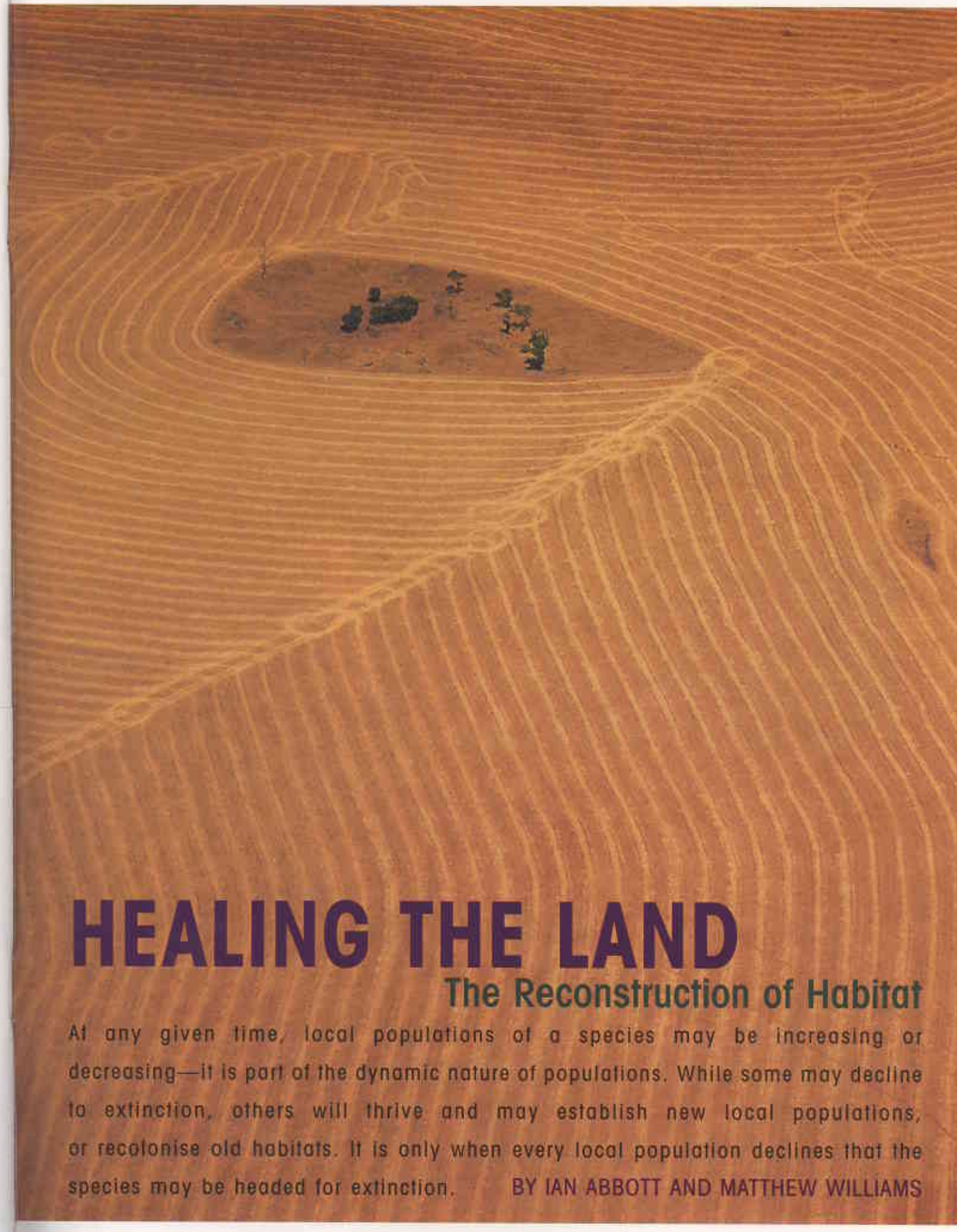


HEALING THE LAND

The Reconstruction of Habitat

At any given time, local populations of a species may be increasing or decreasing—it is part of the dynamic nature of populations. While some may decline to extinction, others will thrive and may establish new local populations, or recolonise old habitats. It is only when every local population declines that the species may be headed for extinction.

BY IAN ABBOTT AND MATTHEW WILLIAMS

On at least five occasions in the past 450 million years, more than 50 per cent of the marine species on Earth became extinct (see box). Once environmental conditions changed, however, new species evolved and the ecological niches left vacant by the extinct species were reoccupied. We are now heading into another of these so-called mass extinction periods. For the first time, humans are present and are themselves responsible for most of the damage (see 'Extinctions in Western Australia' in *LANDSCOPE*, Winter 1997). By applying scientific knowledge, we can lessen the threat and perhaps halt the march towards extinction.

