Fox Control Management Plan for the Protection of Long-footed Potoroo

Great Dividing Range Victoria

- Barry Mountains Core Expansion
- Alpine Ark

VICTORIA
State Government

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This Plan has been developed in partnership with Taungurung Land and Waters Corporation and Gunaikurnai Land and Waters Aboriginal Corporation.

This Plan has been developed in consultation with:

- Victorian Hound Hunters
- Game Management Authority
- Australian Deer Association
- Victorian Deer Association
- Sporting Shooters Association of Australia
- Individual hound hunters
- Specialist invasive species control practitioners
- Local landowners
- Grazing licensees
- Arthur Rylah Institute for Environmental Research (ARI)
- Department of Environment, Land, Water and Planning (DELWP)
- Parks Victoria

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Introduction

The purpose of this Fox Control Management Plan is to establish a framework for an expanded baiting regime that substantially reduces the impact of Red Foxes on the Great Dividing Range Long-footed Potoroo population in the Barry Mountains and adjoining areas, while minimising the impact of the program on the activities of public land users and neighbours. The key off target risk of baiting is to domestic dogs including dogs associated with deer hunting, grazing licensees, private land owners and visitors.

The opportunity and benefits of connecting and integrating the expanded Barry Mountains program into the existing Mountain Pygmy Possum predator control program in order to create a multi and cross tenure predator control program across a large mountainous landscape is also presented as an Alpine Ark concept.

This five-year plan will provide the basis for fox baiting in the area until December 2026 at which time it will be reviewed. An annual implementation plan will be developed to deliver the program.

Part 1: Context

The Long-footed Potoroo (*Potorous longipes)* is a medium-sized, terrestrial rat-kangaroo that inhabits forests in south-eastern Australia. The Long-footed Potoroo is currently known from three apparently disjunct populations in East Gippsland, south-eastern New South Wales and the on the Great Dividing Range (Barry Mountains) in the Victorian Alps. This species was first encountered by biologists in the late 1960s but was not formally described until 1980 (Seebeck and Johnston 1980).

Conservation significance of the Great Dividing Range Population

The occurrence of Long-footed Potoroo in the Barry Mountains only became known to State Government land managers in 1995. The population straddles the Great Dividing Range, occurring in both the upper Ovens and Mitchell River catchments in the Alpine National Park and state forest.

Surveys since indicate the range is now more extensive, occupying a known area of over 200,000 ha, spanning about 80 km from the most northern to southern records.

The Long-footed Potoroo has been found in a wide range of forested Ecological Vegetation Classes (EVCs) on the Great Dividing Range from altitudes of 500m to 1370m.

The primary habitat EVCs are Wet Forest, Damp Forest and Riparian Forest. Secondary habitat EVCs are Montane Damp Forest, Herb-rich Foothill Forest and Shrubby Dry Forest.

However, Long-footed Potoroos may not have highly specialised habitat requirements in this area and their presence may be more related to absence of foxes (Lumsden et. al. 2019).

The Great Dividing Range population is presumably isolated from the East Gippsland population, approximately 100 km to the east.

The isolated and sparse nature of the Long-footed Potoroo population in the Barry Mountains confirms the importance of this area to its long-term conservation.

The Red Fox: a key threat to the Long-footed Potoroo

There is evidence that the Long-footed Potoroo was formerly more widely distributed than current records would indicate (Norris et al. 1983; Seebeck 1992; Bilney et al. 2010). There are many factors that may have contributed to that decline in population and range.

The Great Dividing Range population has been subject to intense and frequent bushfires, more recently in 2003, 2006/07 and 2020. A survey following the 2020 bushfires indicated Long-footed Potoroos were more than three times more likely to occur in unburnt areas than in areas that were severely burnt. (DELWP 2021). However, it appears that fire has had less influence on the distribution of the species in the Great Dividing Range area than foxes.

Fox predation is a major threat to Long-footed Potoroo, and possibly the primary factor influencing the species distribution and habitat associations within forested landscapes across its wider historic range (Lumsden et. al. 2019).

The Great Dividing Range is known to carry a significant fox population. In a survey of 271 sites from 2007-2009, Long-footed Potoroos were detected at 37 (13.6%) and Red Foxes at 43 (15.9%) (Lumsden et. al. 2019).

The results from camera surveys of 120 sites in 2020 indicate that Long-footed Potoroos were more likely to occur in locations with lower predicted fox density, with 75% of sites with a predicted fox density of <0.25 foxes/sq. km being occupied by Long-footed Potoroos, but only 25% of sites with a predicted fox density of >0.25 foxes/sq. km being occupied (DELWP 2021).

Predicted probabilities of fox and Long-footed Potoroo occurrence in the landscape contrast across the Barry Mountains.

Foxes are predicted to be more likely to occur at lower and higher elevations and least likely to occur in steep slope elevations between 400 and 1400m, where Long-footed Potoroos are more likely to occur. Nevertheless, on the basis of habitat suitability, Long-footed Potoroos would be predicted to occupy more of the landscape if foxes were absent (Lumsden et. al. 2019).

Effective fox suppression should therefore continue to be a high priority for the conservation of the Long-footed Potoroo.

Legal Framework

Land Management

Alpine National Park

The Alpine National Park is established and regulated under the National Parks Act 1975 and managed by Parks Victoria under the Parks Victoria Act 2018. The area is managed in accordance with The Greater Alpine National Parks Management Plan 2016.

State forest

State forest is regulated principally under the Forest Act 1958 and managed by the Department of Environment, Land, Water and Planning (DELWP). The Barry Mountains are included in Regional Forest Agreements for the North east and Gippsland.

Traditional Owners

The area north of the Great Dividing Range is within the area encompassed by the Taungurung Land & Waters Corporation (TLaWC) *Traditional Owner Settlement Act 2010* Agreement with the Victorian Government. This settlement includes joint management of the Alpine National Park in this area and a Land Use Activity Agreement (LUAA) and a Natural Resource Agreement (NRA).

The area south of the Great Dividing Range is within the area encompassed by the Gunaikurnai Land and Waters Corporation (GLAWAC) *Traditional Owner Settlement Act 2010 Agreement* with the Victorian Government.

Long-footed Potoroo

Victoria

The Long-footed Potoroo is listed as "Threatened Species" under the *Flora and Fauna Guarantee (FFG) Act 1988*, with the category of threat being "Endangered". An FFG Action Statement has been prepared that contains a number of actions relevant to the Great Dividing Range population (DSE 2009).

Commonwealth and International

The Long-footed Potoroo is listed as "Endangered" under *the Environmental Protection and Biodiversity Conservation Act 1999*, and "Vulnerable" on the International Union for Conservation of Nature (IUCN) Red list of Threatened Species. A national recovery plan was first prepared in 2000 (Seebeck 2000), and a revised plan has been submitted to the federal Department of Environment for endorsement.

Red Fox

Victoria

The Red Fox (Vulpes vulpes) is an "Established Pest Animal" in the State of Victoria under the *Catchment and Land Protection* (CaLP) *Act 1994*. "Established Pest Animals" such as the Red Fox are established in the wild in Victoria and considered a serious threat to primary production, Crown land, the environment or community health in Victoria. The Act states it is not possible to eradicate established pest animals (e.g. foxes) from the State, therefore asset protection is the most effective approach to minimise their impact on high value assets.

In the Alpine National Park, the *National Parks Act 1975* requires the extermination or control of exotic fauna (including foxes).

Commonwealth

Fox predation has been listed as a "Key Threatening Process" under the *Environment Protection and Biodiversity Conservation Act 1999*. A key threatening process is that which threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological communities. Long-footed Potoroo is listed as species affected by the European Red Fox in the Threat Abatement plan (DEWHA 2008).

Deer Hunting (with Dogs)

Wildlife (Game) Regulations 2012

Deer hunting with dogs is regulated by the *Wildlife (Game) Regulations* 2012, and the Code of Practice for the Welfare of Animals in Hunting under the *Prevention of Cruelty to Animals Act* 1986.

Scent Trailing hounds

Sambar deer can be hunted with scent-trailing hounds in the area bounded on the south by the Princes Highway and on the west broadly by the Hume Highway from 1 April to 30 November (excluding Easter). Hunting of sambar deer with scent-trailing hounds is not permitted in national or state parks or in water catchment areas and around some specified towns. Any hunter wishing to hunt sambar deer with the aid of scent-trailing hounds must have a game licence which authorises the use of hounds. Maximum hunter group size permitted up to 10 hunters and five hounds (with some exceptions) and hounds must be registered.

Gun Dogs and Deer Hunting Dogs

Deer hunters may hunt deer with the aid of gundogs and deer hunting dogs. Only two deer hunting dogs or gun dogs or a combination can be used by any hunter, team of hunters or hunters working together. This applies throughout the state and year round, wherever hunting with dogs is permitted.

Policy

Protecting Victoria's Environment – Biodiversity 2037 is Victoria's plan to stop the decline of native plants and animals and improve the natural environment. The Fox Control Management Plan for the Protection of Long-footed Potoroo has the following alignments with Biodiversity 2037:

Statewide targets:

That no vulnerable or near-threatened species listed on IUCN Red List of Threatened Species will have become endangered.

Long-footed Potoroo is classified as Vulnerable on the IUCN Red List of Threatened Species.

Priority 1: Delivery of cost-effective results utilising decision support tools in biodiversity planning.

The Strategic Management Prospects (SMP) decision support tool identifies fox control cost effectiveness in the range of 70-100% across most of the Barry Mountains landscape.

Priority 17: Outlines the need to better understand and respond to key threats and opportunities for biodiversity conservation, such as control of weeds and pest animals.

Current Barry Mountains Core Fox Control Program

A fox baiting program was initiated in 2004 following the 2003 Alpine Fire, to reduce predation on the core known Long-footed Potoroo population as it recovered from fire (Robley et al. 2005). The program has continued since, covering approximately 45,000 ha in the Alpine National Park, Tea Tree Range State forest, Buffalo River State forest and Dandongadale State forest through the Weeds and Pests on Public Land (WPPL) program.

Baiting has proved effective with locations close to bait stations having low probabilities of occupancy for Red Foxes which in turn are matched by a heightened probability of occupancy for Long-footed Potoroos (Lumsden et. al. 2019).

As part of the 2020 Bushfire Recovery Program a camera monitoring project was conducted in October - November 2020 to determine further the occurrence of Long-footed Potoroo in the Barry Mountains landscape and to further inform a strategy for their protection. The survey detected Long-footed Potoroos at 35 of the 120 camera locations. Twelve occurred in burnt areas and 23 in unburnt areas. Thirteen were recorded in the Alpine National Park and 20 in state forest (DELWP 2021). Half those detected were within the relatively small current baiting area. These and previous recordings of Long-footed Potoroo occurrences, along with introduced predators, are shown on Map 1.

