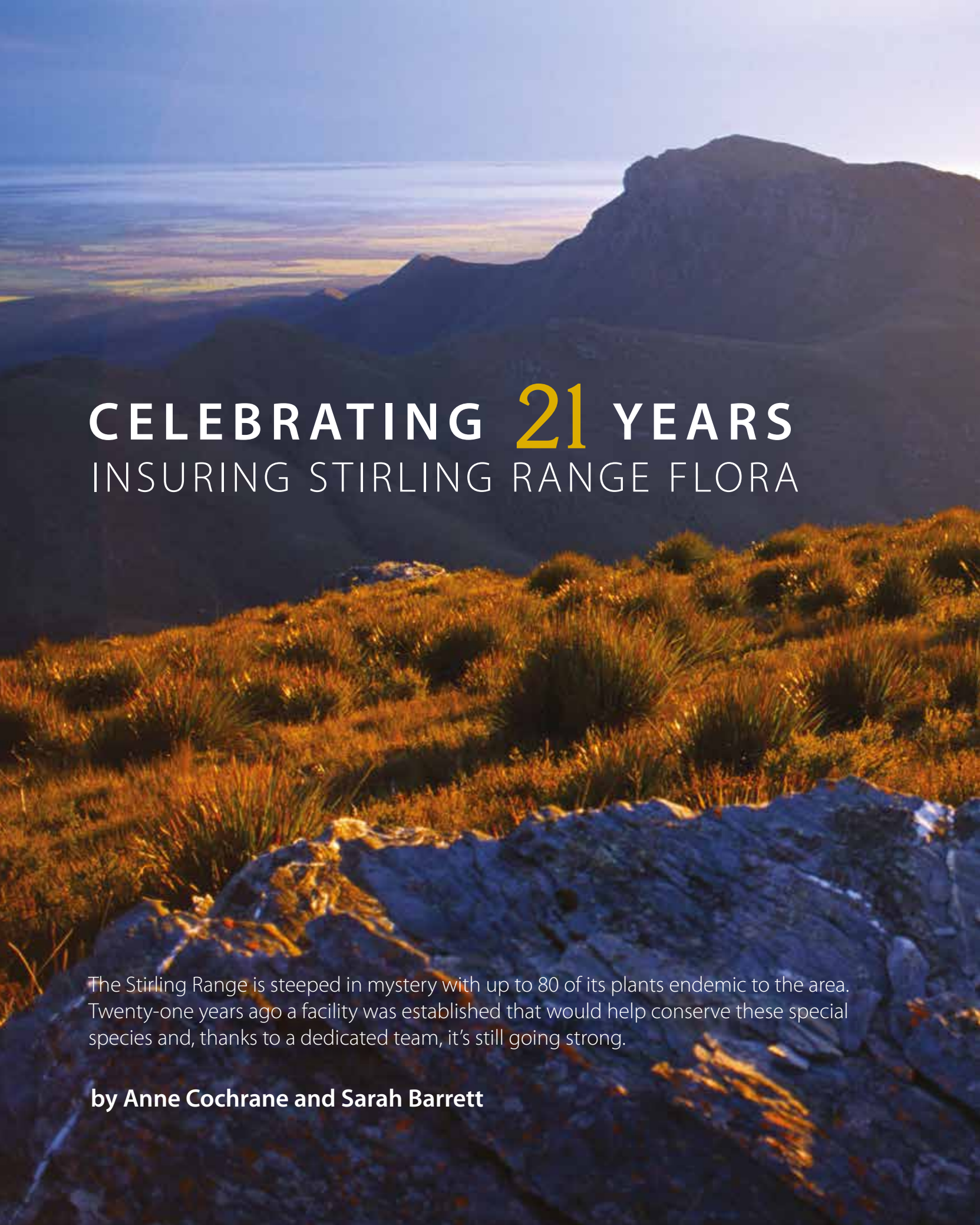

CELEBRATING 21 YEARS
INSURING STIRLING RANGE FLORA

The Stirling Range is steeped in mystery with up to 80 of its plants endemic to the area. Twenty-one years ago a facility was established that would help conserve these special species and, thanks to a dedicated team, it's still going strong.

by Anne Cochrane and Sarah Barrett

It was the *Albany Advertiser*, in 1937, that first described the Stirling Range as the 'Mountains of Mystery'. It is the only one in the south-west that reaches 1000m in elevation, with peaks rising out of the relatively flat countryside. Its biological richness (both plants and animals) makes it unique in Western Australia and earned it protection as a national park in 1913. Still to this day, remarkably little is known of the biology of the flora. We do know that of the more than 1500 species of plants that call the Stirling Range home, more than 80 of these occur nowhere else in the world. *Phytophthora* dieback, a disease caused by the water mould *Phytophthora cinnamomi*, has long been recognised as a major threat to the conservation of this unique flora. Currently, some 60 per cent of the range is thought to be infested by the disease. Too frequent bushfires, as well as grazing by introduced and native herbivores after fire, are also major concerns. Many of the species that occur in the range are long-lived woody perennials that are killed by fire and have a long juvenile period. If another fire occurs before these plants have the opportunity to set seed then the prospects for their regeneration are poor. An increased risk of fire and subsequent regeneration failure is a likely scenario due to the south-west's recent warming and drying trend, which in all likelihood will impact heavily on the flora.

Main Sunrise on the Stirling Range.
Photo – Alex Bond
Inset left The flowers of the feather-leaved banksia (*Banksia brownii*) come in a range of colours from deep orange to burgundy–red.
Photo – Sallyanne Cousans
Inset centre *Acacia awestoniana.*
Inset right *Banksia anatona.*
Photos – Anne Cochrane/Parks and Wildlife

"Since 1993, department staff have undertaken more than 442 collections of seed from flora in the Stirling Range. These collections represent 116 species, of which 70 per cent are threatened or priority-listed conservation species."

