PROTECTION OF THE ALPINE NATIONAL PARK

Feral Horse Strategic Action Plan

2018-2021

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Protection of the Alpine National Park:
Feral Horse Strategic Action Plan 2018–2021

This report has been prepared by Parks Victoria
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Museums Victoria, horses at Native Dog Flat (Figure 1)
Henrik Wahren, Mt Nelse (Figure 3)
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Back cover: Murray River source, Cowombat Flat, Alpine NP - Feral Horse exclusion plots

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1 Executive summary

Horses are not a natural part of the Australian environment. Their hard hooves can cause serious damage to alpine, subalpine, montane and floodplain environments. This includes the destruction of habitat critical to many threatened plant and animal species, damage to waterways, degradation of fragile vegetation, and soil disturbance that results in erosion or compaction. A reduction in the abundance of feral horses in Victoria's national parks is necessary to protect natural and cultural values and meet obligations under the *National Parks Act 1975* (Vic.), *Flora and Fauna Guarantee Act 1988* (Vic.), *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), and the international Ramsar Wetlands Convention.

This plan describes where and how feral horses will be managed in the Alpine National Park, and adjacent state forests between 2018 and 2021. Over recent years, low numbers of horses have been removed from the Victorian Alps, in cooperation with relevant stakeholders. However, this process has not been sufficient to mitigate the severe impacts of horses on vulnerable areas, particularly to riverine wetlands, alpine peatlands and streambanks. As a result, some areas of the Alpine National Park, are in poor condition and are not showing resilience to the impacts of horses. To ensure the persistence of healthy ecosystems and their function in the Alps, an increased rate of removal of feral horses is needed.

Five key conservation objectives are the core of this action plan:

- Reduce damage to alpine wetland and other vegetation communities by expanding and improving feral horse control.
- Improve knowledge of the relationship between feral horse impacts and environmental condition through monitoring and research.
- Protect Aboriginal cultural heritage.
- Prevent the establishment of new populations of feral horses in the Greater Alpine national parks and adjacent public land.
- Remove isolated populations of feral horses, where feasible.

Increased horse removal within the Alpine National Park, and in limited circumstances State Forest adjoining the Alpine National Park, is required to achieve these objectives. Cooperation with other land managers, both public and private will be important to ensure population reductions in the national park will not be compromised by migration from adjacent land.

The proposed actions to achieve the objectives outlined above are:

- Reduce the abundance of feral horses in the Alpine National Park, and prevent the establishment of new populations.
- Support research projects to further develop vegetation and wetland condition assessments, management targets, and to review the appropriateness of roping (brumby running) as a control technique.
- Work with Traditional Owners to recognise and protect Aboriginal cultural heritage.
- Engage with DELWP and other partners, stakeholders and the community in the delivery of humane horse management.

Feral horse management is a component of an integrated approach to reducing the impacts of introduced animals in the Alpine National Park. Programs to reduce the impacts of deer, pigs and other non-native species will complement horse management.

The successful implementation of this plan will require a collaborative approach with Traditional Owners, agencies, environmental and horse interest groups.

2 Purpose of the plan

Feral horse populations can increase rapidly in size and distribution, damage vulnerable natural and cultural values, and in the Australian alps contribute to impacts on water and catchment qualities. A strategic and evidence-based approach is required to ensure that our natural heritage can be protected, and that humane and respectful management of feral horses can be delivered through effective management programs.

The purpose of this plan is to outline conservation objectives and outcomes to be achieved and the key management actions of an expanded horse control program. The plan is intended to:

1. Deliver cross-tenure management of feral horses on public land as proposed in the Greater Alpine National Parks Management Plan (2016), through increased feral horse management in the East Alps and Bogong High Plains-Cobungra area.
2. Protect vegetation communities, waterways and peatlands that are important to the ecological health of the parks and public lands from the impacts of horses.
3. Improve the protection of collective Traditional Owner cultural heritage across the Victorian Alps.
4. Acknowledge the post-settlement values placed on feral horses (brumbies) and their association with early European use of the Alps.
5. Communicate and engage with partner agencies, community and stakeholder groups in the delivery of a humane and effective feral horse management program.

The plan will be implemented over a three year period from July 2018 to June 2021. Planned actions will focus on capture and control, rehoming where possible, and monitoring and research. Horses will be controlled by observing national codes of practice and standard operating procedures for the management of feral horses, and national and state legislation and regulations.

An annual review of operations will be undertaken to determine progress in the delivery of the management actions outlined in this plan, and the extent to which conservation objectives are being met. The plan includes adaptive actions to allow for improvements or changes in delivery practices as needed to achieve the objectives.

This plan is also intended to complement cross-border park agencies in their management of feral horses. The New South Wales National Parks and Wildlife Service, the Australian Capital Territory's Parks and Conservation Service, Parks Australia and Parks Victoria are the four partner agencies of the Australian Alps national parks Cooperative Management Program (AAnp). Feral horse management has been, and remains, a key issue for the three alpine parks agencies. Each of the three alpine park agencies has developed or is developing a feral horse management plan (OEH 2016).

A specialist AAnp Program feral horse working group of inter-agency staff cooperate on management and technical activities. This incudes funding of research projects and surveys of horse population numbers and spread. Every five years an aerial survey is conducted to ascertain horse population numbers across the Australian Alps. The next planned survey will occur in 2019. The survey will cover known population zones in Victoria (Alpine NP and neighbouring state forest areas), NSW (Southern Kosciuszko NP and neighbouring public land areas).

At the conclusion of this action plan implementation period, a full review of the operational outcomes will be undertaken. A new plan will be developed based on this review. Monitoring and research results collected throughout the term of the plan will be included in the review.

Figure 1: Feral horses grazing at Native Dog Flat, Alpine National Park.

3 Background

Feral horses are present in significant numbers in two regions of Victoria's parks estate. Barmah National Park east of Echuca on the Murray River has a currently estimated population of over 200 animals. Larger and more widespread populations occur in Victoria's Eastern Alps extending into the northwest section of the Snowy River. A separate smaller population occurs on the Bogong High Plains with a population of unknown size in the adjacent Cobungra crown-land to the south-east of the Bogong High Plains.

An aerial survey conducted across the Australian Alps in 2014 has estimated the population in the Eastern Victorian Alps to be around 2350 horses (Cairns & Robertson 2014). The Bogong High Plains has a smaller, more isolated population of around 80–100 animals. Both populations, while situated predominantly within the Alpine National Park, extend into adjacent parks, state forests, reserves and private land.

Feral horses in the Victorian Alps and Barmah National Park are not contained and do not currently occupy their entire potential range.

The Australian Alps National Parks and Reserves (12 national parks and other reserves) are collectively included on the National Heritage List and protected in accordance with the values (and locations) identified in the listing under the *Environment Protection and Biodiversity Conservation Act 1999*. This listing recognises the Australian Alps as having outstanding heritage value for both natural and cultural features, including the features related to the pioneering history of the high country.

The 'Degradation and loss of habitats caused by feral horses (*Equus caballus*)' has been listed as a threatening process under the Flora and Fauna Guarantee Act 1988.

Under law, an obligation to manage the impacts of horses in parks is well established in Victoria. Section 17(2)(a)(iii) of the National Parks Act provides that exotic fauna must be controlled in national parks. Horses are considered exotic fauna in these areas. The Greater Alpine National Park Management Plan (Parks Victoria 2016) also recognises these requirements.

The condition of a conservation estate is influenced by many complex natural and anthropogenic processes, including invasive plants and animals, direct utilisation by people, climate, water availability and regimes, and large-scale disturbances such as fire and flood. Feral horses are one of several established species of introduced animals, including deer, goats, pigs and rabbits, that influence the condition of the Victorian conservation estate. In parallel with the feral horse control program outlined here, Parks Victoria and Department of Environment, Land, Water and Planning (DELWP) develop and deliver on-ground programs to address these additional pressures on Victoria's alpine environment (Parkes et al. 2017).

Between 150 and 200 horses have been removed annually from the Alpine National Park since 2008. This has not reduced the population. The impacts of feral horses in the Alpine National Park and other contiguous areas have now reached critical levels, and without intervention horses will continue to cause long-term and severe degradation of wetlands and waterways and prevent the recovery of these areas. The Alpine National Park contains outstanding natural and cultural values. In recognition of this, it is reserved under Schedule 2 of the *National Parks Act 1975* (Vic.).

For some members of the public and community groups, horses provide a living link to Victorian pioneer and grazing history in the Barmah region and the Alps, and form part of Australian folklore as depicted in 'Banjo' Paterson's poem 'The Man from Snowy River'. Management of horses in national parks and public lands must balance three elements: the right level of protection for our natural environment and pre-European cultural heritage; the humane treatment of feral horses; and social expectations for either a continued heritage connection to the 'brumby' or their management. This plan aims to strike that balance between these elements.

Figure 2: Horses at impacts site undergoing revegetation works, Bogong High Plains, Alpine National Park.

4 Environmental values

Australia's ecosystems have evolved without the grazing pressures of heavy, hard-hoofed animals. Such animals can have significant impacts on soils, vegetation communities, stream and river banks, and wetland zones (Dawson & Axford 2011, Dyring 1990, Robertson et al. 2015, Clemann 2009, Walter 2003). Impacts on sensitive alpine and floodplain ecosystems include selective grazing, trampling, pugging, degradation of waterways and water quality, removal of vegetation and exposure of bare ground, soil compaction, stream-bank slumping, opening tracks through vegetation, and distribution of weeds.

Australian ecosystems and their native inhabitants are not adapted to these relatively recently arrived pressures (240 years versus hundreds of thousands of years of evolution without hard-hoofed animals). A combination of climate change effects, recreation activities, and other invasive species puts significant additional pressures on these natural but now changing landscapes (Scientific Advisory Committee [SAC] 2011).

4.1 Vegetation

Vegetation communities in the alps are diverse and complex (Figures 3-5). They include grasslands, snow-gum woodlands, heathlands, and peatland communities, all of which are impacted by feral horses. The alpine and subalpine communities are very rare in Australia and support many species that are rare and endemic to the parks, including state and nationally threatened vegetation communities such as alpine sphagnum moss peatlands, snowpatch communities, and associated wetland bogs. Feral horses are a known threat to these vegetation communities and individual species. An assessment of peatlands through the East Alps showed evidence of horse impacts occurring at 85 of the 98 sites surveyed (Tolsma 2008).

Figure 3: Late snow patch areas and site of the Small Star-plantain (*Plantago glacialis*), Mt Nelse, Bogong High Plains.

Figure 4: Small Star-plantain (*Plantago glacialis*).

Figure 5: Bogong High Plains, Alpine National Park.

The Greater Alpine National Parks Management Plan (Parks Victoria 2016) defines five broad ecosystems for the management areas. Feral horse distribution occurs within four of the ecosystem types defined in the plan, including 'Alps', 'Dry Forests and Woodlands', 'Wet Forest and Rainforest', and 'Inland Waters and Wetlands'. Feral horses are considered a high priority threat to the four noted ecosystems (Parks Victoria 2016, pages 31–55). These ecosystems do not stop at park borders. The same ecosystems in state forests adjacent to the Alpine National Park have horse populations, and are also being impacted.

Within the Greater Alpine National Parks Management Plan, each of the five ecosystems has defined goals and strategies. Horse management is identified as a key strategy for the protection of each of these ecosystems. Management of horses needs to target those areas that are damaged and are the most vulnerable, or are in good condition but have the potential to be impacted by the threat. This includes high-value natural assets such as the rare snow-patch communities with their specific plant associations that are adapted to prolonged snow cover, as found in isolated areas of the Bogong High Plains.