Methodology

The Barry Mountains Core Fox Control baiting program runs from December to June and up to 2021 was managed by Parks Victoria utilising contractors. Baits are buried in mounds to a depth of 10-15cm at 1km intervals along vehicle tracks in the control area. The bait mound soil is sieved and smoothed off to enable the recognition of predator and non-target species signs during the checks.

The program involves:

- Fresh Baiting: December and March: weekly laying of fresh liver 1080 poison baits. This is timed to coincide with the fox life cycle of juvenile foxes on the move and looking for new territory and the breeding season.
- Manufactured Baits: In January, February, April and May manufactured shelf stable baits are used. The program ends in June with all baits removed by June 30.
- Free (un-poisoned) feeds are not currently employed.

Other Predator Control Programs

Wild Dogs

Wild dog (Canis lupus familiaris), baiting occurs in a small part of the known area of Long-footed Potoroo presence and suitable habitat areas, within 3 km of Private Property. These are targeted ground baiting transects and occur annually on Durling/Dozer-Brown Track in the west and Wet Gully/Morse's Creek tracks in the east. This is largely (but not exclusively) carried out outside the hound hunting season. Several other tracks in the area are endorsed as reserved ground baiting transects but are not currently active.

Fox Baiting to Protect Mountain Pygmy Possum in Alpine Environments

Fox baiting occurs to protect Mountain Pygmy Possum (Burramys parvus) in the Bogong High Plains area of the Alpine National Park and in and around the Mt Hotham, Falls Creek and Mt Buller/Mt Stirling Alpine Resorts. These baiting areas abut Long-footed Potoroo habitat to the east and west and may provide some complementarity to an expanded Long-footed Potoroo program (See Part 2).

Issues and Constraints

Social Pressure

The current fox baiting program has been reduced and become less effective due to social pressures. Initially from 2007, there was a summer-autumn baiting program (November-June) of 150 bait stations and a limited winter baiting program (July to end of October) of 40 bait stations. During 2008 several bait stations experienced human interference and removal of baits. In 2014/2015, adverse interactions between the baiting contractor, Parks Victoria and recreational hound hunters occurred. This led to improving the communication methods and channels with recreational hunters using dogs. To further reduce conflict, the program is now concluded at the end of June, recommencing at the end of November, leaving 5 months un-baited.

Higher elevations

Winter baiting, particularly in July and August, is not likely to be achievable at higher elevations on the Barry Mountains due to snow cover, also affecting access to south of the divide. Nevertheless, much of the area at lower elevations to the north remains generally accessible year-round.

Risks to National Park and State Forest Users

A thorough risk assessment is carried out to identify and mitigate risks. Baits for fox control are buried, marked and regularly monitored. This is to reduce risks to visitors, recreational users, licensees and neighbours of public land as well of to non-target animal species. Appendix One lists current users of the area and an assessment of impacts of an expanded fox control program.

There is no risk to visitors coming into contact with baits if they don't interfere with baiting sites.

The main risk to users of non-target baiting is to their dogs. Dogs may be present in state forest associated with:

- Deer hunters with scent trailing hounds, deer hunting dogs or gun dogs.
- Visitors with domestic dogs.
- Grazing licenses with working dogs.
- Neighbours with domestic dogs.

Dogs that are engaged with their owners are less likely to spend time digging for buried baits as opposed to foxes that spend significant time scavenging. The risk to hounds, deer hunting dogs and gun dogs is much reduced since the widespread use of GPS collars allowing dogs to be traced if they leave the pack or owner and roam. Nevertheless, there is a risk if baits are disturbed or cached and become exposed or dogs that are at large and are permitted to scavenge. Fox baits contain half the poison dose of that for wild dogs, reducing the likelihood of a larger dog being fatally poisoned, but this is not eliminating the risk. Shelf stable baits take longer to break down and are a greater risk than fresh meat baits if cached. Dogs have been known to be fatally poisoned from ingesting fox baits.

Poisoning of other animals is unlikely due to the very low dosage of 1080 used in fox baits. Secondary 1080 poisoning from dead animals is low risk as 1080 generally breaks down rapidly as the body decomposes, leaving no residual poison in the environment. However, the time this takes can be slower under certain conditions such as cold, dry conditions, and the risks of secondary poisoning may remain longer than expected (Eason, et.al. 2013).

Risks to Native Predators

The buried bait methodology is designed to minimize the likelihood of native predators such as Spot-tailed Quolls taking baits. There is a risk however to Tree Goannas/Lace Monitors (Varanus varius), particularly should fresh meat and/or PAPP baits be used (Refer Part 4). There is no record of Tree Goanna presence in the Barry Mountains baiting area, however there is a record in the Wonnangatta River Valley.

Dingoes (Canis lupus dingo) are also present. Fox baits are a lower risk to wild dogs, dingoes and their hybrids due to a lower dose rate, particularly for PAPP baits (Refer Part 4) and the buried bait technique may reduce the likelihood of dingoes digging up baits. Nevertheless, there is a risk to fatal poisoning of dingoes.

Monitoring of free feed sites is intended to record presence and disturbance from non-target species prior to proceeding with baiting.

Part 2: Expanding the Program

Regular baiting in a proactive and strategic manner will gradually reduce predator numbers and limit impacts (Misfud 2016). Sustained and spatially extensive fox baiting in forest areas can control foxes to low abundances over large areas that can be sustained over time. This results in an increase in the occupancy, colonization and persistence rates for its native prey species and positive conservation benefits for the species (Robley et. al. 2014).

Research carried out over a five-year period in the Great Dividing Range (Lumsden et. al. 2019) has highlighted the inadequacies of the current limited fox control program to conserve Long-footed Potoroo. This has provided science-based evidence that expanding the program spatially and temporally is required to have a significant positive benefit to conservation of the species.

Rationale

Expanding the Barry Mountains core baiting area spatially

Long-footed Potoroos may not have highly specialised habitat requirements within the Great Dividing Range area. In the absence of foxes, it is predicted that Long-footed Potoroos would become much more widespread to the east and north and occupy a wider range of habitats (Lumsden et. al. 2019).

Foxes have an inherent ability to rapidly establish new territories over both long and short distances making the fox perfectly adapted to compensate for any form of population reduction (Saunders & McLeod L 2007). Cost effective management of fox damage, especially to protect vulnerable wildlife, is likely to require control operations which cover relatively large areas so that immigration can be confined to buffer zones on the perimeter of the treated area (Saunders et.al 1995).

Smaller baiting areas often only encompass a small proportion of fox home ranges and removing these foxes allows for rapid colonisation. Larger baiting areas will encompass many fox home ranges, counter rapid colonization and effectively maintain lowered levels of fox abundance. In addition, the most effective programs are those where baits are placed at least fortnightly and continuously across the network (Francis et.al. 2020).

The current Great Dividing Range fox baiting program occurs in modelled high value Long-footed Potoroo habitat.

The treatment area of about 45,000 ha only covers 23% of the known area of occurrence of Long-footed Potoroo across a landscape of about 200,000 ha, and even less of its wider modelled habitat landscape of over 400,000 ha. The existing program covers only 271 km (about 27%) of over 1000km of tracks in the landscape that covers the core high value habitat and known occurrence around the Barry Mountains.

Whilst current fox baiting in the Barry Mountains is having a positive effect on occupancy of Long-footed Potoroos in that area, additional fox baiting in and adjacent to the Barry Mountains will reduce fox re-colonization. In addition, research indicates that it will enhance the distribution and population size of Long-footed Potoroos, due to the higher inherent suitability of these areas for occupancy by foxes (Lumsden et. al. 2019).

Expanding the geographic extent of fox control programs to facilitate occupancy of a greater area of Long-footed Potoroo habitat may be the most effective mechanism for improving the conservation status of the Long-footed Potoroo (Lumsden et. al. 2019).

Expanding the program temporally

Current knowledge of Red Fox ecology and assessment of control programs indicates that to have the maximum probability of achieving success, baiting must occur consistently throughout the year on an ongoing basis to effectively disturb the breeding cycle at various points (Francis et.al. 2020).

Breeding cycle:

Red fox social groups form in the breeding season and consist of a dominant adult male (dog) and a dominant adult female (vixen), and several subordinate vixens which help rear the cubs.

The breeding cycle is:

- Mid-June to the end of July: Vixens mate and foxes are moving around.
- Early August to late September: Social groups form: Cubs are born in dens (3-5 a litter) and vixens are lactating. Male foxes are feeding lactating vixens.
- October – December: Cubs start to abandon the den.
- January – February: Cubs gain independence, moving around.
- March: Juvenile foxes become completely independent: large floating populations of young foxes are looking for a more permanent place to live.
- April- June: New territories formed. Young foxes are sexually mature. 85% vixens breed in the first year.

Baiting in the summer-autumn period targets juvenile foxes moving around and looking for new territory but results in predominantly young foxes being removed from the population, having less of an impact on the resident breeding population due to competition for baits.

Baiting must be maintained through autumn into winter to target the resident foxes and the stable breeding population that are likely to be more at risk as they are moving around and mating.

Removing these resident breeding foxes from the population prior to breeding will have a greater overall effect on population size than targeting only dispersing young.

Baiting in spring impacts on the active breeding social groups.

Non-baited phases allow the stable adult breeding populations to remain at large in the landscape during that period. Programs that bait only in pulses may fail to meet criteria for success (Francis et.al. 2020). The current fox control program is limited in time, baiting only 7 months of the year from December to June.

However, there is a risk with early spring baiting in August-September that lactating vixens poisoned leave cubs vulnerable to starvation and may be considered an animal welfare issue. During this period vixens are less mobile and poisoning at this time may be less effective.

An Alpine Ark: *a landscape approach*

In the context of biodiversity management, an "Ark" provides a place of refuge and protection for a suite of native species vulnerable to introduced predators such as the foxes and feral cats at a landscape scale. Several Ark projects have been established around Victoria to reduce the number of foxes and support the recovery of all native animals' populations, particularly threatened species, from foxes. These include Glenelg Ark, Grampians Ark and the Central Highlands Ark along with the longest running, the Southern Ark project in East Gippsland.

The Long-footed Potoroo habitat distribution model indicates the species may occur more widely adjacent and outside the Barry Mountains core expansion baiting area, particularly to the east (refer Map 1). The wider presence of Long-footed Potoroo has been confirmed by one record in the West-Kiewa Valley. The baiting of foxes and some cat control to protect Mountain Pygmy Possum occurs adjacent to the east in the Alpine National Park, including Mt Hotham and Falls Creek Alpine resorts and in Mt Buller/Mt Stirling Alpine Resort to the west.

