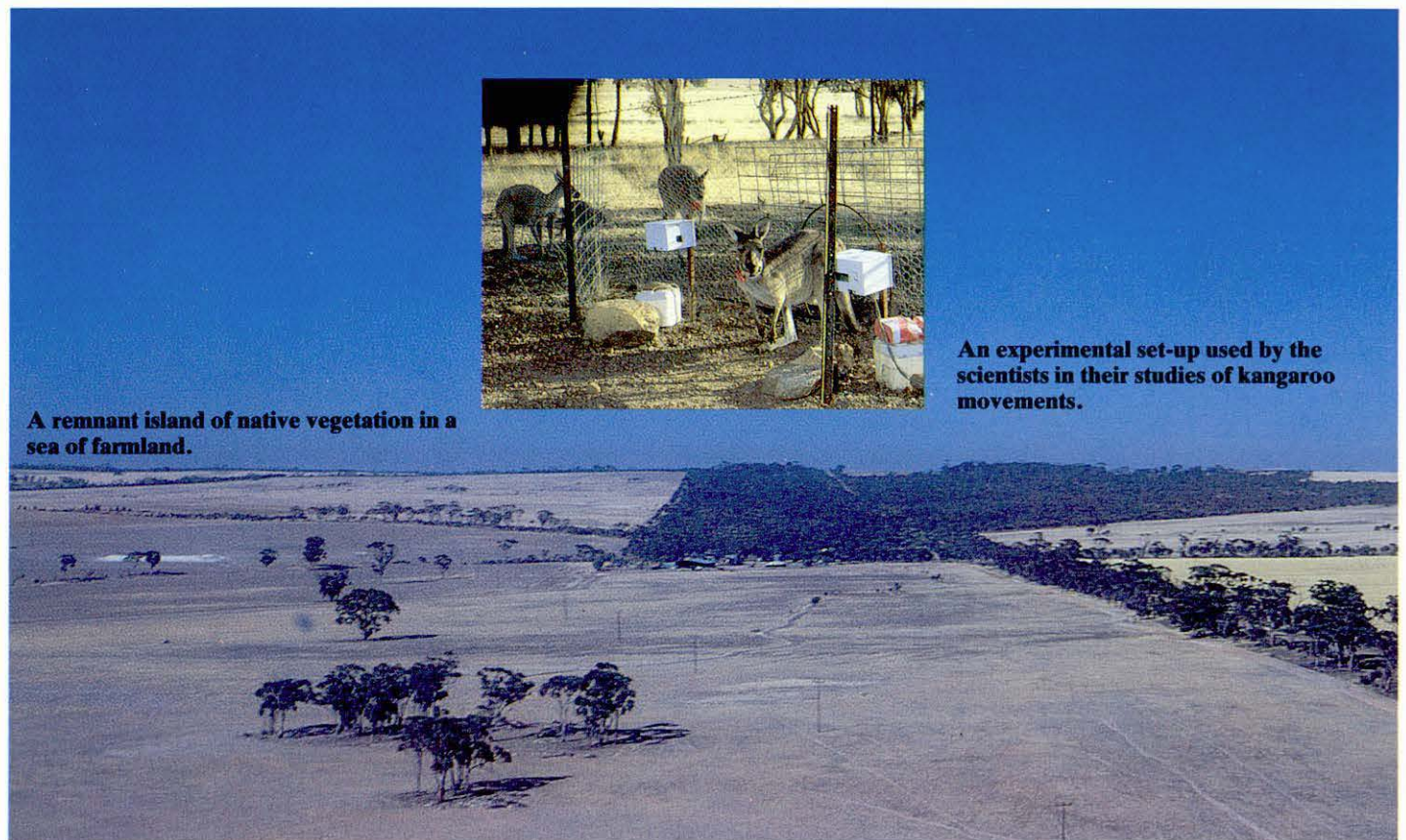


# Kangaroos on the farm



A remnant island of native vegetation in a sea of farmland.

An experimental set-up used by the scientists in their studies of kangaroo movements.

Since European settlement, much of the woodland, heath, and scrub in the south-west of Western Australia has been cleared for agriculture. Unfortunately, this has had a devastating effect on the native wildlife, especially the mammals. How can we ensure that we conserve what's left?