4.2 Fauna and habitat dependency

Feral horses pose a threat to a variety of native fauna (Tolsma 2008, Hope et al. 2009). They compete for resources with native herbivores. Alpine habitats are critical for some of these native species, often only occurring in highly localised patches. Habitats are either destroyed or significantly simplified with fewer foraging, nesting and roosting opportunities for native animals, including water birds, small mammals, reptiles, frogs and invertebrates. Native species that utilise shallow aquatic, stream and river bank habitats, especially frogs and reptiles, struggle to exist in habitats where the loss of vegetation and soil structure leads to a subsequent loss of feeding, shelter and thermoregulation opportunities (Clemann 2009).

A combination of environmental pressures, inclusive of climate change, historic impacts, and the collective of invasive ungulate animals (hoofed mammals including sambar and fallow deer), puts these habitats and native species at significant risk (Impacts, Figures 11-14). In managing the pressures, horses are considered to be threats that can be mitigated, as also are deer and pigs.

Two native species of mammal are potentially at risk from feral horse activity in the Victorian alps (DSE 2013). Habitats of the Smoky Mouse (*Pseudomys fumeus*) and Broad-toothed Rat (*Mastocomys fuscus,* Figure 7) are currently suffering loss and degradation. Records show the Broad-tooth Rat has lived in the Australian alps for thousands of years, however through loss of alpine tussock grasslands and heaths, the Broad-tooth Rat's status in these locations is now considered as vulnerable. The opening up of these grasslands makes the broad-tooth rat and other native species more vulnerable to predation by introduced predators such as feral cats and the European red fox.

Figure 6: Alpine Spiny Crayfish (*Euastacus crassus*).

Figure 7: Broad-tooth Rat (*Mastocomys fuscus*).

The Dendy's Toadlet (*Pseudophryne dendyi*) occurs up to 1700m in elevation, breeds in shallow pools in wet heaths, bogs and fens, but is now becoming harder to locate. Likewise, the Alpine Tree Frog (*Litoria verreauxii alpina,* Figure 9), which occupies similar habitats, is critically endangered (DSE, 2013). Four reptiles (all skink species), including the Alpine Sheoak Skink (*Cyclodomorphus praealtus*), Alpine Water Skink (*Eulamprus kosciuskoi*) and Guthega Skink (*Liopholis guthega*, Figure 8), are listed as endangered. The Alpine Spiny Crayfish (*Euastacus crassus*, Figure 6) occupies cool, clear upland streams in alpine and sub-alpine regions. It also is listed under the *Flora and Fauna Guarantee (FFG) Act* as rare. Other highly restricted and threatened invertebrates such as the Alpine (DSEWPAC 2011) and Mount Stirling Stoneflies are also vulnerable to habitat impacts (SAC 2011, FFG Act).

Alpine wetlands, high-altitude treeless plains, alpine and montane woodland, and heathland are some of the vegetation communities where horses and dependent native species are in direct conflict. Goals and strategies for protection of native fauna and associated habitats can be referenced in the Greater Alpine National Parks Management Plan sections 4.1.2 – 4.1.5 inclusive.

Figure 8: Alpine Water Skink (*Eulamprus kosciuskoi*).

Figure 9: Alpine Tree Frog (*Litoria verreauxii alpina*).

5 Heritage values

5.1 Aboriginal cultural heritage values: Greater Alpine Parks

Aboriginal people have lived in the high country of Victoria for tens of thousands of years. Physical evidence of occupation along with stories, language and memories continue to link Aboriginal people to the alpine parks and lands. Over 600 places and associated objects are recorded from the Victorian alps in Aboriginal Victoria's site registry.

Areas occupied by horses can be rich in Aboriginal cultural values. Aboriginal cultural values may be both tangible (visible) and intangible (lore) and are a significant part of the Greater Alpine parks. Following the 2003 Great Alpine Fire, large areas of bush that had previously proven difficult to penetrate for aboriginal cultural heritage surveys became accessible. An extensive site survey of locations was commissioned. The archaeological work teams found extensive tangible evidence at 350 new sites spread across fourteen alpine areas (Freslov et al. 2004). These sites exist as part of the landscape and are managed in their original place. As most of these sites are not publicised, protection from human intrusion comes from the confidentiality of the locations.

5.2 Post-settlement heritage value of horses

Post-settlement cultural values including mining sites, stockyards and mountain huts are remnant evidence of the history of early European use of the Alps. Feral horses and perceptions of them in the natural environment can be linked to pioneer and grazing history.

The heritage values connected to post-European settlement industries (mining, farming and grazing) on lands that are now national parks are considered important to some sections of the community. The heritage values of 'brumbies' were nominated as a primary interest by 10% of participants in their response to the Engage Victoria public review of the draft plan. There are divergent views around the historical values of horse presence in these parks versus the impact of horses on the natural environment and wildlife.

Historical evidence of the presence of horses in the Australian alps is widely referenced (Context 2015, pp. 36-38). High country grazing played a key part in horses being turned free for agistment and then recaptured by stockmen. It is important that the values of the brumby and associated places, such as alpine cattlemen's huts, is known and shared through experience and information. It is acknowledged that the 'brumby' is part of Australian folklore.

This plan recognises that the history of the horse in these places is important to some members of the community as a living link to the pioneer and grazing history in the Alps and adjacent agricultural lands, and it is also recognised that some people do not support their removal, either in part or whole.

6 Known and potential impacts of feral horses

The impacts of feral horses on environmental values are wide ranging. 'Degradation and loss of habitats caused by feral horses' is formally listed as a Potentially Threatening Process under the Flora and Fauna Guarantee Act. These impacts are outlined below. A summary of relevant research on environmental damage caused by feral horses and the vulnerability of Australian alpine ecosystems is also included as Appendix 1.

Grazing and browsing

Damage to vegetation communities (including threatened communities and species) is a common impact through overgrazing and bark chewing in medium to high-density horse areas (Figures 1, 10, 16, 20). Grasses, tussocks and heaths are preferentially grazed by horses, with these vegetation types being critical habitat for threatened native animal species such as the Broad-toothed Rat and the Smoky Mouse.

Pugging and streambank collapse

Pugging is the compaction of soil and mud caused by hooves (Figure 10, 12). In wet areas where there are many horses, pugging is a commonly observed impact. It creates incisions that are microhabitats for weed invasion, and accelerates drying out and erosion. In bogs, peatlands and floodplains, streambank slumping and vegetation loss leads to waterway degradation and bank collapse as an eventual consequence of horse movements through these areas (Figure 11). In one alps study, 92% of 186 randomly selected sites in treeless drainage lines showed signs of horses and their impacts (Robertson G. et al. 2015).

Figure 10: Horse exclusion plot and grazing impacts (fenced protection on left, horse impacts on right), Cowombat Flat, Alpine National Park

Water quality impacts

Feral horses impact water quality through streambed disturbance, pugging and streambank collapse. Horses may favour wetlands at certain times of the year because of the availability of the 'green pick' vegetation or the accessibility of stream bank vegetation not covered by winter snow. Removal of vegetation reduces water filtering. Water runs off more quickly, heightening erosion potential and lowering overall water yield and water quality. Muddied waters impact alpine and riverine aquatic species including fishes, frogs, native spiny crayfish and the diverse invertebrates that support a wide range of native predators (Figure 13).

Figure 11: Streambank collapse, source of the Murray River, Alpine and Kosciuszko national parks

Figure 12: Pugging, Murray River, Cowombat Flat, Alpine National Park

Trackways

In areas of high horse density (e.g. the Eastern Alps) there is a significant increase in animal pathways through forest, heathland and alpine plains (Figure 15-16). Steep hillsides have a potential for increased erosion, and narrow valleys concentrate an increased collection of animals. Animals using these trackways can be vectors for weeds, and plant and animal diseases, such as *Phytophthora* dieback and frog chytrid fungus (*Batrachochytrium dendrobatidis*).

Figure 13: Suspended mud and poor water quality, Cowombat Flat, Alpine National Park

Figure 14: Siltation and damming of snow plain stream (protected area on right), Native Cat Flat, Alpine National Park

Trampling and bare ground

Soils suffer compaction, loss of plant cover and loss of soil structure through trampling by horses. In peatlands, fens and other stream and riverbank systems, this leads to an increased susceptibility to erosion (Figure 2). Dust wallows (horses and deer) are much drier than surrounding vegetated soils. Greater evaporation and less aeration destabilises the soil and inhibits revegetation. Wallows are widened and deepened by frost heave, runoff and overuse (Figure 17).

Damage to indigenous cultural heritage sites can easily occur, particularly as most of these sites have no physical barriers to deter horses (see Impacts on Aboriginal cultural heritage values below).

Figure 15: Horse trail, Bogong High Plains, Alpine National Park

Figure 16: Horse camp, Davies Plain, Alpine National Park

Dung piles

Large piles of horse manure suppress vegetation. As well as suffocating native grasses and herbs on which it lies, the dung can act as an accessible surface fertiliser that assists non-native weed species to invade (Figure 18).

Weeds

Horse presence and associated impacts can provide opportunity for a variety of introduced plant species to quickly outcompete native species. This is particularly true for the slower-growing Australian alpine and sub-alpine species. Horses also spread weeds through seeds in their dung and attached to their coats and tails.

Native fauna competition

Australia's alpine and sub-alpine zones (above +1400m) make up less than 0.3% of the continent. In a warming climate, native animal species that live within these zones have few migration opportunities to higher habitats. Additionally, these habitats are occupied by horses or have the potential to be impacted by horses. Like animal populations on oceanic islands, native species in the 'alpine islands' have little chance of escape from current and impending threats.

The effect and impacts on native fauna can include increased competition for food and habitat damage. Horses can compete with native grazers (wallabies, wombats), decrease plant species richness and abundance, and cause reductions in ground-dwelling fauna (e.g. Smoky Mouse, Broad-Tooth Rat).

Figure 17: Bare ground – dust wallow, Bogong High Plains, Alpine National Park

Figure 18: Dung pile and trap yard, Bogong High Plains, Alpine National Park

Visitor experience

For some visitors, horses provide a positive experience. The sight of horses provides a visual reminder of the bygone days of pioneering life. This experience is promoted to visitors taking part in licensed private and commercial horse activities in parks. Parks Victoria supports recreational horse-riding, trail-riding, access for horseback camping, and licensed horseback tour operators within specified areas across Victoria's parks estate.

While some visitors seek or enjoy seeing horses in the Alpine National Park, the presence of feral horse can conflict with other visitors' expectations of a natural environment and the key attributes of national parks. Horses can impact water quality through faecal contamination and sedimentation. This is particularly the case at popular camping areas and affects access to potable water. Other issues around horse presence on roadways and campsites have also been raised by park visitors. Some horses (e.g. a stallion protecting its mob from a perceived threat), have been known to intimidate visitors.

Figure 19: Horse-chewed sign, Alpine National Park

Figure 20: Feral horses with foals, Native Dog Flat

Impacts on Aboriginal cultural heritage values

Horses are known to occur in moderate to high densities in many locations where there are Aboriginal cultural sites. Disturbance to Aboriginal cultural sites by horses has been observed and recorded. Feral horses can have adverse impacts at such sites, either by directly damaging culturally important attributes of the site, or by exposing them to damage through removal of vegetation by grazing and by soil disturbance from trampling. Management of other threats to these sites, particularly from large invasive species, is based on control of the threat rather than physical protection such as barriers or fencing.

7 Conservation and welfare - objectives and outcomes

There are long, medium and short-term conservation and animal welfare objectives and outcomes of this plan. They include:

Long-term conservation objectives:

- Reduce damage to alpine vegetation communities by continuing, expanding and improving feral horse control.
- Improve knowledge of the relationship between feral horse impacts and environmental condition through monitoring and research.
- Protect Aboriginal cultural heritage from damage by feral horses.
- Prevent the establishment of new populations of feral horses in the Alpine National Park, and in other parks and forests.
- Remove isolated populations of feral horses where feasible.

Long-term animal welfare objectives:

- Maximise animal welfare outcomes through appropriate expectations, protocols and oversight.
- Minimise feral horse distress through clear standard operating procedures and monitoring of onground activities.

