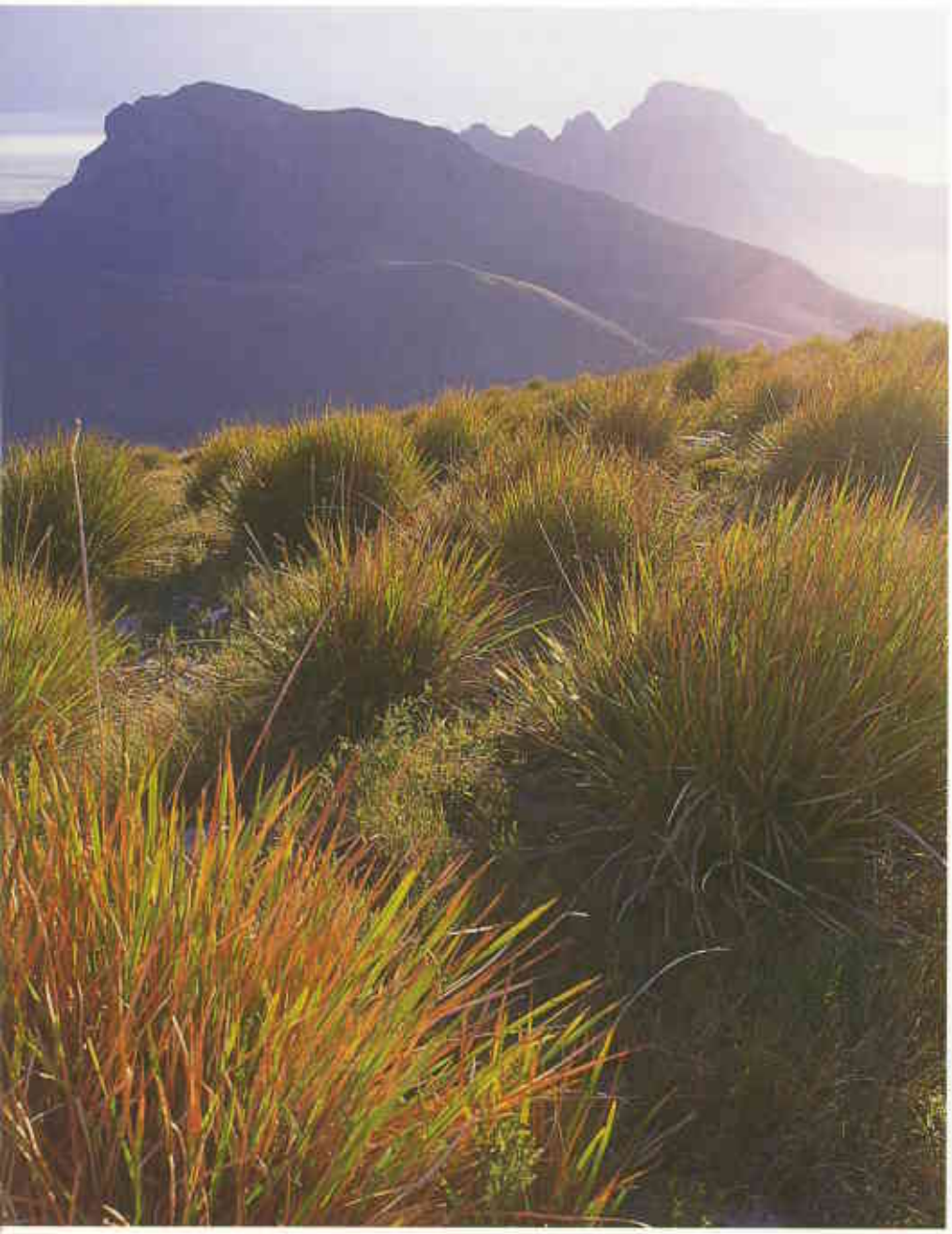
Threatened communities on high: **Stirling plants**

Mountain environments are rare in Western Australia and their conservation is a priority. The mountain heath and thicket community of the eastern Stirling Range is no exception.

by Anne Cochrane and Sarah Barrett

The need to protect the mountainous environment of the Stirling Range was recognised by its declaration as one of Western Australia's first national parks in 1913. The park protects the only real mountain range in the south-west of the Australian continent, rising some 850 metres above the surrounding plains. Its highest point, Bluff Knoll, is 1080 metres above sea level.

