Australian Wildlife Society funds a new strategy to save the mountain pygmy-possum from extinction

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The mountain pygmy-possum (*Burramys parvus*) is a small nocturnal marsupial, endemic to the alpine regions of Australia, and has been selected as the Society's 2020 wildlife of the year. It is adapted to live exclusively in alpine habitat. It is found in highly elevated boulder fields and dense alpine rock crevices of southern Victoria and Kosciuszko National Park in New South Wales. It survives winter by hibernating for up to seven months and is dependent on the insulation provided by snow, and its primary food source, for its survival. Therefore, changes in climate pose a considerable risk to this species. Through sponsorship from Kinder (Ferrero Australia), the Society is playing a key role in the preservation of the mountain pygmy-possum by funding a program to help save this species from a changing climate and possible extinction.

Hibernation is a seasonal response to changes in climate and food availability. Hibernating mammals endure prolonged intervals of torpor, during which the body temperature, metabolism, and other metabolic functions are significantly reduced. Hibernating mountain pygmy-possums reduce their body temperatures from the normal active temperature of 36°C to approximately 2°C during torpor bouts. To hibernate successfully, mountain pygmy-possums require temperatures between 1.5°C and 2.5°C. Hibernation can last between five to seven months. The mountain pygmy-possum prepares for hibernation by doubling its bodyweight before winter begins. The mountain pygmy-possum will eat as much as it can to store enough energy to last through the duration of its dormant period.

The survival of the mountain pygmy-possum depends not only on its immediate environment but also on the regional migratory patterns of its major food source, the bogong moth (*Agrotis infusa*). Each spring, the bogong moth leaves the heat of their breeding grounds in southern Queensland and north-western New South Wales to fly more than 1000 kilometres until they reach the Australian Alps in south Victoria and Kosciuszko National Park, in summer, where they congregate in huge numbers. Once there, they switch their bodies into a dormant state, not unlike hibernation (in summer this dormancy is called aestivation). The peaks of the boulder fields and rock crevices are used as their aestivation sites. A few months later, the moths migrate back north to breed as their larvae cannot tolerate cold conditions.

Hibernation, the insulation provided by snow and the migratory patterns of the bogong moth, play a key role in the mountain pygmy-possum's survival. Dr Hayley Bates, from the University of New South Wales, stresses that if there isn't enough snowfall or snow melts early due to a warming event, as climate modelling predicts, the cold air will penetrate the alpine rock crevices and adversely affect the survival of the mountain pygmy-possum. Temperatures below 0.6°C will wake a mountain pygmy-possum from its hibernation and put it at risk of shivering to death. Furthermore, due to the migratory patterns of its food source, if woken early its food source will not be present, and therefore the mountain pygmy-possum is also at risk of starving to death. If the mountain pygmy-possum experiences two consecutive winters of decreased snowfall, warming climate and non-present key food source, then the species could collapse and go extinct. As a result, in New South Wales, the mountain pygmy-possum is listed as an Endangered Species on Schedule 1 of the *Threatened Species Conservation Act 1995* and is classified as critically endangered on the International

Union for Conservation of Nature's Red List of Threatened Species. Its threatened status is one of the reasons why the Australian Wildlife Society selected the mountain pygmy-possum as its 2020 wildlife of the year.

To combat the effects of climate change, scientists from the University of New South Wales have established a breeding program at Secret Creek Sanctuary, based on evidence provided by the fossil record of its ancestors. Australian Wildlife Society is helping to fund this program to help save the mountain pygmy-possum from extinction. The fossil records show that the prime habitat of the mountain pygmy-possum's ancestors was rainforest environments. As Australia dried out, some animals adapted, however some, including the ancestors of the pygmy-possum, were so connected to the rainforest environment that they followed the environmental shift eastward. The program aims to breed the critically endangered mountain pygmy-possums at warmer, lowland rainforest conditions and lower altitude of 1000 metres. This strategy has been implemented to assist the mountain pygmy-possum to adapt, shift and acclimatise to a more temperate climate, like its ancestral habitat. This strategy will provide the mountain pygmy-possums with the opportunity to adapt to a warmer temperature, providing it with the chance for survival and preventing it from becoming a potential victim of climate change.

While there are many unanswered questions and there is still so much more to learn about this species, the breeding program at Secret Creek Sanctuary provides the opportunity to study the animal and its breeding behaviours, at a warmer temperature. If the program is a success and it can be demonstrated that the mountain pygmy-possum can establish a foothold in a more temperate environment, UNSW Professor Mike Archer predicts that other threatened animals could be preserved using the same strategy.