Long-term outcomes (measurable over 3–10 years):

- Regeneration or recovery of alpine peatlands and streambanks.
- Improved distributions and abundances of vulnerable or threatened fauna species.
- Protection and rehabilitation of Aboriginal cultural sites and places.
- Reduction in existing horse populations, removal of isolated populations and prevention of new populations of feral horses becoming established.

Medium-term outcomes (outcome measurable in 3 years):

- Reduction in pugging and streambank collapse caused by feral horses.
- Reduction in impacts from grazing on significant regenerating or restored vegetation.
- Collaborative partnerships and stronger relationships with Traditional Owners groups.
- Removal of Bogong High Plains (BHP) horses; commence management of potential reinvasions to the BHP by populations outside the national park.
- Significant reduction in the Eastern Alps population through removal of up to 1200 horses from the Eastern Alps over the duration of three-year plan. Population contained and prevented from spreading.
- Increased community support for rehoming captured horses and horse management.

Short-term outcomes (outcome measurable in 1–2 years):

- Where required, protection of vulnerable biodiversity values in the greater alps (e.g. Mount Nelse snowpatch community), achieved through immediate removal of recently detected horse mobs.
- Actively develop partnerships and programs to maximise rehoming capacity, to minimise the proportion of captured horses to be culled.
- Phase up the removal of horses from the Eastern Alps (with consideration of both rehoming capacities and animal welfare issues), up to an aspirational target of 400 horses per year.
- Horse management conducted safely and humanely.
- Ongoing removal of feral horses from the Bogong High Plains-Cobungra area.

8 Management approach

The Feral Horse Strategic Action Plan has been developed with input from key stakeholders and institutions that have an interest in horses and the environment. Experts in animal welfare, invasive species management, environment and social science, and feral horse control programs have provided additional knowledge. In addition to government staff involved in the management of the alpine parks and adjacent forests, key community groups have been consulted to develop an approach that ensures all issues and a wide range of viewpoints are considered. Two specific groups provided input to the development of this plan and may be engaged further during its implementation. Their roles are outlined below.

- Alpine Horses Community Roundtable — This group was established to gather views and expertise from key local interest groups, and where relevant broader input from environmental and horse stakeholder groups. The Alps Roundtable Group provided opportunities for community representatives to present their views early in the planning process. Through January and February 2017, three roundtable meetings were facilitated. The issues and views raised have been considered in the development of this plan (The Primary Agency 2016).
- Feral Horse Control Technical Reference Group — This group provides advice to Parks Victoria on management approaches, targets and control strategies, and has provided a technical review of the action plan's proposals. Its members are independent experts (outside Parks Victoria) specialising in animal welfare, invasive species management, veterinary science, alpine ecology, Aboriginal cultural heritage, and social science. The advice of the group has been considered in development of this plan (FHTRG 2017).

The final plan has also been informed by comment on the draft plan via its presentation on the Engage Victoria website, December 22nd 2017 – February 16th 2018. Overall, survey participants were strongly supportive of the actions (> 80%) outlined in the draft plan. Three quarters of participants had a primary interest in conservation. Other strong advice indicated by participants was: the necessity of humaneness in all actions; trapping as the most supported of all proposed control methods; increased efforts in research and monitoring activities; and ongoing communication of control program outcomes.

A principal in invasive species management throughout Australia, whether the target species be plant or animal, is the identification of the level of threat. Management objectives can be determined using a biosecurity approach that directs investment to one of four levels of action: prevention, eradication, containment and asset protection. This is a model approach advocated in Victoria's Invasive Plants and Animals Policy Framework (DEPI 2010 - Figure 2).

Prevention involves preventing an invasive species from establishing in an area and offers the most cost-effective approach to managing the threat posed by a high-risk invasive species.

Eradication involves removing every individual of the target species from an area and preventing re-colonisation. Eradication is generally only feasible for small isolated populations, often in the early stages of establishment.

Containment involves implementing measures to eradicate outlying (satellite) infestations and preventing spread beyond the boundaries of core infestations (those that are too large and well established to eradicate).

The **Asset protection** approach involves focussing the management of an invasive species in areas where reducing its adverse effects provides the greatest benefits for protecting and restoring specific high value assets.

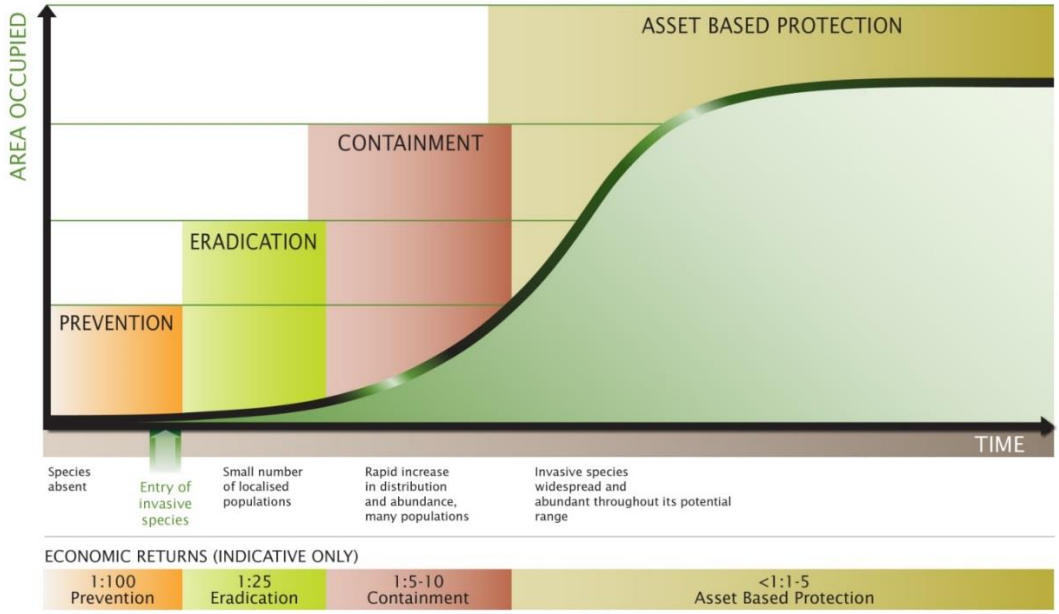

Figure 21: The generalised invasion curve showing objectives appropriate for each stage of invasion/establishment and the reduction seen in the economic returns of managing an invasive species as it becomes more widespread and established (DEPI 2010).

A combination of prevention, localised removal (eradication) of small populations where feasible, and asset protection will be used in feral horse management in the Greater Alpine national parks.

8.1 Abatement of feral horse impacts in the Victorian Alps

Feral horse control to reduce environmental damage and allow for restoration of alpine and subalpine ecosystems will principally be delivered using the control method of passive trapping. This technique lures free-ranging horses to open yards containing baits of salt, molasses and/or lucerne (often through repeat visits), until an operator triggers the gate to close the yards and capture the contained horses. Trap operators will ensure that Parks Victoria's operating standards and animal welfare conditions are met.

It is the intent of this plan to maximise the number of captured horses that will be rehomed. As has occurred in past feral horse management in the Victorian alps, Parks Victoria will actively seek to work with horse interest groups to rehome horses where:

- horses are suitable for rehoming
- horses are captured in areas where transport is safe and humane, and
- rehoming capacity is available.

Passive trapping is considered by most stakeholders and community interest groups as the most humane control method. Roping and mustering are two other capture techniques that have potential as control methods but require further validation around animal welfare considerations, operational safety and cost effectiveness. Roping has been a capture method supported by Parks Victoria over the past decade, however its use is currently suspended while an animal welfare review of the practice is undertaken. This capture technique will be examined through a series of monitored trials commencing in 2018. Using information gathered from these trials, Parks Victoria's Feral Horse Technical Reference Group will be asked to review the results and determine if, or under what conditions, roping could resume as one of the plan's (adaptive) control methods. The plan also identifies the need for a comparable trial for mustering as a potential, but not previously adopted, control method.

Over an initial operations period of three years, management effort will be focused on reducing the impacts of feral horses on vulnerable peatlands and streambanks. While small numbers of feral horses have been removed from the Alpine National Park over several years, an increased scale of removal is required. Where practical and as an interim management measure for vulnerable sites, sensitive ecological and cultural sites may have exclusion fencing constructed to prevent access by horses. However, fencing alone does not address the impacts of horses across the wider landscape.

In the first year of the plan, there are two processes that need to occur:

- Firstly, there will be a focus on building partnerships and programs with horse groups and other organisations with an aim to scale up rehoming capacity and maximise the number of captured horses that can be rehomed.
- Secondly, the capability and capacity of trapping contractors will be built to develop a trapping network and better access to locations of greatest environmental needs, under strict and appropriate operating standards and conditions.

The alpine feral horse control program will therefore be staged in its first year to maximise animal welfare outcomes, and build capacity and capability amongst program partners. As a result, a lower number of horses are expected to be removed in the first stages of this program.

In the Eastern Alps, feral horses are well established and are considered beyond eradication using currently available control tools. It is likely that populations will persist in this area (including the Alpine National Park, adjacent Victorian state forests and adjacent NSW alpine areas), even under increased management.

The management objective for the Eastern Alps will principally be Asset-based protection. To ensure that the most at-risk environments can be protected and where possible allowed to recover from horse impacts, capture will be focused around seven key control areas in the Eastern Alps (Table 2).

An initial target of up to 1200 horses to be captured over three years has been established as an aspirational goal to both contain population growth and reduce abundance of feral horses. Population modelling identifies that a target of 400 animals removed from the Eastern Alps is needed to start reducing the population. A target of 200 animals per annum would keep the current population stable, including births and natural deaths. Based on current trapping rates for the Victorian alps this will mean a significant trapping increase, up to 10 times the average for the period 2007-2017.

Following implementation of the initial three-year strategy, the extent of environmental protection delivered during that time will be reviewed based on whether horse impacts to peatlands and streambanks has been reduced to a level that can allow for recovery. Subject to this review, an adaptive approach may need to be applied. More horses may need to be removed to achieve a low residual population in the eastern Alps, and adequate protection of park values. This review will again explore all possible control options.

In accordance with the Greater Alpine National Parks Management Plan (Parks Victoria 2016), isolated populations of horses will be removed where feasible. The Bogong High Plains population of around 100 horses presents this option. Reduction of this population to zero horses is a medium-term management objective.

Horses are known to inhabit state forest to the south and south east of the Bogong High Plains in the Cobungra and Victoria river valleys. They can often be seen on the edges of the Great Alpine Road between Dinner Plain village and Omeo. Horses in this area will be managed to prevent re-invasion of the Bogong High Plains in cooperation with the Department of Environment, Land, Water and Planning.

Proposed control methods

Table 1 provides an overview of the available control methods. Of these, Trapping is the principal activity to be used between 2018 and 2021 in the Alpine National Park, and where needed in adjacent State Forest, to reduce the abundance of feral horses. Trapping was also supported by the public (Engage Victoria survey 2017-2018) as the most appropriate method of those methods currently available.

Table 1. Overview of the control methods to be used in the Alpine National Park.

