# Loss of woodland threatens cockatoos



With their raucous cries and their round-headed, almost hawk-like silhouettes against the sky, cockatoos are among the first creatures to impress the visitor to the Australian 'bush'.

Although not restricted to this continent, these large parrots have their stronghold here. The screeching of little corellas at dawn and the pink-and-grey twisting of a flock of galahs in the evening sun are as evocative of Australia's open spaces as any kangaroo or gum tree.

To the regret of many farmers, the little corella and the galah, both voracious grain-eaters, do not face extinction, but the related white-tailed black cockatoo could suffer a decline in numbers if we do not manage our woodlands more thoughtfully.

Like other cockatoos, the white-tail nests in ready-made hollows in trees. Some of these cavities are caused by insects, particularly termites, chewing the heartwood, but many are formed by fungi that either attack the roots and work their way up the centre of the trunk or infect an open wound caused by fire or the loss of a limb. The moulds decompose the wood, the wind sways the tree and compresses the rotten fragments, leaving a hollow at the heart of the trunk, and a new home for a pair of cockatoos is created. When a fungus-ridden branch snaps off, the home has a front door and the birds can move in. Older trees form large enough hollows for the cockatoos, which therefore thrive among mature eucalypts.

There are two types of white-tailed black cockatoo (see the box). The longbilled form lives in areas of higher rainfall (more than 750 mm a year) and as suitable woodland abounds this bird is in no immediate danger, but the short-billed form is threatened. The lower-rainfall woodland in which it breeds is being cleared for agriculture, especially wheat-growing. Felling even extends to the roadside verges, thus destroying important corridors between reserves.

#### Other hazards

Where the trees are spared, cockatoos can still face hazards. Dr Denis Saunders of the CSIRO Division of Wildlife Research has found that the short-billed cockatoo eats the flowers and seeds of many shrubs and herbs outside the woodland — for example, on sand-plain heath. This food supply, that includes native plants such as banksias, hakeas, and grevilleas and the introduced crowfoot (*Erodium* species), is dwindling as land is cleared



Birds not of a feather: when the floor between two nests collapsed, a young long-billed corella dropped in on its neighbour, a nestling white-tailed black cockatoo.



White-tailed black cockatoos are restricted to a corner of Western Australia. The short-billed form nests mainly within the range of a eucalypt, wandoo, dispersing more widely outside breeding seasons. Long-billed birds spend the whole year in higher-rainfall areas. The map shows where short-billed birds have been seen during and between breeding seasons.

for farming. The importance of a good supply of these plants emerges strikingly from a comparison of two of the study areas in which Dr Saunders has been working in Western Australia.

At Coomallo Creek, where large areas of land remain uncleared, the birds spend the whole year within 50 km of their nests. At Manmanning, on the other hand, the breeding cockatoos forage in cleared farmland where the birds' food plants are scarce. Consequently the nestlings are fewer, grow more slowly, and weigh less by the time they fledge. After the breeding season the Manmanning birds migrate to the coast to eat the more-plentiful seeds of native plants and exotic pines. This study emphasizes how clearing around woodland could eventually force the cockatoos out of a region.

Another threat comes from grazing within woodland. Among the juicy plants to be devoured are the young saplings that represent the woodland's future. Without regeneration, the woodland slowly dies. Sadly, animals roaming illegally off private land into reserves cause some of this damage, undoing the good intended when such sanctuaries were set up.

Also outside the law are those cagebird fanciers who cut into a tree to steal a nestling cockatoo. Since these people cut

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their access hole near the floor of a hollow, no adult cockatoos will use that site again unless the floor collapses to make the hollow acceptably deep. If this happens, the nest-robbers sometimes return to repeat their breaking and entering at the new nest's position. Dr Saunders found a tree with three holes, signifying three successive robberies. He even had to abandon one study area, mainly because it had suffered so much human predation.

Of course, nest hollows have a limited life. Branches or whole trees blow down; ceilings and floors of hollows collapse. Fire burns a hollow tree quickly and completely. These natural agents of destruction must have been operating for thousands of years without posing a threat to cockatoos, but human interference has drastically tipped the balance, and Dr Saunders has found that hollows are being destroyed faster than new ones are forming.

#### Choosing a nest

Turning to the bird's taste in nest sites, Dr Saunders found that the short-billed form of the white-tailed black cockatoo will use hollows in any eucalypt species, provided the entrance is at least 15 cm in diameter (birds back in, and will damage their plumage if they scrape against the sides of the hole) and the hollow is at least 10 cm deep. The birds showed no preference for holes facing any particular direction, including vertically upwards, or for any particular hole size, depth of hollow, height of the entrance above ground, or material lining the floor. Their breeding success was the same in all the sites used.

The birds do not snap up every available site. Only about 40-45% of hollows suitable for the cockatoos were occupied by birds of one species or another. Dr Saunders has discovered that, although many hollows remain untenanted, the behaviour of the female prevents other cockatoos from moving in as close neighbours.

