Extinctions in Western Australia

By Ian Abbott

Many populations of western Australia's plants, mammals and birds are now extinct. Do we know enough to detect a pattern?

Since Europeans began to settle Western Australia in 1826, many populations of native plants and animals have become extinct. We know one of the major reasons for this; it results directly from clearing the land. Much of the original vegetation was removed to build towns and farms, then to develop industry.

As we might expect, some species that existed entirely within areas heavily affected by development have become extinct, while other species with only part of their range affected have suffered local extinctions. However, even untouched tracts of land might not be wildlife havens; populations of some species seem to have been wiped out by imported predators.

Our knowledge of which plants and animals have gone extinct from which areas is not complete, but we do have some reliable information. For birds and mammals in particular, we know how they were distributed and how they are distributed now. If we look at extinctions of populations as well as of species, and examine locations, we can see a clear pattern emerge.

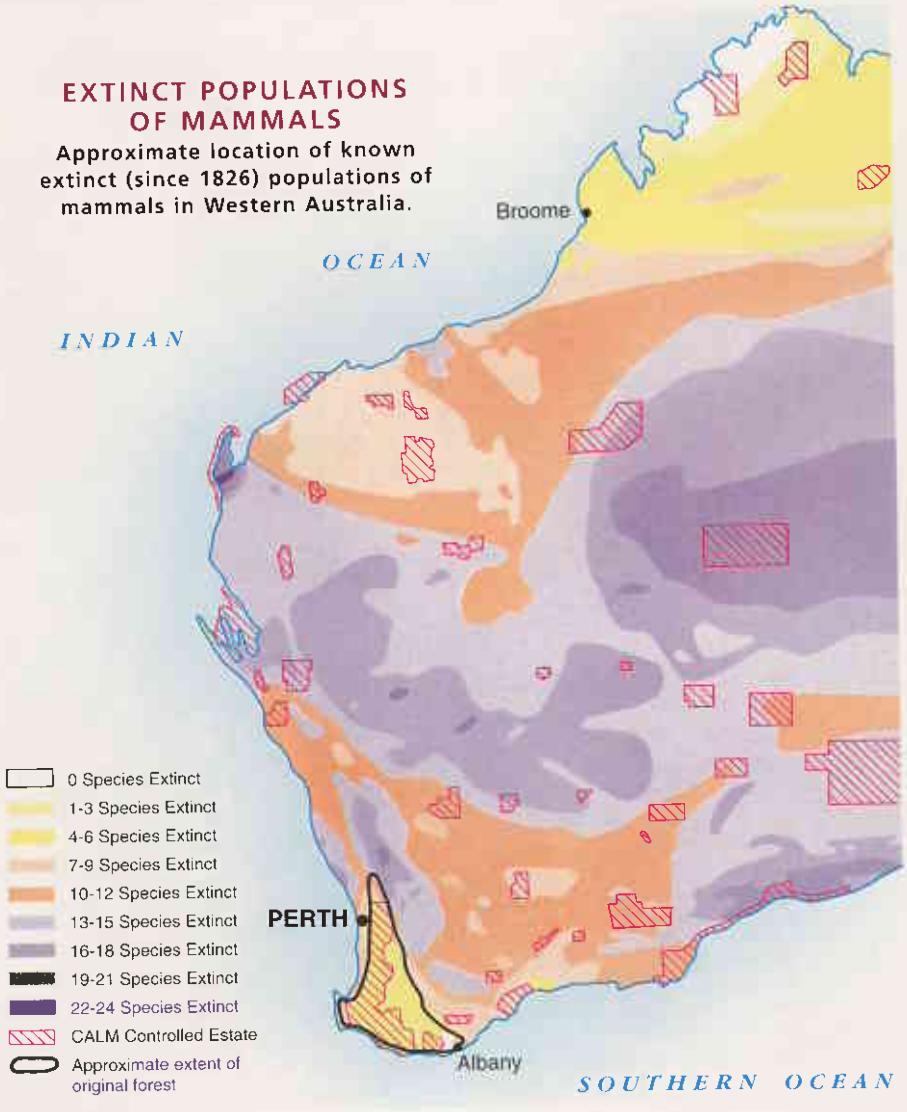
MAMMALS

The only part of the State free of any mammal extinctions is the extreme northern Kimberley. The remainder of the Kimberley and the forested part of the south-west retain the next most intact mammalian fauna.

