions. Under certain circumstances, an executive officer of a body corporate can be liable for civil penalties and criminal offences (including up to two years imprisonment) for a contravention of the EPBC Act committed by the body corporate.

3.0 THE MOUNTAIN PYGMY-POSSUM

The Mountain Pygmy-possum is listed as endangered at both the State and National levels, and the total population is estimated to include around 1,600 adult females (Heinze et al. 2004). It is restricted to alpine habitats in Victoria and New South Wales, and it hibernates under the snow in winter.

Heinze et al. (2004) provide a summary of the ecology and current conservation status of the Mountain Pygmy-possum, which is briefly summarised in this section of the Plan.

3.1 Distribution

The Mountain Pygmy-possum occurs as three geographically isolated populations that are genetically distinct from each other:

Kosciuszko National Park, NSW

Mount Bogong-Bogong High Plains-Mount Higginbotham, Victoria

Mount Buller, Victoria.

Within each population, the areas of suitable habitat that are occupied by the Mountain Pygmy-possum are very small and highly localised. It is estimated that there is less than 7 km² of habitat in total, with less than 4 km² in Kosciusko National Park, less than 2 km² in the Mount Bogong-Mount Higginbotham area, and less than 1 km² at Mount Buller.

3.2 Abundance

As with all rare species, it is difficult to know exactly how many Mountain Pygmy-possums remain in each population. However, there have now been surveys of most of the species' known or potential habitat, and there have been detailed ecological studies on a number of larger sub-populations. These studies indicated that the total population was around 1,600 adult females (due to its unusual life history, adult females are used as the key population measure for this species – see Section 3.4). More than half the total population is thought to occur in the Mount Loch-Mount Higginbotham area. At Mount Buller, the population has been estimated to range from 100-300 adult females.

There is strong evidence of recent declines in population numbers at both Mount Buller and in Kosciuszko, while the population at Mount Higginbotham has stayed relatively constant. Moreover, the extensive fires in January 2003 burnt large amounts of habitat in the Koscuiszko and Bogong High Plains areas, and there appear to be significant population declines in at least some of these burnt areas (D. Heinze, personal

communication). Therefore, the total population numbers are now likely to be lower than 1,600.

3.3 Habitat

The Mountain Pygmy-possum is largely confined to large, deep boulderfields at high elevations that have been formed by the cycle of freezing and thawing which, over time, has broken up the underlying rock into boulders. These spaces between the boulders provide protection from extremes of temperature. They are also summer habitat for the Bogong Moth *Agrostis infusa*, which often occurs in large numbers and is an important food source for the Mountain Pygmy-possum.

As well as physical environment of boulderfields, the vegetation is an important component of the habitat, with nearly all sites having alpine or subalpine shrubby heathland present. This heathland is typically dominated by Mountain Plum-pine Podocarpus lawrencei, a very slow-growing native species, with a range of other shrubs. The seeds and fruit of these species, particularly the Mountain Plum-pine, are key components of the species' diet.

3.4 Life History and Social Organisation

The Mountain Pygmy-possum has a unique life history. It is one of the longest-lived small terrestrial mammals known anywhere (up to 12 years) and it is the only Australian small mammal that hibernates under snow in winter. In Victoria, it has a naturally skewed and variable sex ratio, with fewer males than females (typically ranging from 1:3 to 1.6, with instances of 1:22 recorded in the Mount Buller population). For this reason, the number of adult females is used as the measure for comparing population size.

After mating has occurred, males and females use different habitat areas, with most males being found in lower elevation and less resource-rich areas than the females and young. The ability for individuals to move between habitats used by the males and the females and between habitat patches is critical for the normal social functioning of Mountain Pygmy-possum populations, so connecting habitat links are a key habitat component.

4.0 THE MOUNT BULLER POPULATION OF THE MOUNTAIN PYGMY-POSSUM

The population of the Mountain Pygmy-possum on Mount Buller is the southernmost and most isolated population, and is the most genetically distinct (Osborne et al. 2000). Although not the largest in total area, the boulderfield habitat on Mount Buller is one of the largest single connected areas of boulderfield habitat known, and it extends to lower altitudes than at most other sites. The Mountain Pygmy-possum was not known to occur at Mount Buller until 1996, and ski area development since 1980 has fragmented these previously connected areas.

The main habitat area 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 was in the Fanny's Finish area, Wombat Bowl and Federation Bowl. These areas contain many of the best ski runs in the Resort. The Fanny's Finish area has remained largely unaffected by the development of the Resort, however Mountain Pygmy-possum numbers in this area still appear to be declining. There is also habitat on the northern slopes of the Summit. This is largely outside the ski run areas, and appears to support a relatively significant proportion of the total Mount Buller population (Map 2).

In 1996, the population of the Mountain Pygmy-possum at Mount Buller was estimated at 300 adult females. Recent surveys have seen this estimate drop to 150 in 2002 and less than 100 in 2003 and 2004 (Heinze 2005). A Population Viability Analysis of data from two sites at Mount Buller (Fanny's Finish and Federation) found that this observed decline is likely to be real (i.e. not due to sampling error or random variation) and that the subpopulations at these sites had move significantly closer to extinction (McCarthy 2004).

There are a range of potential factors that may have contributed to the current 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. Most of these impacts occurred before the presence of the species was known, and some began many decades ago. 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 ski areas to maximise their skiing capability.

The population at Mount Buller is now at critically low levels, and urgent management action is required to address this situation.

4.1 Recovery of The Species on Mount Buller

Prior to the development of this Recovery Plan, there has not been an approved plan for the recovery of the species on Mount Buller, as the FFG Action Statement was prepared in 1991, before the species was recorded from Mount Buller. A draft management strategy for the species in Victoria has been in preparation for some years (Heinze 2002), and, although this did not have official status, it has guided some conservation actions in the Resort. There have also been a number of other plans or actions that have contributed to the management of the Mountain Pygmy-possum on Mount Buller. These are summarised below.

