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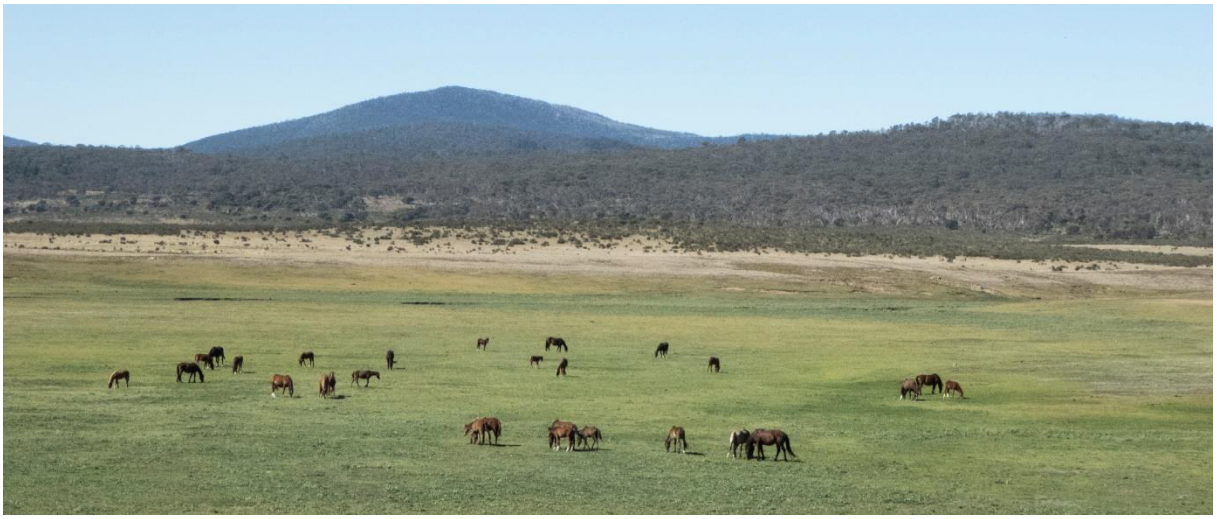

Submission on Kosciuszko National Park Wild Horse Heritage Management Plan (2021) and Draft Amending Plan (2023)

Centre for Ecosystem Science, UNSW, Sydney

11th September 2023

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1. Executive Summary

Wild or feral horses are an invasive species that need to be controlled because of their impacts on environmental values in Kosciuszko National Park. Further, given they have no natural predators, populations will continue to rise until there are no longer food resources for them to survive. Like all large herbivore populations, their populations will inevitably crash and starve during severe droughts. There are considerable animal welfare consequences during such catastrophes. Feral horses impact considerably on the natural ecosystem and species of Kosciuszko National Park, including threatened species. They need to be managed. We support most of the management recommendations in the Kosciuszko National Park Wild Horse Heritage Management Plan, apart from the establishment of feral horse retention areas. Further, we have recommendations in relation to other aspects of feral horse management to ensure an evidence-based management and policy approach is taken.

2. Recommendations

Recommendation 1 – Conservation of native species and ecosystems should drive decision-making for Kosciuszko National Park

Recommendation 2 – Recognition of the considerable scientific evidence identifying significant negative impacts of feral horses on ecosystems, including native species

Recommendation 3. – Feral horse prevention areas need to be maintained by controlling feral horses

Recommendation 4. – Feral horse removal areas need to be established, allowing for control of feral horses

Recommendation 5. – There should be no feral horse retention areas

Recommendation 6. – The Kosciuszko Wild Horse Heritage Act 2018 should be repealed

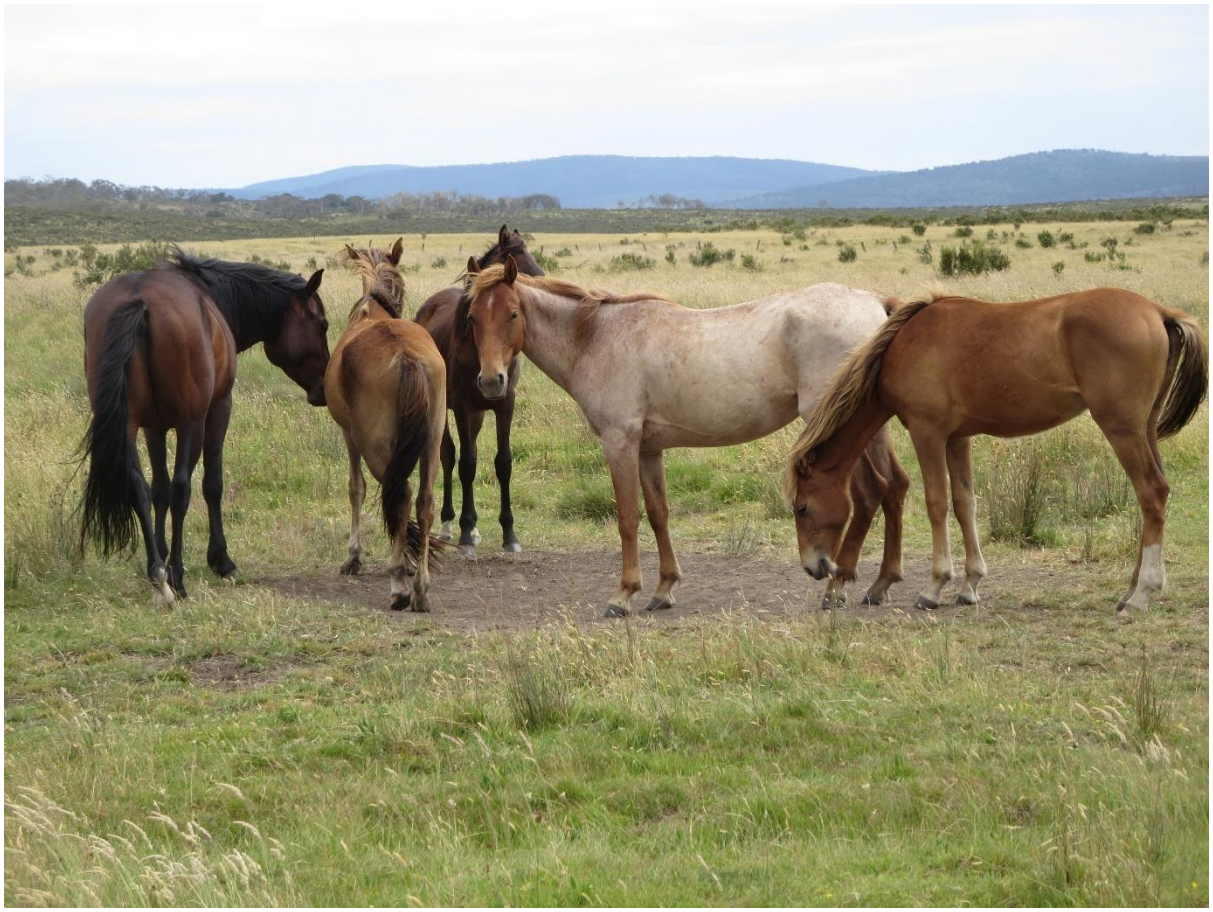
Recommendation 7. – Aerial surveys should be used to survey horse populations