Scientists know from the study of fossils and of islands that extinctions have been frequent in Western Australia during the past 10,000 years. For example, the recently rediscovered Gilbert's potoroo (see 'Lost and Found' in *LANDSCOPE*, Autumn 1995) is known from surface cave deposits on the south coast between Cape Leeuwin and Albany. Most of WA's islands have been isolated for at least 7,000 years as sea levels have risen following the melting of ice held in the polar caps. During this period, many isolated populations are known to have become extinct (for example, tuart and jarrah on Rottnest Island) or are presumed to have died out (for example, singing honeyeaters on Carnac Island).

WHEATBELT ISLANDS

In the WA Wheatbelt, the expansion of a wool and cereal growing industry from about 1890 resulted in extensive clearing of the original native vegetation. In Wickepin Shire, for example, 92 per cent of the original vegetation has been removed. Most of the remainder occurs on private property in small patches no larger than 20 hectares. About three per cent of the original vegetation is retained in natural reserves and other public lands. These fragments, when mapped, resemble an archipelago.

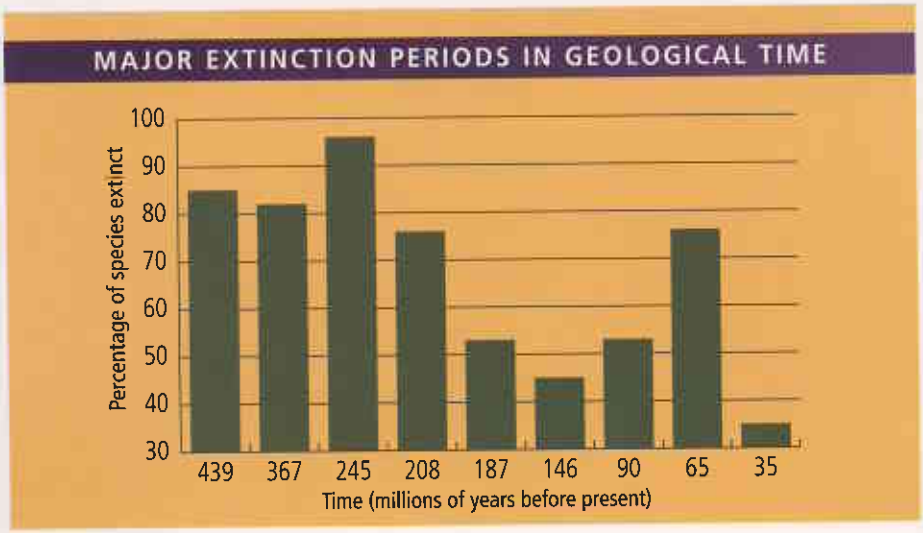
In the early 1970s, Dr Darrell Kitchener of the WA Museum led a team of researchers to document the number of plant, lizard, bird and mammal species present in 23 reserves in the Wheatbelt. Without exception, large reserves were found to hold more species than small reserves. But how do these isolated mainland fragments of original vegetation compare with those of the islands off the south-west coast of WA?

Previous Page
An example of the impact of over-clearing native vegetation on the survival of remnant trees.
Photo – Marie Lochman

Above: The western pygmy possum (*Cercartetus concinnus*), one of many species unable to persist once native vegetation is cleared for agriculture.
Photo – Jiri Lochman

Research shows that the Wheatbelt reserves (most isolated for less than 100 years) still have more species than the islands (isolated for 7,000 years or more). Nevertheless, simply retaining the reserves in their present state will not protect the flora and fauna from the gradual decline that has affected the island species. For a typical Wheatbelt reserve of 115 hectares, the extinctions could be up to two mammal species, six lizard species, 16 bird species and 22 plant species.

Until recently, it was assumed that careful management of each reserve could minimise the losses. This assumption is no longer given credence, because the area of land becoming salty throughout the Wheatbelt has increased dramatically in recent decades (see box on next page). About six million hectares are thought to be susceptible, and rising water tables have the potential at least to impair, if not destroy, much of the reserve system in the Wheatbelt (see 'Healthy Farmland, Healthy Bushland' in *LANDSCOPE*, Autumn 1995).



Half of the 584 nature reserves in CALM's Wheatbelt region are smaller than 115 hectares. These small areas will have little chance of coping with rising water tables. The three largest reserves—Karroun Hill (309,678 ha), Jilbadji (208,866 ha) and Lake Magenta (107,812 ha)—will be the slowest to degrade.