Today, the Stirling Range National Park forms part of the internationally recognised 'megadiverse hotspot' of southern WA, an extremely rich botanical region. The Stirling Range National Park flora contains some 90 families, 384 genera and 1517 species—more than that recorded in many entire countries—within its 115,600 hectares. Eighty plant species are found only within the park boundaries and nowhere else in the world!



These mountains are effectively islands, providing a wide range of habitats in an otherwise largely flat landscape. Although the park experiences a typically Mediterranean climate with wet winters and dry summers, the mountains have a strong influence on local climate. The exposed higher peaks exhibit more extreme temperatures, with extended drizzle through summer and even occasional snow during winter.

The Stirling Range is composed largely of ancient sandstone and quartzite rocks formed from deposits in shallow waters at least 1100 million years ago. The major plant communities in the range relate to soils and topography. Thicket (dense tall shrubs) occurs on the shallow soils of the peaks, mallee-heath (multi-stemmed eucalypts over shrubs) on the slopes and plains, and woodlands clothe the valleys. Drainage from the slopes forms either salt lakes or freshwater swamps. Thicket and mallee-heath vegetation are rich in members of the banksia, pea, myrtle and southern heath families and contain many of the plants that are unique to the range.

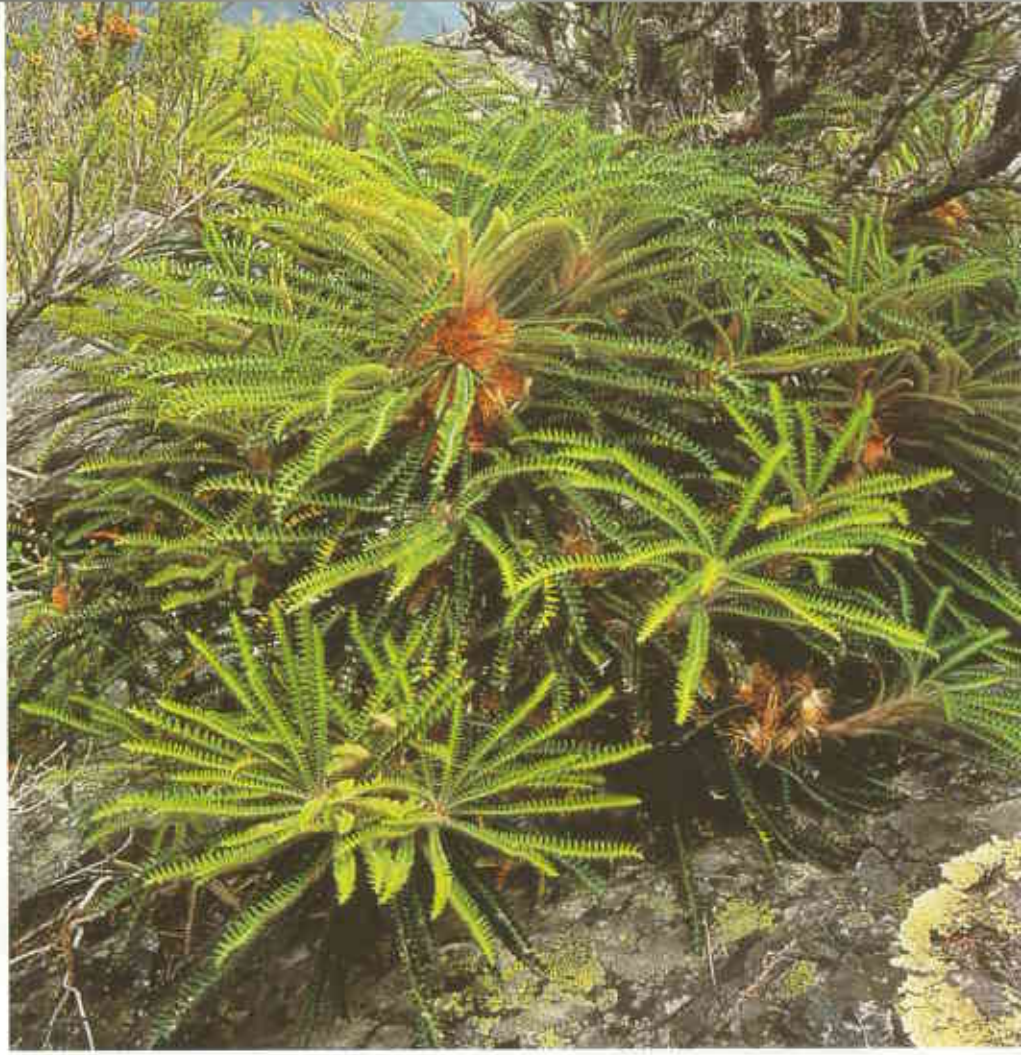
Community values

In the eastern Stirling Range a mountain plant community—quite distinct from that in the central and western areas of the Stirling Range—is found at altitudes greater than 750 metres above sea level. The community structure is typically that of a dense heath or thicket with scrub vegetation on shallow soils, and it is one of the most threatened vegetation communities in WA.

This 'Eastern Montane Mallee Heath and Thicket Community', as it is technically known, of the Stirling Range extends from the easternmost

Previous page
Main A walker approaches the summit of Bluff Knoll.
Photo – Alex Bond
Inset Mountain kunzea (*Kunzea montana*).
Photo – Jiri Lochman

Left Sunrise behind Pyungoorup and Isongerup peaks in the Stirling Range National Park.
Photo – Alex Bond



Above left Yellow mountain bell (*Darwinia collina*).
Photo – Andrew Brown

Above Mountain dryandra (*Dryandra montana*).
Photo – Ellen Hickman

peak of the Stirling Range at Ellen Peak and continues at these altitudes to Coyanarup Peak and includes Pyungoorup (1060 metres), the Arrows, Isongerup (994 metres), Moongoongoonderup (750 metres) and Bluff Knoll. It covers about 375 hectares along this ridgeline. A separate occurrence of approximately 20 hectares is found on the summit area of Mount Success.