There is a remarkable list of threatened species recorded in this wider area that are at some risk from fox and cat predation. Mammals at risk include Long-footed Potoroo, Mountain Pygmy Possum, Broad-toothed Rat, Smoky Mouse, Spot-tailed Quoll and Eastern Pygmy Possum. Threatened alpine reptiles at risk include the Alpine Water Skink, Alpine Bog Skink, She-oak Skink, Tussock Skink and Guthega Skink. Threatened amphibians at risk include Spotted Tree Frog and Alpine Tree Frog.

These existing predator control programs may be integrated and built on to enable an Alpine Ark project that, through integrated fox and cat control, benefits the persistence of a range of species, many threatened, across the multi tenure landscape from the Bogong High Plains to Mt Buller.

Investigations are currently underway to explore expanding further the Barry Mountains Core expansion Area for fox control and integrating with other fox control programs to establish an Alpine Ark. This may include testing of a range of suitable feral cat control methods.

An expanded Fox control Program

Aim
1. To ensure that the Long-footed Potoroo can survive, flourish and retain its potential for evolutionary development in the wild.

Objectives
1. To increase the area of occurrence and abundance of Long-footed Potoroo throughout its potential habitat range in the expanded Barry Mountains area of Great Dividing Range.
2. To reduce the fox population to a level that allows an increase in the Long-footed Potoroo population and is maintained at that level.
3. To mitigate poisoning risks to non-target species including domestic dogs, such as working and dogs associated with deer hunting.
4. To have wide community awareness, and support and endorsement of the Long-footed Potoroo conservation program.
5. To integrate the Long-footed Potoroo protection program into protection of a range of other threatened species from introduced predators across a wider alps landscape.
6. To carry out the program in a safe manner.

Strategies
1. Reduce impacts of fox predation on Long-footed Potoroo by increasing the area of baiting to include the known area of occurrence and priority preferred habitat in the Barry Mountains-Great Dividing Range area.
2. Reduce impacts of fox predation on Long-footed Potoroo by implementing a staged more continuous baiting program throughout the year, subject to ongoing evaluation of effectiveness of fox control, Long-footed Potoroo population monitoring and occupation modelling and seasonal physical constraints (e.g. access).
3. Prioritise fox baiting where the occurrence of foxes is most likely in preferred Long-footed Potoroo habitat.
4. Develop a fox control program that considers the wide range of users and interests in the area and is supported and endorsed by the majority of community, including public land users and neighbours. Minimising the risks of baiting to hunters' dogs is a particular consideration.
5. Integrate the expanded Long-footed Potoroo protection program into the Mountain Pygmy Possum protection and other introduced predator programs to create an Alpine Ark stretching from Mt Buller in the west to the eastern fall of the Bogong High Plains.
6. Carry out all baiting in accordance with Directions for the Use of 1080 and PAPP Pest Animal Bait Products in Victoria (Agriculture Victoria) and Standard Operating Procedures– FOX001 Ground baiting of foxes with sodium fluoroacetate (1080) and/or FOX007 Ground Baiting of Foxes with PAPP.

Part 3 Implementation

Spatial: Fox Control Program Area

Barry Mountains Core Expansion Program

The existing core Barry Mountains fox control program area, largely in part of the Alpine National Park, will be expanded in size to include much of the modelled high value habitat for Long-footed Potoroo in additional areas of the Alpine National Park and adjoining state forest. The expanded area comprises a core area of 229,308 Ha with about 1000 km of tracks, as identified on Maps 1, 2 & 3. This includes the Alpine National Park and state forest to the north and south of the park. This is defined as the "Barry Mountains Core Expansion Area".

Alpine Ark

A further area has been identified that contains additional Long-footed Potoroo high value habitat and connects east and west to areas that are baited for foxes to protect Mountain Pygmy Possum . It comprises an additional area of 183,466 Ha with about 777 km of tracks, as identified on Map 4. This further extension of the Barry Mountains Core expansion will create an "Alpine Ark" concept. It provides landscape scale predator control to protect a range of threatened species, more effective fox control and increase in Long-footed Potoroo persistence in the Barry Mountains Core Expansion Area.

Temporal: Fox Control Program Timing

The temporal and seasonal expansion of the existing Barry Mountains core fox control program will occur in stages (refer Figure 1 below).

Stage 1 will be expanding the existing core Barry Mountains fox control program into previously un-baited areas of national park and state forest. However, previously un-baited areas of state forest in the expanded area will not be baited in the hound hunting season from April to November inclusive.

Stage 2 will comprise, in addition to stage 1, some additional baiting that will occur in state forest during the hound hunting season.

The transition from stage 1 to stage 2 will be subject to monitoring of effectiveness of fox control, occupation modelling of Long-footed Potoroos and subsequent special needs analysis. This may in time direct the need for a more year-round program if deemed necessary to protect Long-footed Potoroo, while being designed to minimise the impact on state forest users, particularly those with dogs (refer Part 4 Canid Pest Ejectors – with reference to dog exclusion devices).

Baiting periods and methods throughout the year will be influenced by:

- Avoiding snow cover in areas generally above 900 metres from July to August (this may vary from year to year depending on conditions);
- Avoiding the vixen lactating period in August and September (refer Part 4); and
- Minimising impact on deer hunting with hounds, deer hunting dogs and gun dogs in state forest.

Barry Mountains Core Expansion Program

The Barry Mountains Core Expansion Program will comprise of:

1. ***The Existing Barry Mountains Core Fox Control Program***
   Parts of the Alpine National Park and designated tracks in adjoining areas in Tea Tree Range State Forest (Tea Tree Range B Zone) are the core area that has been baited since 2004 (Refer Map 1). To consolidate this investment, this area can continue to be baited from December to June inclusive in State Forest and October to June in Alpine National Park (subject to snow conditions).

2. ***Expansion of the Barry Mountains Core Fox Control Program further into the Alpine National Park.***
   The baiting program will be expanded to now include all of the Alpine National Park in the Core expansion area (Refer Maps 1&2). This area can be baited from October to June (subject to snow conditions).

3. ***Expansion of the Barry Mountains Core Fox Control Program further into State Forest***
   The baiting program will be expanded to now include previously un-baited areas of State Forest north and south of the Alpine National Park (Refer Maps 1&2). The implementation of this expansion in state forest will proceed in 2 stages.

   Stage 1
   State forest in the Barry Mountains Core Expansion area can be baited from December to March inclusive. In state forest areas that are not part of the existing Barry Mountains Core Fox Control Program there will be no baiting from April to November (i.e. the hound hunting season), however there may be trials of baiting to test their efficacy and impact on deer hunters with dogs and use of non-poison methods.

   Stage 2
   State forest in the Barry Mountains Core Expansion area can be baited continuously from December to March inclusive. From April to November (i.e. the hound hunting season) baiting can occur in 10-day pulses where baits are removed after 10 days.
   The number of pulses required will be determined by annual monitoring of effectiveness of fox control, technical advice and minimising risk to domestic dogs. This may vary from year to year accordingly. The pulses will be rotated around the four state forest zones so there is generally only one zone baited at any one time (Refer Map 2). Free feeding may occur between pulses. Baiting will not occur in August and September to avoid the vixen lactating period and baiting will generally cease in June above 900 metres due to snow cover but this may vary depending on conditions.

   Alternatively, if research and trials of collared CPE's demonstrate they are effective in fox control while excluding access to the bait from domestic dogs, collared CPE's will be utilised. In that case 10 day pulses for buried baits would not be required. (refer Part 4 Canid Pest Ejectors – with reference to dog exclusion devices).

Stage Transition

It is expected that Stage 1 of the Barry Mountains Core Fox Control Program will commence in December 2021. Any possible transition from Stage 1 to Stage 2 will be informed by annual monitoring of the effectiveness of fox control, further monitoring and modelling of Long-footed Potoroo persistence, specific needs analysis, cost effectiveness, funding available and evaluation of the impact on public land users.

- The Stage 1 baiting schedule is outlined in Appendix 2.
- An example of the application of the Stage 2 zone/ baiting schedule is outlined in Appendix 3.

Alpine Ark

The enlargement of the Barry Mountains Core Expansion area will join with areas currently baited to protect Mountain Pygmy Possum in the Alpine National Park and the Buller/Stirling, Hotham and Falls Creek Alpine Resorts and to create an Alpine Ark. This expansion is subject to further investigation and funding.

If implemented, the timing of baiting in the new additional areas would proceed in similar stages and in alignment with the Barry Mountains Core Expansion Program but now across 10 zones (Refer Map 4). The Mountain Pygmy Possum Protection Program will have its own timing and schedule.

The Alpine Ark will comprise of, in addition to the Barry Mountains Core Expansion Area, areas currently baited to protect the Mountain Pygmy Possum in the Alpine National Park and the Buller/Stirling, Hotham and Falls Creek Alpine Resorts:

1. ***Expansion of the Barry Mountains Core Expansion Fox Control Program further into the Alpine and Mount Buffalo National Parks***
   The baiting program will be expanded to include the Alpine National Park to the east of the Barry Mountains Core Expansion Area and now including Mount Buffalo National Park. These areas can be baited continuously from October to June inclusive (subject to snow conditions). In areas below 900 metres baiting may continue in July. The no baiting period of August and September is to also avoid the vixen lactating period.

2. ***Expansion of the Barry Mountains Core Expansion Fox Control Program further into State Forest***
   The baiting program will be expanded to include previously un-baited areas of state forest adjacent to the Barry Mountains Core Expansion area (Refer Map 4). The implementation of this expansion will also proceed in 2 stages aligned with the Barry Mountains Core Expansion Program .

Stages 1 & 2 and transition

The baiting schedule for stages 1 & 2 of the Alpine Ark expansion and transition from Stage 1 to Stage 2 will proceed will be the same basis as that for stages 1 & 2 of the Barry Mountains Core Expansion Fox Control Program.