Recommendation 8. – Best practice capture and control methods should be used

3. Centre for Ecosystem Science, UNSW Sydney

The Centre for Ecosystem Science (CES), UNSW Sydney, supports instruments of government, including strategies that improve effectiveness of biodiversity conservation,

founded on a strong evidence base. Current rates of biodiversity loss around the world and in Australia are unprecedented. Researchers in CES have established track records in the research and management of Australia's biodiversity, both within and outside protected areas. In particular, researchers focus on the three main realms of biodiversity (freshwater, terrestrial, marine) in the natural world (https://www.ecosystem.unsw.edu.au/). We have considerable experience working in Kosciuszko National Park. We welcome the opportunity to provide this submission on the Kosciuszko National Park Wild Horse Heritage Management Plan.



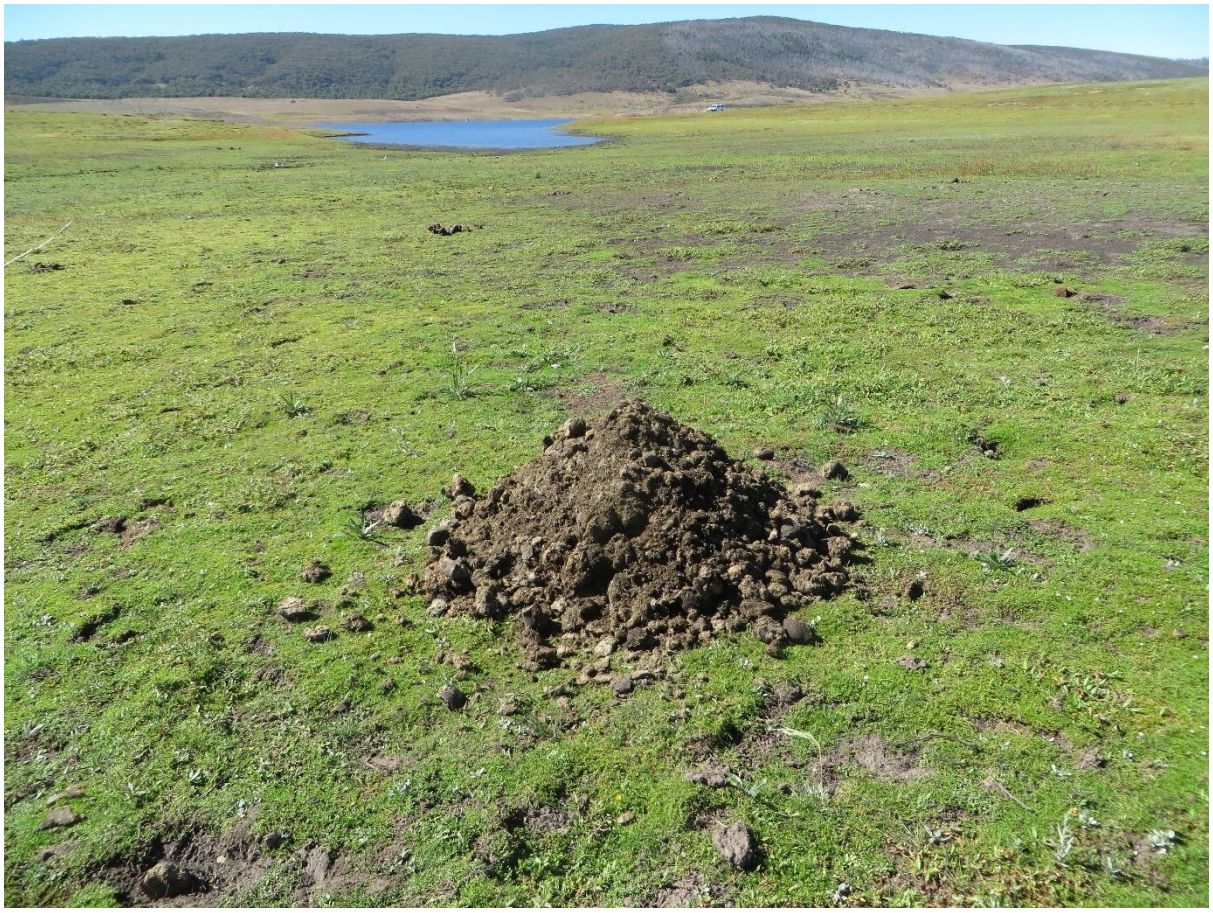
Wild or feral horses cause significant damage to ecosystems and dependent biodiversity in Kosciuszko National Park (Image: David Eldridge).