For 2-3 weeks while she is choosing and preparing the nest, the female chases other female black cockatoos from the immediate vicinity. Once she begins to incubate, she stops harrying other birds, but as the breeding season is only about 13 weeks long her behaviour must restrict the population density to some extent. Dr Saunders did find one tree holding three occupied nests, but the females had 'queued up' to move in.

#### Strange bedfellows

Cockatoos share their woodland with a variety of other hole-dwellers, including kestrels, barn and boobook owls, and other parrots, but most of these species choose smaller hollows than the cockatoos. Even galahs are unlikely to compete for homes, as they seem to prefer nest sites with smaller entrance holes than black cockatoos will accept.

If you peer into enough private residences, you will eventually come across some unorthodox cohabitants, as Dr Saunders confirmed one day when he was greeted by two very different nestlings — one a white-tailed black cockatoo, the other a long-billed corella sharing a hollow.

Originally the youngsters had lived in adjacent cavities like flat-dwellers, with the corella 'upstairs', but the intervening floor collapsed and the two nestlings found themselves in one large hollow with two entrances. They both fledged successfully.

An even stranger episode involved a red-tailed black cockatoo, *Calyptorhynchus magnificus*. When the nestling was about 25 days old, a female mountain duck chose to lay her eggs in the same hollow.

Eventually the young cockatoo found itself sharing its home with a clutch of nine duck eggs. Its parents brought food by day, when the female duck was away, and the duck incubated her eggs during the chilly winter nights. Although the nest was unusually crowded, the ducklings all hatched and the cockatoo satisfactorily fledged in due course.

Less fortunate were the white-tailed black cockatoos in two nests invaded by swarms of bees. Persistent in their hive

	field observations (%)	
plant	breeding	non-breedin
genus fed on	season	season
* Hakea	73	14
* Erodium	11	
* Dryandra	9	7
* Lambertia	4	1
* Banksia	3	16
Eucalyptus	_	59
*Emex		2
* Lupinus		2

The diet of one group of short-billed white-tailed black cockatoos. In the breeding season shrubs and herbs, with some insect larvae found in the flowers, made up the whole diet. construction, the bees forced the cockatoos to abandon their nests, one with eggs, the other housing a nestling.

Such observations are the highlights in a great deal of routine. The tagging, measuring, and observing will continue, giving us an increasingly detailed understanding of the biology of these interesting birds. This knowledge will be invaluable for conservation — that is, if it can be applied in time. The greatest danger is that grazing will prevent most of the woodland — the cockatoos' very home — from regenerating.

And that danger is not unique to this part of Australia; it exists in much agricultural country. A large proportion of Australia's birds, almost 19%, depend upon tree hollows for breeding or shelter, and if the woodland goes they go too.

Small wonder that Dr Saunders would like to see guidelines for woodland management drawn up - and adhered to.

John Seymour

#### More about the topic

- The availability of tree hollows for use as nest sites by white-tailed black cockatoos. D. A. Saunders. Australian Wildlife Research, 1979, 6, 205-16.
- Food and movements of the short-billed form of the white-tailed black cockatoo. D. A. Saunders. *Australian Wildlife Research*, 1980, 7 (in press).
- Simultaneous use of a nesting hollow by a cockatoo and a duck. D. A. Saunders. *Emu*, 1976, **76**, 223–4.

### The black cockatoos' family tree

The white-tailed black cockatoo is restricted to south-western Australia, and occurs in two distinct forms, living in rather different habitats. After making many measurements of birds and eggs, and analysing calls, diets, and distributions, Dr Denis Saunders of the CSIRO Division of Wildlife Research has suggested how these two forms arose.

In a much wetter period of Australia's evolution, woodland stretched across the southern part of the continent, holding a continuous population of black cockatoos.

As the climate became drier in late Pliocene or early Pleistocene times, perhaps two or three million years ago, the woodlands shrank into the southern corners of Australia, in the south-west and south-east. If Dr Saunders is right, the long-billed form of the white-tailed bird is descended from the cockatoos that were isolated in the south-west at that time. Those birds that headed the other way gave rise to the modern yellow-tailed black cockatoos of south-eastern Australia.

The Saunders theory is that, during one of rainier spells of the Pleistocene age, some yellow-tails crossed what is now the Nullarbor Plain into Western Australia and gave rise to the modern short-billed form. By this time the two populations had evolved a number of differences: they did not interbreed and they have remained distinct ever since.

Why both the cockatoos in the southwest should have abandoned yellow for white is a mystery. Indeed, some individuals of both the long- and short-billed forms do have yellow plumage where the rest of the population have white — in the cheek patches, on the tail, and around the edges of many of the wing and body feathers.

As a result of his researches, Dr Saunders has recommended that the shortbilled form of the white-tailed bird should be transferred from the species *Calyptorhynchus baudinii* into the same species as the two forms of yellow-tailed black cockatoo, *C. funereus*. This leaves the long-billed white-tailed bird as the only remaining representative of *C. baudinii*.

Distribution and taxonomy of the whitetailed and yellow-tailed black cockatoos Calyptorhynchus spp. D. A. Saunders. Emu, 1979, 79, 215-27.