4.1.1 Existing Conservation Measures

- Predator control programs and preparation of a Predator Management Strategy by the ARMB.
- Preparation of a Vegetation Management Plan for the Mount Buller Ski Field by BSL.
- Erection of an interpretation display at Cow Camp and interpretive signs on the Summit by the ARMB.
- Construction of a habitat connection at the top of Wombat ski run by the ARMB and BSL.
- Rehabilitation of some recent damage to the vegetation and boulder habitat on Robin's Run and Outer Edge has been undertaken by BSL.
- Habitat connections have been constructed across access tracks at in the Wombat Bowl area by BSL.
- Habitat connections have been constructed across Whiskey Creek Trail and the Southside Access Track by the ARMB.
- Some sediment control works have been undertaken on tracks within Mountain Pygmy-possum habitat by BSL.

4.1.2 Recovery Plan Process

The Victorian Minister for Environment has required that this Recovery Plan be prepared by the Mount Buller and Mount Stirling Alpine Resort Management Board.

There is a considerable existing knowledge base relevant to the recovery of the Mountain Pygmy-possum on Mount Buller, comprising scientific research on the species and its habitat (both at Mount Buller and elsewhere), a number of other plans (e.g. Vegetation Management Plan, site-specific rehabilitation plans, etc), a draft management strategy, a range of other unpublished documents, and a body of experience in on-ground management. Most importantly, there is the group of people who have built this knowledge base.

The process of developing this Recovery Plan has been based on actively involving the individuals - researchers, managers, agency staff and consultants – who know about the Mountain Pygmy-possum on Mount Buller, through an intensive program of workshops and discussions (see Acknowledgments). Relevant documentation has been reviewed, and is briefly summarised where necessary, but the focus of this Recovery Plan is on the actions that need to be put in place to ensure that the Mountain Pygmy-possum population survives on Mount Buller.

4.1.3 Plan Implementation

The primary responsibility for the implementation of this Recovery Plan will lie with the ARMB, but it will also require considerable inputs and support for BSL and DSE. To facilitate this cooperative approach, a Mount Buller Pygmy-possum Recovery Team will be established, to set annual goals, incorporate new knowledge into adaptive management and to report on progress to the ARMB Board annually. The Recovery Team will include at least:

- A representative of the ARMB
- A representative of BSL
- A representative of DSE.

The ARMB representative will be the Chair.

5.0 RECOVERY OBJECTIVES

5.1 30 Year Objective

A self-sustaining population (approximately 500 adult females) of the Mountain Pygmy-possum that exists within a sustainable ski resort.

Key indicators:

• Monitoring of key sub-populations shows the following outcomes:

```
>5 breeding females
Grimus (1 monitoring site)
Buller South (1 monitoring site)
                                            >30 breeding females
Wombat Valley (2 monitoring sites)
                                             >10 breeding females
Federation (4 monitoring sites) –
        Site 324
                                             >10 breeding females
        Site 350
                                             >50 breeding females
        Site 329
                                             >10 breeding females
        Site 334
                                             >10 breeding females
                                              >5 breeding females
Chamois (1 monitoring site)
```

• A population showing normal social functioning, with no second litters and a male to female ratio of between 1:6 and 1:10.

Key actions to achieve this goal are:

- All sub-populations that were connected prior to 1970 have multiple functioning habitat connections.
- All Type I and Type II habitat existing in 2005 are protected and enhanced.
- Subject to the success of the pilot program and outcomes of the feasibility study (refer to Section 6.1.9), a combination of enhancement of degraded habitat, revegetation of boulder fields and habitat creation has restored the carrying capacity to pre-1970 levels (this has been estimated by DSE to require up to 8-10 ha of enhancement and revegetation and 5-7 ha of habitat creation)
- Less than 0.5% of introduced predator scats contain remains of the Mountain Pygmy-possum
- There is a good understanding of the ecology of and threats to the Mountain Pygmy-possum at Mount Buller amongst those that work there and those that visit.

5.2 5 Year Recovery Goals

This Recovery Plan has a five year life (2005-2010). The following goals set out the key goals that are to be achieved in that period.

Key indicators:

Monitoring of key sub-populations shows the following outcomes:

```
Grimus (1 monitoring site)
                                              >1 breeding females
Buller South (1 monitoring site)
                                             >15 breeding females
                                              >1 breeding females
Wombat Valley (2 monitoring sites)
Federation (4 monitoring sites) -
        Site 324
                                              >5 breeding females
        Site 350
                                             >25 breeding females
                                              >5 breeding females
        Site 329
                                              >5 breeding females
        Site 334
                                              >1 breeding females
Chamois (1 monitoring site)
```

- A population showing normal social functioning, with no second litters and a male to female ratio of between 1:6 and 1:10.
- Less than 1% of introduced predator scats contain remains of the Mountain Pygmy-possum.

Key actions to achieve this goal are:

- All Type I and Type II habitat has been accurately mapped (distribution and quality) and "habitat patches" delineated.
- The location of habitat corridors has been mapped.
- All Type I and Type II habitat existing in 2005 is protected and enhanced.
- Subject to the success of the pilot program and outcomes of the feasibility study (refer to Section 6.1.8), there has been 3-6 ha of enhancement of degraded habitat and revegetation of boulder fields.
- Subject to the success of the pilot program and outcomes of the feasibility study (refer to Section 6.1.9), there has been 2-3 ha of habitat creation.
- All sub-populations that were connected prior to 1970 have at least one functioning habitat connection.
- The viability and effectiveness of constructed connections has been assessed through monitoring.

- Potential low altitude and sub-optimal habitats have been surveyed.
- The availability of suitable planting stock is ensured through the support, in collaboration with other alpine resorts, of a sustainable alpine plant nursery.
- The Mount Buller Pygmy-possum Recovery Team has been established, setting annual goals, incorporating new knowledge into adaptive management and reporting on progress to the ARMB annually.

5.3 Knowledge Gaps

While there is much we do know about the Mountain Pygmy-possum and can act on now, there are also gaps in our knowledge. The following points set out actions that are to be undertaken to overcome existing knowledge gaps that relate directly to the achievement of the goals and actions set out in this Recovery Plan.

