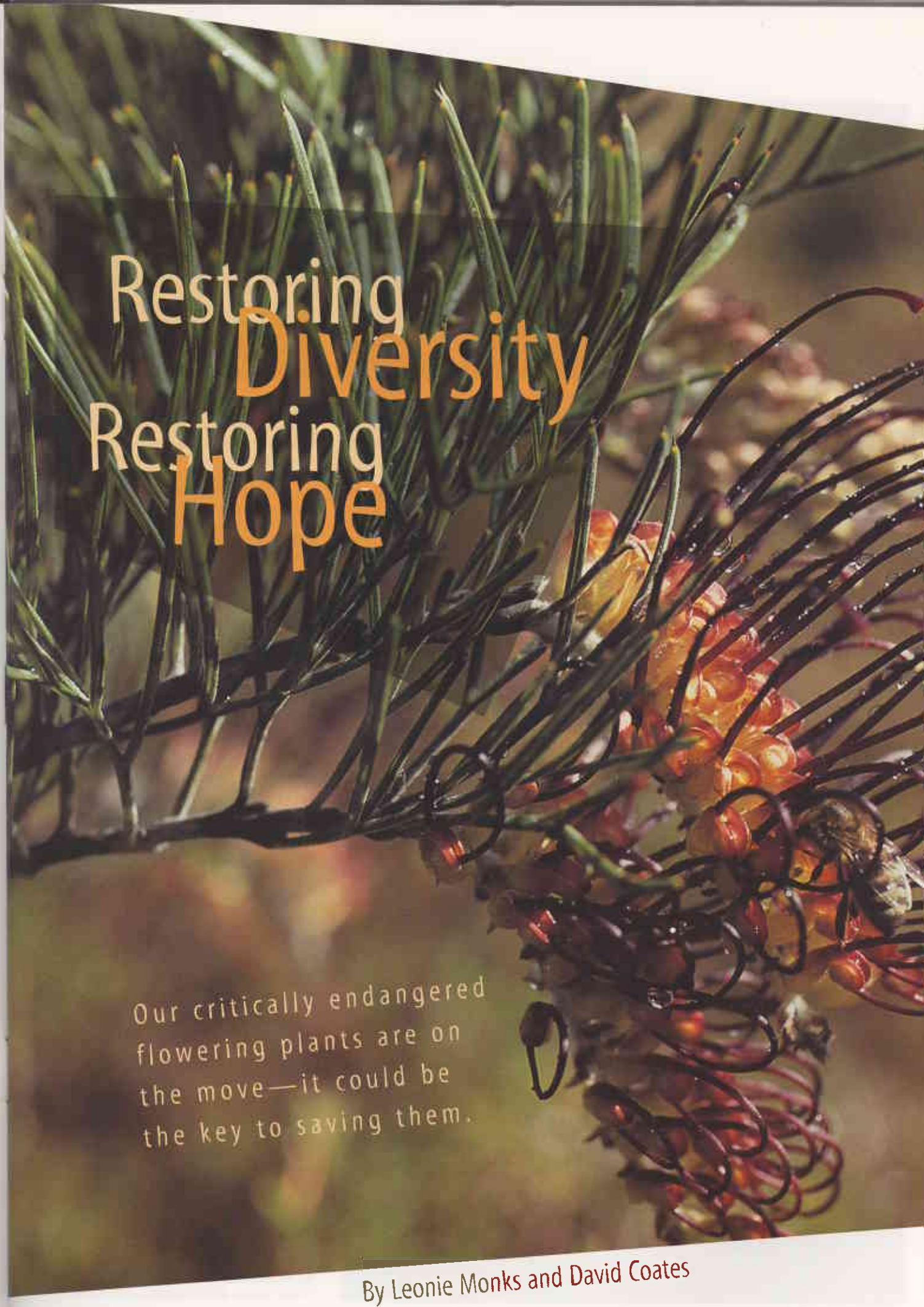

Restoring Diversity Restoring Hope

Our critically endangered flowering plants are on the move—it could be the key to saving them.

By Leonie Monks and David Coates

The prospects of Western Australia's most threatened plant species are a lot brighter with the launch of Western Everlasting—the largest conservation program to target threatened plant species in Australia. An important part of Western Everlasting involves establishing critically endangered plant species at safe sites within conservation reserves and on private land, where their chances of survival are good.

There are, currently, 95 plant species considered critically endangered in Western Australia. Without immediate action, a significant proportion of them face extinction in the next few years. Unfortunately, populations of critically endangered plants are often confined to extremely small degraded remnants of native vegetation that are under pressure from weed invasion, grazing, salinity or introduced diseases such as dieback, caused by the root-rot water-mould *Phytophthora cinnamomi*. More than half the critically endangered plants in WA are found on road verges, where they face the added threats of accidental destruction from road maintenance activities and herbicide spray drift from adjacent farms.

