Counting Cockatoos

The status of the forest red-tailed black-cockatoo

Is this bird rare or just rarely seen? Has human impact had anything to do with its apparent rarity? A recent survey by CALM helps shed some light.

BY IAN ABBOTT

Restricted to the forests of the lower south-west of Western Australia, the forest red-tailed black-cockatoo is rarely encountered by ornithologists and bird-watchers. But is it truly rare, or does it just appear to be rare because it lives in remote areas infrequently visited by ornithologists? And if it is indeed rare, should we blame humanity's impact on the natural environment? Over the past two years staff from the Department of Conservation and Land Management (CALM) have attempted to find the answer to these questions.

The forest red-tailed black-cockatoo of south-west Western Australia was first made known to science in 1836 as *Calyptorhynchus naso*, but it is now recognised as one of four subspecies of the red-tailed black-cockatoo (*C. banksii*), which is distributed over much of Australia. Our subspecies, *C. banksii naso*, is restricted to the south-west corner of Western Australia from Perth southwards to Albany.

At close quarters, the male is quite distinctive, with its sooty-black plumage, long thick bill, rounded helmet-like crest and bright red panels in its tail feathers. The female is duller and is lightly spotted and barred in yellow; its tail-feather panels are orange-yellow, barred with black.

Like other cockatoos, the forest red-tailed black-cockatoo is a seed-eater. Its chief source of food is the large, hard seeds extracted from the base of the woody fruit of marri (*Corymbia calophylla*), but the seeds of jarrah (*Eucalyptus marginata*), karri (*E. diversicolor*), Albany blackbutt (*E. staeri*) and the common sheoak (*Allocasuarina fraseriana*) are also eaten. Breeding begins in September and October, and the nest sites are large hollows in standing trees. Suitable hollows are found in trees with a diameter of more than 60 centimetres at chest height (taken as 1.3 metres). Incubation of the single egg (occasionally there are two) takes about a month and the young bird is fed in the nest for nearly three months.

HOW UNCOMMON IS IT?

Three lines of available evidence seem to suggest that the forest red-tailed black-cockatoo may be uncommon. Firstly, a local and international search of major museum collections of Australian birds revealed the existence of only 44 specimens, most of which were collected in the period 1866–1916. The most recently collected specimen found was dated 1994. Secondly, a search of the ornithological literature for the period 1900–94 turned up fewer than 50 publications referring to the forest red-tailed black-cockatoo. Most of these were based on sightings at one or only a handful of localities. One publication, however, mapped 52 localities based on published and unpublished records over a period of 26 years. Lastly, there are many published bird lists for localities in the south-west of Western Australia, and in many of these the forest red-tailed black-cockatoo was not recorded.

Taken together, these historical sources of information might suggest that the forest red-tailed black-cockatoo either truly is uncommon, if not rare, or is only encountered on rare occasions by ornithologists because it lives in remote places.