4. Environmental values affected by feral horses in Kosciuszko National Park

Terrestrial ecosystems

Around the world, wild or feral horses cause considerable damage to natural ecosystems and their dependent biodiversity (Eldridge et al. 2020). The extent of environmental impacts of feral horses in the Australian Alps is supported by scientific evidence spanning more than 30 years. They have significant, negative impacts on alpine ecosystems (Driscoll, 2018; Driscoll et al., 2019). In 2018, the NSW Threatened Species Scientific Committee determined that "Habitat degradation and loss by feral horses" was a key threatening process. In 2011, feral horses were listed as a Key Threatening Process under the federal environment legislation: the Environment Protection and Biodiversity Conservation Act - *EPBC Act 1999*. In the assessment of the impact of feral horses, the independent NSW Threatened Species Scientific Committee determined that 79 native plant and animal species were impacted, with six of these species found only in Kosciuszko National Park. Further, feral horses also impact on alpine and subalpine peatlands (Hope 2018, Tolsma et al., 2018, Tolsma and Shannon, 2018) and white box-white cypress Pine communities (Ward-Jones et al., 2019), listed under the *EPBC Act 1999*.

Feral horses affect soil biology (Brim-Box et al., 2014); alter landscape hydrology *via* structural changes to the soil and vegetation (Worboys and Pulsford, 2013); and influence the community composition of many organisms (Levin et al., 2002; Zalba and Cozzani, 2004; Beever and Brussard, 2004; Levin et al., 2002; Beever and Herrick, 2006). Wild horses also ringbark trees and spread weeds and pathogens. In particular, they change nutrient cycles with concentrated urine and faeces (dung heaps), which then become a key mechanism for spreading weeds (Loydi and Zalba, 2009). They also spread weeds by directly transporting them (Weaver and Adams, 1996). Further damage to plants and vegetation can occur when horses trample and rub against vegetation, browse the growing tips, and compact soils with their hard hooves, causing disturbance and increasing erosion (Schott 2005).



Feral horse dung heaps are serious vectors for the spreading of weeds in Kosciuszko National Park (Image: David Eldridge).

Much of the research on impacts of feral horses over the past quarter century has focused primarily on vegetation, with long-term legacy effects of horse activity in both the Victorian and NSW alpine and sub-alpine communities. There is extensive scientific literature documenting feral horse impacts on plant community structure and composition (Venn and Williams, 2018; Eldridge et al., 2019), with strong focus on terrestrial systems (Prober and Thiele, 2007). Feral horses do this damage by feeding on grasses and sedges, and also bark and roots, but also their physical impact with their weight and hard hooves, impacting vegetation and compacting soil. High densities of feral horses negatively impact many alpine plant species, including the anemone buttercup *Ranunculus anemoneus* (Doherty et al., 2015). These communities include treeless alpine and sub-alpine communities, and woodlands of the lower slopes such as the white cypress pine–white box woodlands (a sub-assemblage of the Endangered Ecological Community white box yellow box Blakely's red gum woodland), particularly in the Byadbo and Pilot Wilderness of Kosciuszko National Park (OEH 2016; Doherty et al. 2015).

Using a global database, data were extracted from studies in Kosciuszko National Park of the effects of feral horses on a range of ecosystem processes and properties (Eldridge et al. 2019). There were consistent declines in native animal abundance, grass cover and height; sedge, subshrub, shrub and biocrust cover; and soil moisture, soil infiltration, Nutrient index

and soil stability (Table 1). With increased feral horse activity, there are increases in the cover of bare soil, forbs and weeds, and soil nitrogen, respiration and electrical conductivity (Table 1). There were no changes in soil bulk density, enzymes, carbon, C:N ratio, erosion, pH and phosphorus, and grass density and fungal diversity, litter cover, plant abundance, plant biomass, plant cover, plant richness with effects of horse activity (Table 1).

Table 1. Effects of increasing levels of horse grazing on a range of plant, animal and soil attributes from studies in the alpine regions of eastern Australia in terrestrial and freshwater ecosystems. Source: Eldridge et al. (2019) OEH (2017) and OEH (2019) unpublished data.