- Fully understand the distribution and ecology of the Mountain Pygmypossum on Mount Buller through increased geographic spread of trapping program.
- Develop predator monitoring techniques for winter monitoring.
- Assess the effectiveness of corridors for the Mountain Pygmy-possum.
- Research impacts of oversnow activities on Mountain Pygmy-possums and their habitat (this is relevant to Mt Hotham, Falls Creek and several NSW Resorts, so should be pursued as a joint research project).
- Develop techniques for monitoring Bogong Moth abundance and health (including potential presence of arsenic and other residues).
- Develop techniques for monitoring the health of Mountain Plum-pine.
- Keep up-to-date with remote monitoring technologies and regularly reassess suitability for Mountain Pygmy-possums.
- Review existing Mountain Pygmy-possum monitoring program and modify if needed.

6.0 ISSUES AND RECOVERY ACTIONS

The threatening processes and the associated recovery actions can be divided broadly into three headings:

- Habitat loss, fragmentation and degradation.
- Direct impacts on the Mountain Pygmy-possum
- Climate change

6.1 Habitat Loss, Fragmentation and Degradation

Large areas of Type I and Type II habitat for the Mountain Pygmy-possum have been lost or degraded over the last 70 years, and the risk of further degradation still exists. Habitat loss, fragmentation and degradation are the key threatening processes for the Mountain Pygmy-possum on Mount Buller. The prevention of any further habitat loss, fragmentation or degradation of habitat is a critical component of this Recovery Plan. The retention and management of all existing habitat, the maintaining and enhancing of connections between habitat areas, and the rehabilitation of degraded habitat areas are the most urgent actions for the Mountain Pygmy-possum's recovery on Mount Buller. The loss of significant areas of habitat means that there may not be sufficient habitat remaining on Mount Buller for the species. Re-construction of lost areas of habitat and the potential for creating entirely new areas of habitat needs to be urgently assessed, and, where feasible, implemented.

Together, these habitat management actions are the key to the survival of the Mountain Pygmy-possum on Mount Buller. Without them, extinction of the population is predictable and likely.

6.1.1 Summer Road Usage

The extensive network of roads and tracks on the southern slopes of Mount Buller contribute to the fragmentation of a number of Type I and Type II habitat areas and are a source of sediment, weeds and litter that impacts on habitat areas. They are also likely to facilitate the access of introduced predators to Mountain Pygmy-possum habitat areas.

Aims:

- To reduce fragmentation of habitat by roads and tracks.
- To minimise the inputs of sediment, weeds and litter from roads and tracks into habitat.

To reduce predator access to habitat.

Actions:

- 6.1.1. (a) No further roads or tracks to be developed in Type I or Type II habitat or the 30 metre buffer, unless for the specific purpose of restoration of habitat and with the approval of DSE.
- 6.1.1. (b) Develop and implement a Road and Track Management Strategy for Mount Buller:
 - Roads/tracks will be classified into high/medium and low use categories;
 - Tracks will be constructed and used to a level consistent with their classification (e.g. low use tracks will have minimal summer use by low impact vehicles only and will have a vegetated surface). Some tracks appear to be overbuilt compared to their use (e.g. Family Road) and could be narrowed and revegetated;
 - Redundant or inappropriate tracks in or near Mountain Pygmypossum habitat will be identified in the Strategy and then closed and rehabilitated (e.g. Bull Run Mid Road, Wombat Tower 9 access);
 - All roads and tracks on the southern and northern slopes will be authorised personnel access only and be controlled by locked gates at all times;
 - The assessment of closure or restriction on use of tracks will take into account the potential needs (short or long term) for access to implement other actions in this Recovery Plan;
 - 6.1.1. (c) Plan vehicle use to minimise unnecessary trips (e.g. ensure all standard equipment is in vehicle; plan to take lunch, etc).
- 6.1.1. (d) The current low mountain bike and walking use in areas of Mountain Pygmy-possum habitat or buffers will be maintained. Summer recreational use of these areas will not be promoted.

6.1.2 Lift Rationalisation

It is understood that BSL have a long-term aim to rationalise the number and location of ski lifts on Mount Buller. This may provide opportunities to mitigate some existing impacts on Mountain Pygmy-possum habitat.

Aim:

 To minimise impacts and, where possible, enhance Mountain Pygmypossum habitat if the lift system is rationalised.

Actions:

6.1.2. (a) Ensure any review of ski lifts includes a full consideration of potential impacts on the Mountain Pygmy-possum, including the potential to reduce impacts associated with some existing lifts and associated access and infrastructure (e.g. Southside).

6.1.3 Waste and Litter

Waste management issues can contribute to habitat degradation (e.g. litter trapped in boulders) and to death of Mountain Pygmy-possums (e.g. animals trapped or drowned in discarded containers or inappropriately designed or unsecured waste bins).

Aim:

• To minimise litter input to habitat.

Actions

- 6.1.3. (a) Waste management planning and facilities on Mount Buller will take into account potential impacts on the Mountain Pygmy-possum.
- 6.1.3. (b) There will be an emphasis on minimising litter in and around Mountain Pygmy-possum habitat areas through the appropriate provision of bins (including at the top of lifts).
- 6.1.3. (c) Educate staff and visitors as to the impacts of litter on the Mountain Pygmy-possum.

6.1.4 Fire

The vegetation in the habitat of the Mountain Pygmy-possum is highly sensitive to fire and can be very slow to regenerate after being burnt. It is critical that no Mountain Pygmy-possum habitat is burnt on Mount Buller. In the event of a wildfire, the habitat areas will be regarded as the prime environmental asset on the mountain and given the same level of fire protection that is provided to key physical assets.

Aim:

To exclude fire from habitat.

Actions

6.1.4. (a) List all Mountain Pygmy-possum habitat on any fire protection asset listings.