RECONSTRUCTING HABITATS

So what is the solution? It is not enough simply to treat symptoms, like joining up nature reserves with corridors, or trying to save every remnant patch of bush by fencing it off. Rather, it is essential to think strategically and treat the cause of the problem, such as by replanting parts of the Wheatbelt with deep-rooted perennial vegetation so that water tables will again fall (see 'Halt the Salt!' in *LANDSCOPE*, Spring 1997). Once the long-term future of the existing native vegetation is secured, locally extinct species can be reintroduced, and the original floral and faunal habitats can be reconstructed.

The cost of regrowing trees over ten to 20 per cent of the Wheatbelt will be very high, and will need to be borne largely by the public rather than each landowner in the Wheatbelt. Where commercially attractive trees, such as oil mallees (see 'Oil in the Leaves' in *LANDSCOPE*, Winter 1993), can be used, these costs to the public can be reduced significantly.

The WA Museum study of Wheatbelt reserves indicated that vegetation type had an important influence on the distribution of mammals. For example, kwongan, woodland and shrubland hold more mammal species per hectare than mallee. This means that if the preferred habitat types were reconstructed and expanded, and populations of introduced foxes and feral cats were reduced in size, some of the Wheatbelt's rare animal species might flourish once again.

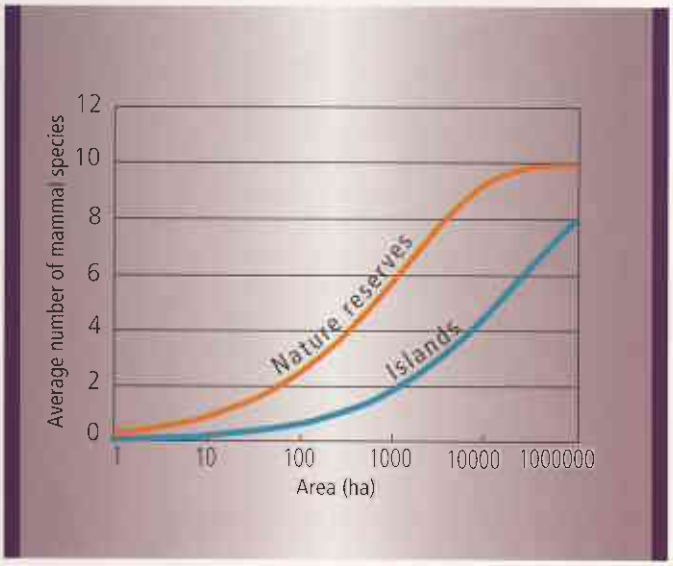
The issue of reintroductions and repatriations of species is controversial. Some people insist that years need to be spent documenting the genetic variation in remnant populations from which individuals will be relocated. They may even hope for a virtual guarantee that none of the translocated animals will die in transit or upon

OVER-CLEARING OF NATIVE VEGETATION

The role that the destruction of native vegetation plays in increasing stream salinity was appreciated in Western Australia as long ago as 1897. By 1905, a number of railway water supplies had become too saline for use in the boilers of steam locomotives. At Cranbrook, a dam (earth tank) was constructed in 1888 and was supplied from a catchment, the centre of which was three kilometres away. For the first few years, the catchment was covered by its original native vegetation. In 1902, the water became saltier and started to cause problems in locomotive boilers. Testing showed that the salty water was coming from the southern side of the catchment—which had recently been cleared. A cut-off drain was constructed to divert this salty water from the dam. Subsequently the dam water remained fresh.