Mammals are good indicators of environmental changes. Their bones, larger and less delicate than those of birds, last for a long time in protected places. It is helpful that barn owls (*Tyto alba*), for example, through their predation of small mammals over long periods, build up extensive deposits of pellets containing indigestible bones in their roosts in caves. The cave systems between Cape Naturaliste and Cape Leeuwin, in Cape Range, and in the Nullarbor Plain are rewarding sites for palaeobiologists to investigate this dateable evidence, and reveal much about the occurrence of mammals before and since the advance of European disturbance. Additionally, as with birds, the quest of early collectors for new species and subspecies of mammals, together with knowledge acquired by

EXTINCT POPULATIONS OF MAMMALS

Approximate location of known extinct (since 1826) populations of mammals in Western Australia.



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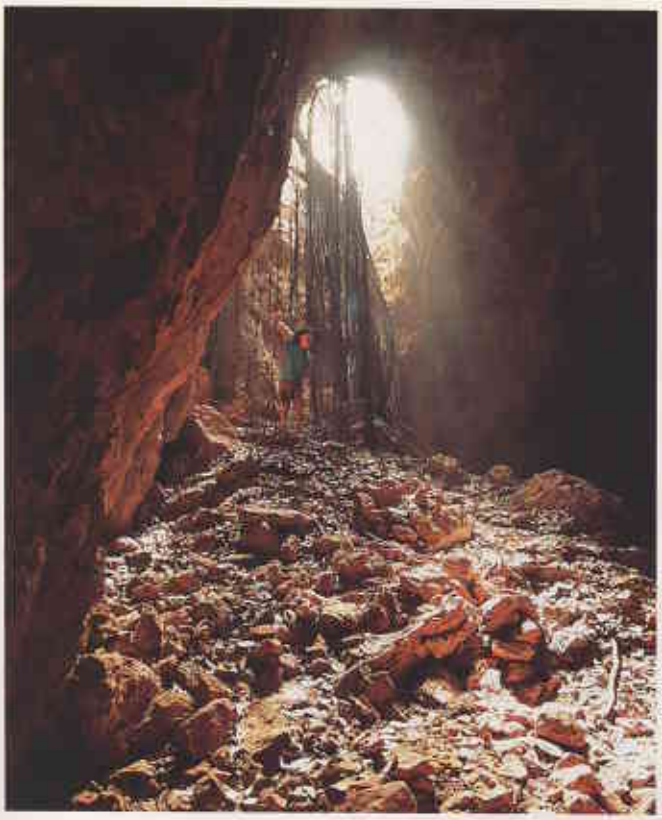
Main: Bracken (*Pteridium esculentum*) is a common fern in the south-west of WA. Unusually for a fern, it thrives away from moist situations and regenerates quickly after fire.
Inset: Fossilized teeth discovered in Mammoth Cave near Margaret River.
Photos – Jiri Lochman

Above: The malleefowl has disappeared from much of its original range in WA largely as a result of predation by the fox, which arrived in the State only 70 years ago.
Photo – Babs & Bert Wells/CALM

Left: The map of extinctions has been compiled from individual species maps produced by Dr Alex Baynes (WA Museum), Dr Andrew Burbidge and Norm McKenzie (both of CALM).



Above left: An owl roost in a cave in Cape Range National Park.
Photo – Geoff Taylor/Lochman Transparencies

Top: The barn owl (*Tyto alba*) is a common species of owl in WA.
Photo – Bill Belson/Lochman Transparencies

Above: The black-footed rock-wallaby (*Petrogale lateralis*) has disappeared from more than 90 per cent of its original range in WA as a result of fox predation.
Photo – Babs & Bert Wells/CALM

early explorers and obtained more recently from older Aborigines, tells us fairly accurately where mammals were originally distributed.

Populations of mammals that have become extinct show a completely different pattern from birds and flora. Most extinctions have occurred in places remote from European settlement—the Gibson Desert, Cape Range Peninsula and parts of the Nullarbor. These extinctions probably reflect various combinations of the same reasons: cessation of Aboriginal burning, predation by foxes and cats, climatic change, and habitat destruction by rabbits.