- 6.1.4. (b) Review the DSE Regional Fire Management Plan to ensure that it fully takes into account the protection of Mountain Pygmy-possum habitat on Mount Buller.
- 6.1.4. (c) Develop a Fire Management Strategy for Mount Buller that fully takes into account the protection of Mountain Pygmy-possum habitat, including specific pre-planning to ensure that habitat is protected from both burning and from physical damage (e.g. fire line construction, track enlargement) during a wildfire.
- 6.1.4. (d) No planned burning to be undertaken in Mountain Pygmy-possum habitat or in areas where escapes could easily threaten habitat.

6.1.5 Drainage/Sedimentation

Much of the Mountain Pygmy-possums habitat on Mount Buller occurs naturally in drainage lines. The natural flow of water through these areas may be important to the maintenance of the habitat and its vegetation. It also means that habitat areas are sensitive to changed flows or increased sedimentation caused by actions in their catchment. On some of the older ski slopes that occur on Mountain Pygmy-possum habitat (especially in the Federation Bowl), sediment from past ski area development has partially filled in the boulder field habitat in many areas.

Management of drainage and sediment flows into the Mountain Pygmy-possums habitat is an important component of this Recovery Plan. There are two main sources of sediment in the Resort area: roads/tracks and poorly vegetated sections of ski areas. Construction areas can create short-term sources of sediment.

Aim:

• To minimise sediment input to habitat.

Actions:

- 6.1.5. (a) Review and map all drainage and sediment sources in the catchments for Type I and Type II habitat areas, including roads and tracks, unvegetated or poorly vegetated areas and cross-drains (including outlet of Wombat underground collector drain) on ski areas.
- 6.1.5. (b) Develop an appropriate design of sediment trap for tracks that can be cleared without causing extra disturbance to the environment (e.g. with a removable pit).
- 6.1.5. (c) Install sediment traps for all roads and tracks draining to Type I and II habitat.

- 6.1.5. (d) Ensure that sediment traps are regularly cleared and maintained; all trapped sediment to be removed to an appropriate designated disposal site.
- 6.1.5. (e) Install a sediment trap for drainage from the Village to top of Chamois.
- 6.1.5. (f) Stabilise and revegetate eroding or poorly vegetated areas (see also Action 6.1.8).
- 6.1.5. (g) Minimise sediment from road use by refining management practices (see also Action 6.1.1).
- 6.1.5. (h) Ensure all works are conducted to EPA best practice guidelines for Sediment Pollution Control.
- 6.1.5. (i) Use appropriate low-impact construction techniques.

6.1.6 Habitat Connectivity

The habitat for the Mountain Pygmy-possum on Mount Buller occurs in a number of discrete patches, and animals need to be able to move between these patches. This section focuses on the use of artificial rock-filled tunnels or surface rock corridors to provide localised connections for the Mountain Pygmy-possum across unsuitable habitat where the original connecting habitat has been removed or degraded, usually where revegetation or broadscale habitat re-creation is not an option.

Aim

• To ensure that urgent habitat connections are put in place to enable normal movement and social functioning.

Actions

Develop a manual for the design and construction of Mountain Pygmy-possum crossings, based on the three types set out in the ARMB's planning permit application number 2004/0083 (February 2004), and covering:

- design guidelines
- approvals process
- construction methods and standards
- sediment control during and after construction
- monitoring techniques to assess effectiveness.

- 6.1.6. (a) Improve the tunnel at the top of Wombat and Little Buller Spur (Map 3) to meet specified design guidelines and standards.
- 6.1.6. (b) Improve connectivity across Outer Edge (Map 3) by:
 - enlarging the recently constructed surface rock corridor below Zwier's Zig Zag access trail
 - constructing another crossing (surface or tunnel) near the drop-off from Family Run.

6.1.7 Vegetation Management

Aims

- Prevent further clearance of vegetation in habitat areas.
- Ensure vegetation management actions within habitat areas do not degrade habitat values.

Actions

- 6.1.7. (a) With the exception of minor infrastructure or maintenance works undertaken under permit from DSE, no clearance of vegetation in Type I or II or buffer habitats is to be undertaken.
- 6.1.7. (b) Manage vegetation according to the approved (by DSE) Vegetation Management Plan (VMP) (Harvey, A. and Rumpff, L. (2004a & b) for the next 12 months. Specific actions in the VMP that are consistent with the requirements of this Recovery Plan are:
 - No summer grooming of any Type I habitat
 - No summer grooming of any Type II or buffer habitats in the next 12 months
 - Selective manual removal of emergent trees (Snow Gums and Hickory Wattle) at the appropriate growth stage (before they are too large) is allowed
- 6.1.7. (c) Upon expiry of the current approved VMP, the new VMP approved by DSE will address:
 - Resolution of long-term vegetation management in Type II habitat or buffer habitat in Sun Valley, Wood Run, Potters Lane and base of Grimus
 - Detailed vegetation mapping of the entire ski field.

6.1.7. (d) Trimming of fringing vegetation on roads and trails will be done to the minimum level needed for safe passage of vehicles; specific prescriptions for this will be prepared and incorporated into the next update of the VMP.

6.1.8 Revegetation and Habitat Restoration

Revegetation and the restoration of degraded habitat are complex management issues. This Recovery Plan sets out a number of key actions for these areas, but a detailed Revegetation/Habitat Restoration Plan is needed, similar in concept to the VMP, to ensure that these actions are planned and carried out in a consistent way and that the challenging issues of logistics and resources are fully considered.

Aims

- Enhance habitat areas where natural vegetation is degraded.
- Revegetate habitat areas where natural vegetation has been lost.