The animals that still call the area home have survived by making a living in residual patches of native vegetation (the so-called remnants, described in *Ecos* 53), or by adapting to feed on crops, or by a bit of both. But many of the remnants do not provide the haven they may appear to. Ranging in area from a few hectares to about 2000, they seldom contain the vegetation communities of the original landscape in the correct proportions and so cannot support the density of animals they did before fragmentation occurred. Many of these areas are merely rocky outcrops that could not be cultivated, or small, isolated clumps of trees.

Biologists know that 13 mammals have become extinct in Western Australia. Five species are gone from the wheat belt, four exist there only in a few locations, and only three native mammals — the echidna, the

western grey kangaroo, and the euro (also known as the common wallaroo) — remain relatively common. Many farmers continue to shoot kangaroos and wallabies in the belief that these animals erode productivity. Can farming and the remaining kangaroos coexist in the wheat belt?

Helping to answer this question is Dr Graham Arnold of the CSIRO Division of Wildlife and Ecology's Perth laboratories. Over many years, his work, and that of his colleagues Mr John Weeldenburg and Ms Dian Steven, has provided a wealth of information on the habits of the region's kangaroos. The backbone of the research was a detailed survey of kangaroo numbers in 446 measured patches of bush across four shires, covering 1700 sq. km of Western Australia's central wheat belt.

The scientists also carried out more detailed observations of two large rem-

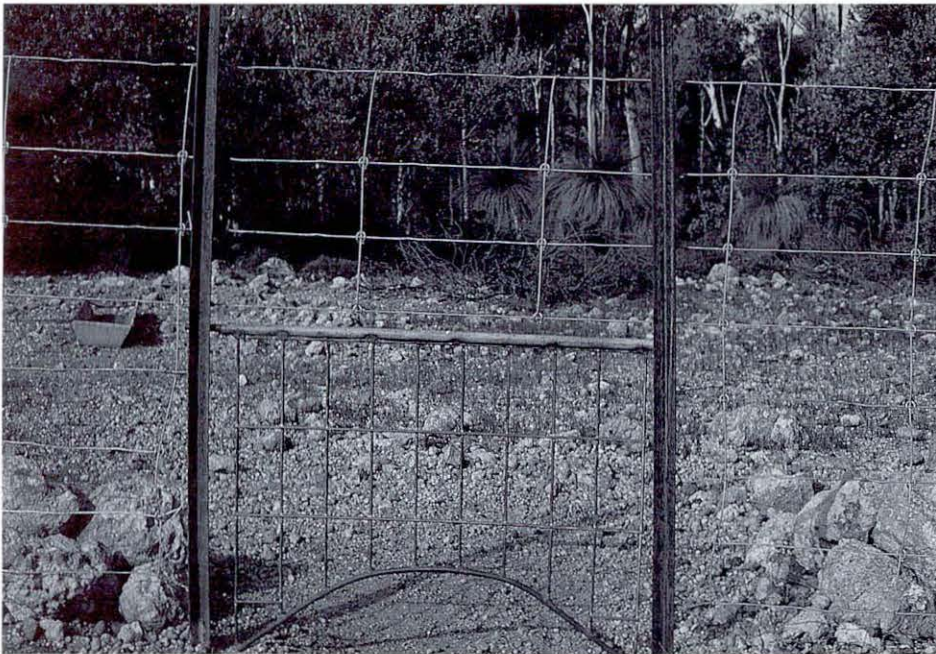
nants. For 11 years they surveyed a 300-ha remnant of wandoo woodland, with relatively easy access to farmland, and its population (from about 95 to 200) of western grey kangaroos. They also monitored the effects on farmland of kangaroos from the 2200-ha Tutanning Nature Reserve, near Pingelly.

## No place like home

Both studies showed how much kangaroos like their 'home range', or living area. Each animal has its own range, although overlapping usually means other individuals live in it too. The size varies from 50 to 150 ha, depending on how good the habitat is and on the sex of the animal. (Large breeding males have large home ranges that may encompass those of several females.) Parts of the range are used for shelter, others for feeding. Dr Arnold's detailed tracking showed that most individuals move, on average, only 400 to 500 metres in a day. Most kangaroos have a strong 'bond' with their home range and, although they may make occasional forays outside it, generally spend their entire lives — up to 20 years — within it.

The biologists found several examples from the wandoo remnant of what Dr





This 'kangaroo-gate' lets kangaroos through, but not Merinos.

Arnold terms 'high fidelity' to home ranges. They caught one female at the same site 18 of the 21 times that they found her over 8 years; and they caught another in the same place 12 times out of 12 during a period of 9 years. There's no doubt that these western greys are very sedentary. Despite their athletic abilities when hopping, kangaroos don't like moving just for the sake of it!

