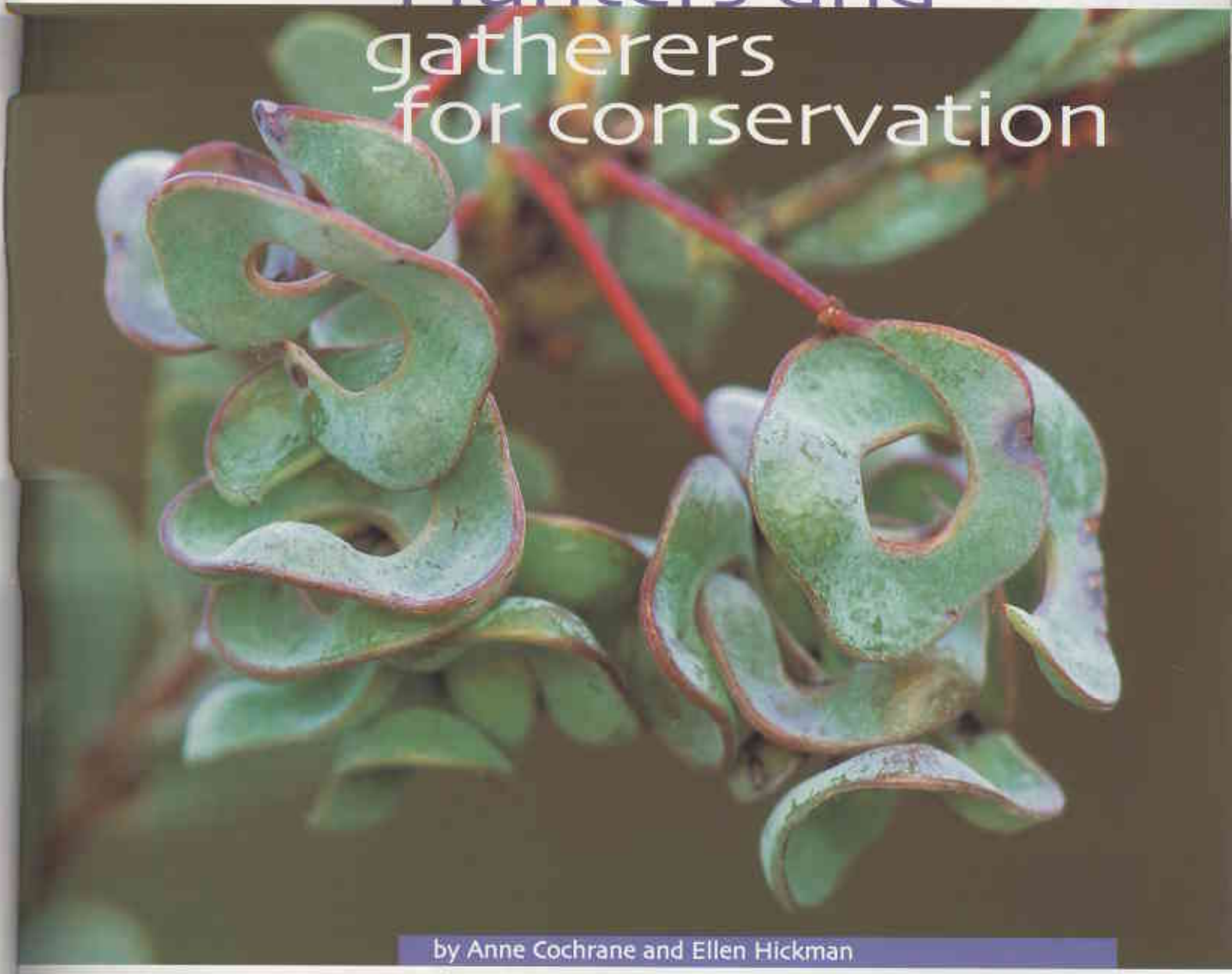
Hunters and gatherers for conservation



by Anne Cochrane and Ellen Hickman

In the past, many societies relied on hunting and gathering for survival. These days, hunting and gathering have different connotations. Hunting for a parking space and gathering groceries off the supermarket shelf may be more apt to modern society. For the Department of Conservation and Land Management's Threatened Flora Seed Centre, hunting and gathering means searching for, and collecting, seeds of rare and threatened plants for long term conservation.

Many of our poorly known plant species probably haven't been seen by botanists for many years. And with more than 12,000 named and unnamed species in Western Australia—a good 20 per cent of which are on the Department of Conservation and Land Management's Declared Rare and Priority Flora list—it's no wonder.