Actions

- 6.1.8. (a) Revegetation in Type I and II Mountain Pygmy-possum habitat and in buffer and connecting vegetation will be appropriate to the site:
 - Areas that are still substantially covered by native vegetation will need only enhancement or infill plantings with those species that have decreased due to past management (Map 3)
 - The aim for areas that have lost most of their indigenous plant diversity but retain some native plant cover or where natural regeneration is occurring will vary:
 - if Type I or Type II habitat, the aim will be a full cover of indigenous vegetation, to be achieved through the promotion of natural regeneration combined with supplemental plantings (Map 3);
 - if buffer or connecting habitat, then the aim will be a cover low indigenous shrubs, to be achieved through the promotion of natural regeneration combined with supplemental plantings (Map 3).
 - Areas that have largely or completely lost their indigenous vegetation cover will be revegetated with a simplified indigenous vegetation of low shrubs such as *Hovea* (Map 3)

- 6.1.8. (b) Suitable soil, locally indigenous plants and boulders are scarce resources any future approved construction or works (including in the village areas) will be required under their permit to salvage soil, plants and/or rock from construction areas where these resources would assist in Mountain Pygmy-possum habitat management works elsewhere on the mountain; the potential for salvageable material at each site is to be determined by ARMB as the referral authority.
- 6.1.8. (c) Prepare a Revegetation/Habitat Restoration Plan (RHRP) by Spring 2006 that:
 - Is consistent with this Recovery Plan
 - · Prioritises revegetation areas
 - Sets out operational plans for revegetation for each site
 - Defines site preparation needs (e.g. weed control, physical preparation, etc.)
 - Calculates resource needs for the life of the RHRP, identifies the sources of these resources and sets out the timelines for procuring these resources.
- 6.1.8. (d) Ensure the availability of suitable planting stock through the support, in collaboration with other alpine resorts, of a sustainable alpine plant nursery.

6.1.9 Boulder Field Management

Habitat loss and degradation has been a major cause of the decline of the Mountain Pygmy-possum on Mount Buller. The population is at critically low levels and the lack of habitat appears to be a major constraint on its recovery. The retention of all remaining habitat and the improvement of degraded habitat, while critical actions, will still mean that a substantial proportion of the original habitat on Mount Buller remains lost to the animal. This may not be sufficient to sustain the species on Mount Buller. Therefore, this Recovery Plan recommends that a number of lost habitat areas are re-created, beginning with two pilot projects in areas with few constraints in order to build the practical experience that will be needed if habitat re-creation is to be achieved on a larger scale. The viability of further habitat re-creation in areas of more difficult terrain on Mount Buller is to be fully investigated through a detailed feasibility and planning study to be completed by September 2006.

In most degraded areas, habitat restoration will involve revegetation, sometimes with construction of Mountain Pygmy-possum tunnels. In other areas, the boulder fields remain, but have been filled in by silt or vegetation

debris from past clearing. Some sites have also been degraded through the removal of boulders and the replacement of boulders in these areas needs to be considered as a potential management option.

The geology of the high altitude boulder fields on Mount Buller is granite, basalt and/or metamorphic sedimentary. These rock types are not widespread away from the Mountain Pygmy-possum habitat areas, so finding a resource of boulders suitable for Mountain Pygmy-possum tunnel construction or for habitat enhancement/re-creation will be critical.

The physical placement of boulders in many areas presents considerable practical difficulties, which also have cost implications. Generally, boulders will need to be transported to the management site, requiring either an existing road or a new temporary road where this can be achieved outside of Type I or II habitat. Large numbers of boulders will require high levels of vehicle traffic. Alternative methods of transporting boulders will need to be explored (e.g. helicopter, cable systems, etc.). Once at the site, the placement of boulders would need to be done by large earthmoving equipment. This equipment needs access to the site and reasonably level areas to work from. Large sections of the most degraded Mountain Pygmypossum habitat (e.g. in Federation Bowl) are so steep that there would be serious logistic, physical and safety issues to be overcome before such works should be undertaken. Other issues include the potential indirect impacts on other habitat areas from increased vehicle traffic or temporary access roads, the stability of created boulder fields and off-site impacts associate with sourcing the rock.

A major habitat re-creation program would be a major civil construction program. As such, its permit requirements would be similar to what would be expected for such works, with full consideration of environmental, social, economic, safety and other potential impacts. As well as State planning permission, it would clearly be a referrable action under the EPBC Act, and is likely to be a controlled action.

Despite these constraints, it is reasonable to presume that habitat loss and degradation has been a major cause of the decline of the Mountain Pygmypossum on Mount Buller. The population is at critically low levels and the lack of habitat appears to be a major constraint on its recovery. The retention of all remaining habitat and the improvement of degraded habitat, while critical actions, will still mean that a substantial proportion of the original habitat on Mount Buller remains lost to the animal. This may not be sufficient to sustain the species on Mount Buller. Therefore, this Recovery Plan recommends that a number of lost habitat areas are re-created, beginning with two pilot projects in areas with few constraints in order to build the practical experience that will be needed if habitat re-creation is to be achieved on a larger scale. The viability of further habitat re-creation on

Mount Buller is to be fully investigated through a detailed feasibility and planning study during summer/autumn 2006.

Aims

- · Restore degraded boulderfield habitat.
- Re-create lost habitat areas where feasible.

Actions

- 6.1.9. (a) Engage a suitably qualified person to undertake a study of potential sources of suitable boulders for habitat restoration and recreation, including sources that can be used for works commencing in Spring 2005.
- 6.1.9. (b) Assess the feasibility of removing wood and other debris from inter-rock spaces on Women's Downhill, Federation and Southside by undertaking a pilot removal project in summer 05/06 (Map 3).
- 6.1.9. (c) Ensure future approved construction or works on Mount Buller are required under their permit to salvage rock from construction areas where these resources would assist in Mountain Pygmy-possum habitat management works (see Action 6.1.8 (b).
- 6.1.9. (d) Undertake two pilot habitat re-creation projects, one at the Funnel and the other in the "island" of degraded habitat that lies between the upper sections of Wombat and Little Buller Spur runs; planning, design and approvals to be undertaken over winter 2005, in order to undertake re-creation works the following summer (Map 3).
- 6.1.9. (e) Undertake a detailed feasibility and planning study for major boulder field habitat re-creation works at Mount Buller. It will involve a range of independent expertise, including Mountain Pygmy-possum habitat, construction in steep, dangerous environments, minimum impact construction in sensitive environments, environmental approvals and costing of works. It will:
 - fully consider all aspects of the process (sourcing the rock, transporting, cleaning, preparing/sizing the rock, site preparation, placing and stabilising the rock, ongoing maintenance, potential for rock slip/instability, equipment needed, access requirements, Worksafe issues, ongoing liability issues);
 - review the potential of all areas of "lost" Type I and II habitat for habitat re-creation;
 - develop a prioritised and costed list of feasible sites, and set out the approvals required;

- consider potential alternative approaches (e.g. winning rock onsite, removing recent sediment from *in situ* boulder fields, etc);
- set out a program of boulder field habitat re-creation works that incorporates all of the above;
- be completed by September 2006.