Description	Application
Trapping	
Trapping involves establishing trap yards and using lures such as salt, molasses and/or lucerne to encourage feral horses to go into the trap yards. Once inside the trap yard, a tripwire triggers the closure of the entry gate. Trapping can be more expensive than other control methods.	Trapping has been used with success in parts of the Victorian Alps, including the Bogong High Plains. The installation of a new and expanded trapping network in the Bogong High Plains-Cobungra area and in the Eastern Alps will increase the number of horses removed using this method. Trapping can be logistically challenging in remote areas due to the need to monitor traps and remove horses from trap yards in a timely manner. Where undertaken in more easily accessible areas, trapping can be a humane and effective control method for removing feral horses. **Will be used as the preferred primary control method.** Trapping will be used as the primary method to remove feral horses from all areas in the Alpine National Park area. In 2018-2019 an expanded trapping network will be established. Detailed locations for traps will be determined during planning prior to operational implementation.
Mustering	
Mustering involves using horse riders, ground vehicles or helicopters, or a combination of these, to gather and move groups of feral horses into a yard.	Mustering has not been used for controlling feral horses in the Victorian Alps. Mustering operations are best suited to open and relatively flat terrain and would not be feasible in the many parts of the Victorian Alps that are dominated by rugged or forested terrain. However, there are some locations where mustering could be a practical, effective and humane method for removing feral horses. **Mustering to be trialled as a secondary control method.** Mustering may be trialled as a feral horse control technique during the term of this Plan, where the terrain allows safe and humane operations.
Roping	
Roping (also called brumby running) involves skilled horse riders chasing targeted feral horses on horseback and capturing them using a rope/halter.	Roping has been used in accordance with operating procedures to remove feral horses in the Alpine National Park for many years and is a useful approach where poor access precludes trapping. Historically, Roping has been used to remove more horses than trapping. Some people see roping as a traditional activity that has important cultural significance. Roping has been known to occur in adjacent state forests by members of the public. Management of the activity in state forests is not within the scope of the plan. Roped horses (Alpine NP) can be transported out of the park and offered for rehoming where this can be done humanely.

Description	Application
	There are opposing views regarding the humaneness of roping (ITRG 2016). Due to this, this technique is currently undergoing review and evaluation through field-based trials. **Roping will remain suspended as a capture method while scientifically evaluated.** Roping will be independently monitored and evaluated for its humaneness, efficacy and cost effectiveness. Further use of the technique will be based on an expert review of the monitoring results after this review. If practices do not meet sufficient animal welfare standards, Roping will be discontinued as a horse control management technique. If practices can meet animal welfare standards, Roping may be considered for resumption in the Eastern Alps.
Fencing	
Fencing (exclusion zones) involves the strategic placement of fences to prevent feral horses from accessing fragile/sensitive areas.	Fenced exclusion plots have been used effectively to demonstrate the damage feral horses can do to sensitive high plains areas in the Eastern Alps. In areas where feral horses are unlikely to be totally removed, such as the Eastern Alps, fencing can help to provide experimental 'feral horse free areas' that can assist land managers and researchers to develop a more detailed understanding of how to restore horse damaged areas in the Alps. Many peatlands in the Eastern Alps have been heavily damaged by feral horses, and restoration of these areas may take many decades even where the abundance of horses is reduced. Exclusion of feral horses in some key areas will allow monitoring and restoration of representative areas. Fencing is expensive to establish and maintain in remote areas, but may be a feasible option to meet research and restoration needs. **Research opportunity and site-specific protection:** In 2018–19 the establishment of at least two experimental restoration areas will be considered. Existing exclusion areas in the Eastern Alps may be expanded to achieve this goal. Some areas on the Bogong High Plains may also be protected using temporary fencing.
Fertility control	
Fertility control agents can be used to manage reproduction rates of individual horses if the agent can be administered effectively and individual horses can be identified and re-treated when required. This technique has been used overseas and is generally only practical in small confined populations where an immediate reduction of environmental impacts is not required.	**Will not be used.** Due to the large population sizes of feral horses in the Victorian alps, difficulty in delivering the control agent effectively in the field for large numbers of uncontained and unidentified animals, and the inability for the technique to reduce populations immediately (over a short period), fertility control is not currently being considered for horse control in Victorian parks (see Feral Horse Technical Reference Group – Control techniques issues summary 2017).

Description	Application
Shooting (free ranging horses)	
Ground and aerial shooting can provide specific and humane ways of managing feral animals, using appropriately skilled shooters under suitable conditions.	In inaccessible remote areas where trapping, roping or mustering (and subsequent horse transport) are not possible or are unlikely to be humane, ground or aerial shooting (or both) may be the most feasible horse control option. It has also been proposed by a number of stakeholders and welfare organisations as a more humane approach than other methods, in terms of minimising animal stress, time to death and cost. However, community consultation has revealed a polarized perception of the technique with limited public support. To date, ground or aerial shooting has not been used to remove free-ranging feral horses by public land managers in Victoria due to public perceptions and preference for passive techniques such as trapping. **Will not be used to control free-ranging feral horses.** In year three of this plan an evaluation of the success or otherwise of trapping and other capture methods will commence. If results demonstrate that the use of additional techniques may be required to achieve adequate protection of the environment from feral horses, further public consultation and dialogue will be undertaken on techniques such as shooting of free-range animals.

Figure 22: Mount Feathertop from the Razorback

Management actions for the removal of horses in the Alps

Eastern Alps

- Establish and maintain an ongoing trapping network at high conservation value areas in the Eastern Alps.
- Remove up to 1200 horses over the three years of this plan. Evaluation of the extent of success achieved using the control tools proposed in this plan will commence in year 3.
- To provide field-based evidence, roping will initially only be used as an independently monitored trial. It will then be evaluated for its humaneness, efficacy and cost effectiveness. Further use of the technique will be based on expert review of the monitoring results.
- Subject to sufficient safeguards and protocols, a mustering trial may be undertaken in state forest at Nunniong Plains in collaboration with DELWP, or other suitable eastern alps locations in the Alpine National Park.

Bogong High Plains – Cobungra area

- Establish and maintain an expanded trapping network in the Bogong High Plains-Cobungra area.
- Remove Bogong High Plains-Cobungra horse populations. Due to the vast terrain and reliance on trapping, horses may persist in low numbers in the Bogong unit through potential re-invasion from adjacent crown lands, possible illegal release and/or escape of horses into the park.
- Deliver an ongoing horse removal program to limit the persistence and reinvasion of horses. Evaluation of the extent of success achieved using the control tools proposed in this plan will commence in year 3.

Management of captured horses

Regular communication from Parks Victoria and a cooperative partnership with community interest groups will be integral to a successful outcome for horse management. Parks Victoria has and will continue to work with the horse rehoming groups to provide rehoming or ownership opportunities for captured horses. Capacity of interested community groups to accept and rehome captured horses needs to be comprehensively understood, and additional opportunities for rehoming horses investigated if feasible. It is not proposed that Parks Victoria will manage holding properties for captured horses, therefore rehoming interest and capacity in the community is critical to a successful rehoming program.

Rehoming captured horses is a priority and will be attempted in partnership with brumby interest groups. Where rehoming options can be secured, horses will be transported from capture sites and offered for rehoming by volunteer horse interest groups and partner organisations. Not all horses may be suitable for, or able to be taken by, horse interest groups for ownership or rehoming. Where there is not capacity from these groups to rehome the captured horse, and where transport can be minimised, the horse or horses may be offered for sale at suitable sale yards.

Under prescribed circumstances, horses will need to be humanely put down within or close to trap yards by shooting under strict protocols. These circumstances are:

- Where the horses are injured, ill, of very poor body condition and/or too aged for successful rehoming
- Where remote trap locations are established and transporting horses from these areas is likely to be inhumane
- Where rehoming opportunities have not been secured.

Animal welfare and safety protocols (Parks Victoria 2013) will be further refined to guide delivery of safe, effective and humane operations.

The following principles will be applied to the management of captured horses:

1. Minimise transport and holding times for captured horses prior to transport.
2. Mares and dependent foals are not separated.
3. Where assessed as potentially suitable for rehoming, captured horses that can be transported humanely will be made available for rehoming by appropriately skilled horse rehoming groups. A horse once received by the relevant horse group or person becomes the property of that group or person.
4. If transport conditions and distances are likely to result in poor welfare outcomes for horses, horses are not suitable for rehoming or in ill health, or there is no rehoming opportunity available, these horses may need to be humanely put down at capture sites. Where possible, carcasses of horses will be removed from capture sites and disposed of appropriately (possibly by burial).

Location-based control and removal methods

Table 2. Where and how horses will be managed.

Control location	Management objective	Priority	Management approach	
			Control	Removal
Areas not currently occupied by wild horses	Prevention	1	In the event of a new feral horse incursion, horses will be removed using trapping or other capture methods.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Bogong High Plains	Remove all horses. Limit potential re-invasions into Bogong High Plains.	2	Trapping	Captured horses will be offered for rehoming if safe and humane transport is possible.
Cobungra populations	Removal/Containment. Prevent spread back into BHP.	3	Trapping	Captured horses will be offered for rehoming if safe and humane transport is possible.
Eastern Alps populations (see sub population descriptions below)	Asset Protection	2-3	Trapping, supplemented by potential mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.

Control location	Management objective	Priority	Management approach	
			Control	Removal
Eastern Alps: Davies Plain	Asset protection through reduced horse abundance.	2	Trapping, potentially supplemented by mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Eastern Alps: Nunniong (State Forest)	Asset protection through reduced horse abundance.	3	The open, relatively flat terrain of the Nunniong area and good access make it a suitable location for an initial mustering trial. Trapping will also be used.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Eastern Alps: Limestone	Asset protection through reduced horse abundance.	2	Trapping, potentially supplemented by mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Eastern Alps: Buchan Headwaters/Upper Tambo	Asset protection through reduced horse abundance.	3	Trapping, potentially supplemented by mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Eastern Alps: Buenba/Mount Murphy	Asset protection through reduced horse abundance.	3	Trapping, potentially supplemented by mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Eastern Alps: Mount Misery	Asset protection through reduced horse abundance.	3	Trapping, potentially supplemented by mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.
Cowombat Flat - source of the Murray river.	Asset protection through reduced horse abundance.	3	Trapping, potentially supplemented by mustering in suitable locations.	Captured horses will be offered for rehoming if safe and humane transport is possible.

8.2 Stakeholder and community engagement

Consultation and social objectives

Community engagement has been underway since 2012–2013. This involved community-based advisory groups, interviews with key peak and regional interest groups, a Victorian community perception survey, and the release of information sheets and background papers.

The results of the Engage Victoria community feedback to the draft plan have been released as a stand-alone document. A summation of the results is provided as Appendix 2 to the final plan. The principal outcome was support for enhanced protection of the Alpine National Park by increased control of the feral horse population.

Objectives for stakeholder and community engagement in implementing the feral horse action plan are to:

- Work closely with Traditional Owners to protect Country and sites of cultural signficance.
- Enable partnerships that contribute to the effectiveness of feral horse management.
- Ensure key stakeholders are given the opportunity to contribute to the delivery and evaluation of the Action Plan.
- Keep the community and stakeholders informed of actions and progress.

Key stakeholders and partners

Parks Victoria recognises the importance of partnerships with Traditional Owners, other agencies, horse interest groups and the community. These partnerships are central to the successful implementation of this plan.

Actions:

- Support partnerships with Traditional Owners, agencies and groups (including community groups and volunteers) in managing or monitoring feral horses and their occupied areas within the landscape.
- Support partnerships with groups that can provide capacity to maximise the rehoming of feral horses.
- Build understanding and acceptance around the need for the removal of horses from these areas, and the control methods to be employed.
- Build awareness around the need for landscape restoration.
- Investigate additional opportunities for rehoming or ownership of captured horses, to better understand and build community capacity and interest in accepting ownership of captured horses.

Communications

Parks Victoria will continue providing updates to the community and stakeholders on the progress and management of feral horses. Twenty percent of comments received during the public consultation process highlighted the need to raise further awareness and understanding of feral horse management.

These included:

- Improvement of information on environmental impacts caused by feral horses.
- Better understanding of welfare/humaneness issues related to control options.
- Park visitors can report on the occurrence of and interactions with feral horses.
- Feedback on outcomes of management actions.
- The costs of the different management methods.

Key stakeholders will be informed of outcomes from annual program reviews. Management approaches will be adapted according to results of the reviews and feedback from community, researchers and technical experts.

Actions:

- Community and stakeholders are informed of actions and progress.
- Scientific evidence supporting the need for the management approach is shared with key stakeholders and communities.
- Maintain open and responsive communication lines with stakeholders.