Attribute	**Location**	**Effect**	**Reference**
Terrestrial impacts			
Animal abundance	Kosciuszko National Park	Decline	Schulz and Green (2018)
Animal abundance	Kosciuszko National Park	Decline	OEH (2017)
Bacterial diversity	Kosciuszko National Park	Decline	OEH (2017)
Bare soil	Kosciuszko National Park	Increase	OEH (2017)
Bare soil	Victoria	Increase	de Bies and Vesk (2014)
Bare soil	Victoria	Increase	Prober and Thiele (2007)
Bare soil	Victoria	Increase	Thiele and Prober (1999)
Biocrust cover	Kosciuszko National Park	Decline	OEH (2017)
Forb cover	Kosciuszko National Park	Increase	OEH (2017)
Fungal diversity	Kosciuszko National Park	No change	OEH (2017)
Grass cover	Kosciuszko National Park	Decline	OEH (2017)
Grass density	Kosciuszko National Park	No change	OEH (2017)
Grass height	Kosciuszko National Park	Decline	OEH (2017)
Litter cover	Kosciuszko National Park	No change	OEH (2017)
Litter cover	Victoria	Decline	Prober and Thiele (2007)
Litter cover	Victoria	No change	Thiele and Prober (1999)
Nutrient index	Kosciuszko National Park	Decline	OEH (2017)
Plant abundance	Victoria	Increase	Prober and Thiele (2007)
Plant abundance	Victoria	No change	Thiele and Prober (1999b)

Plant biomass	Victoria	Decline	de Bies and Vesk (2014)
Plant biomass	Victoria	Decline	Prober and Thiele (2007)
Plant biomass	Victoria	No change	Thiele and Prober (1999)
Plant cover	Victoria	Decline	de Bies and Vesk (2014)
Plant cover	Victoria	Decline	Dyring (1990)
Plant cover	Victoria	Decline	McDougall (2007)
Plant cover	Victoria	No change	Prober and Thiele (2007)
Plant cover	Victoria	No change	Thiele and Prober (1999)
Plant cover	Victoria, ACT and NSW	No change	Robertson et al. (2015)
Plant height	Kosciuszko National Park	Decline	OEH (2017)
Plant richness	Cabramurra, NSW	Decline	Schulz and Green (2018)
Plant richness	Kosciuszko National Park	Increase	OEH (2017)
Plant richness	Victoria	Decline	Dyring (1990)
Plant richness	Victoria	Increase	de Bies and Vesk (2014)
Plant richness	Victoria	Increase	McDougall (2007)
Plant richness	Victoria	Increase	Thiele and Prober (1999)
Plant richness	Victoria	Increase	Weaver and Adams (2008)
Plant richness	Victoria	No change	Prober and Thiele (2007)
Plant richness	Victoria, ACT and NSW	No change	Robertson et al. (2015)
Sedge cover	Kosciuszko National Park	Decline	OEH (2017)
Shrub cover	Kosciuszko National Park	Decline	OEH (2017)
Subshrub cover	Kosciuszko National Park	Decline	OEH (2017)
Soil bulk density	Kosciuszko National Park	No change	OEH (2017)
Soil bulk density	Victoria	Decline	Dyring (1990)
Soil carbon	Kosciuszko National Park	No change	OEH (2017)
Soil carbon	Victoria	No change	Dyring (1990)
Soil C:N ratio	Kosciuszko National Park	No change	OEH (2017)
Soil EC	Kosciuszko National Park	Increase	OEH (2017)

Soil enzymes	Kosciuszko National Park	No change	OEH (2017)
Soil erosion	Victoria	Decline	Dyring (1990)
Soil erosion	Victoria	Increase	Prober and Thiele (2007)
Soil erosion	Victoria	Increase	Thiele and Prober (1999)
Soil erosion	Victoria, ACT and NSW	Decline	Robertson et al. (2015)
Soil infiltration	Kosciuszko National Park	Decline	OEH (2017)
Soil moisture	Victoria	Decline	Dyring (1990)
Soil nitrogen	Kosciuszko National Park	Increase	OEH (2017)
Soil phosphorus	Kosciuszko National Park	No change	OEH (2017)
Soil pH	Kosciuszko National Park	No change	OEH (2017)
Soil respiration	Kosciuszko National Park	Increase	OEH (2017)
Soil stability	Kosciuszko National Park	Decline	OEH (2017)
Soil stability	Victoria, ACT and NSW	Decline	Robertson et al. (2015)
Weed cover	Victoria	Increase	Dyring (1990)
Freshwater impacts			
Stream size	Victoria	Decline	Thiele and Prober (1999)
Riverbank fish habitat	Kosciuszko National Park	Decline	OEH (2019)
Pollution tolerant macroinvertebrates	Kosciuszko National Park	Decline	OEH (2019)
Native *Galaxia olidus*. abundance	Kosciuszko National Park	Decline	OEH (2019)
Trout biomass	Kosciuszko National Park	Decline	OEH (2019)
Macroinvertebrate richness	Kosciuszko National Park	Decline	OEH (2019)
Stream size	Victoria	Increase	Prober and Thiele (2007)
Streambed fine sediment	Kosciuszko National Park	Increase	OEH (2019)
Turbidity	Kosciuszko National Park	Increase	OEH (2019)
Water temperature	Kosciuszko National Park	Increase	OEH (2019)