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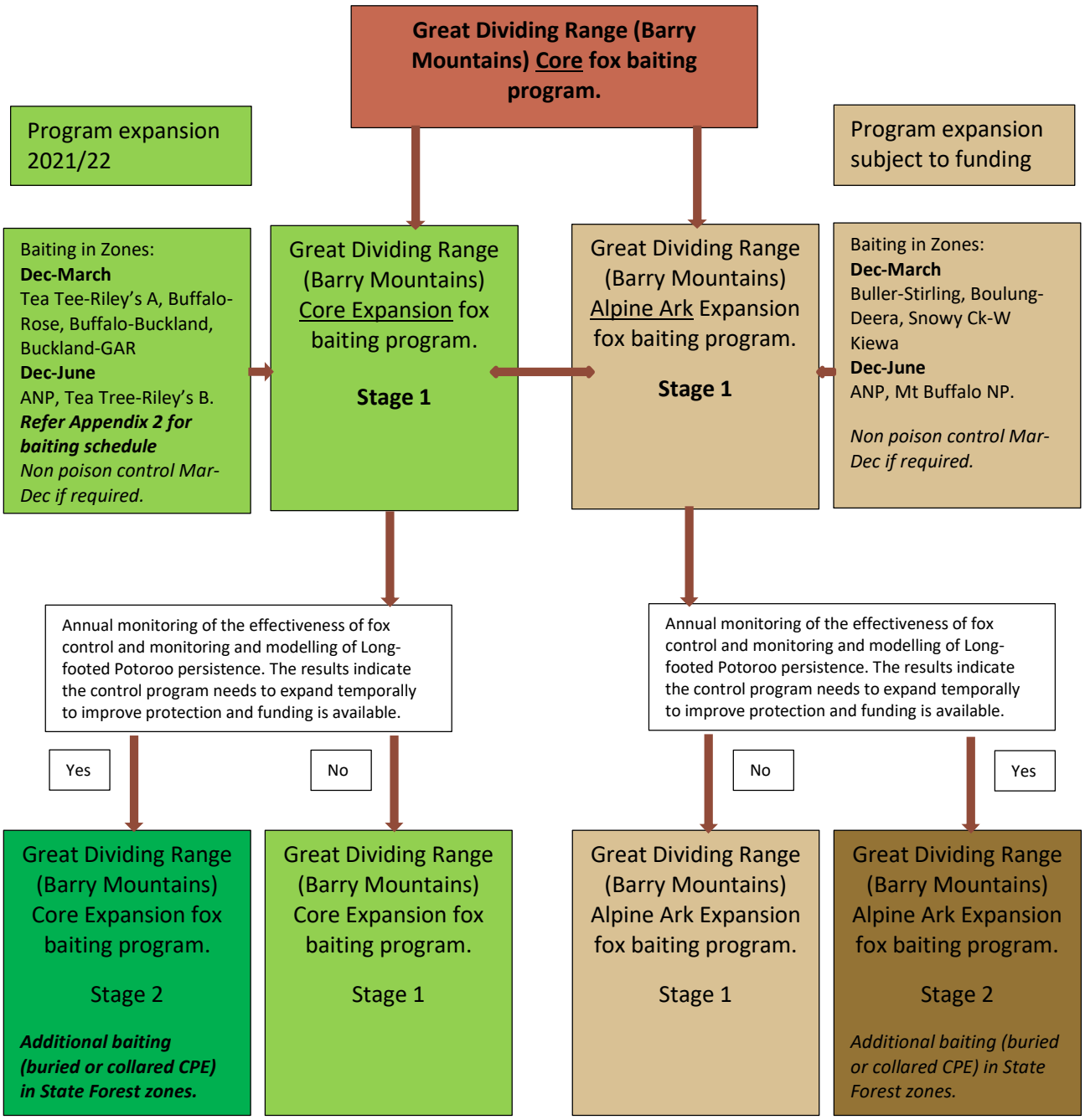
Figure 1: Great Dividing Range (Barry Mountains) Core fox baiting program stages



Fox Control Zoning

Zoning for fox control can provide a more targeted and tenure based fox baiting program and for Stage 2 baiting, a method for a year-round program while providing a rotation of substantial bait free periods in different zones in state forest during the hound hunting season. Zoning also identifies areas generally not suitable to bait.

Barry Mountains Core expansion

The Fox Control Zones are:

1. Alpine National Park
2. Buffalo-Rose
3. Buffalo-Buckland
4. Buckland-Great Alpine Road
5. Tee Tree-Riley's
6. No Baiting

Alpine National Park
The Alpine National Park Zone is 82,061 ha with 360.3 km of tracks available for baiting being 40.4% of tracks in the core expansion fox baiting area. There are approximately 315[1] bait station locations. The zone includes all areas within the Park in the Barry Mountains fox baiting area (excluding the Cynthia Range, Hearn Spur, Wombat Range area that is not included in stage 1 due to its lower habitat value for Long-footed Potoroos). Nearly 90% of those tracks are a priority for baiting with high value areas being mainly around the Great Dividing Range and Lake Cobbler. The area is mostly above 900m elevation. Baiting can occur year-round but a substantial number of tracks will not be baited July-September to avoid the snow covered and lactating vixens' periods.
Buffalo-Rose
The Buffalo-Rose Zone is 29,281 ha with 75 km of tracks available for baiting being 8.4% of tracks in the core expansion fox baiting area. There are approximately 59[1] bait station locations. The zone includes all areas of state forest within the Barry Mountains fox baiting area west of Buffalo River and most tracks are below 900m elevation. About half those tracks are a priority for baiting with high value areas being mainly toward Cobbler Lake. Baiting can occur mostly year-round where conditions permit excluding the August-September lactating vixens' period.
Buffalo-Buckland
The Buffalo-Buckland Zone is 43,516 ha with 156.1 km of tracks available for baiting being 17.5% of tracks in the core expansion fox baiting area. There are approximately 127[1] bait station locations. The zone includes all areas of state forest within the Barry Mountains fox baiting area north of the Alpine National Park, between the Buffalo River and Buckland Rivers. Almost all those tracks are a priority for baiting with high value areas being mainly on the Buffalo Range, south of Mt Buffalo National Park. Several tracks have sections above 900 metres restricting baiting to Oct-June. Otherwise, baiting can occur on lower sections year-round excluding the August-September lactating vixens' period.
Buckland-Great Alpine Road
The Buckland- Great Alpine Road Zone is 42,652 ha with 162.4 km of tracks available for baiting being 18.2% of tracks in the core expansion fox baiting area. There are approximately 129[1] bait station locations. The zone includes all areas of state forest within the Barry Mountains fox baiting area north of the Alpine National Park, between the Buckland Rivers and the Alpine National Park boundary adjacent to the Great Alpine Road. All tracks are a priority for baiting with high value areas being mainly on the Demon Ridge, West Ovens and The Gunns. Several tracks have sections above 900 metres restricting baiting to Oct-June. Otherwise, baiting can occur on lower sections year-round excluding the August-September lactating vixens' period.

Tea Tree-Riley's
The Tea Tree-Riley's Zone is 31,798 ha with 15.5% of tracks in the core expansion fox baiting area. The zone includes all areas of state forest within the Barry Mountains fox baiting area south of the Alpine National Park (excluding the southern sections of Tea Tee Spur and Sarah Spur tracks due the lower habitat value for Long-footed Potoroos). Nearly 90% of tracks are a priority for baiting with high value areas being mainly on the Tea Tree Range and high slopes south of the Great Dividing Range. Most of the tracks are over, or have access over, 900 metres restricting baiting to Oct-June. **Tea Tee-Riley's Zone A** is the new expanded area with 76.6 km of tracks available for baiting with approximately 66[1] bait station locations. **Tea Tree-Riley's Zone B** is the Humffray River-Riley's Creek area that has been baited since 2004 with 61.1 km of tracks available for baiting containing approximately 56[1] bait station locations.
No Baiting
The No Baiting Zone contains tracks that are close to private property or camping areas and generally not suitable for baiting. There are 108.8 km of roads and tracks in this zone being 10.9% of tracks in the core expansion fox baiting area. The zone includes roads and tracks along the Buffalo and Buckland valleys and those close to private property in the Upper Ovens and Rose River valleys. Should priorities appear in this zone, baiting may occur using techniques such as collared CPEs (Refer Part 4), or soft jaw leghold traps, following consultation with Traditional Owners and landowners and consideration of visitor use involving dogs.

[1] The numbers of bait stations will vary from time to time. Bait stations may be excluded for a number of reasons including protection of cultural heritage, track closures, tracks becoming impassable, impacts of bushfires, tree hazards or road works. This will be assessed prior to commencement of the program for each year.

Alpine Ark

The additional five zones that together with Barry Mountains Core expansion and areas currently baited to protect the Mountain Pygmy Possum in the Alpine National Park and the Buller/Stirling, Hotham and Falls Creek Alpine Resorts comprise the Alpine Ark are:

1. Alpine National Park
2. Mount Buffalo National Park
3. Buller-Stirling
4. Boulung-Deera
5. Snowy Ck – West Kiewa

Alpine National Park

The Alpine National Park Alpine Ark Zone is 96,918 ha with 241 km of tracks available for baiting being 31% of tracks in the additional Alpine Ark baiting area. The zone includes the Bogong and Dargo High Plains sections of the Alpine National Park adjoining the Hotham and Falls Creek Alpine Resorts. Baiting to protect Mountain Pygmy Possum already occurs on 63% of the tracks. Baiting can occur year-round but a substantial number of tracks cannot be baited July-September to avoid the snow covered and lactating vixens' periods.

Mt Buffalo National Park

The Mount Buffalo National Park Alpine Ark Zone is 25,369 ha with 161 km of tracks available for baiting being 15% of tracks in the additional Alpine Ark baiting area. Mt Buffalo National Park is the northern most extent of the mapped habitat for Long-footed Potoroo and contains significant high value habitat. Baiting can occur year-round but a substantial number of tracks cannot be baited July-September to avoid the snow covered and lactating vixens' periods.

Buller Stirling

The Buller Stirling Ark Zone is 16,249.3 ha with 168 km of tracks available for baiting being 22% of tracks in the additional Alpine Ark baiting area. The areas includes the Mt Buller- Mt Stirling Alpine Resort and adjoining state forest. Baiting to protect Mountain Pygmy Possum already occurs on 35% of the tracks. Baiting can occur year-round in but a substantial number of tracks cannot be baited July-September to avoid the snow covered and lactating vixens' periods.

Boulung-Deera

The Boulung-Deera Alpine Ark zone is 22,362.4 ha with 91 km of tracks available for baiting being 12% of tracks in the additional Alpine Ark baiting area. The area is in state forest in the south eastern extent of the of the mapped habitat for Long-footed Potoroo and contains high value habitat. Baiting can occur year-round in but a substantial number of tracks cannot be baited July-September to avoid the snow covered and lactating vixens' periods.

Snowy Ck – West Kiewa

The Snowy Ck-West Kiewa Alpine Ark Zone 24,312.1 ha with 161 km of tracks available for baiting being 20% of tracks in the additional Alpine Ark baiting area. The area is in state forest in the north eastern extent of the of the mapped habitat for Long-footed Potoroo and contains significant high value habitat. Baiting can occur year-round in but some of the tracks cannot be baited July-September to avoid the snow covered and lactating vixens' periods.161 km

The Barry Mountains Core expansion and Alpine Ark fox baiting zones are outlined on Maps 2 & 4. Details of the priority and baiting strategy for each road and track is set out in the track database that is available separately.

