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REPTILES: IMPACTS OF FERAL HORSES—THE ALPINE WATER SKINK

FERAL HORSE IMPACTS ON A THREATENED LIZARD AND A NATIONALLY ENDANGERED ECOLOGICAL COMMUNITY IN VICTORIA'S SUB-ALPINE REGION

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As introduced, large ungulates, horses represent a relatively recent and novel threat to Australian ecosystems (Ashton and Williams 1989; Tolsma and Shannon 2018). Feral horses have a wide distribution across mainland Australia, and arguably have the greatest negative impact on highly sensitive and nationally endangered species, such as the Alpine Sphagnum Bogs and Associated Fens Endangered Ecological Community (Parks Victoria 2017; Roberston et al. 2015). Already highly fragmented with a very restricted geographic extent, Sphagnum bogs are typified by soft, spongy moss, impeded drainage systems and restricted growing seasons (Commonwealth of Australia 2009). The long-term survival of Sphagnum bogs is under threat, particularly from climate change and fire (Commonwealth of Australia 2009; White 2009), and damage by feral horses may compound these threats, exacerbating ecosystem degradation and biodiversity loss (Greene and Osborne 2003).

The Alpine Water Skink (*Eulamprus kosciuskoi*) is a live-bearing, diurnal reptile that is almost exclusively associated with montane and alpine Sphagnum moss beds and associated wet healthlands (Department of Sustainability and Environment 2003). Its highly specialised habitat requirements and dependency on this fragmented ecosystem likely make it vulnerable to grazing and trampling of vegetation by feral horses (Clemann 2002; Department of Environment, Land, Water and Planning 2018; Steane et al. 2005).

We assessed the potential impact of feral horses on bog vegetation and populations of *E. kosciuskoi* at 20 sites in Victoria's north eastern alpine range (between Nunniong and Cobberas). We quantified feral horse impacts as hoof damage to substrate (pugging), the level of defined animal tracks, and grazing disturbance. We also determined an index of feral horse abundance from scat counts. Vegetation structure and cover were quantified using structure pole and line intercept surveys. *E. kosciuskoi* occupancy and abundance were surveyed using repeated 30-minute active searches across suitable habitat.

Sites with increased horse use had lower grass, sedge, rush (graminoids) and shrub structure, and reduced cover of shrubs and mosses. These sites also supported more forbs. *E. kosciuskoi* were more likely to occur at sites with increased areas of Sphagnum bog and wet heathland vegetation, and were less likely to occur and had a lower abundance in areas with more forbs. *E. kosciuskoi* were also more abundant in areas with increased Sphagnum moss structure. We suggest forb-dominated areas may provide less suitable habitat for *E. kosciuskoi*, as these skinks require sufficient Sphagnum cover for thermoregulation, shelter and foraging (Steane et al. 2005). As we detected a positive relationship between feral horses and forbs, it is possible horses are driving vegetation change that indirectly negatively affects Alpine Water Skinks.

Our findings add to a growing body of research that demonstrates feral horses negatively impact endangered Sphagnum bogs and other sensitive montane and alpine vegetation communities, and hence indirectly impact co-occurring and habitat-dependent fauna.

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Alpine Water Skink (*Eulamprus kosciuskoi*).
Source: Rebecca Cherubin.

Right: A large Stocky Galaxias (*Galaxias tantangara*).
Source: Hugh Allan.