NEEDLE IN A HAYSTACK

Western Australia is a very large State and there are relatively few professional botanists employed to do flora surveys. Fortunately, there are a larger number of interested amateur botanists, especially those who have been involved in the Regional Herbarium Project, who are always on the look out for plants. In some cases, records at the department's Western Australian Herbarium show the most recent specimen collections were made as long ago as 10 or 20 years. In many instances, no-one has looked for these plants in recent years. In other cases, someone has looked but has not found them. This could be because changes to the landscape have occurred over time. For example, changes in road alignment and signage may have made it difficult to relocate these plants. Miles have changed to kilometres, bends in some roads have been straightened, road names may have been changed and towns have been bypassed by new roads.

Some plant specimens come with very little information attached to them. The collecting locations affixed to some of WA's oldest specimens merely described the area as 'King George Sound' or 'Swan River Colony', and relocating these sites is nearly impossible.

The recent use of the Global Positioning System (GPS) for flora survey work has increased the accuracy of location information, and it is now possible to 'navigate' your way to a previously located population without much difficulty. This technology uses satellites to fix locations, and the exact latitude and longitude of the site can be recorded with great accuracy. But the ease of finding these locations depends on having a recent location defined by a GPS to compare with.

In all too many cases, the plants themselves may have disappeared—perhaps because native vegetation has been cleared, or through natural ageing of plants in the absence of appropriate disturbance, or because of death from the effects of salinity, disease, weed invasion or an inappropriate fire regime. Over the years, the taxonomic description of some plants has changed, making it difficult to relocate particular specimens, which may now be called something entirely different—all very confusing.

Staff from the Department of Conservation and Land Management's Threatened Flora Seed Centre have been gathering seeds from a wide range of rare, threatened and poorly known plant species for more than eight years.

Previous page
Acacia seedpods and various fruits and seeds.
Photo – Jiri Lochman

Above left: It is thought that some 450 plant species in the Wheatbelt may become extinct over the next few decades from waterlogging and/or rising salt levels in the soil.
Photo – Val English

Left: Collecting fruiting cones from a banksia plant. Many *Banksia* species are highly susceptible to the dieback disease, caused by *Phytophthora cinnamomi.*
Photo – Anne Cochrane

These seed collections are placed in long-term storage, and are part of the department's strategy for biodiversity conservation (see 'Banking for the Future', *LANDSCOPE*, Winter 1996). Conserving species in the wild is the prime focus of conservation managers, but in the face of looming threats, like salinity and dieback disease, plants are not always safe, even when located in conservation areas such as national parks and nature reserves. Hence the need for an insurance policy such as seed storage. Ultimately, seeds can be used now or in the future for research and for reintroducing plants to the wild.

Hunting for populations of these threatened plants has often been fraught with difficulty: gathering has generally been easier, although somewhat time consuming. Some of the more frustrating incidents that have interrupted the Threatened Flora Seed Centre's gathering activities have included natural disasters, over which we had no control.

NEVER A DULL MOMENT

A long-planned seed collecting trip to the Threatened Eastern Montane Ecological Community of the Stirling Range National Park, in the south-west of Western Australia, was thwarted by a wildfire, and the site of many of the target plant populations was scorched beyond recognition. Consequently, it will be five years after the fire before the species, known only from that area, can be collected. And some of the more slow-growing plants may take up to 10 years to germinate or resprout, grow and mature sufficiently to flower and produce fruit for collection.

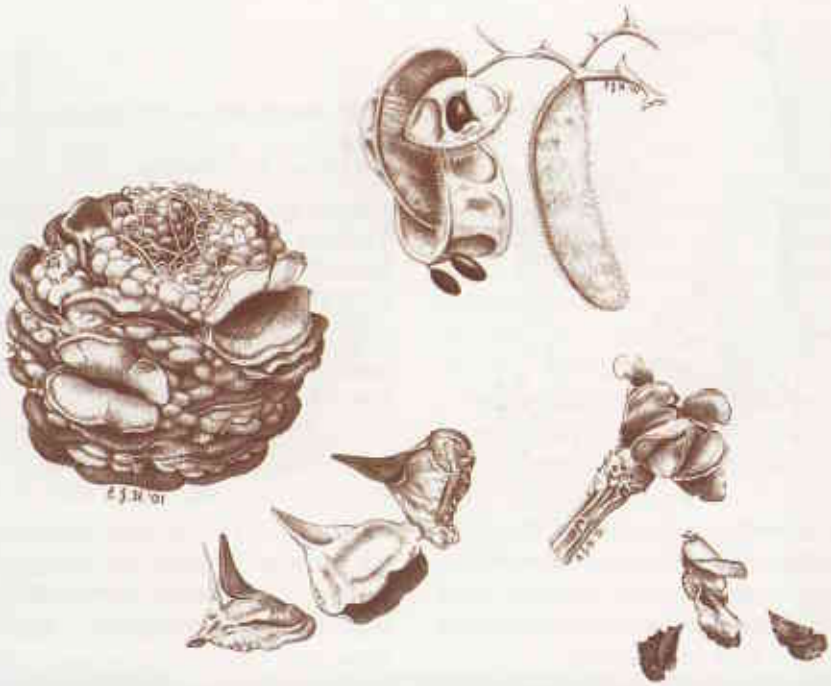
The weather may also turn against us—another example of nature interfering with a collecting trip. The weekend prior to a planned trip becomes a heat wave, and the thermometer rises above 40°C for two days. Minute seeds in papery capsules mature quickly over the hot spell, resulting in the early release of all seeds. That year's seed crop is lost forever to human sight, although the seeds replenish the soil-stored seedbank ready for natural regeneration. If the skies had produced rain, or the weather had stayed cool, the seed would have ripened 'on time', with a high possibility of the collection being a success. Seeds of these species must now await collection during the following year.