This threatened community contains most of the plant species that are unique to the range, including 11 threatened species. Three of them are members of the well-known mountain bell group: the yellow mountain bell (*Darwinia collina*), the fringed mountain bell (*Darwinia squarrosa*) and the Success bell (*Darwinia* sp. Stirling Range). Also threatened are Drummond's grass (*Deyeuxia drummondii*), mountain paper-heath (*Sphenotoma drummondii*) and mountain rattle-pod (*Daviesia obovata*).

The attractive feather-leaved banksia (*Banksia brownii*) was previously considered to be endangered but was upgraded to critically endangered because of recent population extinctions and a projected decline in population size of more than 80 per cent over the next three generations (see 'The feather-leaved banksia', *LANDSCOPE*, Autumn 2005). The giant andersonia (*Andersonia axilliflora*), mountain dryandra (*Dryandra montana*), small-flowered snottygobble (*Persoonia micranthera*) and Stirling Range beard-heath (*Leucopogon gnaphalioides*) are also listed as critically endangered. To protect the latter three species from extinction, a seed orchard has been established near the Porongurup National Park (see 'A safe haven for threatened plants', *LANDSCOPE*, Summer 2005–06).

Other species that characterise the community include mountain kunzea (*Kunzea montana*), southern sandplains beaufortia (*Beaufortia anisandra*), Stirling Range paper-heath (*Sphenotoma* sp. Stirling Range), hedgehog heath (*Andersonia echinocephala*) and Stirling Range clawflower (*Calothamnus crassus*). In spring, the thicket is a mass of flowering shrubs and is a sight to behold. This mass flowering occurs later than on the lowlands and is at its best in October. Eucalypt species are notable for their absence but occur at immediately lower altitudes.

Vegetation community at risk

The predominant threat to the plant species that form the rare mountain thicket and mallee-heath communities is the root-rot pathogen *Phytophthora cinnamomi*—or *Phytophthora* dieback—which transforms the vegetation. This soil-borne pathogen causes root-rot and death of susceptible plants. A range of proteaceous species such as mountain banksia (*Banksia orcophila*), Stirling Range banksia (*Banksia solandri*) and Stirling Range honeypot (*Dryandra concinna*)—which were once significant members of this community—are now rare, primarily due to the impact of *Phytophthora*-caused dieback. Sedges and other disease-resistant plants are progressively replacing colourful tall banksias and dryandras.