6.2 Direct Impacts

Some factors - declining food resources, disturbance, predation - directly impact on the Mountain Pygmy-possum. Actions to mitigate these are set out in this section.

6.2.1 Off-site impacts on Bogong Moths

Bogong Moths are an important food resource for the Mountain Pygmy-possum. The Bogong Moth migrates to the Alps for the summer, but breeds in the plains of the Murray-Darling Basin. There is no information on variation of Bogong Moth numbers on Mount Buller. There is evidence that Bogong Moths bring arsenic residues, and possibly pesticide residues, from the plains into Mountain Pygmy-possum habitat. Little is known about the status and threats to the Bogong Moth in its breeding areas, and off-site management actions in these areas are not proposed.

Aim

• Assess whether Bogong Moths are a limiting factor for the Mountain Pygmy-possum on Mount Buller.

Actions:

- 6.2.1. (a) Develop and implement a simple abundance monitoring protocol for Bogong Moths at a minimum of at least two Mountain Pygmypossum habitat areas on Mount Buller.
- 6.2.1. (b) Analyse abundance data at the end of each summer to assess the potential for this species being a limiting factor for the Mountain Pygmy-possum on Mount Buller.

6.2.2 Snow Grooming and Oversnow Vehicles

The winter hibernation period is a critical phase of the annual cycle of the Mountain Pygmy-possum. The noise and activity associated with over-snow vehicles (e.g. snowmobiles and snowgroomers) may disturb the species during hibernation and the compaction of snow by these vehicles may reduce or alter the insulating properties of the snow. While there is some

information to support these hypotheses, further research would be required to confirm them. Due to the critical importance of the hibernation period and the fact that oversnow vehicle use is an area where recovery actions can be rapidly implemented, this Recovery Plan takes a precautionary approach and recommends immediate changes to the use of oversnow vehicles in key winter habitat areas on Mount Buller.

Aim

• Ensure that the potential for impacts of snow grooming and oversnow vehicles on the Mountain Pygmy-possum and its habitat is minimised.

Actions:

- 6.2.2. (a) BSL and the ARMB, in conjunction with other Alpine Resorts (e.g. Mount Hotham and Falls Creek) will investigate the effects of oversnow transport and grooming on Mountain Pygmy-possums and their habitat.
- 6.2.2. (b) Until the potential effects of oversnow transport and grooming on Mountain Pygmy-possums and their habitat are known, snow grooming will not occur on the ski runs shown on Map 4.
- 6.2.2. (c) The ski runs listed above will be maintained as no grooming areas until it can be demonstrated to the satisfaction of an independent scientific panel that oversnow vehicles and grooming do not negatively impact on Mountain Pygmy-possums and/or their habitat.
- 6.2.2. (d) The access trails in the Wombat and Federation Bowl areas are groomed, however grooming will only be undertaken for essential operational procedures in these areas and will occur at a minimum snow depth of 50 cm.
- 6.2.2. (e) Snow grooming activities within other areas of Type I and Type II habitat and 30m buffers will be minimised (essential operational procedures only), until it can be demonstrated to DSE's satisfaction that oversnow vehicles and grooming do not negatively impact on Mountain Pygmy-possums and/or their habitat.
- 6.2.2. (f) All snow grooming activity within the southern ski slopes shall be recorded during the 2005 snow season to document the current grooming regime and to assist in researching the potential risks to the Mountain Pygmy-possum and its habitat of oversnow transport and grooming.
- 6.2.2. (g) All snow grooming prescriptions will be reviewed following the 2005 snow season and no-grooming zones will be clearly mapped and

- included in a grooming strategy/plan to be developed by BSL and distributed to BSL staff.
- 6.2.2. (h) The use of oversnow vehicles for search and rescue and medical evacuation will be allowed in all areas.
- 6.2.2. (i) Snowmobile use will be limited to essential operational duties including maintenance relating to machinery malfunction and provision of essential services in Type I and Type II habitat and associated 30m buffer during the 2005 snow season. Where such snowmobile use is deemed necessary in these areas, use of a 4-stroke machine will be encouraged. When new snowmobiles are purchased, they will be 4-stroke machines.
- 6.2.2. (j) Protocols for minimising the impact of snowmobile use on Mountain Pygmy-possum habitat will be developed cooperatively by the ARMB, BSL and DSE and will be incorporated into future manuals. All users (staff of BSL, staff of the ARMB, police, Ski Patrol, SES, etc) of snowmobiles on Mount Buller are to be trained in this protocol. This protocol will apply to all snowmobile use, including medical and search and rescue.
- 6.2.2. (k) Grooming on runs on the Southern Slopes that do not support Type I or Type II habitat will continue but will be undertaken in a manner that minimises damage to vegetation and soil, especially in low snow conditions.
- 6.2.2. (I) Where there are Mountain Pygmy-possum corridors constructed across runs that otherwise do not have Mountain Pygmy-possum habitat, the location of the corridors will be clear to machine operators and grooming activities must be managed to ensure that the corridors are not damaged or unnecessarily disturbed.
- 6.2.2. (m)Where revegetation is being undertaken on ski runs that otherwise do not have Mountain Pygmy-possum habitat, the location of revegetation areas will be clear to machine operators and grooming activities must be managed to ensure that revegetation areas are not damaged, especially in low snow conditions.
- 6.2.2. (n) Type I or Type II preferred habitat may expand over time as new habitat is re-created. The snow grooming strategy/plan will need to take into account the sensitivity of these new areas.
- 6.2.2. (o) Snow farming activities are subject to the same restrictions as grooming activities.