Left: Eucalyptus petila fruits releasing seed.
Illustration – Ellen Hickman

Below: Although fire is an important element in the natural landscape and contributes to the regeneration of many plants, frequent fires may contribute to species loss in many parts of Western Australia.
Photo – John Kleczkowski/Lochman Transparencies

Last year, a devastating drought in the eastern agricultural Wheatbelt region meant that little rainfall occurred during the growing season. Many plant species flowered poorly and produced a disappointing fruit crop (including crop plants such as wheat for human consumption). Fingers will be crossed that this year's winter rain will enable the drought-stricken countryside to turn green and produce an abundant flowering and fruiting season.

On the subject of disaster, though not exactly natural, a long drive led to the discovery that one of the prime species targeted for seed collection had been decimated by a shire verge-pruning campaign. The tractor-driven slasher had rendered many plants unrecognisable, dead or damaged. The remaining live plants had seeds that were still two weeks away from being ripe. The cost of a repeat visit would have overextended the budget for



that year. The collection had to be postponed until the following year, when other species would also be collectable and thus make the trip cost-effective.

Then there was the seemingly fruitless search for plants that should have been there, but weren't. One species produces delicate, pink or purple, eye-catching flowers in a sea of tall dense heath forming the understorey of banksia woodland. Without flowers, it was a virtual twig, leafless and cryptic, and nowhere to be seen. These plants eluded us, despite an extensive search.

And then, of course, some plants look very similar to other plants of a different species. The differences are only distinguishable by a small variation in the flowering parts. In most instances, the timing of seed collection means that plants have finished flowering and those distinguishing differences are no longer visible when the fruit has formed. And so, if two species of plants that are very similar grow together at the same site, it may be virtually impossible to tell them apart unless they have been tagged when the plants have been in flower.

WHEN ALL GOES WELL

Fortunately, many 'hunting' trips are plain sailing. The location information is precise, the plants are easily spotted and the fruit dangles tantalisingly before our eyes, ripe and ready for picking. With the hunting complete, the task of gathering begins.

For most species, secateurs and fingers are used to extract the fruits or seeds from the plants, and to place them in bags ready for transport to the seed store. Because plants come in all

Clockwise from top left: Fruits and seeds from *Banksia meisneri* ssp. *ascendens*, *Acacia alata* var. *platyptera* and *Dryandra sessilis* var. *cordata*.
Illustrations – Ellen Hickman

Above left: Equipment used by the Threatened Flora Seed Centre staff to collect seeds.
Photo – Anne Cochrane

Left: Tweezers were required to extract fruits from the prickly centre of this threatened wattle, *Acacia imitans*.
Photo – Andrew Crawford

shapes and sizes, collecting seed from a small herb may involve grovelling on the ground or stooping for hours on end. Alternatively, collectors may need a long-handled pruner to gather seeds from a tall eucalypt tree. Sometimes, the trees are too tall and collection is impossible with the tools at hand.

Some WA native plants are also very prickly (for example, some *Dryandra* and *Hakea* species). Prickles prevent the plant from being eaten by herbivores such as rabbits and kangaroos, but mean that seed collectors need to wear gloves to retrieve the fruits. In some cases, seed collectors have to compete with invertebrate seed gatherers, such as ants, and seed predators such as weevils and the larvae of other insects. All too often, the seed within a fruit will be damaged by these predators and ants will have taken ripe seed to their nests underground. In the latter case, the seed is kept safe and will often germinate after disturbance, such as fire, has occurred at the site.