Their fondness for home has important implications for their management. If a farmer shoots kangaroos in one area, then any remaining animals from another area are unlikely to move into that territory, preferring to remain in their own home ranges. It could be several years before a few adolescents leave their mothers' original ranges to find their own, and take over the vacant territory. Thus localised culling, rather than attempts at wholesale eradication, may be sufficient to ameliorate any damage that kangaroos in an area are doing to farmland.

### How much damage?

But how much real damage can kangaroos in the wheat belt do to farmers' pockets?

Many patches of remnant bush cover less than 10 ha, and only a small proportion exceed 50 ha. Most, therefore, do not provide enough area for permanent kangaroo home ranges. So the animals must use a group of remnants and the surrounding farmland in order to survive.

Dr Arnold's research is still clarifying how far individuals will be prepared to move between patches of bush, and how many such areas make up a home range. Surveys have revealed that in some cropping areas, where only 2–3% of the land is bush, as few as 10 kangaroos may live in 100

sq. km. Furthermore, if the remnants are widely scattered, with only one or two animals based in each, then the males may have only a slim chance of bumping into females during oestrus. Whether kangaroos will persist in such heavily farmed areas is doubtful.

In other areas with more bush — and especially one or two large patches — kangaroos probably can persist. If they do, what continuing effects will they have on the surrounding farmland? To help answer this, Dr Arnold and his team observed the numbers of animals on farmland around the Tutanning Nature Reserve during their 6-year study of the population there.

They found that, yes, kangaroos would indeed go and nibble in the farmlands — mainly at night. They saw more kangaroos on paddocks planted with crops than on pasture. But most of the kangaroos remained in the reserve; of the total population, each year only about 5% were seen on farmland. (The exact percentage varied from year to year, being highest during a year of very low winter rainfall.)

What's more, most of these shy animals ventured no more than about 100 m from the reserve, so damage was confined to just that area. Annual crop losses were only about 1% of a paddock's yield.

Around the 300-ha wandoo woodland remnant, the kangaroos made a little more use of the surrounding land. They showed a special liking for lupins, eating up to 95% of the experimentally sown crops that were close to small holes (called 'pop' holes) that the animals made in or under the fence along the edge of the woodland. (To be strictly accurate, it's possible that this did not reflect a preference for lupins, but sim-

ply indicated that the plant might have been more easily destroyed than other crop species.) Wheat and barley suffered less, and with oats the figure was only 24%.

The animals preferred to remain within 100 m of the wood. And although some moved out as far as 400 m in order to feed, they never grazed beyond that. If cropping were kept at least that distance from all remnants, then probably no damage would ever occur on farms. However, such a wide buffer may not always be practical.

### Gates and fences

So, other solutions may be necessary. Dr Arnold's work showed that strong fences with two barbed wires will prevent nearly all kangaroos from gaining entry to a paddock. Euros are different; they go under fences, so a barb is needed along the bottom. Many farmers don't object to a few roos *per se* on their pasture, but dislike the damage they may do to fences, which can then allow sheep to roam.

The CSIRO scientists have designed a special kangaroo access gate, which they have used for many years on their own experimental station. Kangaroos quickly learn to work these swinging gates in the fence (which offer entry to pasture from a patch of bush and the ability to return), but sheep (Merinos) do not. Ideally, areas of bushland should be fenced off anyway, to help prevent trampling of seedlings and shrubs by stock. (See the *Ecos* 62 article on rural dieback.)

Dr Arnold has established that more than 95% of crops in the wheat belt are never visited by kangaroos anyway. Therefore, landholders face only relatively small losses from animals that constitute a unique part of Australia's natural heritage. The essential question is, are some farmers willing to bear small losses in order to support kangaroos?

Roger Beckmann

### More about the topic

The use of surrounding farmland by western grey kangaroos living in a remnant of wandoo woodland and their impact on crop production. G.W. Arnold, D.E. Steven, and J.R. Weeldenburg. *Australian Wildlife Research*, 1989, **16**, 85–93.

Variations in distribution of western grey kangaroos, *Macropus fuliginosus ocydromus*, in the Tutanning Nature Reserve and their impact on adjacent farmland. G.W. Arnold and D.E. Steven. *Australian Wildlife Research*, 1988, **15**, 119–28.

Can kangaroos survive in the wheatbelt? G. Arnold. *Western Australian Journal of Agriculture*, 1990, **31**, 14–17.