For some critically endangered plant species, simply maintaining existing populations is not enough to ensure their long-term survival. Translocation and restoration programs are vital. While some argue that if extinction is inevitable in natural populations, it is wasteful to carry out expensive and time-consuming restoration programs, there are others who say that restoring diversity is, most of all, about restoring hope. The dramatic recovery of threatened animals such as the woylie, through the Western Shield fauna conservation initiative, shows that sometimes hope isn't the only thing to be restored.

The blunt wattle (*Acacia aprica*) is known from just five populations (120 plants) occurring on narrow road verges near the Wheatbelt town of Coorow. All are threatened by road maintenance and farming activities. The translocation site is an old gravel pit and tip site on a small reserve nearby. Not only did the local Shire of Carnamah agree to the translocation, it also helped CALM officers deep-rip the old gravel pit. In winter 1998, 1500 seeds were sown on the site.
Photo – Gillian Stack/CALM

The spiral-fruited wattle (*Acacia cochlocarpa* subsp. *cochlocarpa*) is known from two small roadside populations near Watheroo. A secure translocation site was selected in a nearby nature reserve. The disused gravel pit was recently deep-ripped by CALM as part of the Salinity Action Plan and then planted with 1500 seeds in winter 1998.
Photo – Gillian Stack/CALM

FILLING THE GAPS

The translocation and establishment of viable populations of Western Australia's critically endangered plants is a complex process requiring expertise and knowledge in a range of biological disciplines. Unfortunately, much of the basic biology of our critically endangered plants, such as reproduction, pollination and habitat requirements, is poorly understood. Translocations of these plants over the next few years will not only improve their chances of survival, but also provide a valuable source of baseline information to fill these gaps and help in future restoration work.

Current translocation programs are carefully designed to investigate factors that are critical to the survival of the plants, such as propagation

Previous page
The striking maroon flowers of Foote's grevillea (*Grevillea calliantha*).
Photo – Sue Patrick/CALM

Left: A sprawling mat of spiral-fruited wattle (*Acacia cochlocarpa* subsp. *cochlocarpa*) near Watheroo.
Photo – Leonie Monks/CALM

The only known population of western woolly cyphanthera (*Cyphanthera odgersii* subsp. *occidentalis*) is on a degraded railway reserve near Wyalkatchem. There are plans to translocate this critically endangered subspecies to a secure site nearby in the coming year. Propagation of plant material has begun at Kings Park and Botanic Garden.
Photo – Andrew Brown/CALM

The Three Springs Daviesia (*Daviesia bursarioides*) occurs in six small populations in the Three Springs area. It was listed as critically endangered due to threats such as weed invasion, accidental destruction and chemical spray drift. A small population growing in a nature reserve was selected as a suitable restocking site, and in winter 1998, 190 seedlings were planted. Initial monitoring has found that 94 per cent of the plants are surviving and most are healthy.
Photo – Leonie Monks/CALM

The Kamballup dryandra (*Dryandra ionthocarpa*) is restricted to the unusual spongolite soils of a small reserve near Kamballup. It was ranked as critically endangered in 1995 due to the threat posed by an adjacent mine and loss of habitat. Preliminary translocations have confirmed that a nearby nature reserve is a suitable, secure site. A full translocation is planned for 1999.
Photo – Leonie Monks/CALM

and establishment techniques. Many translocations rely on the use of seeds, so an in-depth understanding of seed biology is particularly important. Complicated seed dormancy mechanisms, where seed is stored for long periods in the soil or on the plant, add to the challenge. Breaking dormancy and getting the seed to germinate is a vital first step in the recovery process. Work in this field is being carried out by CALM's Threatened Flora Seed Centre (see 'Banking for the Future' in *LANDSCOPE*, Winter 1996) and Kings Park and Botanic Garden.

Developing propagation techniques for both seeds and cuttings is another vital phase in the translocation process. Although many native plants can be propagated and grow readily in well-watered urban gardens, experience so

Above right: Marking the translocation site for prickly honeysuckle (*Lambertia echinata* subsp. *echinata*) in Cape Le Grand National Park.

Right: Planting seeds of the spiral-fruited wattle in a disused gravel pit.