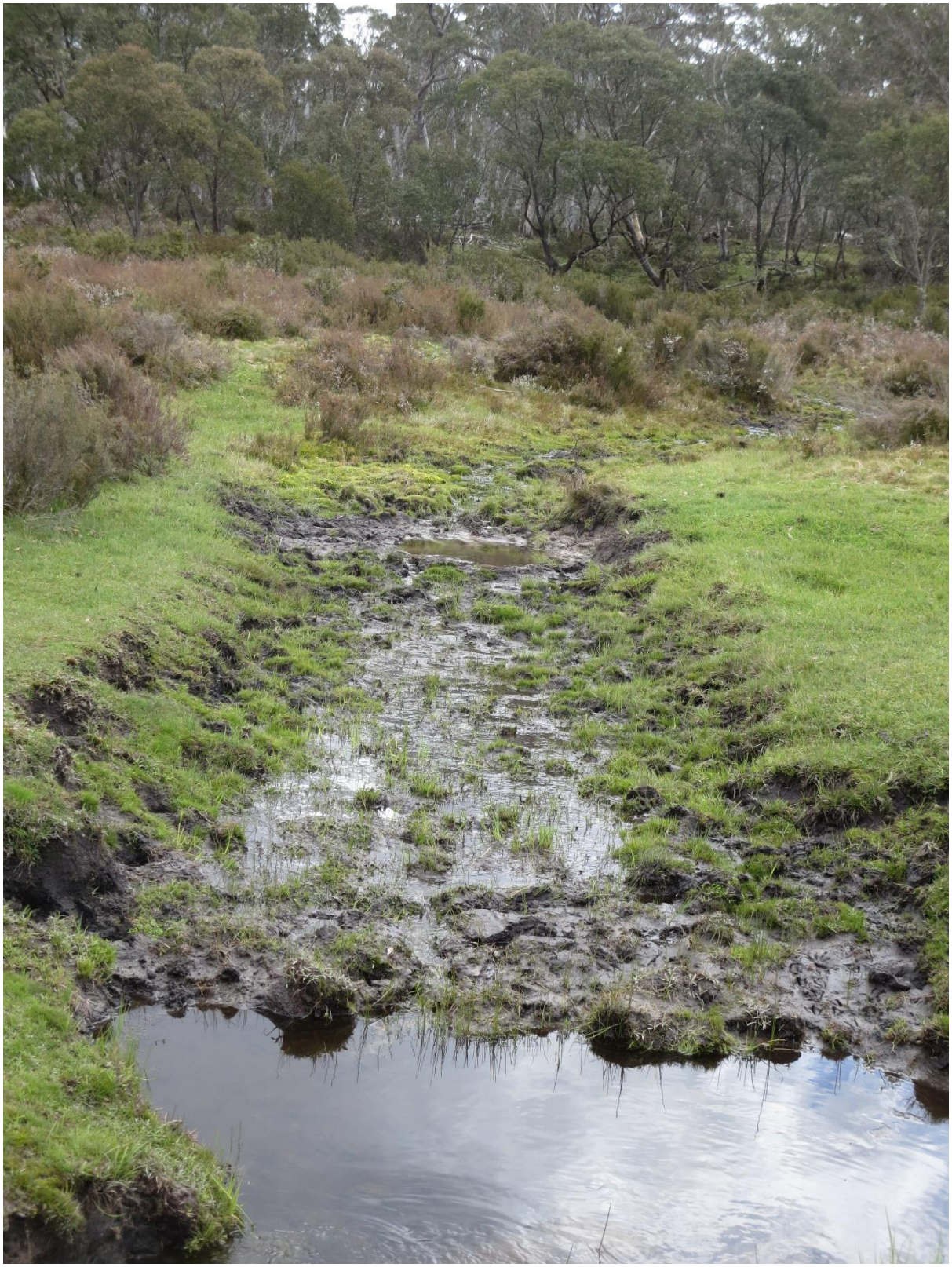
Streambank compaction	Kosciuszko National Park	Increase	OEH (2019)
Water conductivity	Kosciuszko National Park	Increase	OEH (2019)
Escherichia coli concentration in water	Kosciuszko National Park	Increase	OEH (2019)

Feral horses grazing in Kosciuszko National Park also reduce plant biomass for native species. They also change the structure of the habitat, affecting specialist alpine mammals such as the broad-toothed rat *Mastacomys fuscus* (O'Brien et al., 2008; Schulz and Green, 2018; Cherubin et al., 2019; Eldridge et al., 2019; Schulz et al., 2019) and mountain pygmy-possum *Burramys parvus*.

Freshwater ecosystems

Feral horses damage freshwater ecosystems, including streams, wetlands and riparian systems (Dawson, 2009). In swamps, emergent and sub-emergent plants are an important source of food for horses. They graze in wetlands and trample areas, create tracks, and compact the soil. They also bathe in water by wallowing or in dust baths. This changes streams and rivers, causing erosion and bank slumping (Paull, 2018), affecting nutrient dynamics (Dyring, 1990). They reduce streambank stability (Prober and Thiele, 2007), increase run-off by creating paths (Pittock and Finlayson, 2018), and increase sedimentation of rivers and wetlands (Porfiriro et al., 2017; Robertson et al., 2019). They may also have impacts on run-off (Worboys et al., 2010). This also reduces water quality. Analyses of stream turbidity in Kosciuszko National Park streams indicated significant increases, much greater than at control sites, exceeding 50 times the national turbidity guidelines (Scanes et al., 2021). Such increases in turbidity can lead to loss of aquatic biodiversity and function, with a clear link to impacts of feral horses (Scanes et al., 2021).

For the peatlands of Kosciuszko National Park, there are widespread effects of horse damage. They create paths which channel water and drain peatland communities, significant storages of carbon (Hope et al., 2012), which are destroyed by drying which releases carbon into the atmosphere, contributing to greenhouse gases. These peat soils are ancient, formed over thousands of years, but quickly destroyed by feral horses (Hope, 2018). Even low numbers of horses are destructive (Williams, 2019). Feral horses are particularly damaging to sphagnum bogs (Berman, 2008; Prober and Thiele, 2007; Tolsma, 2009; Warboys and Pulsford, 2013; Robertson et al., 2015). This impact is becoming more evident with increasing numbers of horses (Worboys and Pulsford, 2013).