BIRDS

As the map on page 52 shows, there have been few known bird extinctions over the bulk of the State. Some birds are known to have gone locally extinct in parts of the Kimberley, the Nullarbor Plain and the Wheatbelt, but most have occurred on the Swan Coastal Plain, particularly the western suburbs of Perth. Across this wide range of places there are several likely causes, including destruction of habitat by cattle (riverbanks in the Kimberley), by rabbits (the Nullarbor), by sheep farming (the Wheatbelt, the Swan Coastal Plain and the area east of State forest), by wheat growing (the Wheatbelt), and by urbanisation (such as the Perth and Albany areas).

The original distribution of bird species in Western Australia is well understood, owing to their interest to ornithologists, collectors of eggs (in earlier times) and bird watchers. In the early decades of this century, there was intense rivalry between scientific collectors to secure and name new species or subspecies. This resulted in newly settled or explored areas being investigated when in a near-pristine state.

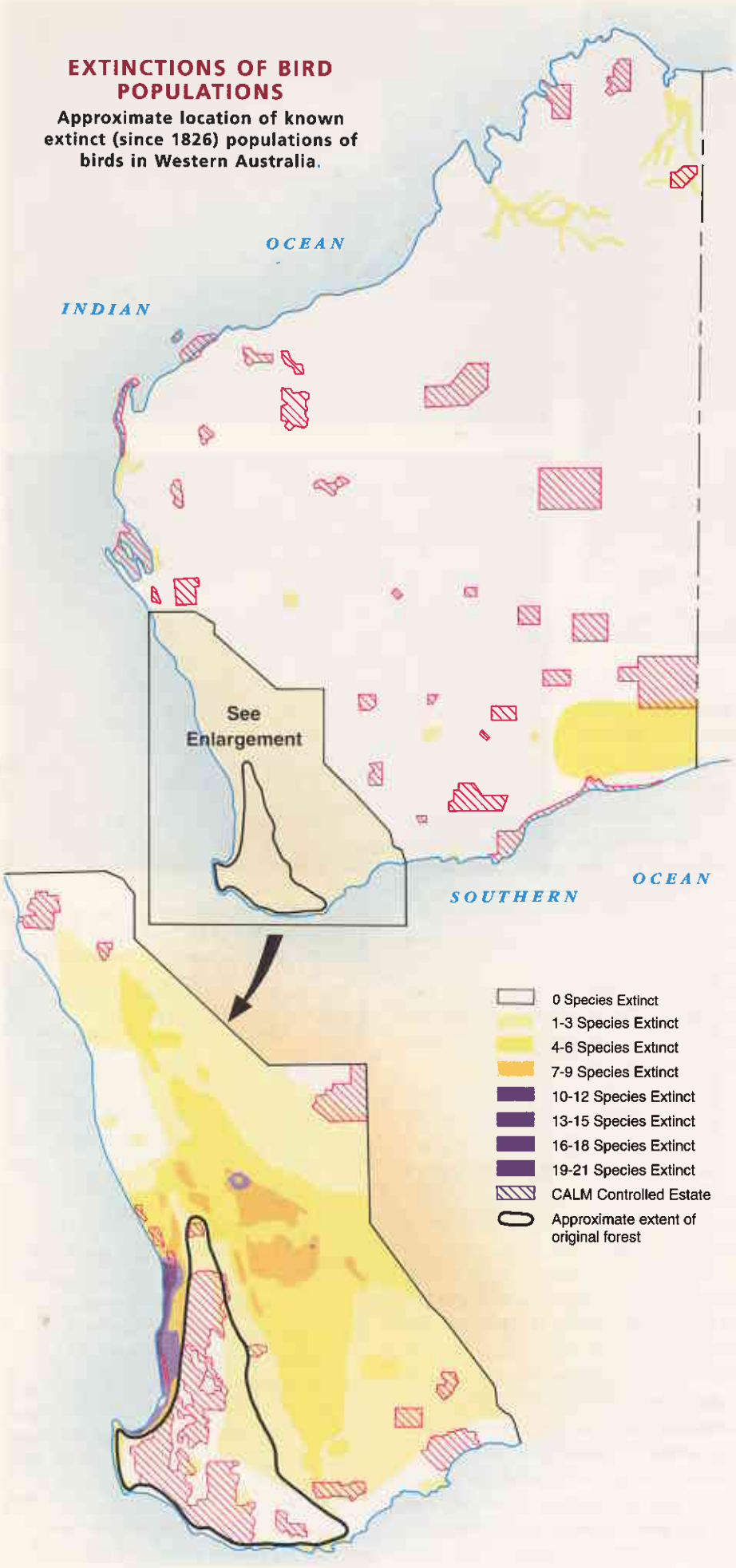
Between 1980 and 1991, the then Curator of Birds at the WA Museum, Dr Glen Storr, synthesised one million records of bird distribution and published these as information about the original and current distribution of all bird species present in WA.