Far right: A western prickly honeysuckle (*Lambertia echinata* subsp. *occidentalis*) seedling is planted in State forest.
Photos – Leonie Monks/CALM

Foote's grevillea (*Grevillea calliantha*) is only found in an eight-kilometre radius near Dandaragan. Only six populations (137 plants) were known but 108 seedlings have been planted in a reserve managed by the Shire of Dandaragan. Inspections of the site indicate the seedlings are healthy, growing and already flowering.
Photo – David Coates/CALM

McCutcheon's grevillea (*Grevillea maccutcheonii*) occurs on the southern ironstones near Busselton and is known from only one population. Very little seed is available, so plants for this translocation are being raised from cuttings. It will take several years for enough plants to be raised for a viable translocation.
Photo – David Coates/CALM

The prickly honeysuckle (*Lambertia echinata* subsp. *echinata*) is one of the rarest of the critically endangered species. Until recently, there were only three adult plants known in the wild. These were left behind after gravel mining activity in the area. Access to the translocation site is difficult because the gravel pit and access track were deep-ripped and rehabilitated three years ago. CALM staff use a four-wheel motor bike to transport plants and equipment. In winter 1998, 90 seedlings of this subspecies were planted out.
Photo – Leonie Monks/CALM

Left: This seedling of round leaf honeysuckle (*Lambertia orbifolia*) is surrounded by a 'gro-cone'—used to promote growth.

Below: Senior propagator Sophie Juszkiewicz with seedlings raised at Kings Park and Botanic Gardens.
Photos – Leonie Monks/CALM

far indicates it is more difficult to establish self-perpetuating populations in the wild.

The final phase in a translocation, following establishment of the population on a secure site, is detailed monitoring of the plants. Ideally, this should be for at least five years, and depending on the life cycle of the plant, 10 years or more. Monitoring helps determine the success of the translocation and provides valuable data on the reproductive biology and life cycle of the plant.

So far, CALM and Kings Park and Botanic Garden scientists have collaborated on five threatened plant translocation programs in Western Australia. The species involved are the matchstick banksia (*Banksia cuneata*), the Corrigin grevillea (*Grevillea scapigera*), the scarlet leschenaultia (*Lechenaultia laricina*), Trigwell's rulingia (*Rulingia* sp. Trigwell Bridge) and the Wyalkatchem foxglove (*Pityrodia scabra*). The Corrigin grevillea translocation is the most successful so far, with good seed production over the last two years. The matchstick banksia and Trigwell's rulingia are also looking promising, with

Western prickly honeysuckle (*Lambertia echinata* subsp. *occidentalis*) was discovered in 1992 and is only known from one location. The population is under extreme threat from dieback, with one of the 10 remaining plants already succumbing. A secure translocation site was selected in a dieback disease-free area of State forest. Unfortunately, small amounts of seed and propagation difficulties combined to restrict the number of seedlings available for translocation to just 11. Further propagation experiments are planned for 1999 to overcome these difficulties.
Photo – David Coates/CALM

Although they look identical, molecular genetics has shown that round leaf honeysuckle (*Lambertia orbifolia*) found near Narrikup is very different from that found near Augusta. The species, as a whole, is listed as threatened but the Narrikup form is known from only two road verge populations (160 plants) and is therefore critically endangered. A total of 216 seedlings were planted into a nature reserve close to the known populations and all but one have thrived.
Photo – David Coates/CALM

TRANSLOCATIONS (PLANTS)

A translocation is the deliberate transfer of plant material (e.g. seedlings) from one area to another for conservation purposes.

There are several different types of translocations:

- A re-stocking translocation is where a plant population is increased by adding further individuals to an existing site.
- A re-introduction translocation is where plants are grown in areas where they formerly occurred, but are now believed to be extinct.
- An introduction is where a population is established in a site where the species is not previously known to have occurred, but is within the known distribution range and habitat type.
- A conservation introduction is where a population is established, for conservation purposes, in an area that is outside the known distribution range for the species, but which is appropriate habitat.

Adapted from: *Guidelines for the Translocation of Threatened Plants in Australia*

both species flowering in 1998 and the rulingia setting large amounts of seed.

Funding assistance from Environment Australia through the Natural Heritage Trust meant that CALM could initiate translocation programs for a further 10 critically endangered plants in 1998. The first plantings of seven species were carried out last winter. The species were the blunt wattle (*Acacia aprica*), spiral-fruited wattle (*Acacia cochlocarpa* subsp. *cochlocarpa*), Three Springs Daviesia (*Daviesia bursarioides*), Foote's grevillea (*Grevillea calliantha*), prickly honeysuckle (*Lambertia echinata* subsp. *echinata*), round leaf honeysuckle (*Lambertia orbifolia*) and western prickly honeysuckle (*Lambertia echinata* subsp. *occidentalis*). Plantings of the other three species, western woolly cyphanthera (*Cyphanthera odgersii* subsp. *occidentalis*), Kamballup dryandra (*Dryandra ionthocarpa*) and McCutcheon's grevillea (*Grevillea maccutcheonii*), was carried out in winter 1999.

The translocation of all 10 species is based on seed collected and germinated by CALM's Threatened Flora Seed Centre. Seedlings are then grown at the Kings Park and Botanic Garden Nursery before being planted back into the wild. Monitoring programs on all the sites are evaluating success and gathering biological data as the plants mature to flowering and seed production. They will be monitored every second month for the first year and then less frequently for subsequent years.