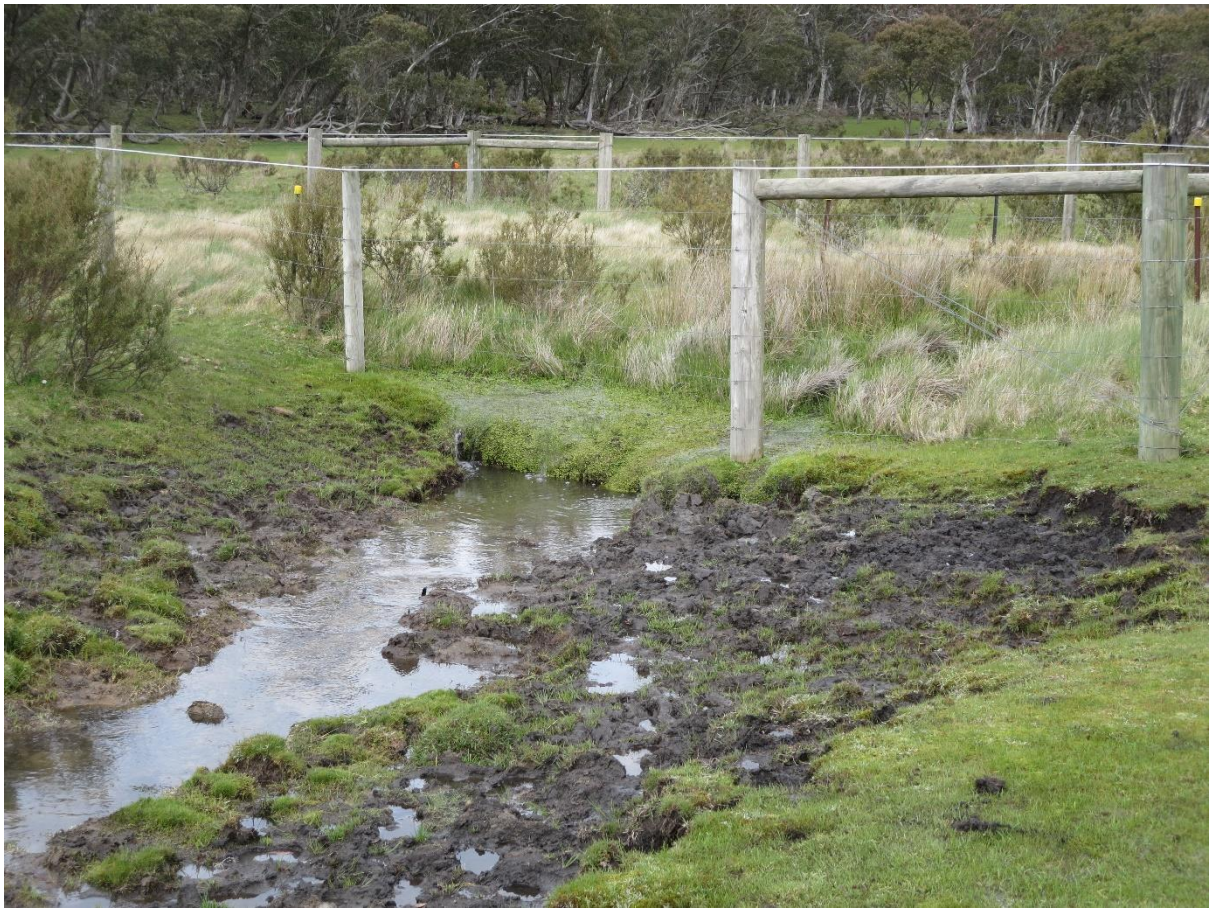
Example of serious erosion effects of feral horses on stream in the Kosciuszko National Park, destroying habitats with their hard hooves and deteriorating water quality. (Image: David Eldridge)

In aquatic systems, increasing horse activity has resulted in declines in stream size, fish

biomass and macroinvertebrate richness, and increases in water pH, turbidity, conductivity and fine sediment (Table 1). Horse impacts on freshwater systems are also likely to cause significant effects on platypus populations throughout Kosciuszko National Park. Removal of riparian vegetation and trampling of banks causes significant issues for platypuses (*Ornithorhynchus anatinus*), which rely on riverbanks to build resting burrows and nesting burrows for their dependent young. Changes to water quality and impacts on their macroinvertebrate prey will also significantly impact the species distribution.

Horses also regularly impact freshwater areas to drink but pug and dig up stream beds, affecting freshwater ecosystems (see photos). Impacts on water quality can affect unique karst systems within the park, such as at Blue Waterholes and Yarrangobilly Caves. High levels of sediments in the groundwater rising at Blue Waterholes probably reflect past feral horse grazing activity, affecting the system for several millennia (Spate 2004). This legacy effect of feral horse grazing is particularly problematic for fragile karst systems which are essentially unrenewable and are irreparable within human time frames (Spate 2004).

Sphagnum bogs are particularly impacted with legacy effects because of their slow growing trajectory with peat soils permanently damaged by horse hooves. The sphagnum bogs are essential for the Critically Endangered corroboree frogs (*Pseudophryne corroboree)*, with their habitats disturbed, trampled, channelized and drained (Macdonald, 2009; Hope et al. 2012). Other threatened wetland and river species are affected including the stocky galaxis *Galaxis tantangara*, alpine spiny crayfish *Euastacus crassus*, alpine she-oak skink *Cyclodomorphus praealtus*, alpine water skink *Eulamprus kosciuskoi*, corroboree frog (Hunter et al. 2009; Driscoll et al., 2019; Cherubin et al., 2019; Foster and Scheele, 2019; Ward-Jones et al., 2019) and alpine tree frog *Litoria verreauxii alpina* (Robertson et al. 2015). Additionally, impacts to these sensitive areas can also affect the downstream river health, impacting other species including platypuses.