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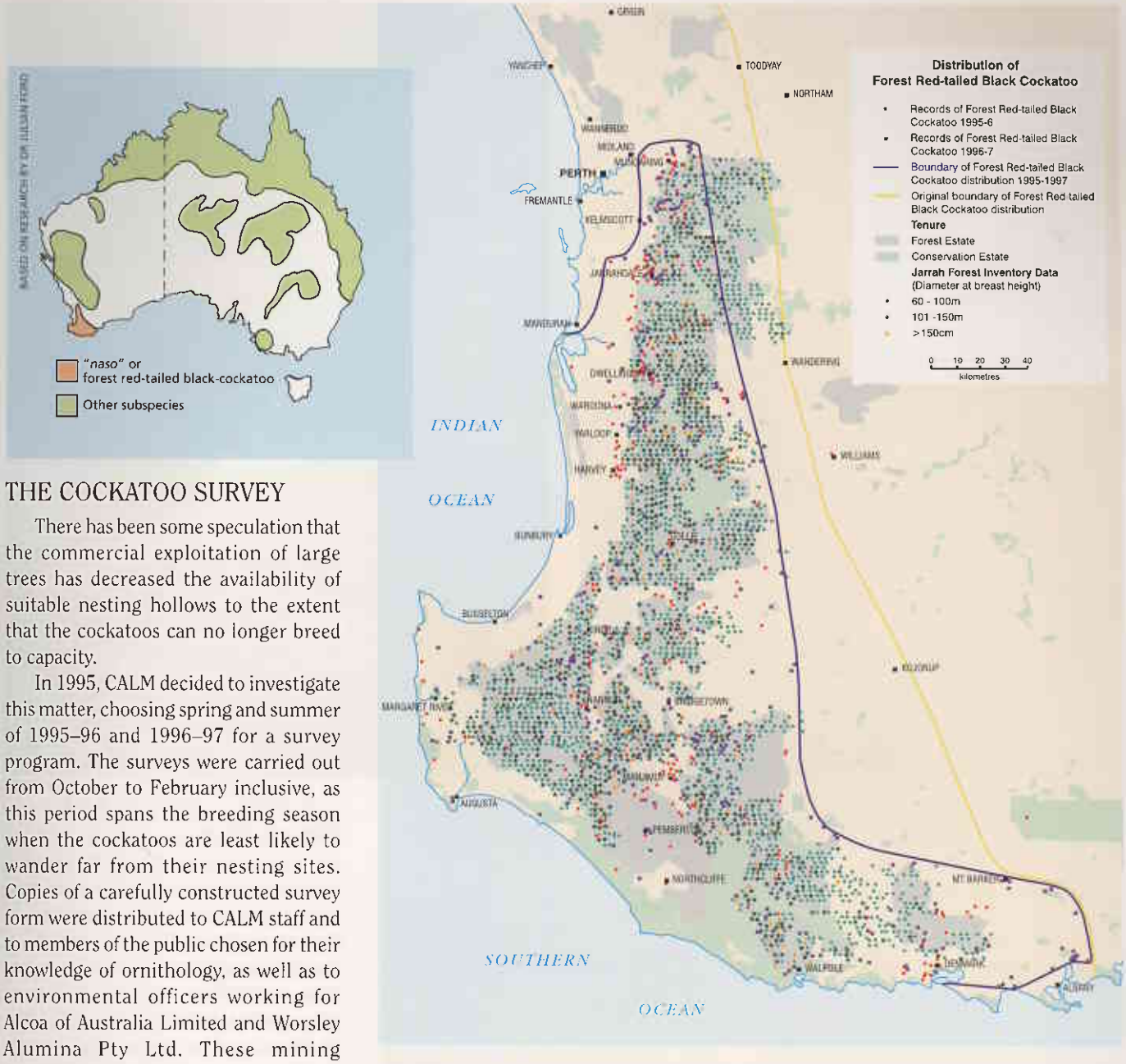
Jarrah forest, country of jarrah and marri trees.
Photo – CALM
Inset: Female red-tailed black-cockatoo.
Photo – Jiri Lochman

Left: A pair of forest red-tailed black-cockatoos.
Photo – Simon Nevill



THE COCKATOO SURVEY

There has been some speculation that the commercial exploitation of large trees has decreased the availability of suitable nesting hollows to the extent that the cockatoos can no longer breed to capacity.

In 1995, CALM decided to investigate this matter, choosing spring and summer of 1995–96 and 1996–97 for a survey program. The surveys were carried out from October to February inclusive, as this period spans the breeding season when the cockatoos are least likely to wander far from their nesting sites. Copies of a carefully constructed survey form were distributed to CALM staff and to members of the public chosen for their knowledge of ornithology, as well as to environmental officers working for Alcoa of Australia Limited and Worsley Alumina Pty Ltd. These mining companies lease large tracts of forest land within the range of the cockatoo and their environmental staff take a keen interest in matters of conservation importance. The information requested on the survey forms included details of the locality where cockatoos were observed, the date of observation, numbers of birds seen, where in the landscape they were seen, the type of forest they were frequenting, the criteria used for identification and any evidence of breeding.

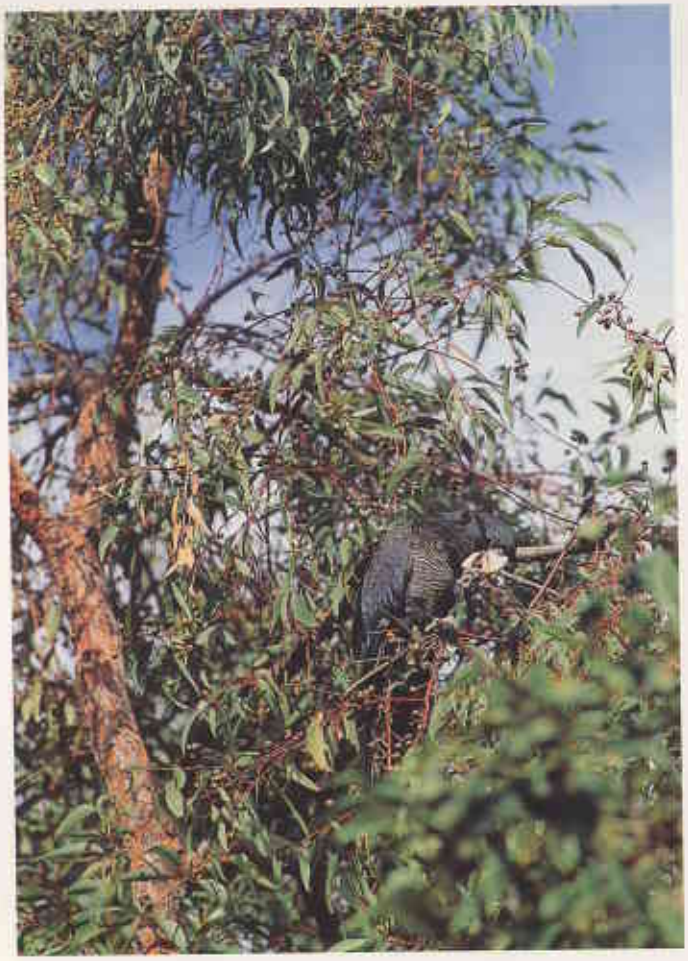
In scientific terms, the hypothesis to be tested by the survey was that logging, by selectively removing large merchantable jarrah trees, has reduced the number of available nesting sites—large hollows in standing trees—resulting in a contraction in the distribution of the forest red-tailed black-cockatoo. A testable prediction of this hypothesis would be that cockatoos should, in the breeding season, occur only in or close to large tracts of unlogged forest set aside from commercial forestry.

