Battling the odds

With threats such as grazing by herbivores, the effects of dieback disease and two extreme fire events in recent years, an important threatened ecological community in the Stirling Range is facing long odds for survival. But a comprehensive and holistic approach to protect the species found there is providing hope that they will be safeguarded for the future.

by Damien Rathbone, Sarah Barrett, Dylan Lehmann and Emily Harper

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Main Fenced areas were constructed at 10 sites, protecting 6250m² of heath.
Photo – Sarah Barrett/Parks and Wildlife
Insets Quokkas on Bluff Knoll.
Photo – Parks and Wildlife
Yellow mountain bell (*Darwinia collina*).

Above Mountain latrobea (*Latrobea colophona*).
Photos – Damien Rathbone/Parks and Wildlife

Nestled in the eastern part of the Stirling Range National Park, an important and diverse ecological community houses a treasure-trove of endemic and threatened flora species. Declared a threatened ecological community (TEC) and ranked critically endangered due to the extent and severity of *Phytophthora* dieback disease, the area carries an unassuming name – the 'Montane Heath and Thicket of the eastern Stirling Range' – but the plants that populate it make it a special place indeed. Many of the species found there are as interesting as they are rare, from the fascinating star-burst shaped flowers of the giant andersonia (*Andersonia axilliflora*), to the pretty pendulous flowers of the yellow mountain bell (*Darwinia collina*), and the fluffy-white flowers of the Stirling Range beard heath (*Leucopogon gnaphalioides*) as well as the mountain latrobea (*Latrobea colophona*), the mountain dryandra (*Banksia montana*) and the small-flowered snottygobble (*Persoonia micranthera*).

Devastating changes to the area have impacted this TEC and resulted in fewer than 14 per cent of the community remaining as a representation of the original suite of plant species that were once common; indeed many dieback-susceptible species have become locally extinct. During the past 50 years, fire frequency has also increased and almost three-quarters of the ecosystem has experienced fire in both 1991 and 2000 – a very short time between fires. As most mountain-top species rely on seed to regenerate and many are very slow to mature in the harsh environment, this has led to severe population declines. Climate change also threatens these mountain-top species that have literally nowhere to migrate in response to a warming and drying climate.

MORE THAN MEETS THE EYE

Monitoring of the critically endangered species in the aftermath of the 2000 fire revealed that, as well as being at risk from dieback, they were faced with another threat. Evidence showed grazing and browsing by rabbits (*Oryctolagus cuniculus*) and quokkas (*Setonix brachyurus*). It was hoped that rabbit numbers would decline with time, and plants would eventually reach a natural equilibrium with browsing pressure from native herbivores. But, unfortunately, by the late 2000s it was evident that browsing impacts remained high and posed a threat to the long-term survival of the TEC.

Since then, a number of actions have been undertaken including the targeted eradication of rabbits using 1080 oats and the establishment of protective fencing for highly threatened flora species. Small individual fencing structures were initially built for species such as the mountain dryandra and the mountain latrobea. Monitoring indicated the significant impact of browsing across these populations and revealed that these small structures were highly effective at protecting individual plants. It also showed that if the growing tips were repeatedly browsed then the growth necessary to enable flowering and setting seed would be prevented, placing the regenerative potential of these species at risk. This, combined with the effects of fire and disease, is a serious threat to the long-term viability of the ecosystem.

In 2013, the positive results of small-scale fencing motivated the expansion of browsing mitigation through the construction of larger fenced areas. A project was developed and funding sourced from the State Natural Resource Management organisation with the aim of protecting specific patches of threatened flora as well as the more common species that make up the TEC. Materials were transported by helicopter to selected sites at about 1000m above sea level. In 2014, eight 25 x 25m fenced areas were constructed on Bluff Knoll and in 2015 another two fencing structures were built on nearby mountain tops. While logistically challenging work due to the remote, exposed environment and the rocky steep terrain, the project

Above Signage has been installed to inform visitors about the project.

Top left Grazed mountain dryandra.

Far left An analysis of rabbit scats revealed sedge and grass species are a major component of a rabbit's diet.
Photos – Sarah Barrett/Parks and Wildlife

Left A quokka browsing on Stirling Range beard heath.
Photo – Parks and Wildlife

has benefited from a team of dedicated Parks and Wildlife project officers working in partnership with volunteers. Signage has also been installed to inform curious tourists about the project and to discourage trampling of vegetation and track formation by the public near fenced sites.

After the fenced areas were built, detailed monitoring was established to compare growth inside and outside the fenced areas; within months the positive effects were evident. At the same time, remote infra-red photography was used to ascertain exactly which herbivores were the primary grazers of key threatened species. Footage in 2011 had captured quokkas and rabbits on camera with quokkas photographed 'in the act' of browsing the Stirling Range beard heath. New footage taken in 2014 and 2015 again revealed that for the Stirling Range beard heath, giant andersonia and mountain latrobea, quokkas were the culprits, nibbling nightly on these threatened species. An analysis of camera footage from 2011–15 revealed that of the seven fauna species recorded, 75 per cent of the photographs were of quokkas, the only strictly herbivorous native species. Other species observed were mardo (*Antechinus flavipes*), bush rats (*Rattus fuscipes*), quenda (*Isoodon obesulus*), feral cats (*Felis catus*), dunnarts (*Sminthopsis griseoventer*) and more recently honey possums (*Tarsipes rostratus*).

In July 2015, Parks and Wildlife project officer Damien Rathbone sought to further clarify the relative impact of quokkas and rabbits by analysing plant fragments in the scats of these species. The results of this dietary analysis revealed that sedge and grass species formed the major component of rabbit diet in this plant community. In contrast, quokka scats contained a wider variety of shrub species, in particular species from the myrtle and heath plant families. Fragments were identified from two threatened species – the yellow mountain bell and the Stirling Range beard heath as well as another two heath species of conservation significance.

In winter 2015, monitoring confirmed the positive effect of fencing with significant increases in plant volume and the number of flowers of fenced individuals of the Stirling Range beard heath, yellow mountain bell and mountain latrobea compared with those outside the closures.

THE FUTURE

Destruction caused through browsing by native herbivores suggests an imbalance in normal ecosystem processes due to multiple interacting threats. However, the results of this project so far are very promising, rapid recovery has occurred within the closures and many threatened species are already flowering and producing seed to replenish their soil seed banks. Browsing mitigation will also complement the investment made into other conservation activities in the montane TEC, such as the collection and preservation of seed in Parks and Wildlife's Threatened Flora Seed Centre, the re-stocking of keystone montane species and the aerial application of the fungicide phosphite to tackle *Phytophthora* dieback. The first significant collection of seed from fenced mountain latrobea was made in February 2015; a species once close to local extinction. If a bushfire should occur at some time in the future, these species should now be able to be regenerated and persist in their unique mountain environment. Hopefully, future generations will be able to enjoy mountain top vistas filled with an abundance of flowering species such as the mountain latrobea, yellow mountain bell, and Stirling Range beard heath.

Above Eastern Stirling Range vista.

Above right and far right A 'before' and 'after' comparison of grazed mountain latrobea. *Photos – Damien Rathbone/Parks and Wildlife*

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