Figure 23: Horses on roadway, Native Cat Flat, Alpine National Park

9 Monitoring, evaluation and research

9.1 Monitoring and evaluation

Parks Victoria is committed to an evidence-based approach to the management of natural and cultural values. Monitoring and evaluation are fundamental to that approach, helping to ensure that decisions are based on the best information available and that the effectiveness of management improves over time as knowledge increases. Monitoring provides the information necessary for evaluating how successful management has been, as well as identifying where changes in the management approach or resourcing are needed. The feral horse management program will include four levels of monitoring:

Input — time, money and other resources invested in implementing management activities. This helps an understanding of the efficiency of management and informs resource needs for future management.

Output — management actions undertaken (what, where, when and how much). It is important to understand what actions were undertaken so that the effectiveness of management can be interpreted in reducing the horse population and enhancing natural and cultural values. It is also important to monitor compliance with animal welfare standards and protocols in the capture and transporting processes.

Threat — the status of threats to natural values. In this case, threat monitoring will target horse populations but also review other invasive animal species to correlate attributable impacts. Changes in the size of feral horse populations will generally be more rapid than changes in the status of natural and cultural values. New populations will be controlled through full removal. Monitoring horse populations provides short-term feedback on the effectiveness of management, indicating whether desired longer-term outcomes are likely to be met.

Conservation outcomes — the condition of natural and cultural values we seek to protect through managing feral horse populations. This is the fundamental test of the effectiveness of management, telling us whether longer-term conservation goals are being achieved.

Because the feral horse management program will follow an adaptive management approach, management techniques and goals will evolve over time as we learn more. Consequently, monitoring needs will also change over time to enable the evaluation and improvement of management effectiveness and to better inform decision-making.

9.2 Input monitoring

To ensure an understanding of the efficiency of any management undertaken, and to help plan for future management, it is important to document the costs of implementing the program.

Actions:

- Parks Victoria will maintain records of budget expenditure, staff, contractor and volunteer time, materials and other resources used to implement all activities associated with the management of feral horses in the Alpine National Park.

9.3 Output – Monitoring management actions

Capture and removal

As well as documenting costs associated with the management program, it is important to document activities undertaken to manage feral horses. What was done, where and when it was done and how much was done must be known so that any changes in horse populations and in natural and cultural values can be related to work undertaken to control horses. This helps understand how well different management actions worked, where further effort is needed and where changes in approach are required.

Actions:

- Parks Victoria will monitor the effort and maintain records of the number of horses removed using each control method.
- Parks Victoria will monitor compliance of capture, transport and husbandry standards, and adherence to set protocols.

Animal welfare

Monitoring of animal welfare associated with all aspects of the feral horse control program including capture, handling, transport, and where necessary, euthanasia or destruction of animals is an integral component of implementing the program. To maintain compliance with relevant legislation, Parks Victoria has in place Standard Operating Procedures to guide delivery of the control program.

Management to date of the Eastern Alps population has included roping (brumby running) and trapping, undertaken through a contractual arrangement with the Alpine Brumby Management Association in accordance with specific operating guidelines and conditions.

Questions exist regarding the humaneness of roping, community capacity to absorb large numbers of horses, and cost-effectiveness of this approach. Hence, the continued use of roping is subject to a review by technical experts of the animal welfare outcomes associated with this approach in year one of the plan.

Actions:

- Develop and implement a monitoring protocol to ensure compliance with national codes of practice and standard operating procedures, so that the welfare considerations of horse capture are known, monitored and documented.
- Complete the roping monitoring program to evaluate the appropriateness of this capture method as a management technique. Review and assessment will be undertaken by technical experts in year one of the management program.

9.4 Threat - Feral horse monitoring

Estimating horse abundance across the landscape

Changes in the abundance of horses caused by removal needs to be monitored, and the associated reductions and impacts understood to determine the effectiveness of further control. This in turn is critical for determining the level of management effort needed to successfully achieve population reduction targets with subsequent control activities.

Effective horse monitoring programs using helicopter or fixed-wing aircraft surveys have been established for the Eastern Alps and Bogong High Plains populations. These programs will be continued, and where necessary will be reviewed and revised as knowledge of horses in both locations improves. Specifically, there may be a

need to expand the survey area for the Bogong High Plains population. Recent observations suggest this population may now occur in areas not believed to be occupied by feral horses when this monitoring program was established. As such, there may be a need to expand the survey area in future years to encompass all areas where feral horses occur.

Actions:

- Continue to monitor the Eastern Alps feral horse populations every five years (or as required) using the methods applied in the aerial 2014 survey.
- Review the appropriateness of the survey area for the Bogong High Plains population.
- Modify survey designs as appropriate based on this review.
- Implement current or modified survey of the Bogong High Plains population every two years or as required.

Estimating local horse abundance

There is a need to understand what is happening to the feral horse population at a localised scale in the areas where management actions such as trapping are applied. This is important for determining whether the local population is reduced following management action, as well as understanding whether that reduction is maintained. A current project being undertaken by researchers at the University of Tasmania is seeking to develop an effective approach for localised monitoring of horse abundance in the alps. Subject to the results of this research, monitoring of local horse populations should be undertaken in at least some areas where management actions occur.

Actions:

- Progress development of an effective approach for localised monitoring of horse abundance.
- Implement localised monitoring of horse abundance in selected areas.

9.5 Conservation Outcomes - Natural and cultural values monitoring

Management of feral horses is being undertaken to protect natural and cultural values of the Alpine National Park. Hence, assessment of the effectiveness of management must consider outcomes for both natural and cultural values.

Natural values

Although a wide range of natural assets in the Eastern Alps and Bogong areas are affected adversely by feral horses, the initial phase of the management program is focused on the protection of peatlands and streambanks. Monitoring will be implemented to determine the status of these natural values and how they change over time in association with any management implemented. Where possible, we will seek to utilise or complement existing monitoring programs.

In the alps, monitoring will focus on attributes of peatlands and streambanks that are known to be impacted by feral horses. The specific methods are yet to be developed, but may draw on relevant elements of established monitoring programs. This may include:

- The alps-wide peatland condition monitoring program.
- Attributes of stream condition considered in the alps-wide assessment of feral horse impacts undertaken by the Australian Alps Liaison Committee (AALC).
- Streambank elements monitored inside and outside existing horse exclusion plots established at Native Cat and Cowombat Flats in the Alpine National Park.

Additional exclusion plots (areas fenced to exclude horses) may also be established to determine how peatlands and streams recover when they cannot be accessed by horses.

Actions:

- Develop and implement monitoring to determine the status of peatlands in the Eastern Alps and Bogong areas and how this changes over time in relation to management effort.
- Develop and implement monitoring to determine the status of streambanks in the Eastern Alps and Bogong areas and how this changes over time in relation to management effort.

Cultural values

The Victorian Alps have a rich cultural heritage that is important to Traditional Owners and the broader Victorian community. Heritage values include the physical as well as intangible attributes of the landscape, both of which may be damaged by feral horses. Protection of Traditional Owner cultural values in the Alpine National Park is a focus of the initial phase of the feral horse management program.

Culturally important sites such as middens, artefact scatters and burial sites are sensitive to disturbance. Monitoring will be established to understand the status of culturally important sites and how this changes over time in association with management actions.

The Greater Alpine National Parks Management Plan notes sites of post-European settlement where the presence of horses have been significant e.g. huts and yards. These sites also require management protection.

Actions:

- Work with Traditional Owners to develop and implement monitoring of the status of culturally-important sites and how this changes over time in association with management actions.

9.6 Research to address priority knowledge gaps

The feral horse management program will include a research stream to address priority knowledge gaps, reducing uncertainty and further enhancing the effectiveness of management over time. The focus of the research program will evolve over time as knowledge regarding the management of feral horses and their impacts improves (AALC 2014).

In the short term, important areas of research will include:

- Developing an effective technique for localised estimation of feral horse abundance (see 9.4.2).
- Evaluating the humaneness and cost-effectiveness of roping (see 9.4.3).
- Exploring the use of remotely piloted aircraft systems (drones) and remotely captured imagery for gathering data to assessing feral horse abundance, and stream, vegetation and habitat condition. (AALC project 2016-2018).

Further areas of research may include:

- Demography of feral horse populations.
- Habitat use and movement of horses across the landscape.

10 Reporting and review

Feral horse management will be delivered in two principal components:

1. An operational component to deliver the capture and removal of feral horses from the Victorian Alps, undertaken as seasonal conditions, access and weather allows.
2. A monitoring and evaluation component to determine current estimates of horse density, and to determine removal targets based on pre-determined target densities and the achievement of conservation and welfare outcomes.

Reporting on the operational component will be included in Parks Victoria's Eastern Region seasonal and end-of-year reports. Contractors and groups receiving captured horses will be required to provide necessary data regarding gender/age/condition, capture method, and if known post-capture outcome.

Monitoring and other research projects will run concurrently with operational activities.

To provide technical advice on these two principal horse management components, the existing Feral Horse Technical Reference Group will remain in place and will be asked to provide advice on progress in implementing these components. The Technical Reference Group will continue to provide review and further guidance for at least the first year of operation.

This plan will be reviewed and evaluated each year following its commencement in the 2018–2019 financial year. There will also be a formal review and evaluation of the plan, at the conclusion of the three-year implementation period. Reports on the reviews and associated outcomes will be made available via the Parks Victoria website.

Figure 24: Fenced vegetation plot, Bogong High Plains, Alpine National Park

11 References

Australian Alps Liaison Committee (2015). *Australian Alps factsheet: Wild horse management,* Australian Alps National Parks Cooperative Management Program.

Australian Alps Liaison Committee (2014). *Developing an applied research program for wild horse management*, Workshop proceedings, Australian Alps national parks Cooperative Management Program.

Cairns S. & Robertson G. (2015). *A report on the 2014 survey of feral horses (Equus ferus caballus). in the Australian Alps*, Report to the Australian Alps Liaison Committee by GE & SC Cairns Consulting: Armidale, NSW.

Clemann, N. (2009). *Survey and monitoring of threatened alpine herpetofauna: annual report for the 2008-2009 Season.* Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg.

Context (2015). *National cultural heritage values assessment and conflicting values report: The wild horse population, Kosciuszko National Park*, Report to NSW National Parks and Wildlife Service by Context: Brunswick, Victoria.

Dawson M. & Axford J. (2011). *The ecology of feral horses and their environmental impact in the Victorian Alps, Background Paper 1,* Parks Victoria: Melbourne.

DEPI (2010). *Invasive Plants and Animals Policy Framework,* Victoria. Department of Environment and Primary Industry, Melbourne, Victoria.

DSE (2013). Advisory List of Threatened Vertebrate Fauna in Victoria- 2013. Department of Sustainability & Environment, Melbourne. Internet document at-
https://www.environment.vic.gov.au/__data/assets/pdf_file/0014/50450/Advisory-List-of-Threatened-Vertebrate-Fauna_FINAL-2013.pdf

DSEWPAC (2011). Approved Conservation Advice for Thaumatoperla alpina (Alpine Stonefly).. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/25289-conservation-advice.pdf.

Dyring J. (1990). *The impact of feral horses (Equus caballus). on sub-alpine and montane environments*, MAppSc thesis, University of Canberra: Canberra.

Feral Horse Technical Reference Group (2017). *Control techniques – Issues summary*. Feral Horse Technical Reference Group 2017, Parks Victoria: Melbourne.

Freslov J., Mullet R., Hughes P., Kelly T., Johnson D., Shawcross W., Hunt P., Williams D., McGregor O., Collins S., Wines D. & Zipfer C. (2004). *Post Wildfire Indigenous Heritage Survey, Vol.1*, a report prepared for Parks Victoria and Department of Sustainability and Environment, AAV Report No.2833

Hope G., Nanson R. & Flett I. (2009). *The Peat-forming Mires of the Australian Capital Territory. Technical Report 19*. Territory and Municipal Services, Canberra.