Fire is also affecting the biological diversity of the range. Fire is an important element in the regeneration of many native plants, but if fires occur too frequently they can change the composition and abundance of many species. Plant growth after fire is often extremely slow in exposed mountain areas as it is impeded by

Above Signage at Bluff Knoll.
Photo – Renee Hartley

Above right Hedgehog heath (*Andersonia echinocephala*).
Photo – Anne Cochrane

the low temperatures and high wind speeds that prevail for much of the year, affecting those species that are slow to mature and set seed.

Climate change (see 'Climate change and biodiversity' on pages 54-61) has also been identified as a major threat to the diversity of the mountain vegetation community. It is now widely accepted that the world's climates are changing due to the emission of greenhouse gases such as carbon dioxide and methane. Predictions suggest that, relative to 1990, south coast temperatures will rise by up to 1.5°C and rainfall may reduce by up to 60 per cent over the next 20 to 30 years. As there is nowhere for the mountain-top endemics to go, it is possible that many of these species will become extinct.

Recreational values

As it protects the most significant mountain environment in the south-west of WA, the Stirling Range National Park is highly valued by local and overseas visitors. Often enclosed in mist and cloud, the mountains are shrouded in mystery and this is part of their attraction. This iconic area has had a long history of recreational use and the high peaks of the park have attracted visitors interested in rock climbing, bushwalking and nature appreciation. The diversity of microclimates, soils and topography have also attracted biologists and naturalists.

Being the highest peak in the range, Bluff Knoll is the most popular day outing in the park and the five-hour return walk provides visitors with exceptional views from the summit on a clear day. In 2005-06 about 34,500 people visited the Bluff Knoll car park, although less than half of them completed the walk to the summit.

The walk from Ellen Peak to Bluff Knoll is a popular two-to-three-day wilderness walk that challenges a small number of people each year. The route passes through the unique mountain vegetation community. The major impact of recreational activity on the mountain thicket threatened ecological community has been increased spread of plant disease, most probably through the transport of infested soil. Due to the introduction of *Phytophthora* dieback to high points in the landscape by human and animal vectors, the entire eastern ridge is now infested. Any clearing of ground for tents can also impact on this threatened plant community. Trampling and braiding of tracks in some areas also has adverse effects on the fragile plant community, particularly in the early years after fire when seedlings are very vulnerable to damage.

Conservation strategies

A recovery team consisting of representatives from the Department of Environment and Conservation (DEC), local botanists and community groups assists with the management of the threatened mountain vegetation community in the park. Mapping of diseased areas, flora surveys and documentation of growth and survival in key threatened species are ongoing activities. Aerial spraying of infested areas with the fungicide phosphite has successfully slowed the decline of susceptible species in those areas. Implementing a fire management

Above Bushwalkers on the walk from Ellen Peak to Bluff Knoll.
Photo – Rob Oliver

Below Fringed mountain bell (*Darwinia squarrosa*).
Photo – Andrew Brown

strategy and conducting ecological research is considered vital, and conserving the seeds of key species is being undertaken as a priority.

It is hoped that remote weather stations can be installed on some peaks in the future to gather long-term climate data. This would provide scientists and managers with a more precise understanding of the environmental conditions prevailing at these altitudes, and ecological parameters such as flowering, fruiting, recruitment and survival in key mountain species may then be linked to prevailing temperature, soil and rainfall conditions.

Harmonious coexistence

To ensure the ongoing survival of this unique vegetation community, a new code of conduct is being developed for walkers to minimise trampling, reduce camping impacts and discourage disposal of rubbish. Fires have been prohibited for many years and this is being strongly reinforced. The code of conduct—conveyed by trailhead signs and other information points—will alert users to the nature conservation values of the area and its unique flora. As well as the precious plants, numerous native animals, both large and small, rely on this mountainous environment and will also suffer if their habitat declines further.

More and more people are experiencing the pleasure of reaching a summit and glimpsing a sunrise or sunset, seeing the colours of the bush blanketed in snow or catching sight of a distant peak shrouded in mist or cloud. These experiences of the mountainous environment of the Stirling Range should be treasured. But this area and the precious plants that form the special vegetation community should be respected. We must all observe the signs, abide by the code of conduct to reduce the spread of *Phytophthora* and ensure that footwear is clean. It is our duty to ensure that generations to come can continue to enjoy the wildflowers of this area.

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