In the south-west, the general absence of extinctions from State forest is noteworthy. The noisy scrub bird has become extinct in areas of forest outside State forest. Malleefowl (*Leipoa ocellata*) have disappeared from forest or woodland near Lake Muir; they may have succumbed to predation by foxes, which arrived in the area in the 1930s. Malleefowl occur in small numbers in parts of State forest (see 'Living with Logging', *LANDSCOPE*, Summer 1995–96).

Lewin's rail (*Rallus pectoralis*), last observed in 1932 southwest of Bridgetown, is the only recorded extinction in State Forest. The cause of the rail's demise in the forest is unknown, as it also disappeared from its two other known locations outside State Forest. Moreover, the rail occurred in swamps, which are unlogged (see Bush Telegraph, *LANDSCOPE*, Winter 1996).

PLANTS

Even though there are far more species of plants than of birds and



mammals, we know far less about them. We can only document plant extinctions at the level of entire species, not populations.

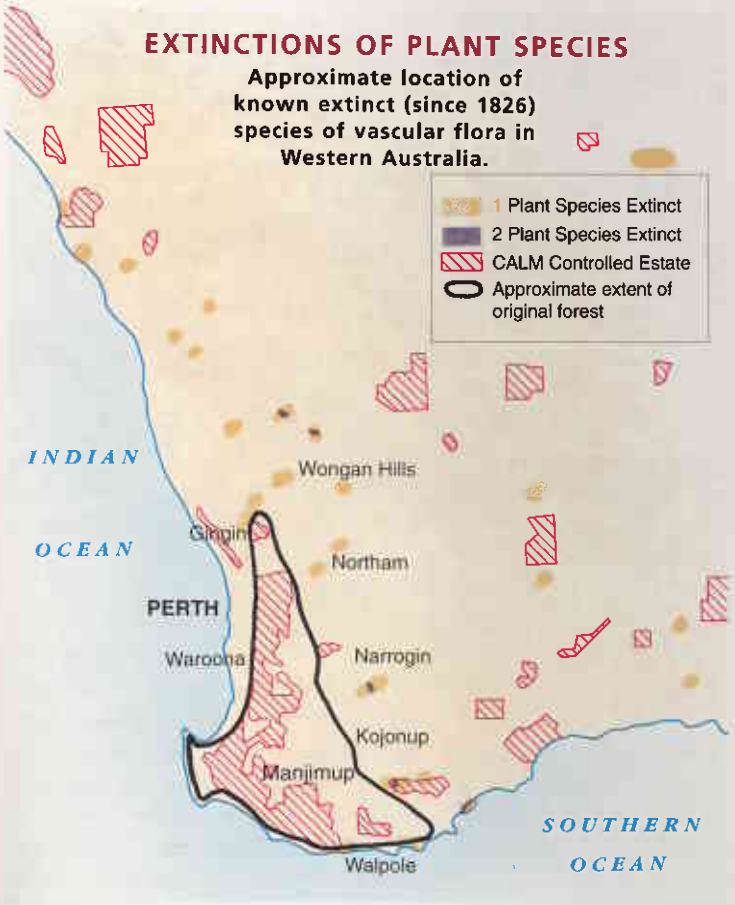
CALM keeps an updated list of 'presumed extinct' species of flora, which is published from time to time in the Government Gazette. Unfortunately, the original geographic range of 14 of these species is unknown, except somewhat vaguely as WA or south-west WA; clearly, the locations of these species cannot be mapped. For the remaining species, the WA Herbarium's computerised database provides data that have been used to map the location of extinctions.