Method

The baiting program will be carried out in accordance with:

1. Directions for the Use of 1080 and PAPP Pest Animal Bait Products in Victoria; (Agriculture Victoria, 2018).
2. Ground baiting of foxes with sodium fluroacetate (1080). Standard Operating Procedure. PestSmart website. (Sharp et.al 2012).
3. Ground Baiting of Foxes with PAPP. Standard Operating Procedure. PestSmart website. (Sharp et.al 2016).

The baiting methodology will be based on that used in the current program:

- Baits are buried in mounds to a depth of 10-15cm and placed at 1km intervals along vehicle tracks in the control area.
- The bait mound soil is sieved and smoothed off to enable the recognition of predator and non-target species signs during the checks.
- Bait stations will be clearly marked so they can be identified by public land users with dogs.
- The type of baits used, manufactured or fresh and delivery method, will be adjusted as needed to meet the most effective outcome related to time and place and reducing the risk to non-target native species such as Tree Goannas and Dingoes (refer Part 4).
- 1080 baits will be used; however, investigations will continue for consideration of the efficacy of using PAPP baits (refer part 4).
- The timing will be in accordance with the Fox Control Timing section above.
- The placement will be in accordance with the Fox Control Zoning section above.
- The baiting program will be effectively communicated in accordance with Communicating the Fox Baiting Program below.

Measuring Effectiveness

Program design

The expected effectiveness of the expanded baiting program design on the conservation of Long-footed Potoroos has been determined by running baiting scenarios through modelling programs that predict the effect on fox populations (Foxnet) and the corresponding influence on the occupancy and population of Long-footed Potoroos (Robley et.al 2021). The modelling has made predictions for the impact of existing and planned expansion of fox baiting on the whole landscape of modelled habitat of Long-footed Potoroos in North-east Victoria and adjoining areas baited for the conservation of Mountain Pygmy Possum (see Map 1). Specific Needs Analysis (SNE) assesses the justification for investment.

Foxnet Modelling

The Foxnet modelling indicates that if the baiting program persists for a 10-year period the fox baiting program regimes presented in this plan will have the following outcomes;

Barry Mountains Core Expansion Area

Stage 1 (No expansion of existing baiting in State Forest in the hound hunting season)

- Increase the overall reduction in the fox population from 19% in the current program to 42%;
- Increase the area where a reduction of foxes of over 65% will occur from 2.1% of the area in the current program to 11.7% of the area.

Stage 2 (Rotational zone pulse baiting throughout state forest in the hound hunting season)

- Increase the overall reduction in the fox population from 19% in the current program to 46%;
- Increase the area where a reduction of foxes of over 65% will occur from 2.1% of the area in the current program to 30% of the area.

Alpine Ark

Stage 1 (No expansion of existing baiting in State Forest in the hound hunting season)

- Increase the overall reduction in the fox population from 19% in the current program to 59%;
- Increase the area where a reduction of foxes of over 65% will occur from 2.1% of the area in the current program to 21.3% of the area.

Stage 2 (Rotational zone pulse baiting throughout state forest in the hound hunting season)

- Increase the overall reduction in the fox population from 19% in the current program to 59%;
- Increase the area where a reduction of foxes of over 65% will occur from 2.1% of the area in the current program to 46% of the area (DELWP 2021).

Occupancy Modelling

The Occupancy modelling is based on Long-footed Potoroo habitat modelling, known occurrences of Long-footed Potoroos and predicted fox densities from Foxnet. It confirms that detection of Long-footed Potoroos is more likely in areas with lower fox density. Modelling suggests that the Barry Mountains Core expansion baiting program in this plan (Stage 2) could increase the area occupied by Long-footed Potoroo by 50%.

Population Modelling

Population modelling simulates population dynamics through time. It estimates relative risks of population extinction under difference scenarios, including fox baiting, based on available demographic information.

The modelling indicates that the Barry Mountains Core expansion fox baiting program in this plan (Stage 2) could substantially reduce risk of extinction of the Long-Footed Potoroo population.

The Barry Mountains Long-footed Potoroo population may be at high risk of local extinction over the next 50 years under the current baiting program. Modelling indicates that under the Barry Mountains Core Expansion baiting strategy the risk of the population falling below 500 individuals over 50 years (i.e. a high risk of extinction) was shown to drop from 96% under the current core baiting program to 9% if Stage 2 of the Core Expansion strategy is implemented (DELWP 2021).

These models provide a useful indication of the potential impact of fox baiting programs on the effective conservation of Long-footed Potoroos. They confirm the value in expanding the current baiting program for the conservation of Long-footed Potoroo as put forward in this plan. Nevertheless, the models are based on uncertain demographic data and plausible but untested assumptions about predation rates.

At this stage the combined impact of fox and feral cat predation is not able to be determined nor is the potential for an increase in feral cat numbers where foxes are successfully controlled through an expanded fox baiting program. Further work on understanding the population demographics of Long-footed Potoroos and impact of foxes and feral cats on predation in this area will improve the accuracy and usefulness of model outputs, and guide adapting to new information.

Specific Needs Analysis

Specific Needs Analysis (SNA) has assessed the relative cost-effectiveness of this plan. This is through consideration of modelled benefits to the Long-footed Potoroo using a population model, project costs, and consideration of benefits to co-occurring species such as Broad-toothed rat and Spot-tailed Quoll. The SNA has assessed both the Barry Mountains Core Expansion Stage 1 and Alpine Ark Stage 1 as being in the Strategic Management Prospects top 10% for cost effective action. The additional costs of Stage 2 compared to modelled outcome makes stage 2 for Barry Mountains Core Expansion and Alpine Ark less cost effective at this point but this will be subject to annual review of the effectiveness of stage 1.

Monitoring Program effectiveness

A comprehensive monitoring and evaluation strategy is being developed for Barry Mountains Core Expansion and Alpine Ark programs using population modelling to assess fox (and feral cat) control strategies, predict plausible changes in species (including Long-footed Potoroo) response to management actions, and design a robust and adaptive monitoring program to measure the effectiveness of control strategies. This will inform consideration of implementing stage 2 of the Barry Mountains Core Expansion and Alpine Ark programs.

Communicating the Fox Baiting Program

Effective communication with users of the Alpine National Park and state forest will be crucial to deliver information on the location of active poison baiting. This is particularly important for deer hunters with hounds or gun dogs. This information is most effective if delivered with as much forward notice as possible to allow users to plan their activities well in advance.

Deer hunting organisations such as Victorian Hound Hunters, Sporting Shooters Association Australia and the Australian Deer Association are important partners in conveying information to their members.

Key messages for the community

- Long-footed Potoroo is a threatened and endangered species.
- The Barry Mountains contain an isolated population of Long-footed Potoroo and this area is crucial to the species survival.
- Foxes and bushfire are serious threats to the survival of Long-footed Potoroo.
- Fox baiting has been underway in this area to reduce predation of Long-footed Potoroo for many years but only covers a small area of Long-footed Potoroo habitat and known occupied areas.
- Research indicates that extending the fox baiting program further into state forest and the Alpine National Park in the Barry Mountains will benefit the survival and persistence of Long-footed Potoroos.
- A reduction in fox numbers will also benefit other threatened native species and nearby landholders with stock or other domestic animals on their property.
- Dogs are not permitted in the Alpine National Park but are allowed in state forest.
- Hunting with hounds, gun dogs and deer hunting dogs is a legitimate and popular activity in state forest in this area.
- Dogs at large are at risk of digging up baits or coming across fox cached baits.
- The expanded fox control program is designed to lessen risks to domestic dogs and minimize impact on legitimate activities such as hunting with hounds in state forest by:
    - Burying baits to reduce likelihood of domestic dogs at large coming across baits (this also reduces the likelihood of native carnivores accessing baits);
    - Placing baits at 1 km intervals along tracks to minimize bait density and caching of baits by foxes;
    - Minimise impact on activities such as hound hunting by rotating baiting in zones so there are always areas bait free in the state forest hound hunting season (April to November).
    - Baited tracks are clearly signposted, bait sites are marked with tags and information on baited areas is available widely on websites and apps and communicated to representative groups, landowners and public land licensees.
- Visitors are encouraged to keep dogs under control and not allow them to roam.
- Everyone can work together to protect threatened species while enjoying visits to this area.

Communication mediums

The communication of baiting information will be conveyed in the following ways as a minimum:

Websites:

- Victorian Hound Hunters
- Australian Deer Association
- Sporting Shooters Association of Australia
- Parks Victoria*
- DELWP*
- Game Management Victoria*

* dedicated section for poisoning program information including wild dogs

App

- Investigate building on the hunting section of the DELWP hosted “More to Explore” App.

In the field:

- All tracks being baited will be clearly signposted when baits are laid.
- All baits stations will be clearly tagged when poison is laid.
- Information Boards with fox program information will be located at the entry to the Rose, Buffalo and Buckland Valleys and to the South, near Arbuckle Junction and Grant Historic Area access.

By Mail:

- Adjoining landowners.
- Traditional Owners.
- Licensed graziers in state forest.
- Other state forest licensees (e.g. Bee Keepers).

Timeframe for Implementation to 2022

Date (commence)	Activity
August 2021	Prepare Communication Plan and develop communication tools.
August 2021	Prepare Implementation Plan for 2021/22 and risk assessment.
August-September	Prepare to engage contractors and arrange all approvals (e.g. Cultural Heritage).
October-November 2021	Communicate information about the commencement of monitoring using free feeds. Camera trapping. Free feeding and bait station monitoring.
November 2021	Communicate information about the commencement of baiting in the Barry Mountains Core Expansion Area.
November 2021	Clear all tracks in preparation for bait runs and install signage.
December 2021	Commence baiting in the Barry Mountains Core Expansion Area.
February 2022	Communicate information about the continuation of baiting until June in the hound hunting season in state forest sections of the Barry Mountains Core Expansion Area (Tea Tree-Riley's B Zone).
End March 2022	Baits removed from state forest excluding Tea Tree B Zone.
April 2022	Hound Hunting season commences.
June 2022	All remaining baits removed.
August 2022	Prepare Implementation Plan for 2022/23, considering if Alpine Ark stage 1 can proceed.
August 2022	Prepare to engage contractors and arrange all approvals (e.g. Cultural Heritage).
September-October 2022	Communicate information about the planned implementation.
October 2021	Clear all tracks in preparation for bait runs and install signage.
October 2022	Commence baiting in the ANP.
December 2022	Commence baiting in SF.

Part 4 Further Considerations

Predator control programs need to be adaptive to change due to:

- Outcomes of research and development around pest animal control techniques that deliver more efficient and effective control methods.
- Natural impacts on the landscape, such as fire.
- Improved understanding of the dynamics of the predator and prey relationships in the landscape.
- Improved understanding of Long-footed Potoroo demographics for modelling.

The fox control program will be attentive to new information and adjust as needed. The following matters are currently under further investigation and may influence the plan over the next five years.