Comparative difference between a natural wetland area, fenced off from feral horses, and highly eroded and grazed area by feral horses (Image: David Eldridge)

Recommendation 1 – Conservation of native species and ecosystems should drive decision-making for Kosciuszko National Park

Kosciuszko National Park was declared for its natural values, obligating the NSW Government to protect this reserve under the *Biodiversity Act 2016*. Conservation of native species and ecosystems should be the primary goal for the Kosciuszko National Park and wild or feral horses are a recognized key threatening process under NSW and Commonwealth environmental protection legislation.

Recommendation 2 – Recognition of the considerable scientific evidence identifying significant negative impacts of feral horses on ecosystems, including native species

There is a well-established track record of scientific evidence linking damage of feral horses to serious loss and degradation of the environment, including affecting threatened species and ecological communities. This needs to drive decision-making.

5. Population increases in feral horses in Kosciuszko National Park

Wild or feral horses (*Equus caballus*), also known as brumbies or mustangs, are a major invasive species around the world, presenting considerable ecological, social, cultural and

ethical challenges for land managers, conservationists and governments on several continents (Scasta et al., 2016). If unchecked, feral horse populations increase rapidly (Garrott, 2018). The feral horse population has increased rapidly from the late 1950s in Australia, soon recognized as a pest species (Nimmo and Miller, 2007). Feral horse grazing in Kosciuszko National Park was recognised as an ecological threat in the late 19th Century by Helms (1893), but their impacts in the Australian Alps were not explored exclusively until the mid-20th century (Costin, 1954). They were introduced into the Australian Alps more than 150 years ago (Walter, 2002).

Feral horse numbers have rapidly increased in Kosciuszko National Park, seriously impacting on the biodiversity of terrestrial and freshwater ecosystems (Image: David Eldridge).

From aerial surveys in New South Wales part of the Australian Alps, there were an estimated 7,150 horses, with most 6,150 in Kosciuszko National Park in 2014 (Cairns and Robertson, 2015). Their range extended over 3,000 km^2 of the Australian Alps National Parks of NSW and Victoria (Dawson and Hone, 2012). They varied in density, reaching highest recorded value of 2.74 individuals per km^2 in the northern Kosciuszko National Park (Cairns and Robertson, 2015). The Kosciuszko horse population was estimated to be increasing by 6-17 % annually (Cairns, 2015). By November 2020, the number of horses had increased by nearly 40% to 14,380 feral horses (± 95% confidence interval of 8798–22,555) (Cairns, 2020). By November 2022, there were an estimated 18,814 feral horses (±95%

confidence interval of 14501–23,535) (Cairns, 2022). They now range over 53% of the Kosciuszko National Park (Kosciuszko National Park Heritage Horse Management Plan 2021 and Draft Amendment 2023).

Feral horses are difficult to maintain at a sustainable low level. They also concentrate, particularly in freshwater areas in the summer (Beever and Brussard, 2000; Beever and Herrick, 2006). Populations of feral horses also rapidly grow, because they can breed from 3 years of age (or 2 years at low densities with high food availability) and continue to breed until 15–18 years (Dawson and Hone, 2012). They have a maximum finite rate of increase of between 1.21 and 1.36 (Dawson and Hone, 2012). They have high annual fecundity ranged from 0.21 to 0.31 young per adult female, with high juvenile survival from 0.83 to 0.90 per annum and annual adult survival averaged 0.91 per annum (Dawson and Hone, 2012).

There are many reasons for significant control of feral horses in Kosciuszko National Park, including removing all feral horse populations from Kosciuszko National Park and ensuring appropriate management to ensure that they no longer occur. This is essential, given that horse management needs to be compatible across the Alps and jurisdictional areas in Victoria and ACT, consistent with management in Kosciuszko National Park. The current management and proposed retention areas for horse conflicts with other jurisdictional approaches to management of the Australian Alps national parks (Australian Alps National Parks 2021).

Recommendation 3. – Feral horse prevention areas need to be maintained by controlling feral horses

We support the recommendation in the management plan that all feral horses need to be removed from the 47% of the Kosciuszko National Park which does not currently have feral horses. This is essential to ensure no further ecological impacts on native fauna and flora and ecological processes.

Recommendation 4. – Feral horse removal areas need to be established, allowing for control of feral horses

We support the recommendation in the management plan that all feral horses need to be removed from the 21% of Kosciuszko National Park identified as feral horse removal areas and subsequently maintained at zero populations. This is essential to ensure no further ecological impacts on native fauna and flora and ecological processes.

Recommendation 5. – There should be no feral horse retention areas

We do not support the recommendation in the management plan that a population of 3000 feral horses be maintained in Kosciuszko National Park in horse retention areas (32% of the Kosciuszko National Park). Feral horses are having significant impacts on Kosciuszko National Park and its environmental values, demonstrated by significant scientific evidence.

Management aimed at sustaining feral horse populations will always be problematic and challenging. A first step on this path would be to lower populations of feral horses in these 21% of these 'horse retention areas' to 3000 by 30th June 2007. But removal should continue until these areas no longer have feral horses. This is essential to ensure no further ecological impacts on native fauna and flora and ecological processes.