THE FINDINGS

The two surveys together yielded 615 sightings, distributed widely over the lower south-west of the State. They confirmed that the cockatoo appears now to be locally extinct over most of the Swan Coastal Plain, in the area between Dandaragan and Mt Helena, and in the area east of a line joining Mt Helena to North Bannister. Apart from two isolated records (which were presumed to be 'vagrants', or wanderers), the species was not recorded in the eastern parts of its former breeding range, from Wandering (due east of Mandurah) to Mt Barker (north of Albany).

The cockatoo's absence from the Swan Coastal Plain is only to be expected, given the extent of woodland clearance for urban and agricultural development, and the fact that this species is known to be rather intolerant of human disturbance. However, there is little doubt that they did once inhabit the area, given that the Perth suburb of Karrakatta, west of Kings Park in Perth, means 'hill of the red-tailed black- cockatoo' in the Nyoongar language (*karrak* = the red-tailed black-cockatoo; *katta* = hill).

The survey results were considered to be reliable, as nearly all recorded the sighting of the distinctive red panels on the tail feathers and the unmistakable call—'*koorark*'. A check of the 60 records based solely on call (when the observers



could not view the tails of the cockatoos satisfactorily) showed that all but four were by observers who had sighted the tails of this species at other times.

Interestingly, the location of records was split almost exactly evenly (48.7 and 51.3 per cent) between the northern and southern forests (the border being taken as the Preston River). The average number of cockatoos seen per record was 6.9 in the north and 5.1 in the south. The largest flocks recorded were 50 (both north and south). Although most records were in jarrah-marri forest (84 per cent in the north, 76 per cent in the south), cockatoos were noted in a wide range of forest and woodland types. These included yarri (*Eucalyptus patens*), wandoo (*E. wandoo*), karri, tuart (*E. gomphocephala*), Albany blackbutt, yate (*E. cornuta*) and flooded gum (*E. rudis*). There were even records from bluegum (*E. globulus*) plantations and pine plantations, and there were two road kills.

The only major difference found between north and south concerned the location of records in the landscape. In the north, 38 per cent were in valley locations while only 26 per cent were on ridges. In the south, however, the order was reversed, with 41 per cent of the sightings on ridges and only 22 per cent in valleys. This difference may reflect the variable niches of marri, whose seeds form a large part of the cockatoo's diet. In the north, this tree reaches its optimum development below the level of the laterite soils in the uplands, whereas in the south, it tends to occur more in upslope areas, being displaced on the lower ground by karri, yarri and flooded gum. Of the two jarrah forests, the southern one has a greater volume of marri timber than the one in the north. The proportion of midslope sightings was similar in both regions, with 16 per cent in the north and 17 per cent in the south.

Above left: Female red-tailed black-cockatoo extracting seed from jarrah fruit.
Photo – Simon Nevill

Above right: Adult male red-tailed black-cockatoo. Note the shining black plumage, black beak and helmet-like crest.
Photo – Jiri Lochman

LOGGING: TESTING THE PREDICTION

If logging of forest were threatening the long-term survival of the forest red-tailed black-cockatoo, the survey should have found many more records in southern forest than in northern forest. This should follow from the vast area of unlogged forest in the south (365 390 hectares) relative to that in the north (41 190 hectares). Yet the survey showed that the cockatoos were just as well represented and widespread in the north as in the south.