Reducing the risk to domesticated dogs

Use of PAPP baits

A poison bait for foxes (FOXECUTE®) contains a compound called para-aminopropiophenone (PAPP) which can be used in place of 1080 in some circumstances. The rate used for foxes has a lower risk to dogs and there is an antidote (Blue Healer), however this must be administered by a Vet within 30 minutes making this largely impractical for the Barry Mountains. PAPP is considered to be more humane than 1080 and is not considered a risk to animals eating poisoned animals (known as secondary poisoning). Foxes are amongst the most sensitive species to the effects of PAPP. The lower dosing of FOXECUTE® baits for fox control creates a small margin of safety for dogs but this is not absolute and small dogs would still be vulnerable to the fox dose, so normal protective measures are still required for domestic dogs (ACT 2015).

PAPP may affect some native animals such as goannas or quolls. However, good baiting technique helps to minimise the risk to non-target species and maximize the effect on targeted fox populations (A Murray 2021 pers. comm). Indicative studies have shown that buried FOXECUTE® baits under field conditions retain lethal doses up to several weeks after deployment. This is longer than the typical 1 – 2 week period for which 1080 baits remain lethal in moist soil (ACT 2015). However, PAPP is only available as a manufactured shelf stable bait and cannot be used for poisoning fresh meat baits at this stage.

Further investigation is needed to establish the value of using PAPP baits as an alternative to 1080 and the cost effectiveness of 1080 fresh meat baits. PAPP may fully or partly replace 1080 in the baiting program.

Canid Pest Ejectors

Canid Pest Ejectors (CPEs otherwise known as M44's) are a mechanical device designed to deliver a measured dose of 1080 or PAPP directly into the mouth of foxes and wild dogs. The device is activated when a fox or dog pulls firmly (with a force greater than 1.6kg) in an upward motion on the lure head which then propels its poison contents directly into the mouth of the animal. The benefit is that poison capsules are sealed and protected from the weather and cannot be cached. Smaller mammals don't have enough force to trigger the poison. A variety of lure heads can be used to optimise the attractiveness of the CPEs to foxes.

CPEs are nevertheless a risk to dogs. Exclusion collars that prevent dogs, including wild dogs and dingoes, accessing the CPE are being trialled in different parts of Australia including the Northern Territory and the Snowy Mountains. Trials to date have shown the CPE collars are effective in preventing non-target species activation but there is a period of when foxes are averse to approaching the collars.

This suggests that CPEs need to remain in place for long periods and can't be moved around for rotating zoned pulse baiting. CPEs may be particularly applicable to areas where poisoning of dingoes and wild dogs should be avoided and areas more frequented by domestic dogs and hounds.

The use of CPE's with a dog exclusion device should continue to be investigated and trialled. If research and trials of CPE's with a dog exclusion device demonstrate they are effective in fox control while excluding access to the bait from domestic dogs, dog exclusion CPE's will be utilised as an alternative to 10 day pulses of buried baits in State Forest in the hound hunting season (should transition to stage 2 occur) and may in time completely replace buried baits across the fox control area.

Leghold padded jaw traps

Trapping is time consuming and labour intensive and is therefore an inefficient method for large-scale fox control. Traps must be inspected daily to prevent prolonged suffering from exposure, thirst, starvation and/or shock. However, trapping may be useful for the control of isolated occurrences of foxes in areas outside the current baiting area or period and where daily inspection is feasible.

Once trapped, foxes are euthanised by shooting at the site of capture. Non-target animals such as native animals or domestic dogs can be released unharmed.

Trapping is regulated by the Victorian Prevention of Cruelty to Animals Act (1986) and Regulations (2008). Trapping of foxes using padded-jaw traps. is to be carried out in accordance with Standard Operating Procedure (fox005) (Sharp et.al . 2012 & 2016a).

Lactating Vixen period

The Standard Operating Procedures (SOP) for Ground baiting of foxes with sodium fluroacetate (1080) and PAPP. (Sharp et.al . 2012 & 2016) states that: *"to minimise the animal welfare implications of orphaning dependent cubs, where possible, it is preferable not to undertake baiting programs when vixens are lactating (i.e. August and September)".* The SOP also states "*This is also the time when vixens are moving around least within their territory thus reducing the likelihood of finding baits*".

The vixen lactating period corresponds partly to the winter period when baiting in limited. However, for September, the impact of this requirement on the efficacy of the fox control program in the Barry Mountains requires further research, including developing an accurate understanding of the vixen lactating period in the alps. Should it be determined that baiting is critical in this period to reducing the impact of fox predation on long-footed Potoroos, it may go ahead with a documented rationale.

Other Introduced Predators

The Red Fox is not the only risk to Long-footed Potoroos. Long-footed Potoroos are also vulnerable to predation by wild dogs (Canis lupus familiaris), dingoes (Canis lupus dingo), and their hybrids and feral cats (Felis catus). Camera based evidence indicates that the area contains a significant population of all these predators.

Further investigation is underway to determine the risk of the feral cat population to Long-footed Potoroo and effective control methods that minimise the impact on other activities of public land users. A feral cat control program may be introduced to the area to integrate with the fox control program. There is no research-based evidence that there is an increase in the rate of predation by feral cats on native species following a reduction in fox abundance in Australia (Robley, et al. 2004).

Wild dogs, dingos and their hybrids may predate on Long-footed Potoroos, but there is evidence they may suppress foxes and other introduced animals. Research has identified a triangular relationship of fox to wild dog density: when wild dogs are abundant, foxes are consistently rare, while when wild dogs are rare, foxes may be abundant but are not always so. This suggests that the abundance of wild dogs sets an upper limit on the abundance of foxes, but does not fully determine fox abundance (Johnson & VanDerWal 2009). As such fox bating should aim to avoid non-target fatal poisoning of wild dogs and dingoes.

Communication Tools

Effective communication of the program is crucial to minimising risk and building community confidence. New media and technologies provide innovative communication tools but they need to be tailored to the audience.

The program will continue to investigate the best media to communicate the program, particularly should the program transition to Stage 2 which involves some baiting in State Forest in the hound hunting season.

This will include investigating a one stop app and website which can communicate up to date information for a range of public land users about where baits for foxes and dogs are laid. The DELWP hosted “More to Explore” app may provide a suitable communication tool.

Summary

Protecting Long-footed Potoroo from foxes

Long-footed Potoroo is a threatened and endangered species and the Barry Mountains contains one of three small isolated populations in Australia. The viability and health of the Barry Mountains Long-footed Potoroo population is compromised by predation from the Red Fox. This is exacerbated by frequent and severe bushfires and the ability of Long-footed Potoroo to recover.

The existing Barry Mountains core fox baiting program while locally effective, covers only a small part of the modelled habitat and known occurrences of the Great Dividing Range population of Long-footed Potoroo. This plan prescribes the expansion of the current Barry Mountains core fox baiting program to a create a Barry Mountains Core Expansion area. This will increase the fox control area from currently approximately 45,000 ha to 229,000 ha to provide fox control over a much wider area of modelled high value habitat and recorded presence of Long-footed Potoroo.

This large landscape scale approach comprises about 1000 km of tracks and will encompass many more fox home ranges and will counter rapid colonization to effectively maintain lowered levels of fox abundance over an extensive area. It will also provide the opportunity for Long-footed Potoroo to colonise wider habitat types where fox presence was limiting their distribution.

This expansion of the core fox baiting program in the Barry Mountains provides the opportunity to integrate with the adjacent Mountain Pygmy Possum predator protection program to establish a large multi and cross tenure Alpine Ark project covering over 400,000 ha from the Bogong High Plains, across the Great Dividing Range to Mt Buller. This will benefit a range of threatened species.

Reducing the risk to domestic and working dogs and hounds

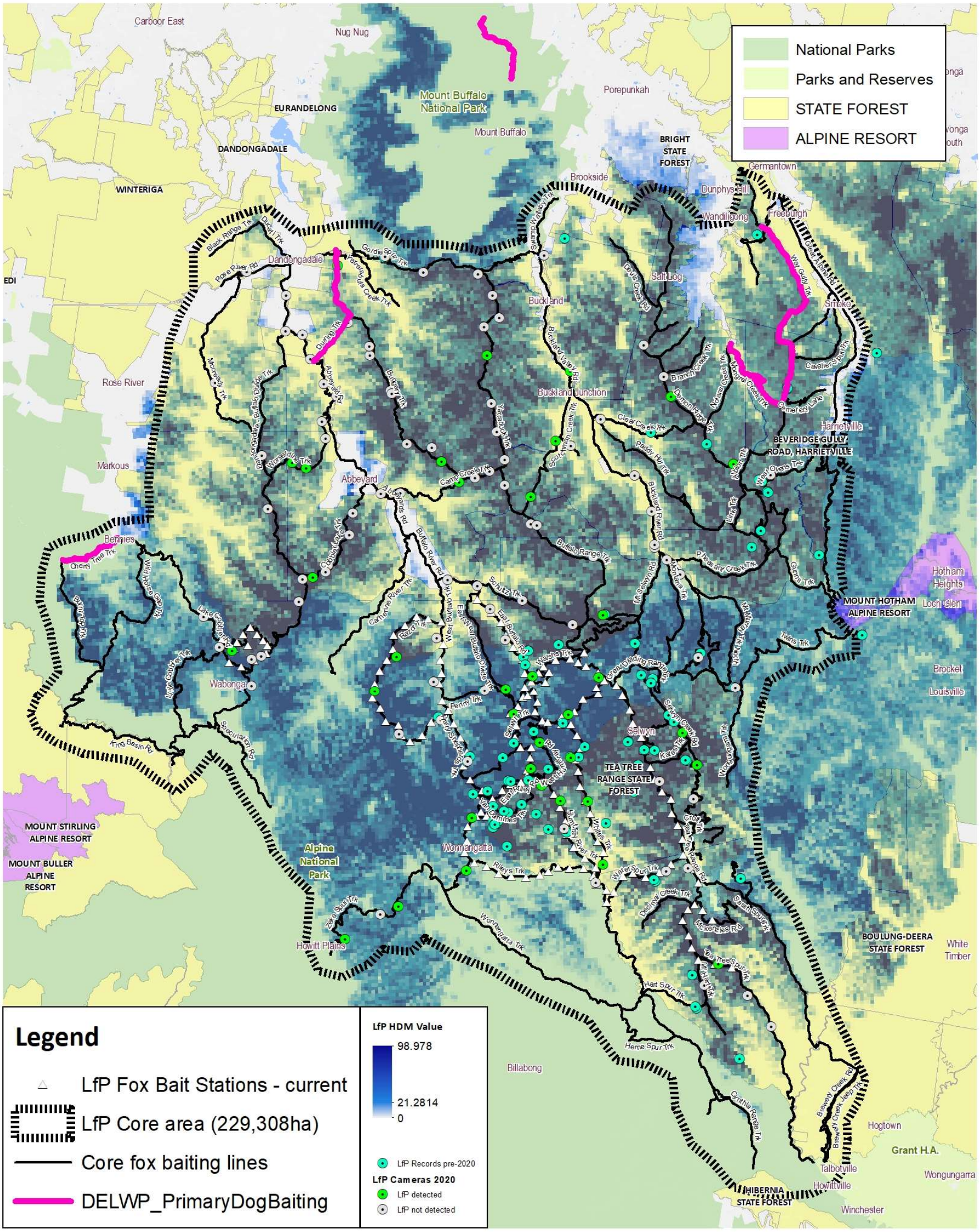
The main risk of expanding fox baiting in the Barry Mountains is the potential unintentional poisoning of domesticated dogs, particularly those associated with deer hunters utilising hounds, deer hunting dogs and gun dogs. In state forest, hunting with hounds is permitted April to November inclusive and deer hunting dogs and gun dogs are permitted year round. There is also risk to working dogs associated with licensed grazing and pet dogs associated with landowners and visitors.