Recommendation 6. – The Kosciuszko Wild Horse Heritage Act 2018 should be repealed

There are sufficient areas around Kosciuszko National Park for feral horses. They are a major threat to biodiversity and the environmental and cultural values of Kosciuszko National Park. Repealing this legislation would provide an unequivocal mandate for NSW National Parks and Wildlife Service to carry out their professional obligations and protect native Australian wildlife.

6. Monitoring of feral horse populations in Kosciuszko National Park

Synthesizing the known information on the effects of feral horses in the Australian Alps and identifying key knowledge gaps is critical for providing solutions to the management of feral horse populations and for developing effective solutions to manage or mitigate their impacts.

Employing large spatial scale surveys on wildlife is fundamental for supporting and evidence-based approach to management and decision-making. There are key principles for surveys, including ensuring that the scale is appropriate, timing is defined and technique appropriate. For long-term understanding, it is also critical that surveys are repeatable in their timing, technique and scale. For management of invasive or native large herbivores, the size and changes to populations need to be known for effective management (Lancia et al., 1996). Over time, this can provide the baseline for understanding changes in range and abundance.

For large areas, aerial surveys of animals are critical and essential. They remain the only practical way of estimating changes in abundance and distribution over large areas, in operation for almost 80 years (Caughley and Sinclair, 1994). They are used all over the world to survey animal populations from elephants (Dunham 2012), kangaroos (Caughley and Grigg, 1981) to waterbirds (Kingsford and Porter, 2009). They are a dependable methodology for collecting requisite information on large animal populations. They inevitably require a sampling of the area to be surveyed and are thus inevitably affected by sampling error (Caughley, 1977), as with all sampling. There is sometimes a perception that an accurate estimate is needed. However most wildlife management can be affected with data on indices for changes over time. Importantly, these indices can track populations and if methodology remains the same are a powerful method for comparative analysis. There will always be challenges with obtaining exact numbers because of the speed of the aircraft and observability of horses.

Aerial surveys of horse populations in Kosciuszko National Park are essential to adequately track their abundance and distribution. They are effective and provide valuable information for management (Walters and Hone, 2003; Cairns 2015, 2020, 2022). These need to be continued, utilizing the same methodology over time and so results from year to year are comparable.

Recommendation 7. – Aerial surveys should be used to survey horse populations

There is well established scientific knowledge in relation to the use of aerial surveys for wildlife populations around the world. Ongoing aerial surveys of feral horses are essential to provide robust and annually comparative estimates of populations and their size and distribution for targeted management. It is essential that surveys are repeated over time to provide an index of populations. Indices do not have to provide accurate numbers for effective management decisions.

7. Control methods of feral horse populations in Kosciuszko National Park

There are a range of control methods for horses: trapping and culling or removal, ground or aerial mustering and culling or removal, ground shooting, fertility control and fencing. Each control method complies with Commonwealth or State animal welfare codes, regulations, or standard operating procedures (NPWS, 2016). Aerial shooting of feral horses is the most humane and only practical method of population control (Dobbie et al. 1993) and is used widely in other jurisdictions within Australia (e.g., ACT, Northern Territory). Aerial shooting is known to have the lowest negative animal welfare impacts of all lethal control methods (Kosciuszko Wild Horse Scientific Advisory Panel 2020; ITRG 2015, cited in the Draft Amending Plan 2023). It is also the most cost effective (Beeton and Johnson, 2019). Aerial culling was estimated to cost about $85 per feral horse compared to passive trapping costs of about $1116 per horse (Beeton and Johnson, 2019). This is a significant difference for scarce conservation resources.

Mustering and translocating are expensive, with impacts on horse welfare outcomes because of the stress caused by mustering, handling and trapping (Beeton and Johnson, 2019). This can be exacerbated by ‘capture myopathy’, leading to degenerative muscle condition (Breed et al. 2019), which is often lethal and increases death of foals (Dechen Quinn et al. 2014). Trapping of feral horses in portable yards using salt block lures, helicopters or ground mustering is used extensively in Kosciuszko National Park. Trapping success is limited in alpine areas and requires continual checking to prevent interference to yards. Helicopter or ground-based mustering is inappropriate in inaccessible areas, where the population density is low, and in areas of high visitor densities. Roping under contract involves capturing horses from horseback and leading them to yards. This can work in rugged but success is mixed, can be dangerous even for skilled riders, and may be inappropriate in fragile alpine environments.

Fertility control cannot extend across the range of feral horses and is also extremely expensive and ineffective because horses move widely inside and outside Kosciuszko National Park (Hobbs and Hinds, 2018). It is unlikely to be effective in Kosciuszko National Park because; the terrain is extremely rugged and the horse population is widely dispersed, making it difficult to trap sufficient number of animals, at regular intervals, and to identify treated and untreated animals across a large population size, even if suitable vaccines were available in Australia (Hobbs and Hinds, 2018). The Independent Technical Review Group on Wild Horses (ITRG, 2016) concluded that fertility control, in the absence of other methods, would be ineffective at Kosciuszko National Park.

Fencing of sensitive areas is effective but extremely costly and only really applicable for extremely small areas (Durant et al., 2015, see photo above). Fences are also difficult to maintain, particularly in rugged alpine areas, and subject to vandalism, and may exclude native herbivores from accessing vital resources.

Recommendation 8. – Best practice capture and control methods should be used

Control of all invasive species is difficult but essential. Without control, there will be increasing damage. Management of feral horses is essential, requiring best practice capture and control methods. Without control, there will be severe animal welfare impacts on feral horse populations during severe droughts as well as the environmental impacts caused by feral horses.

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