ITRG (2016). *Final report of the Independent Technical Reference Group: Supplementary to the Kosciuszko National Park Wild Horse Management Plan*. Report by the Independent Technical Reference Group to the NSW Office of Environment and Heritage: Sydney.

Office of Environment and Heritage (2016). *Draft Wild Horse Management Plan Kosciuszko National Park*, NSW National Parks and Wildlife Service: Sydney.

Parkes J.P., Latham A.D.M., Forsyth D.M., Stamation K., Latham M.C., Cowan P. & Fahey B. (2017). *Framework for managing introduced large herbivores on Parks Victoria estate*, A report to Parks Victoria by The Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning: Heidelberg, Victoria.

Parks Victoria (2013). *Operating guidelines for feral horse capture by roping*, Parks Victoria: Melbourne.

Parks Victoria (2016). *Greater Alpine National Parks Management Plan*, Parks Victoria: Melbourne.

Robertson G., Wright J., Brown D., Yuen K. & Tongway D. (2015). *An Assessment of Feral Horse Impacts on Treeless Drainage Lines in the Australian Alps*, a report prepared for the Australian Alps Liaison Committee, Australian Alps National Parks Cooperative Management Program.

Scientific Advisory Committee (2011). *Final Recommendation on a nomination for listing – Degradation and loss of habitats caused by feral horses (Equus caballus).,* Department of Environment & Primary Industries: Melbourne.

The Primary Agency (2016). *Stakeholder feedback regarding wild horse management in Barmah National Park and Greater Alpine National Parks,* A report to Parks Victoria by The Primary Agency: East Melbourne.

Tolsma, A (2008). *An Assessment of the Management needs of Mossbeds in the Victorian Alps, 2004-2008.* Report to Parks Victoria, Arthur Rylah Institute for Environmental Research, Melbourne.

Walter M (2003). *The population ecology of wild horses in the Australian Alps*, Report to the Australian Alps Liaison Committee, Australian Alps National Parks Cooperative Management Program.

12 Maps

Bogong - Cobungra Area

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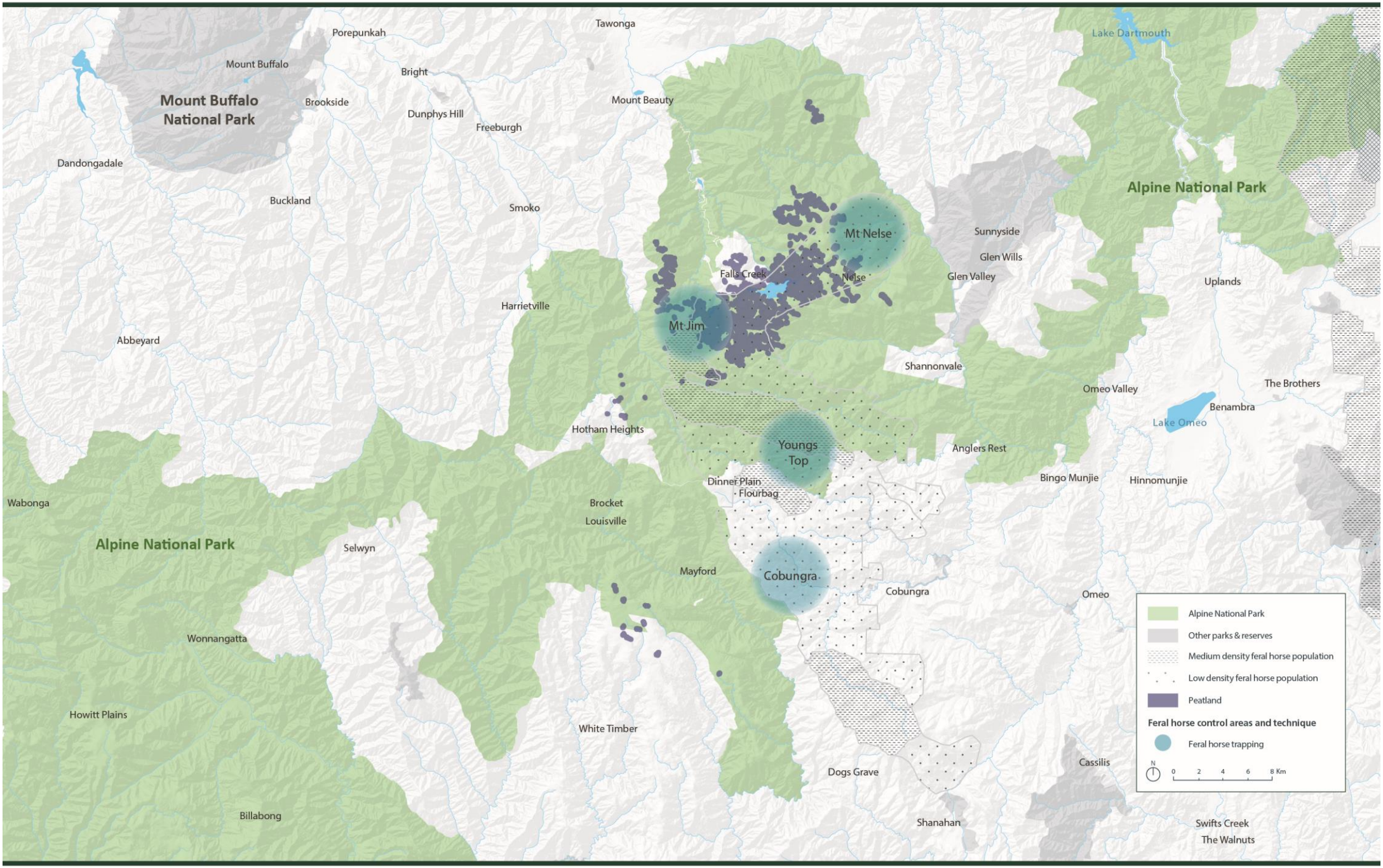

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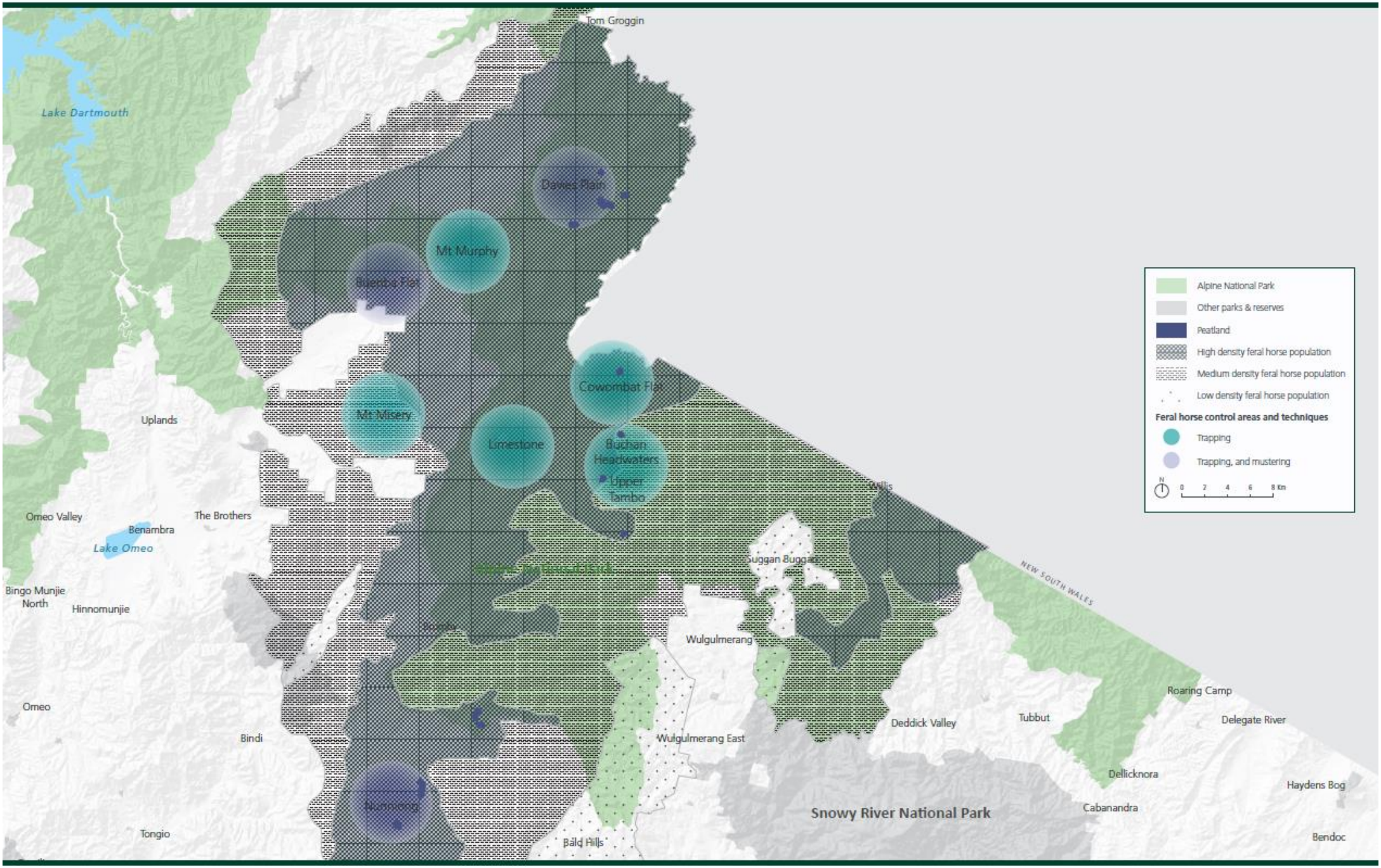
Eastern Alps Region



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Appendix 1

Summary of the science related to feral horse impacts in the Victorian Alps

The environmental impacts of feral horses are well documented. This document summarises some of the published studies and lists further studies that have examined the impacts of feral horses and that are particularly relevant to the Victorian Alps. It includes:

1. An introduction extracted from a study that assessed impacts of feral horses on treeless drainage lines in the Australian Alps (Robertson et al. 2015)
2. An extract from the Flora and Fauna Guarantee (FFG) – Scientific Advisory Committee (SAC), Final recommendation on the listing of 'Degradation and loss of habitats caused by feral horses' as a Threatening Process (SAC 2011)
3. A summary of five papers describing direct assessments of impacts of horses on soils, waterways and vegetation
4. A broader reference list that has informed the plan, including references from Robertson *et al.* 2015 and SAC 2011. Note that some of these references are not directly about horses but relate to issues associated with impacts in and vulnerability of alpine ecosystems.

1. Introduction (extract from Robertson *et al*. 2015)

This introduction is extracted from a study that assessed impacts of feral horses on treeless drainage lines across the whole Australian Alps landscape. It provides an overview of the impacts of feral horses in the alps that have been identified in other studies. Further details of this study are included elsewhere in this document.

"Feral horses have been present in the Australian Alps since the 1890s (Dyring 1990). The environmental impacts of feral horses in the Australian Alps have been of concern since at least the 1950s (Costin 1954, 1957). Impacts on riparian and wetland ecosystems, especially those impacts associated with erosion and damage to streams, are of particular concern. Many of these ecosystems include the Commonwealth-listed Alpine Sphagnum Bogs and Associated Fens Endangered Ecological Community and synonymous communities listed under New South Wales and Victorian State legislation. These ecosystems also provide important habitat for a range of Commonwealth and/or State listed threatened species including the Alpine Water Skink, Guthega Skink, Alpine She-oak Skink and Alpine Bog Skink (Clemann *et al.* 2001; Clemann 2001; Meredith *et al.* 2003; Steane *et al.* 2005).