The expanded program will minimize the impact on legitimate use of hounds and other dogs by:

- Proceeding with stage 1 only initially. Stage 1 does not include baiting in state forest in the hound hunting season (April-November) other than tracks in the existing core program (Tea-Tree-Riley's B zone).
- Use of buried low dose fox baits at 1 km intervals along tracks with regular monitoring.
- Baited tracks are clearly signposted, bait sites are marked with tags and information on baited areas is widely made available to all visitors and users.
- Continue investigation into methods that may reduce the risk to dogs such as PAPP baits and Canid Pest ejectors with dog exclusions.
- Should population and effectiveness monitoring require the program proceed to Stage 2, baiting in state forest during the hound hunting season will only occur in zoned 10-day pulses of buried baits or preferably and subject to trials, utilise CPE's with a dog exclusion device.

The Barry Mountains Core Expansion program (Stage 1) will commence late in 2021. The further expansion to create an Alpine Ark is in the planning phase. The transition from Stage 1 to Stage 2 for both the programs will be informed by annual monitoring of the effectiveness of fox control, specific needs analysis, further modelling of Long-footed Potoroo persistence, cost effectiveness, funding available and evaluation of the impact on public land users.

Map 1 Barry Mountains Core Expansion Area



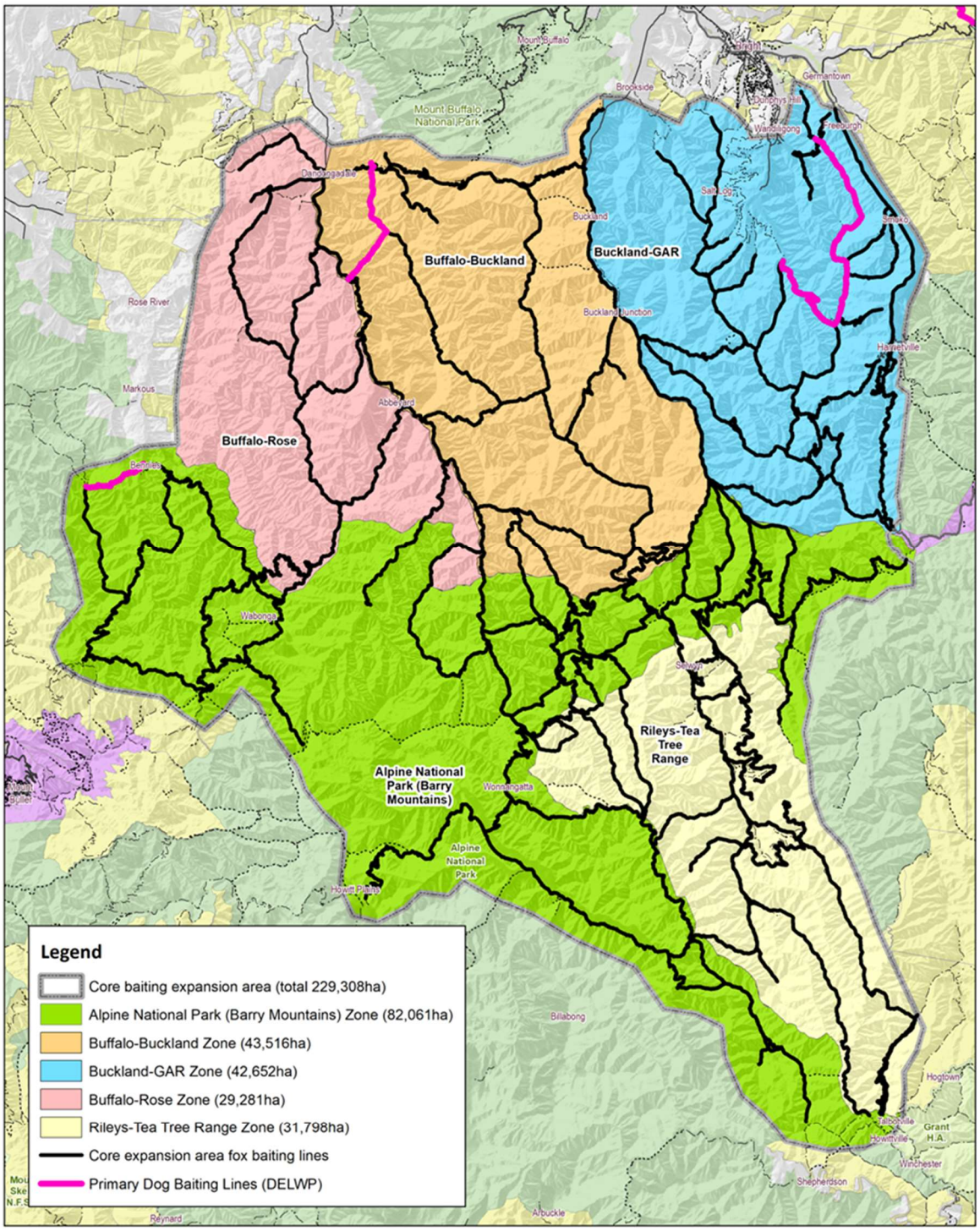
Long-footed Potoroo - Fox Baiting
Barry Mountains Core Expansion Program

0 5 10 20 Km

1:225,000

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

Map 2 Barry Mountains Core Expansion Fox Control Zones



Long-footed Potoroo - Fox Baiting expansion 2020-21
Parks Victoria Estate | DELWP State Forest