So far as we know, no flora species became extinct outside the area mapped. For example, no species are extinct in State forest. Most extinct species were located in the semi-arid part of the State now largely cleared for wheat growing.

ENDLESS CHANGE

Local extinctions of populations and extinctions of species are part of the endless change characteristic of nature. They usually depend on changes in climate and vegetation; for example, scientists from the WA Museum have speculated that karri forest may have come to dominate the southern part of the south-west capes region only as recently as 10 000 years ago. Bones extracted by WA Museum scientists from caves between Capes Leeuwin and Naturaliste show that the so-called 'local' mammal fauna has changed considerably over thousands of years. Animal species moved in or out of the area gradually as the surrounding vegetation steadily altered from heath to forest in response to climatic change.

Such local extinctions occur naturally and periodically even without the intervention of humans, and with modern techniques are easy to deduce. The Tasmanian devil (*Sarcophilus harrisii*) was present in Devil's Lair Cave 12 000 years ago. Hair from another cave was radiocarbon-dated at 430 years before the present, indicating that devils lived in the area as late as 1520 AD. Koalas (*Phascolarctos cinereus*) and wombats (*Vombatus ursinus*) were present in areas near these caves up to 30 000 years ago. Rock wallabies (*Petrogale lateralis*) were there until 5 000 years ago. The bones of echidnas



(*Tachyglossus aculeatus*) have also been found, though the species was not present in the region when settlers arrived in the 1830s.

During the past 1.6 million years, the glaciers and ice caps of the Earth have advanced and retreated more than 20 times. Global sea levels and weather systems have consequently changed. Our planet is presently in the interglacial phase of the cycle, as the glaciers have retreated. However, there is little doubt that glacial conditions will once again return in the distant future.

Going back further in geological time reveals even more dramatic change. In the Jurassic Period (208–144 million years ago), what is now Western Australia supported a flora dominated by podocarpacean and araucariacean conifers, and by cycads, lycopods and ferns. In the Palaeocene and Eocene Epochs (66–36 million years ago), most of the southern part of the State was covered by rainforest dominated by *Nothofagus*, *Araucaria*, *Podocarpus* and *Dacrydium*. Most of these plant species have failed to survive in south-west WA to the present day.

Of the Gondwanan plant species that still remain, most are widespread, though restricted to wet peaty soils, runoff areas from granite outcrops and/or moist shaded locations. These include *Lycopodiella, Phylloglossum, Isoetes, Selaginella,* and most ferns. Some species, however, have adapted to the inhospitable jarrah forest and its fire-prone environment (for example the ferns *Pteridium esculentum* and *Lindsaea linearis*, the cycad *Macrozamia riedlei*, and the shrubby podocarp *Podocarpus drouynianus)*.

Change and adaptation: these are the two key factors in the fate of a species, in whether it survives or becomes extinct, locally or entirely. With careful observations and the help of modern science, it is quite possible to detect patterns in the changing distributions of species, especially areas of extinctions. This information has a practical use: it is a sound foundation for reintroducing species to their former localities if and when the threatening processes responsible for their local extinction can be abated or reversed.

Top: The fern *Lindsaea linearis* occurs throughout the lower south-west, but is not restricted to damp areas and has adapted to the fire-prone environment of the south-west.
Photo – Babs & Bert Wells/CALM

Above: Zamia (*Macrozamia riedlei*), a widespread cycad in the south-west of WA. Cycads were a very common component of the vegetation more than 100 million years ago.
Photo – Marie Lochman

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Noisy scrub-birds are rare in museum collections. This one, from a Dutch Museum, was probably collected by John Gilbert. See page 36.

This year, The Hills Forest celebrates its fifth birthday. Find out what's been happening there in our story on page 10.

The Kimberley region of Western Australia has some weird and wonderful landforms. Read all about them on page 16.

Mount Bakewell looms over the old town of York, but it is more than just a prominent landmark. Find out why on page 42.

The northern quoll is just one of WA's marsupials that have been part of a recent conservation status review. See page 22.

COVER

Get down on the ground, scramble through the leaf litter and compost in your garden, and discover the fascinating world of insects. 'Insects in the Garden', on page 28, shows how these seemingly insignificant creatures help keep the ecosystem running smoothly and how they are a vital part of nature's life-cycle.

Illustration by Philippa Nikulinsky

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