Streams, wetlands and adjacent riparian ecosystems are susceptible to damage through selective grazing, trampling, pugging, wallowing and crossing by feral horses and other hard-hoofed animals (Costin 1954; Whinam & Comfort 1996; Williams *et al*. 1997; Whinam & Chilcott 2002; McDougall 2007; Prober & Thiele 2007; Wild & Poll 2012). Impacts associated with feral horses include changes to soils, streams and vegetation (Dyring 1990); changes in stream structure and function, vegetation structure and composition (Prober & Thiele 2007; Wild & Poll 2012); and damage to peatland systems through track creation, compaction, trampling, pugging and stream bank slumping (Tolsma 2009).

Due to concerns about impacts on natural values, feral horse abundance across the Australian Alps has been monitored systematically since 2001. The feral horse population was reduced by large bushfires that affected much of the Australian Alps in 2002-2003 (Walter 2003). However, since then, the population has continued to grow, with the annual rate of increase for the Northern Kosciuszko area in New South Wales and the Southern Kosciuszko – Northern Victoria area estimated at 17% and 6% respectively (Cairns 2014)."

2. Extract from FFG Nomination for Listing: Degradation and loss of habitats caused by feral horses

The Flora and Fauna Guarantee Scientific Advisory Committee (SAC) is an expert advisory committee comprising seven scientists, a majority of whom are not Victorian Government employees. The Committee determines whether a nomination is valid and satisfies one or more of the criteria for listing under the FFG Act. The following is extracted from the 2011 SAC final recommendation regarding the listing of 'Degradation and loss of habitats caused by feral horses'.

"Feral horses impact on habitats in two broad ways:

- via direct herbivory (consumption of native plants), in particular grazing impacts on threatened species and ecological communities, and
- through degradation of natural habitats, including fouling of waterholes, accelerating gully erosion and trampling and consuming native vegetation. Of particular concern is the degradation of habitats important for the survival of threatened species and communities."

"…In the far east of Victoria, very few areas of high-altitude wetland, grassland or open snowgum woodland are unaffected by the activity of feral horses, with bare ground, tracks and piles of dung being common (Tolsma 2008b). Permanent and seasonal wetland areas are particularly susceptible to damage by horses or other ungulates, with selective grazing, trampling, pugging of peat and stream bank slumping.

In recent surveys on the Nunniong Plateau and the East Alps Unit of the Alpine National Park, evidence of feral horse activity (tracks, compaction, trampling, pugging and stream bank slumping) was observed in 85 of 98 peatlands assessed. The majority of these affected peatlands are threatened Alpine Bogs and Fens (Tolsma 2008a, b)."

"On average, 25% of all peatland areas assessed in the East Alps Unit of the Alpine National Park was affected by trampling, and 16% of peatland areas assessed in State forest to the south (Tolsma 2008a, b).

Many areas of burnt alpine peatland, particularly in the East Alps Unit, are unlikely to recover fully while feral horses remain (Tolsma 2008b). Trampling is also hampering Sphagnum bog recovery in naturally regenerating peatlands, and appears to be affecting some peatlands in which active restoration work is being undertaken.

Trampling by hoofed mammals has also been considered one of the major threats to other FFG-listed alpine vegetation communities. Within the *Caltha introloba* Herbland Community, cushions of Tuft-rush (*Oreobolus*), which play an important role in reducing the erosive forces of flowing water, may be dislodged by trampling, or have their regeneration disrupted (McDougall 1982, McDougall and Walsh 2007). Similarly, the Alpine Snowpatch Community is situated on steep, sheltered slopes, where constant irrigation during thaw renders them particularly susceptible to soil loss following damage to the vegetation by trampling (McDougall 1982, Wahren *et al*. 2001, McDougall and Walsh 2007). Montane Swamp, because of its position in the landscape, is another listed community that may also show the impact of feral horses.

Feral horses also pose a threat to some native fauna utilising aquatic habitats, especially reptiles and frogs. Processes believed to be threatening these species include climate change, development for ski resort infrastructure, feral predators and exotic herbivores such as feral horses (Clemann 2002, 2009). In Victoria the Alpine Water Skink, *Eulamprus kosciuskoi,* is restricted to wet alpine habitats such as *Sphagnum* bogs/peatlands, wet heath and riparian vegetation (Meredith *et al*. 2003, Steane *et al*. 2005). These types of habitats are attractive to large herbivores such as horses and are therefore extremely vulnerable to trampling. Damage to habitat caused by feral horses is specifically identified as a threat to the federally-listed Alpine She-oak Skink *Cyclodomorphus praealtus* (Clemann 2011).

The presence of feral horses places additional pressure on the riparian and instream habitat of some highly restricted and threatened invertebrates found in the Victorian alps. Both the Alpine Stonefly (*Thaumatoperla alpina*, Bogong High Plains) and the Mt Stirling Stonefly (*Thaumatoperla flaveola*, Mt. Buller-Mt Stirling massif) have a stream-dwelling aquatic stage and a riparian-dwelling terrestrial stage likely to be affected by horse damage to that habitat. The Cobberas area is also the habitat of at least two dragonfly species that require suitable stream habitats for their nymphal stages. The impact of feral horses is exacerbated by fire, particularly in the alpine region, where fire events are likely to become more frequent as a result of warmer temperatures and reduced rainfall (Timbal and Jones 2008)."

3. Summary of five selected papers

Dyring, J. (1990). The Impact of Feral Horses (Equus caballus) on Sub-alpine and Montane Environments in Australia. MAppSci Thesis, University of Canberra.

Aim: To qualitatively determine some current impacts of feral horses on sub-alpine and montane areas in Victoria and New South Wales.

Method: Habitat preferences were analysed in relation to activities of the horses. Abundance estimates were made for sites in southern Kosciusko National Park (NSW) and Eastern Victoria and related to habitat use. Impacts on soils and the associated vegetation were assessed by comparisons between trampled sites and the adjacent untrampled areas. Assessments of disturbance along stream banks were related to vegetation type.

Results: Extensive trampling and track establishment/widening by horses was confirmed. Trampled areas had fewer plant species, greater exotic (weed) abundance. Significant streambank disturbance was detected.

Wild, A. and Poll, M. (2012) Impacts of feral horses on vegetation and stream morphology in the Australian Alps: Feral horse exclusion plot monitoring and analysis. Report to the Friends of the Cobberas, Parks Victoria and the Australian Alps Liaison Committee.

Aim: To assess the effect of feral horses on stream banks, vegetation structure and floristic composition.

Method: Replicated trial plots were established at two sites; four pairs of plots at each site, one plot in each pair on other side of a stream line; each pair contained a fenced and unfenced plot. The fenced plots excluded large grazers (horse & deer) but allowed small grazers (rabbits, wombats) to enter. Sites located at Cowombat and Native Cat flats in Eastern Victoria.

Results: Areas grazed and trampled by horses had greater levels of bare ground, increased stream flow and erosion and damage to stream banks. There were also differences in vegetation composition and structure.

Porfirio, L.L., Robertson, G., Hugh, S., Gould, S.F. and Mackey, B. (2014). Monitoring the impact of feral horses on vegetation condition using remotely sensed fPAR: a case study in Australia's alpine parks.

Aim: Investigate if changes in vegetation condition are correlated with the presence of wild horses and, if so, determine whether these changes could be detected using satellite data.

Method: Matching ground based observations of site condition with photosynthetic activity data collected via satellite.

Field observations of vegetation condition and photosynthetic activity data collected via satellite from wetlands and riparian areas were compared among sites with and without horses. Assessment also considered whether any detected relationships could be attributed to the presence of wild horses as compared with topographic factors.

Results: The presence of wild horses correlated with sites that had poorer and more variable vegetation condition. Satellite data identified major breaks in the vegetation growth pattern due to drought, fire and other forms of disturbance (horses). An analysis of the satellite data matched the analysis of the ground based observations.

Robertson, G., Wright, J., Brown, D., Yuen, K. and Tongway, D. (2015). An Assessment of Feral Horse Impacts on Treeless Drainage Lines in the Australian Alps. Australian Alp national parks Cooperative Management Program.

Aim: A comparison of various attributes of treeless drainage lines among sites with signs of horse presence and sites that do not show evidence of horse presence.

Methods: A random selection of 186 sites. Horse-present sites (129), horse-free sites (57). Treeless, both ephemeral and perennial, therefore inclusive of grasslands, bogs, fens, and other wetlands. Excluded any site grazed within the last 5 years by cattle. Survey technique known as Ephemeral Drainage Line Assessment, developed to assess whether a drainage line is stable or actively eroding (Tongway and Ludwig 2011). Nine indicators (variables) examined, all relating to soil and stream stability, and vegetation cover.

Results: The condition of all variables related to soil and stream stability was significantly worse in horse-present sites than in horse-free sites.

Tolsma A. and Shannon J. (2018) Assessing the impacts of feral horses on the Bogong High Plains, Arthur Rylah Institute, Dept. Environment, Land, Water and Planning. Melbourne.

Aim: To document the nature and extent of feral horse impacts across the Bogong High Plains, including any noted changes in the impacts over the last decade. The locations were principally wetland and grassland areas and/or areas close by e.g., riparian zones.

Method: Field-based assessments of 106 sites including previously assessed sites where horse presence and impacts had been recorded and sites where horse presence and impacts had not been recorded. Determine presence of horses; identify evidence of damage (to environmental values); delineate damage caused by horses and damage done by other species (e.g. deer); describe the nature of the impacts, compare to previous assessments.

Results: Horse activity and impacts are widespread and expanding across the Bogong High Plains. Impacts included stream bank damage, pugging, trampling of wet areas, dung deposition, creation or widening of tracks, roll pits, vegetation damage, general trampling.

4. References

Ashton D.H. and Williams R.J. (1989). *Dynamics of sub-alpine vegetation in the Victorian region. 'The scientific significance of the Australian Alps'*. (Ed. R. Good) pp. 143–168. (Australian Alps National Parks Liaison Committee: Canberra).

Axford, J. and Brown, D. (2013). *Wild horse management and control methods*. Parks Victoria, Melbourne, Victoria.

Axford, J., Brown, D. and Dawson, M. (2013). *The ecology of wild horses and their environmental impact in the Victorian Alps*. Background Paper 1. Parks Victoria, Bright, Victoria.

Bishwokarma, D., Freudenberger, D. and Pulsford, I. (2014). *Preliminary investigation into the impact of pest horses on the White Cypress Pine-White Box Woodlands of Kosciuszko National Park.* A report to National Parks & Wildlife Service, NSW Office of Environment and Heritage, Department of Planning and Environment, Jindabyne, NSW.

Cairns, S. (2014). Australian Alps National Parks 2014 survey of feral horses (*Equus ferus caballus*) in the Australian Alps. Australian Alps Liaison Committee. 23 pp.

Clemann, N. (2001). Action Statement for the Alpine She-oak Skink *Cyclodomorphus praealtus*. Department of Natural Resources and Environment, Victoria.

Clemann, N. (2002). A herpetofauna survey of the Victorian alpine region, with a review of threats to these species. *The Victorian Naturalist.* 119: 48-58.

Clemann, N. (2009*). Survey and monitoring of threatened alpine herpetofauna: annual report for the 2008-2009 Season.* Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg.

Clemann, N. (2011). *Survey and monitoring of threatened alpine herpetofauna: annual report for the 2009-2010 Season.* Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg.

Clemann, N., Scroggie, M. and Gillespie, G. (2001). Herpetofauna of the alpine region of Victoria. Report for the Victorian Department of Natural Resources and Environment. Arthur Rylah Institute for Environmental Research, Heidelberg.

Costin, A.B. (1954). A study of the ecosystems of the Monaro region of NSW: with special reference to soil erosion. Soil Conservation Service of NSW.

Dawson, M. (2005). *The Population Ecology of Feral Horses in the Australian Alps: A Management Summary* commissioned report pub. Australian Alps national parks Cooperative Management Program.