INSURING FOR THE FUTURE

Conserving seed is an effective means to prevent the loss of plant diversity and has been used as a conservation tool for many decades. In WA, some of the first seed collections carried out for conservation by the then Department of Conservation and Land Management were made in late 1992, when a dedicated seed bank was established for species at risk of extinction due to *Phytophthora* dieback. Since 1993, department staff have undertaken more than 442 collections of seed from flora in the Stirling Range. These collections represent 116 species, of which 70 per cent are threatened or priority-listed conservation species. The plants represented in these collections are predominantly long-lived woody perennials, many of which are critically endangered and rely on seed for regeneration. In some cases, the seeds held in the bank represent populations now long extinct. Some examples include the feather-leaved banksia (*Banksia brownii*) (see 'The feather-leaved banksia', *LANDSCOPE,* Autumn 2005), the cactus dryandra (*Banksia anatona*) and Lambert's honeysuckle (*Lambertia fairallii*).

Over the years, collecting has not been without difficulties. The logistical challenges of collecting on a mountain range are many. In numerous cases there has been a mismatch between the timing of seed release and our site visits. In some cases, bags have been placed around developing fruits to avoid missing ripening seed, which has meant repeat visits to ensure the bags have been taken off plants and seeds safely collected. Local weather conditions also present challenges, as wet conditions restrict access to some areas of the range.

A good example of a 'logistical nightmare' was collecting a critically endangered species in the Montane Heath Threatened Ecological Community, which occurs on the high peaks of the eastern Stirling Range. Collecting the small-flowered snottygobble (*Persoonia micranthera*) posed a suite of problems that, unfortunately, are not restricted to this species alone. *Persoonia* plants were being heavily grazed, probably by quokkas (*Setonix brachyurus*) and rabbits, preventing fruit set, and had to be enclosed by wire cages. As plants recovered, flowering improved and tiny fleshy fruits developed. However, these small 'drupes' took a year to mature, so gauze bags were placed on them to ensure the fruits did not disappear into the leaf litter. Finally, after several years of long treks up and down mountains by dedicated staff to implement all these actions, small seed collections were made in 2011 from the plants that had survived *Phytophthora* dieback in this period. As a result, there are now 280 seeds from nine populations in storage. The next hurdle is to germinate and successfully propagate the species. Transplanting using cutting has not proven successful to date, nor attempts to produce plants through tissue-culture. This shows that seed collections are essential to ensure that genetic material of this species is secured for the future and demonstrates that more collections, especially from other populations on the edge of extinction, will need to be made.

Funding for these actions has come from a variety of sources, including South Coast and State Natural Resource

Management groups, the Commonwealth of Australia and the Millennium Seed Bank Project of the Royal Botanic Gardens, Kew. Without this financial support many of these actions would not have been possible.

PUTTING THE SEED TO GOOD USE

Many seeds will remain stored in the bank as insurance against loss in the wild. However, many are actively used to support the conservation of wild populations of threatened species. Due to the threat of *Phytophthora* dieback in the Stirling Range, the opportunities for augmenting declining populations are severely limited and, as many of the more threatened species grow on the peaks, the logistics for establishing new populations are challenging. So seeds are used primarily for creating new populations that are, by necessity, distant from the threat of disease.

Enhancing population numbers has not been the only fate of these seeds during the past decade. Many seeds have been grown into seedlings for studying the susceptibility of the species to disease. Seeds have also been used in experiments to assess their capacity to germinate under warmer conditions. In other cases, seeds have been used to clarify the genetic relationships between the different populations of some species.

THE FUTURE

Seed collections continue because of the increasingly perilous situation many of these plants face. The re-establishment of new populations will also continue, as will spraying *in situ* populations with the fungicide phosphite to help plants combat *Phytophthora* dieback, and fencing to protect plants from grazing. These management actions are critical to allow plants to grow, mature, reproduce and set seed so they can be appreciated well into the future.

Opposite page
Left Low cloud over Bluff Knoll, Stirling Range National Park.
Photo – Alex Bond

Above (clockwise from left)
Collecting seeds of the critically endangered *Banksia anatona* in the Stirling Range.
Photo – Sarah Barrett/Parks and Wildlife
Bianca Klein and Emily Harper from Parks and Wildlife's Albany District cleaning seeds of Stirling Range species.
Seeds of the endangered *Daviesia obovata* from the Stirling Range.
Photos – Andrew Crawford/Parks and Wildlife
Small translocated seedling of *Banksia brownii*.
Photo – Anne Cochrane/Parks and Wildlife

Above right Interpretation at a translocation site for the critically endangered Stirling Range-endemic *Acacia awestoniana*.
Photo – Anne Cochrane/Parks and Wildlife

Anne Cochrane is a Parks and Wildlife senior research scientist based in Perth. She is the manager of the Threatened Flora Seed Centre, the department's seed conservation facility. Anne can be contacted on (08) 9219 9062 or by email (anne.cochrane@dpaw.wa.gov.au).

Sarah Barrett is a Parks and Wildlife threatened flora officer based in Albany. She has worked in the South Coast region since 1994 when she undertook a biological survey of mountains on the South Coast. Since 1999 she has co-ordinated the implementation of the Albany District Threatened and Priority flora program. Sarah can be contacted on (08) 9842 4521 or by email (sarah.barrett@dpaw.wa.gov.au).

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