6.2.3 Introduced Predator and Introduced Animal Control

Introduced predators (foxes, cats, dogs) are known to prey on Mountain Pygmy-possums. While their boulderfield habitat offers some protection from predators, they are vulnerable where their habitat has been degraded or where they have to move through more open areas between fragmented habitats. The ARMB carries out extensive predator monitoring and control on Mount Buller as part of its general management responsibilities.

Introduced grazing animals (rabbits, deer) appear not to directly impact on the Mountain Pygmy-possum but can damage or inhibit revegetation and natural regeneration.

Aims

- Minimise impacts of all introduced predators.
- Minimise impacts of introduced grazing animals.

Actions:

- 6.2.3. (a) Continue to implement the ARMB's Predator Management Strategy at Mount Buller.
- 6.2.3. (b) As a priority, develop and implement improved winter monitoring and control of foxes and cats.
- 6.2.3. (c) Domestic cats are not permitted on Mount Buller; this policy must be maintained.
- 6.2.3. (d) The presence of domestic dogs on Mount Buller is not consistent with the conservation of the Mountain Pygmy-possum; a policy to increase control over domestic dogs in the Resort will be developed, as a priority.
- 6.2.3. (e) Control and if possible eradicate rabbits within the Resort area.
- 6.2.3. (f) Ensure that deer do not negatively impact on revegetation or regeneration of Mountain Pygmy-possum habitat.

6.3 Climate change

A warming of the environment on Mount Buller due to the effects of either greenhouse-induced or natural climate change has the potential to cause changes in the Mountain Pygmy-possum population through both direct impacts (e.g. heat stress, altered life history patterns) and through degradation or loss of habitat resources. There will also be potential changes to ski field management due to climate change that could directly impact on the Mountain Pygmy-possum. While climate change cannot be controlled

merely through local actions, there are a number of issues and actions at Mount Buller that need to be undertaken.

Aims:

- Minimise local contributions to climate change.
- Develop an understanding of the extent of local climate change.
- Ensure that actions to manage poor snow conditions do not impact on the Mountain Pygmy-possum or its habitat.

Actions:

- 6.3. (a) The extent of local climate change will be monitored by establishing 2-3 climate monitoring stations at sites representative of key Mountain Pygmy-possum habitat areas (the existing Bureau of Meteorology winter monitoring stations may be suitable sites; there should be liaison with the Bureau on how best to implement this action).
- 6.3. (b) The extent of local hydrological change will be monitored by establishing 2-3 hydrological monitoring stations at sites representative of key Mountain Pygmy-possum habitat areas.
- 6.3. (c) Planning for any increased snow making facilities will need to take full account of potential impacts on the Mountain Pygmy-possum and its habitat; new facilities in Type I or Type II habitat or buffers will need EPBC referral by the proponent.
- 6.3. (d) The potential for increased nutrient flows to alter or damage Mountain Pygmy-possum habitat if recycled water is used in the future for snow making must be assessed by the proponent, and, if implemented, post-operation impacts must be monitored and managed.
- 6.3. (e) The water reticulation system for snow making currently provides an important source of water that is used in establishing revegetation; this role will be explicitly recognised and considered in water management for snow making and in any future changes to the system
- 6.3. (f) There have been suggestions that snow making could be used to ameliorate some of the impacts on the Mountain Pygmy-possum from poor snow conditions; this is an untested assumption and one that is unlikely to be able to be implemented over significant areas of Type I and Type II habitat. This is not considered to be a priority area for research at present.

6.4 Other Issues

This section sets out a number of other issues that are important for the recovery of the Mountain Pygmy-possum on Mount Buller but that are not directly related to the three key threatening processes.

6.4.1 Captive Management

Captive management of critically threatened populations can:

- provide a degree of insurance against total loss of a wild population
- · provide animals for reintroduction to the wild.

The smaller the source population and number of animals that can be incorporated into a captive population, the more problematic it is to establish a successful captive program. Establishing a successful captive population is a high risk operation when the wild population has reached critically low levels. Risks arise for the wild population due to the removal of individuals and there are potential risks to the captive animals.

One means of minimising the impacts of removing individuals from the wild population is to capitalise on the portion of the wild population that has low expectation of natural survivorship. This approach has been successfully applied to a number of species, including a number in Australia.

'Captive management' does not necessarily entail the establishment of a self-sustaining captive population managed as an entity discrete from the wild population. A blend of captive-husbandry and wild-management techniques have achieved outstanding recovery results for the Mauritius Kestrel Falco punctatus and the Chatham Island Black Robin Petroica traversi. Innovative cross-fostering of pouch young to other wallaby species is currently being used to more rapidly build numbers of the Victorian population of the Brush-tailed Rock Wallaby Petrogale penicillata.

The Mountain Pygmy-possum has been maintained in captivity with varying success for a number of years by Healesville Sanctuary and Taronga Zoo, but captive breeding has never been successfully achieved. Captive management has never been considered an integral component of the conservation of the species recovery program and has therefore not been resourced at a high level.

As the Mount Buller population of the Mountain Pygmy-possum is at a critically low level, the potential impacts on the wild population of removing any animals into captivity must be evaluated carefully. On the other hand, if captive management is to have any likelihood of contributing

to recovery of the Mount Buller population there would appear to be no time to waste.

Heinze (2005; pers. comm.) has recorded some Mountain Pygmy-possums with second litters late in the breeding seasons of 2003/04 and 2004/05. This is likely to lead to high mortality of both the females and litters involved. A *Headstart* approach could be investigated for these animals, which would rear them to a point past their most vulnerable age, with a view to their release into appropriate habitat on the mountain during the earliest opportunity.

Any holding of captive animals, particularly healthy individuals, would be best done at Mount Buller. This would permit flexibility and an approach that integrates management of the wild and any captive populations. It would also allow animals to be maintained most easily within an appropriate climate regime and with ready access to natural foods. It would require a relatively small, but dedicated, facility. It would also require the services of one or two keepers with a high level of expertise with small marsupials.