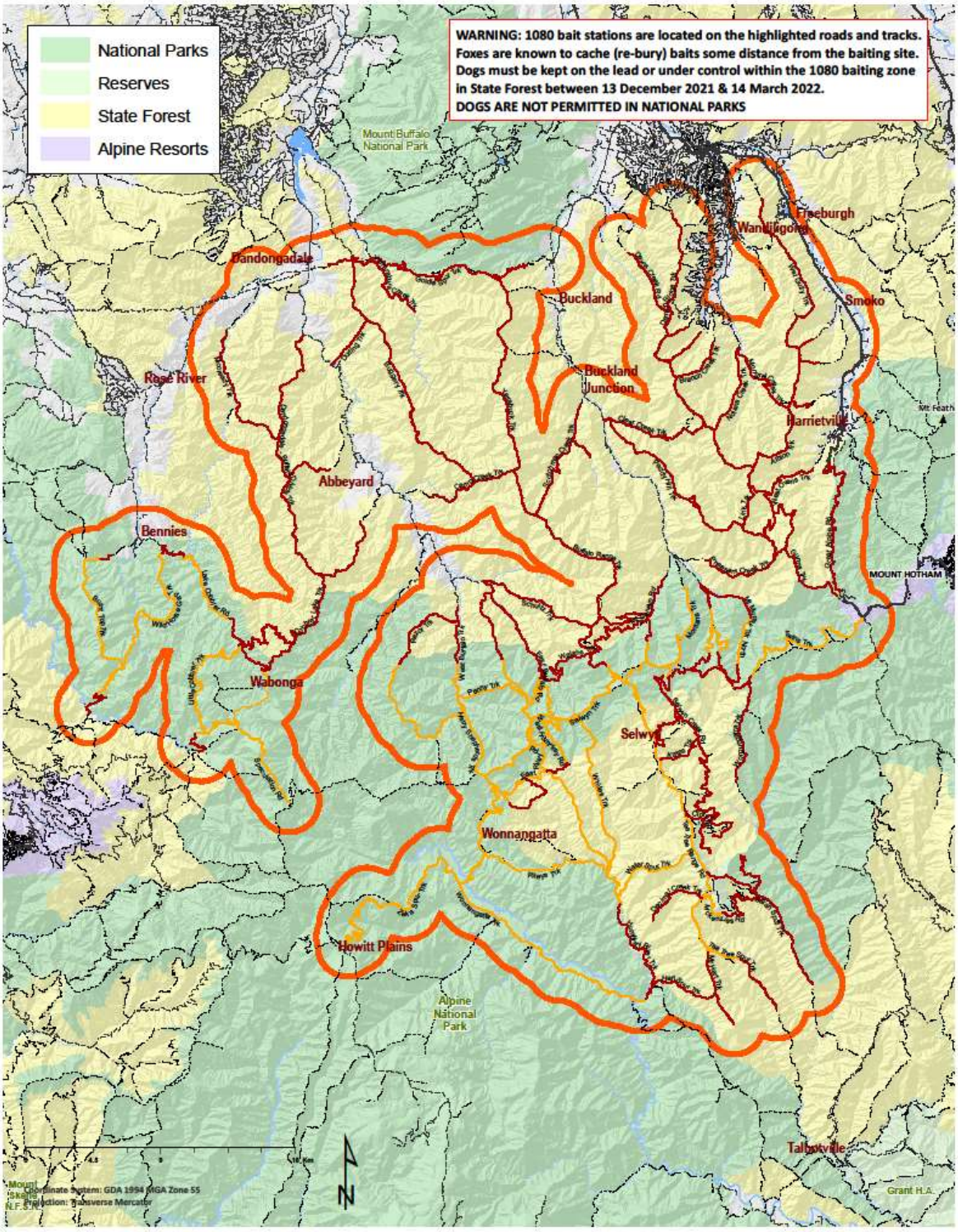
Parks VICTORIA · VICTORIA

0 5 10 20 Km

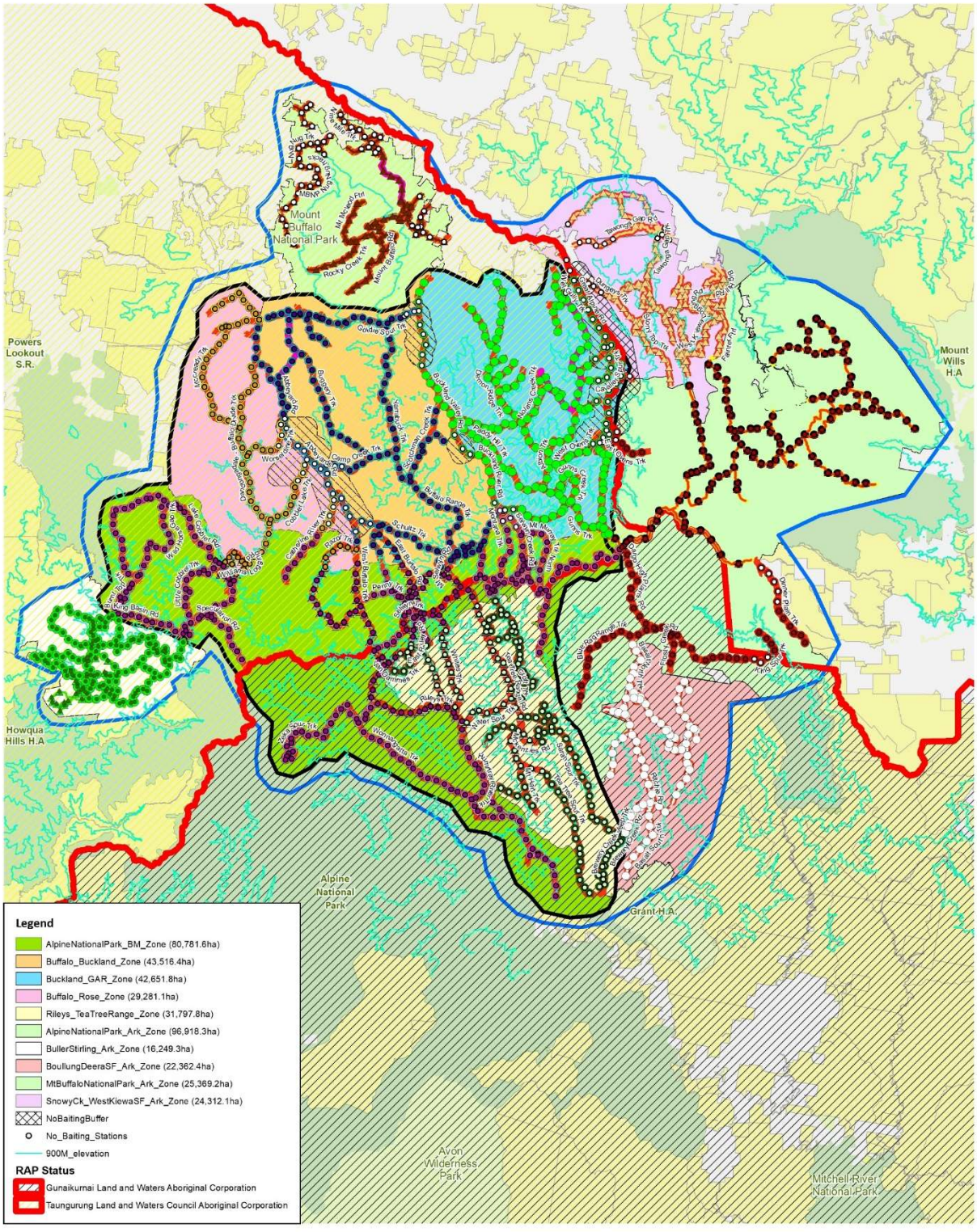
1:215,000

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

Map 3 Barry Mountains Core Expansion. Fox Baiting Program 13 December 2021 – June 30 2022



Map 4 Alpine Ark Fox Control Zones



Alpine Ark Fox Baiting

Parks Victoria Estate/ DELWP State Forest/ Alpine Resort

Parks VICTORIA

VICTORIA State Government

0 10 20 40 Km

1:350,000

Coordinate System: GDA 1994 MGA Zone 55

Projection: Transverse Mercator

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Appendix 1: Current users of the area and impacts of an expanded fox control program under Stage 1 prescriptions

Activity	Context in the area	Likely impact of a fox control program	Impact mitigation
Deer Hunting (stalking)	Both the state forest and Alpine National Park is utilized by deer stalkers but in lesser numbers than hound hunters. In state forest, Deer stalkers may operate year round and have up to 2 deer hunting dogs or gun dogs. In the Alpine National Park, Deer may be hunted from 15 February to 15 December without dogs.	Medium: Fox control involves the laying of poison baits (1080) along existing tracks at 1 km intervals. Gun dogs and deer hunting dogs in state forest may be susceptible to poison baits but less than hounds as they are generally held close to the hunter. There is no risk to humans if they don't interfere with baits.	No poison baits in State Forest (excluding Tea Tree-Riley's B zone) during primary deer stalking season (April to Nov inclusive). Advise deer organisations when fox poison programs are in place so they can advise all members and display information on their websites. Provide clear warning signage on access roads and camping areas.
Deer Hunting (with hounds)	This state forest area is very heavily utilised from April to November by hound hunting groups, both local and from other regions. They work the upper reaches of both the Buffalo and Buckland Valleys as well as gaining access to south of the divide on the Tee-Tree Range. They often establish base camps.	High: Fox control involves the laying of poison baits (1080) along existing tracks at 1 km intervals. As hounds run unrestrained through the bush in state forest (and national park if they illegally wander), these baits may be dug up and consumed by hounds or they may pick up cached baits. There is no risk to humans if they don't interfere with baits.	No poison baits in State Forest (excluding Tea Tree-Riley's B zone) during the hound hunting season (April to Nov inclusive). Advise deer organisations when fox poison programs are in place so they can advise all members and display information on their websites. Provide clear warning signage on access roads and camping areas. Compile a contact list of known hound hunters so they can be advised directly. In collaboration with hound hunters, design control programs spatially and temporally to reduce risk of hound poisoning while effectively reducing fox impacts of Long-footed Potoroos.
Four Wheel driving	Both the state forest and Alpine National Park are popular for four wheel driving. The Buckland and Buffalo River Valleys provide access to the popular Wonnangatta Valley destination by various routes. They may also be associated with camping. As longer routes go through the Alpine National Park, dogs are usually not present but dogs may be present on shorter trips in state forest.	Medium: Domestic dogs may dig up and consume a bait if left unrestrained to wander. There is no risk to humans if they don't interfere with baits.	No poison baits on major state forest access roads and tracks e.g., Rose River Rd, Buffalo River /Abbeyard Rd's & Buckland Valley Rd or within the vicinity of designated recreation camp sites. Provide clear warning signage on access roads and at camping areas when baits are laid to advise visitors to restrain their dogs at all times.

Activity	Context in the area	Likely impact of a fox control program	Impact mitigation
Camping	DELWP and Parks Victoria provide free camping areas with basic or no facilities in in the Buckland and Buffalo River Valleys and Alpine NP. These are popular throughout much of the year. Domestic dogs are allowed in state forest and may be present with campers.	Medium: Domestic dogs may dig up and consume a bait if left unrestrained to wander. There is no risk to humans if they don't interfere with baits.	No poison baits within the 1km of designated camping areas in State Forest. Provide clear warning signage on access roads and at camping areas when baits are laid to advise campers to restrain their dogs at all times.
Hiking	The main hiking route is the Australian Alps Walking Track (AAWT) which follows the Great Dividing Range through the Barry Mountains. While this section is a less popular section for day walkers or shorter hikes, many "through" hikers on the AAWT pass through.	Low: There is no risk to humans if they don't interfere with baits. Dogs are not permitted in the Alpine National Park.	Provide clear warning signage along the AAWT when baits are laid to advise hikers not to interfere with bait stations.
Mountain biking	The area is becoming more popular for mountain bike riders utilizing 4WD tracks on day trips and multi day trips. They may also be associated with camping. Day Riding is popular closer to Bright, Wandiligong and Harrietville using a range of tracks such as Demon Ridge, Morse's Creek Track and connecting tracks.	Low: Mountain Bike riders are unlikely to have dogs with them. There is no risk to humans if they don't interfere with baits.	Provide clear warning signage on access roads and at camping areas when baits are laid to advise visitors not to interfere with bait stations and restrain dog at all times.
Trailbike riding	Similar to four wheel driving, however dogs are not present.	Low: Trail Bike riders' won't have dogs with them. There is no risk to humans if they don't interfere with baits.	Provide clear warning signage on access roads and at camping areas when baits are laid to advise visitors not to interfere with bait stations and restrain dogs at all times.
Trail running	Trail running is becoming increasingly popular in the area. Runners utilize the AAWT but also a range of tracks closer to Bright, Wandiligong and Harrietville such as Demon Ridge, Morse's Creek Track and connecting tracks.	Medium: Trail runners may have dogs with them. There is no risk to humans if they don't interfere with baits.	Provide clear warning signage on access roads when baits are laid to advise visitors not to interfere with bait stations and restrain dogs at all times.

Activity	Context in the area	Likely impact of a fox control program	Impact mitigation
Landowners	There are several landowners within and adjacent to the area occupied by Long-footed Potoroo. In particular there are inholdings in both the Buckland and Buffalo River Valleys and Upper Wandiligong. It is likely these landowners have domestic dogs.	Medium: Fox control involves the laying of poison baits (1080) along existing tracks at 1 km intervals. Domestic dogs may wander from freehold properties or be walked by owners on adjacent public land where they may dig up and consume a bait. There is no risk to humans if they don't interfere with baits.	No poison baits within the 1km of the boundary of private land. Consult directly with each owner of an inholding (i.e. surrounded by public land) advising when poison is laid and to keep dogs restrained (as per wild dog programs).
Licensed Grazing	Licensed grazing occurs in state forest in the Buckland and Buffalo River Valleys and across the Buffalo ranges.	Medium: Fox control involves the laying of poison baits (1080) along existing tracks at 1 km intervals. Working dogs in state forest may be susceptible to poison baits but less than hounds as working dogs are managed closely by their owner and may be muzzled. There is no risk to humans if they don't interfere with baits.	Consult directly with each license advising when poison is laid in their grazing area (as per wild dog programs). Encourage the use of muzzles. DELWP provides muzzles free of charge to grazing licensees.
Bee Keeping	Licensed bee keeping occurs from time to time in the area. There is no requirement for bee keepers to have dogs with them.	Low: Bee Keepers are unlikely to have dogs with them. There is no risk to humans if they don't interfere with baits.	Consult directly with each bee keeping license advising when poison is laid in their licensed area. Provide clear warning signage on access roads when baits are laid to advise visitors not to interfere with bait stations.

Appendix 2: Baiting Schedule: Barry Mountains Core Expansion Area Stage 1

Appendix 3: Example Baiting Schedule: Barry Mountains Core Expansion Area Stage 2