Dawson, M. (2009) *Aerial survey of feral horses in the Australian Alps*. Report prepared for the Australian Alps Liaison Committee, Australian Alps national parks Cooperative Management Program.

Dawson, M.J. and Hone, J. (2012). Demography and dynamics of three wild horse populations in the Australian Alps. *Austral Ecology* 37, 97–109.

Dawson M. and Miller C. (2008). *Aerial mark–recapture estimates of wild horses using natural markings,* CSIRO Publishing.

Dyring, J. (1990). The Impact of Feral Horses (*Equus caballus*) on Sub-alpine and Montane Environments in Australia. MAppSci Thesis, University of Canberra

Eco Logical Australia. (2012). *Modelling wild horse population trends in the East Victorian Alps*. Prepared for Parks Victoria by Eco Logical Australia.

McDougall, K. (1982). *The Alpine Vegetation of the Bogong High Plains*. Soil Conservation Authority, Environmental Studies Series No. 357. Soil Conservation Authority, Victoria.

McDougall, K. (2007). Grazing and fire in two subalpine peatlands. *Australian Journal of Botany.* 55(1): 42-47.

McDougall, K.L. and Walsh, N.G. (2007). Treeless vegetation of the Australian Alps. *Cunninghamia.* 10: 1-57.

Meredith, C., Hudson, S., Robertson, P. and Clemann, N. (2003). *Action Statement for the Alpine Water Skink* Eulamprus kosciuskoi. Department of Sustainability and Environment, Victoria.

OEH (2015) *Assessing the humaneness of wild horse management methods, Kosciuszko National Park Wild Horse Management Plan*. NSW Office of Environment & Heritage: Sydney.

Porfirio, L.L., Robertson, G., Hugh, S., Gould, S.F. and Mackey, B. (2014). Monitoring the impact of feral horses on vegetation condition using remotely sensed fPAR: a case study in Australia's alpine parks. Summary.pdf.

Prober, S.M. and K.R. Thiele (2007). *An experimental monitoring program in the Cobberas-Tingaringy Unit of the Alpine National Park: Progress 1999 to 2005*. A report to Parks Victoria.

Robertson, G., Wright, J., Brown, D., Yuen, K. and Tongway, D. (2015). An Assessment of Feral Horse Impacts on Treeless Drainage Lines in the Australian Alps. Report to the Australian Alps Liaison Committee.

SAC (2011). Final recommendation on a nomination for listing *Degradation and loss of habitats caused by feral horses*. (Nomination No. 813). Scientific Advisory Committee. Flora and Fauna Guarantee. Department of Sustainability and Environment: Melbourne.

Steane, D., Tolsma, A. and Papst, W.A. (2005). *A survey of the Distribution and Habitat Preference of the Alpine Water Skink* Eulamprus kosciuskoi *on the Bogong High Plains, Victoria*. Report to Parks Victoria. Research Centre for Applied Alpine Ecology, La Trobe University and Arthur Rylah Institute for Environmental Research.

Thiele, K.R. and Prober, S.M. (1999). *Assessment of impacts of feral horses (Equus caballus) in the Australian Alps | Part 2: Outline of experimental monitoring programs for determining the environmental impacts of feral horses in the Cobberas-Tingaringy Unit of the Alpine National Park*; Jour. Ecological Interactions.

Timbal, B. and Jones, D.A. (2008). Future projections of winter rainfall in southeast Australia using a statistical downscaling technique. *Climatic Change* 86: 165-187.

Tolsma, A. (2008a). *An Assessment of the condition of Mossbeds in State Forest, Gippsland, Victoria. Across the Victorian Alps, 2004-2009.* Report to Department for Sustainability and Environment. Arthur Rylah Institute for Environmental Research, Melbourne.

Tolsma, A. (2008b). An Assessment of the Management Needs of Mossbeds in Victoria's Alps, 2004-2008. Report to Parks Victoria. Arthur Rylah Institute for Environmental Research, Melbourne.

Tolsma, A. (2009). An Assessment of Mossbeds Across the Victorian Alps, 2004-2009. Report to Parks Victoria. Victorian Department for Sustainability and Environment.

Wahren, C-H., Williams, R.J. and Papst, W.A. (2001). Alpine and subalpine snow patch vegetation on the Bogong High Plains, SE Australia. Journal of Vegetation Science, 12: 779-790.

Walter, M.J. (2003). *The effect of fire on wild horses in the Australian Alps National Parks*. Unpublished report for the Australian Alps Liaison Committee.

Whinam, J. and Chilcott, N. (2002). Floristic description and environmental relationships of *Sphagnum* communities in NSW and the ACT and their conservation management. *Cunninghamia* 7(1): 463-500.

Whinam, J. and Comfort, M. (1996). The Impact of Commercial Horse Riding on Sub-Alpine Environments at Cradle Mountain, Tasmania, Australia. *Journal of Environmental Management* 47(1): 61-70.

Wild, A. and Poll, M. (2012). *Impacts of feral horses on vegetation and stream morphology in the Australian Alps: Feral horse exclusion plot monitoring and analysis.* Report to the Friends of the Cobberas, Parks Victoria and the Australian Alps Liaison Committee.

Williams, R.J., Papst, W. and Wahren, C-H.A. (1997). The Impact of Cattle Grazing on Alpine and Subalpine Plant Communities of the Bogong High Plains. Report to the Victorian Department of Natural Resources and Environment.

Worboys, G.L. and Pulsford, I. (2013). *Observations of pest horse impacts in the Australian Alps*, Canberra, p.20 www.mountains-wcpa.org

Appendix 2

Engagement Summary - Draft Feral Horse Strategic Action Plan 2018-2021

Engagement Summary

Draft Feral Strategic Action Plan 2018-2021

The following is a short summary of public comments on the draft action plan, which looks at protecting Victoria's Alpine National Park from feral horses.

Parks Victoria invited public comment on the draft plan between 21 December 2017 and 16 February 2018. This was to find out how people want feral horses to be managed.

How did we engage?

The following key methods were used to engage community and stakeholders between December 2017 and February 2018.

Project Information was available online through the **engage.vic.gov.au website.**

An **online survey** was available to help community and stakeholders provide structured feedback.

Submissions were accepted in a variety of formats via email direct to the project team.

Who did we hear from?

We heard from over 1,000 community members and stakeholders. There was a strong mix of types of community members who provided their comments.

Age range

We received feedback from a wide range of age groups, from youth aged 15 years to seniors over 85 years old. The largest age group was 65-69.

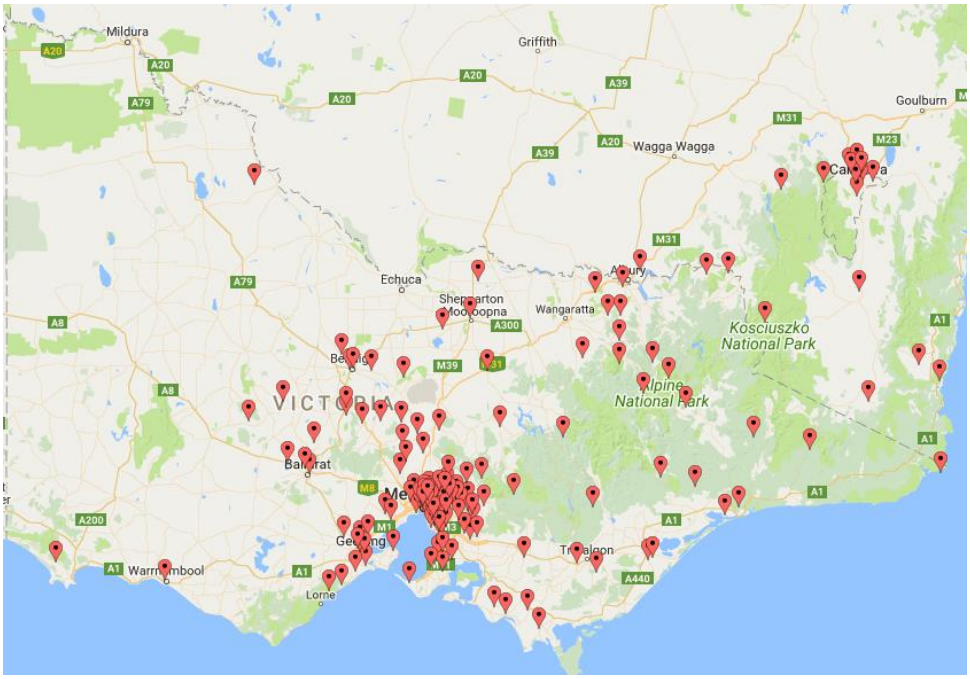
Visits to the Alpine NP

While we heard from people who visit the Alpine National Park daily, weekly or monthly, most people told us they visited the park a few times a year, or less.

Interest in this plan

Most community and stakeholders (>80%) told us they were interested in the draft action plan because of conservation – they wanted to make sure Parks Victoria is looking after the Alpine National Park for future generations to enjoy.

Submissions and surveys came from across the eastern half of Victoria, and from our neighbours in the ACT and NSW who are close to the Alpine National Park. The map below shows the most common postcodes we heard from.



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Engagement Summary

Draft Feral Strategic Action Plan 2018-2021

What did we hear?

Overall, the people and organisations we heard from supported the proposed management actions and control methods, with nearly 4 out of 5 comments supporting the draft plan. The following table explains the key elements of the draft plan that people commented on.

Horse management	More than 80% of responses supported or strongly supported the control of the feral horse population in the Alpine National Park. Concerns about the control methods centred around issues of animal cruelty and limited opportunities for rehoming of captured horses.
Trapping	Supported as a humane control method, but with the foreseeable risk of euthanasia based on the ability to rehome trapped horses.
Fencing *(SHORT TERM LOCALISED PROTECTION)*	Supported as a humane control method, and an effective means of protecting native plants and animals. Feasibility of this method was questioned based on the terrain and timing constraints, and the cost of this approach.
Roping *(CURRENTLY SUSPENDED AND UNDER REVIEW)*	Generally unsupported due to perceptions of animal cruelty and risk of injury to animals. This was also considered an ineffective method of control based on terrain and timing constraints. Some support was recorded as this is a traditional method of control.
Mustering *(PROPOSED AS A TRIAL ONLY)*	Mixed support based on the type of muster – with many responses supporting a slow and safe process similar to those undertaken in New Zealand. Opposition largely focused on fright to animals, risk of damage to vegetation and wildlife, and the constraints of the alpine terrain.
Other methods *(NOT PROPOSED IN THE PLAN)*	**Shooting -** Although not proposed, shooting was both mentioned as an effective and humane control, and criticised due to concerns of cruelty and 'clean shot' risk. **Fertility control –** Although not proposed, fertility control was advocated as a humane control, although many acknowledged that this option is not yet available within Victoria.
Working with Traditional Owners	More than 75% of responses supported or strongly supported the proposal to work closely with Traditional Owners on land management and feral horse control methods.
Managing in Partnership	Strongly supported by 80% of community and stakeholders for collaboration and partnerships in management.
Monitoring, evaluation and research	All 9 research actions proposed in the draft plan were important to community members and stakeholders – highlighting the value of understanding how the plan will make positive changes to environmental values of the park, and evidence-based management.

Next steps

Participants told us they would like to be kept informed about key stages in the development of this plan, and throughout its implementation.

The draft action plan has now been revised by the project team at Parks Victoria, taking into consideration the feedback from community and stakeholders.

The final **Feral Horse Strategic Action Plan 2018-2021** will be released once endorsed by the Minister for Energy, Environment and Climate Change.

The full Public Engagement and Comments Report will be co-released with the Strategic Action Plan.

More information

If you would like to find out more about this project, or Victoria's parks in general, but need some help with English, we can assist. All of Parks Victoria's Information Centre operators are trained to use telephone interpreters and will be happy to take your telephone call at 13 1963.

If you are deaf, or have a hearing or speech impairment, contact us through the National Relay Service on 133 677 or www.relayservice.com.au

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