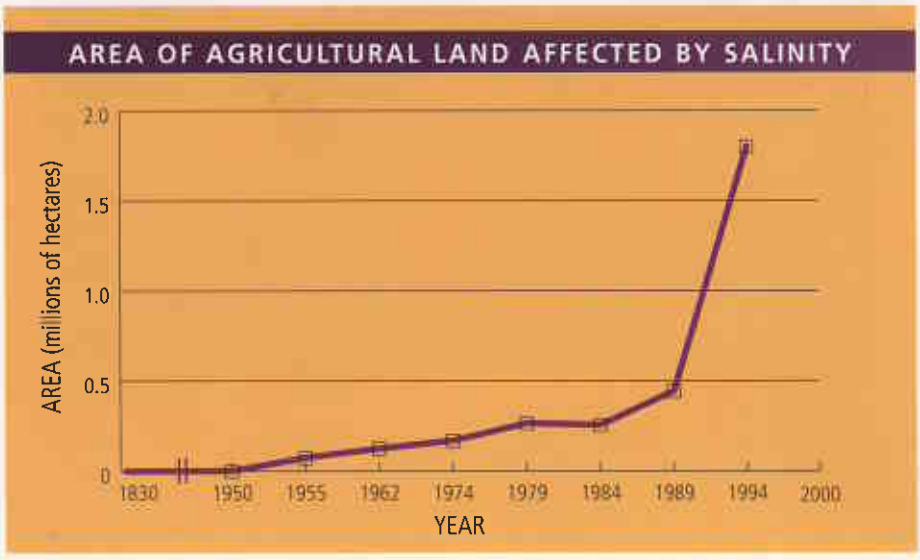
The seminal work from which the above example is taken is a paper published by W.E. Wood in 1924, in the *Journal of the Royal Society of Western Australia*. Wood was an Inspecting Engineer in the Railway Department of WA. Unfortunately, Wood's conclusion was ignored, resulting in the over-clearing of the Wheatbelt.

Extensive clearing of native vegetation has caused this salt damage to much land in the northern Wheatbelt.
Photo – Marie Lochman



Right: Number of species of mammals on Wheatbelt reserves and south-west Western Australian islands, showing the strong influence of area and isolation on species diversity.

Left: Encroachment of salt into remnant eucalypts, resulting in their death.
Photo – Dennis Sarson/Lochman Transparencies



arrival. Others believe that it is practical to attempt some reintroductions now, taking the precautions we already know about, and to monitor carefully. While there will be mistakes, and even some failures, there will certainly be some successes; and every successful repatriation enhances the nature conservation values of the Wheatbelt.

The task of reconstructing these values can be likened to the task of the watchmaker. While it is important to be able to dismantle the watch, place all of its parts on the table and describe each one in detail, it is more important to put the parts back together again and get the watch to work.

A PRACTICAL APPROACH

Using existing science-based knowledge available in CALM, Agriculture WA, the CSIRO and universities, land managers should be able decide which parts of the Wheatbelt landscape are salvageable. Once decided, a deep-rooted perennial vegetation planting program can be established.

The Salinity Action Plan of 1996 was updated last year, and now includes more input from rural communities. In two years, more than eight million trees have been planted. The creation of carbon sinks by the planting of trees has produced another incentive for reversing land degradation caused by rising salinity levels (see 'Farming Carbon' in *LANDSCOPE*, Spring 1998).

Planting vegetation around upland nature reserves will help reduce soil salinity and increase the habitat space for native species. The defragmentation of existing habitats can be achieved by planting belts of vegetation to link remnant patches of native vegetation with nature reserves. Massive planting, supplemented by the pumping of ground water, will also help to restore ecosystem function in lowland areas.

When the degraded land and native habitats have been restored, the final stage would be to reintroduce—in conjunction with effective control of fox and feral cat numbers—the birds, mammals, and other species into nature reserves where they have become extinct.

Only by repairing the damage to lands and habitats can we hope to reconstruct our degraded landscapes, repair the damage done to native species, and halt their march towards extinction.

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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.

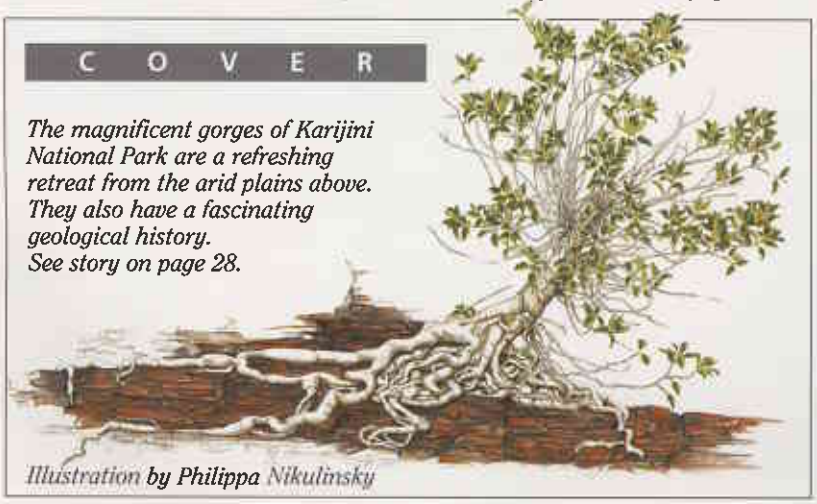
As habitat changes, so do species populations. But just when does a species become threatened? See 'Healing the Land' on page 49.

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.



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