Aim:

Assess the potential for a "Headstart" program at Mount Buller.

Actions:

- 6.4.1. (a) Undertake an evaluation of the potential for a "Headstart" program at Mount Buller. This will include:
 - a review of current captive husbandry knowledge
 - consultation with (a) experts in biology of the wild population, in captive management of small marsupials, (b) experienced wildlife veterinarians, and (c) experts with experience in the integration of these elements for recovery of threatened fauna
 - an evaluation of the risks and opportunities of a captive management program for the Mountain Pygmy-possum based at Mount Buller
 - an assessment of all approvals and permits that would be required.

6.4.2 Responsibility for Management

The existing lease arrangements at Mount Buller differ from those in other Victorian ski resorts. This has resulted in a lack of clarity in environmental and management responsibilities. A review of the lease arrangements, with the aim of creating a more focussed environment for environmental management, has the potential to improve the implementation of this Recovery Plan.

It will be important to ensure that the responsibility for environmental management within both the ARMB and BSL is clear, and each organisation will make sure there are clear and transparent responsibilities and lines of communication.

Aim:

• Ensure clarity and transparency in environmental management.

Actions:

- 6.4.2. (a) Review of the lease arrangements, with the aim of creating a more focussed environment for environmental management.
- 6.4.2. (b) Review internal environmental responsibilities and lines of communication.

6.4.3 Education and Environmental Awareness of Mountain Staff

It is important that all mountain staff are aware of the Recovery Plan and its requirements, of the location of Mountain Pygmy-possum habitat and of the legal requirements on them that arise from relevant legislation, particularly the EPBC Act.

There has been a considerable increase in environmental awareness within the ARMB and BSL in recent years, and the Mountain Pygmy-possum has been a major factor in raising this awareness. Environmental issues now form part of staff induction and key staff are sent to the Alpine Ecology or Alpine Rehabilitation Courses each year. The actions set out in this plan provides an opportunity to build on this, and a program will be put in place to continue to expand the environmental awareness of mountain staff through education and training.

The range of management actions proposed in this Recovery Plan, combined with the presence of high quality educational facilities at Mount Buller, provides learning opportunities, and it may be possible to have the Alpine Rehabilitation Course run on the mountain in some years.

Aim:

• Ensure that all mountain staff are aware of the Recovery Plan and its requirements and of the legal requirements in relation to the species.

Actions:

- 6.4.3. (a) Continue to include environmental issues in staff induction.
- 6.4.3. (b) Continue to send key staff to the Alpine Ecology or Alpine Rehabilitation Course.
- 6.4.3. (c) Seek to have the Alpine Rehabilitation Course run on Mount Buller in some years.

6.4.4 Education and Environmental Awareness of Visitors

The recovery program for the Mountain Pygmy-possum will alter aspects of both winter and summer management, and visitor awareness and support will be important for their acceptance and success.

Aim:

To create a supportive visitor community by ensuring visitors are aware
of the significance of the Mountain Pygmy-possum on Mount Buller
and are informed about the recovery actions that may affect them.

Actions:

- 6.4.4. (a) Maintain existing interpretive displays at Cow Camp and Summit and update when appropriate.
- 6.4.4. (b) Install an interpretive display at the Mount Buller Ski School on Bourke Street.
- 6.4.4. (c) Consider providing Mountain Pygmy-possum information with all resort entry passes and/or lift tickets.
- 6.4.4. (d) Provide regular Mountain Pygmy-possum recovery updates on Mount Buller web page, newsletters, etc.
- 6.4.4. (e) Continue public education through the guided walk program.
- 6.4.4. (f) Develop a secondary school information kit on the Mountain Pygmy-possum at Mount Buller.

6.4.5 Knowledge Management and Base Data

There is considerable knowledge about the Mountain Pygmy-possum on Mount Buller and about on-ground management issues. While much of this is documented, much is not and could be lost with changes in personnel over time. It is important that this knowledge is captured.

The mapping of Mountain Pygmy-possum habitat that has been undertaken by Dean Heinze provides an invaluable resource for managing the species on Mount Buller. This mapping was undertaken at a level appropriate for the needs of scientific research and broadscale management. To properly implement this Recovery Plan, a different level of mapping will be needed. BSL has recently begun to map its infrastructure at a high level of accuracy. It is proposed that this will include accurate mapping of the Mountain Pygmy-possum's habitat. This will be undertaken as a high priority in summer 05/06, and must be done in conjunction with an appropriately skilled ecologist.

Aim:

 To capture and make available key knowledge about the Mountain Pygmy-possum and about on-ground management.

Actions:

- 6.4.5. (a) Set up a knowledge management system, linked to the GIS.
- 6.4.5. (b) Complete accurate mapping of Mountain Pygmy-possum habitat in summer 05/06.
- 6.4.5. (c) All existing works undertaken for Mountain Pygmy-possum management (e.g. tunnels, revegetation) will also be accurately mapped and this will be continuously updated as new works are done.
- 6.4.5. (d) Establish and maintain a library of material and references on the Mountain Pygmy-possum at the ARMB offices.

7.0 SCHEDULING AND COSTING

The schedule for 2005-2006 and indicative costing for the Recovery Plan actions is set out in the following Table (included in authorised documents only).

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ABBREVIATIONS

ARMB	Mount Buller and Mount Stirling Alpine Resort Management Board
BSL	Buller Ski Lifts
DEH	Department of the Environment and Heritage
DSE	Department of Sustainability & Environment (formerly NRE)
EPBC	Environment Protection and Biodiversity Conservation Act 1999
FFG	Flora and Fauna Guarantee Act 1988
NRE	Department of Natural Resources & Environment (now DSE)
VMP	Vegetation Management Plan

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Laurie Blampied (BSL)

John Dyson (ARMB)

Aaron Harvey (Harvey and Associates)

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Louise Perrin (ARMB)

Nick Reeves (BSL)

Nick Whitby (BSL).
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MAPS