The translocations have been greeted with enthusiasm by local people. Several Shires (Three Springs, Carnamah, Moora, Dandaragan and Plantagenet) have allowed their reserves to be used as secure translocation sites and offered to maintain adequate water supplies over the summer. Landowners, such as Bill Scott from Watheroo, have offered to provide local weather information, which is important when interpreting results.

Translocations and associated restoration techniques are relatively new tools in the fight to protect our critically endangered plants. A rigorous experimental approach is therefore essential. Collection of the comprehensive baseline data produced will become more difficult as translocation numbers increase, and staff resources become more limited. CALM is already considering translocations for many of the 95 critically endangered plant species in Western Australia. If biodiversity, and hope, is to be restored on that kind of scale, it will take a joint effort. Assistance from the public will become increasingly important. In fact, the future for many of our most threatened species will depend on it.

Leonie Monks is a Research Scientist with CALMScience, based at CALM's WA Herbarium. She can be contacted by telephone on (08) 9334 0495 or email (leoniem@calm.wa.gov.au).

David Coates is a Principal Research Scientist with CALMScience, based at CALM's WA Herbarium. He can be contacted by telephone on (08) 9334 0490 or email (davec@calm.wa.gov.au).

Winner of the 1998 Alex Harris Medal for excellence in science and environment reporting.

LANDSCOPE

VOLUME FIFTEEN NUMBER 1, SPRING 1999

In 'Photographing a Temperate Wonderland' (page 10), photographers Sue Morrison and Ann Storrie share their experiences .

In 'Those Spotted Things' (page 22), we see how fox-baiting and captive breeding continues to swell populations of this popular native mammal.

Snakes. You either love them or hate them, but how do we live with them? See story on page 45.

Many farmers and landowners are turning to plantation pine for a variety of good reasons. Five of them tell us why. See 'A Crop of Forests' on page 38.

As habitat changes, so do species populations. But just when does a species become threatened? See 'Healing the Land' on page 49.

FEATURES

REGULARS

COVER

The magnificent gorges of Karijini National Park are a refreshing retreat from the arid plains above. They also have a fascinating geological history. See story on page 28.

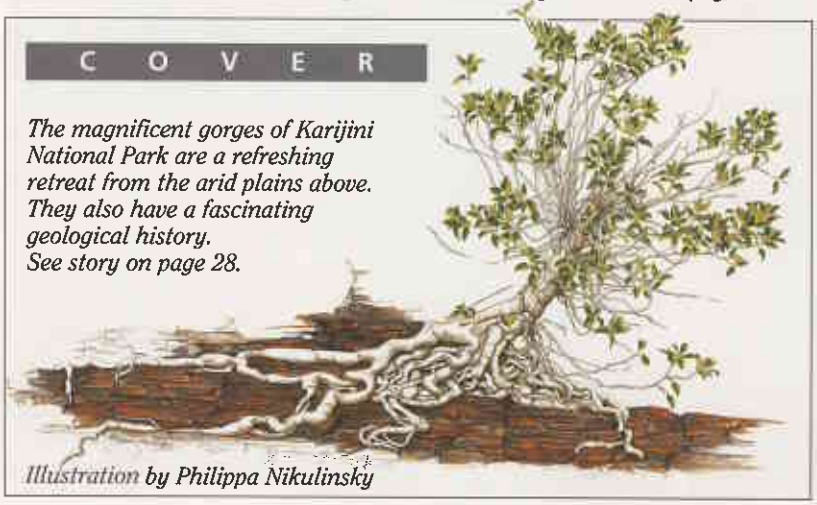

Illustration by Philippa Nikulinsky

Executive Editor: Ron Kawalilak
Managing Editor: Ray Bailey
Editor: David Gough
Story Editors: Mandy Clews, Verna Costello, Louise Johnson, Sandra Toby, Carolyn Thomson-Dans, Mitzi Vance, Penny Walsh
Scientific/technical advice: Andrew Burbidge, Greg Keighery, Ian Abbott, Neil Burrows, Paul Jones and staff of CALMScience Division
Design and production: Tiffany Aberin, Maria Duthie, Sue Marais
Illustration: Gooitzen van der Meer, Ian Dickinson
Marketing: Estelle de San Miguel ☎ (08) 9334 0296 Fax: (08) 9334 0498
Subscription enquiries: ☎ (08) 9334 0481 or (08) 9334 0437
Colour Separation by Colourbox Digital
Printed in Western Australia by Lamb Print

Please do not send unsolicited material to *LANDSCOPE*, but feel free to telephone the Editor.

Visit *LANDSCOPE* online on our award-winning Internet site NatureBase at http://www.calm.wa.gov.au

Published by Dr S Shea, Executive Director
Department of Conservation and Land Management,
Dick Perry Avenue, Como, Western Australia