Not all collection trips end in disappointment. Most are successful and, despite a bit of frustration over the years, the collection of seeds of threatened species has proceeded quickly. The help of volunteers and departmental staff is duly acknowledged, for without them the task would have been much harder. Since the Threatened Flora Seed Centre was established in late 1992, several hundred collecting missions have been undertaken in the south-west of WA, and hundreds of thousands of seeds have been collected and stored for long-term conservation. Seed from 17 families, 76 genera and more than 250 species, subspecies and variants on the State's Declared Rare and Priority Flora lists have been placed in long-term storage.

Germination trials have been conducted and the resultant seedlings have been passed on to the Botanic Garden and Parks Authority for education purposes, or for growing on for the department's translocation program. Other seedlings have been given to the department's scientists for disease susceptibility testing or genetic characterisation.

Since October 2000, additional funding for the project has been secured through collaboration with the Millennium Seed Bank Project, Royal Botanic Gardens Kew UK (see 'Our Frozen Future', *LANDSCOPE*, Winter 2001).

Land clearing, rising salt levels, weed invasion and dieback disease threaten up to 20 per cent of Western Australia's native plant species. With so many species under threat of extinction, hunting and gathering for conservation plays a key role in the department's overall strategy for biodiversity conservation, and is considered a necessity.

But if we were hunting and gathering for our very own survival, we may indeed be hungry. Aren't you glad that the supermarket shelves are stocked on a regular basis and, if the carpark is full, there is always the bus?

Long-handled pruners are required for seed collection of fruits from tall trees, such as this eucalypt species east of Esperance.
Photo – Anne Cochrane

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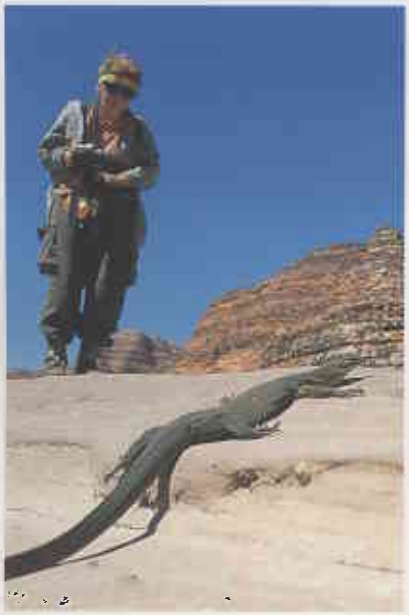
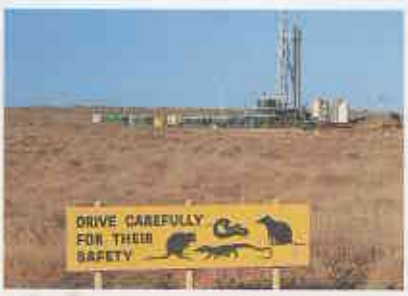
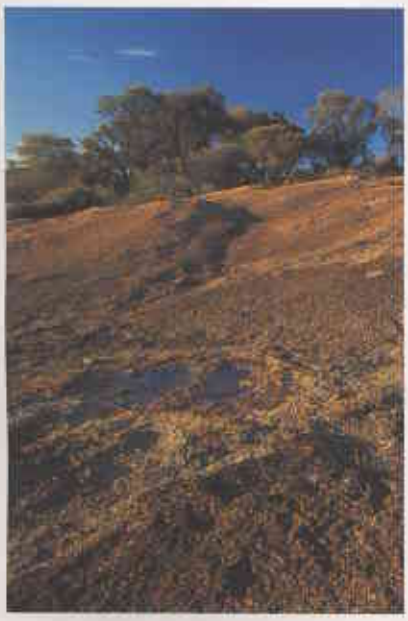


During the past decade more than 500 people have contributed to science projects in WA by joining a LANDSCOPE *Expedition (see page 34).*



Since the 1960s Barrow Island's animals have shared their island paradise with the oil industry. Read how the mammals are being monitored and protected. See page 18.

Georgiana Molloy made a major contribution to the early botanical knowledge of the south-west. Read about this remarkable woman on page 43.



The Goldfields Woodlands National Park protects the region's best examples of eucalypt woodlands (see page 28).

Collecting seeds is one way in which we are helping to conserve biodiversity. Join the 'Hunters and Gatherers for Conservation' on page 49.

FEATURES

REGULARS

COVER

There's something going on in our schools. Students are voluntarily taking an active interest in conserving their local environments. They are visiting forests, beaches and wetlands to study native wildlife. And they are having fun! What is happening and why? See 'EcoEducation—winning over school communities' on page 10.

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