Data collected by Kim Whitford of CALM's Dwellingup Research Centre provide key information about the abundance of hollows in standing trees in jarrah forest. He studied 239 felled trees, ranging in diameter at chest height (1.3 metres) from 20 to 200 centimetres, and found that hollows suitable for use as nest sites by forest red-tailed black-cockatoos occurred in trees more than 60 centimetres in diameter. Kim found that 4.7 per cent of the jarrah and 12.2 per cent of the marri in these larger size classes had potential nest-site hollows.

To this valuable information, we can add data gathered from over the whole jarrah forest in CALM's 1989–91 Forest

Inventory (see 'Shooting from the Stars', *LANDSCOPE*, Summer 1989–90). This inventory was carried out in two phases. Phase 1 involved interpretation of aerial photographs of plots taken at the rate of one per 50 hectares. Phase 2 was a ground check of 10 per cent of the plots studied in Phase 1 to confirm the accuracy of the interpretations.

The inventory established that on average there are 13.3 trees per hectare with diameters greater than 60 centimetres. Trees of this size occur in jarrah forests throughout the State forest, with 85 per cent of the 2 900 measured ground samples containing at least one tree with a diameter larger than 60 centimetres.

Most of the current geographical range of the forest red-tailed black-cockatoo is in jarrah-marri forest. In the 67 per cent of multiple-use jarrah forest available for timber production, four 'habitat trees' per hectare are specifically marked for retention, although many other unmarked trees of large diameter are also retained. Although the home range of a breeding pair of cockatoos has not yet been accurately established, an informed estimate can be made based on a cockatoo's body weight of 600–610 grams. On this basis, each pair should have a large breeding home range of the order of 116–187 hectares. At four habitat trees per hectare in multiple-use jarrah forest, this translates into a minimum of 464–748 specially marked and retained trees of a size suitable for cockatoo nesting, and in which the breeding pair must find a suitable nesting hollow. However, the Forest Inventory data indicate that there is an even greater number of trees of sufficient size with the potential to have developed a suitable size of hollow—some 1 543–2 487 trees per home range. When Kim Whitford's data are applied to these latter figures we can conclude that each home range could possibly include 104–167 trees with hollows suited for nesting use by the cockatoo.

What of the disappearance of the forest red-tailed black-cockatoo from the 210 000 hectares of State forest east of Mt Helena and North Bannister (three per cent of its original range)? It seems unlikely that this is because of insufficient large trees, as in this sector the Forest Inventory recorded an average of 7.9 trees per hectare with diameters exceeding 60 centimetres. Although this is a lower figure than the 11.6 per hectare in those State forests occupied by forest red-tailed black-cockatoo to the west, it is still a healthy state of affairs.

The cockatoos are sometimes presumed to be threatened by the harvesting of marri in the southern jarrah forest and by woodchipping operations. Marri, however, is clearfelled mainly from karri forest, which occurs over only about eight per cent of the current geographical range of the cockatoo. Moreover, about half of the karri forest has been reserved in perpetuity in national parks and in road, river and stream reserves.

Therefore, the broad distribution of cockatoos in State forests, and the satisfactorily high proportion of large trees throughout the State forest estate, do not support the conclusion that logging of native forest threatens the forest red-tailed black-cockatoo.

WHAT ARE THE THREATS?

Presumably, a logging threat would exist only if the larger trees were cleared completely. Indeed, the decline in geographical range of the forest red-tailed black-cockatoo may well have been in response to widespread clearing of jarrah forest and/or woodland and wandoo woodland for agriculture, to the west, east and north of the extensive State forests. It has been calculated that this

13-day-old red-tailed black-cockatoo chick.
Photo – Jiri Lochman

is the reason why 36 per cent of the cockatoo's original range is no longer occupied.

Forest red-tailed black-cockatoos do not seem to be averse to using marri trees left as remnants on roadsides, in paddocks or in towns (e.g. at Jarrahdale and Manjimup), as they were often recorded in such situations during the survey. However, most of these records (95) came from areas adjacent to State forest.

In 1916, the ornithologist Tom Carter wrote that the forest red-tailed black-cockatoo had rapidly diminished in numbers since he first observed the species in 1887. He gave several possible reasons for this decline. One was the clearing of timber following agricultural development and increased settlement, while another was the shooting of birds for their handsome tail feathers or simply for sport. Carter noted that if one of a flock was shot and fell wounded to the ground, the rest of the birds would hover close to it, and thus afford an easy target to a shooter. However, they were seldom shot for food as 'there is not much meat on them', and since they are not considered to be orchard pests they would rarely have been shot by fruit-growers.

HOW MANY ARE ENOUGH?

Radio-tracking or colour-banding nesting cockatoos would allow us to make more precise estimates of home range sizes in the breeding season. Catching and marking birds would also help us understand the composition of flocks. For example, do the six birds in an average flock consist of two breeding pairs and their progeny from the previous year, and do most pairs breed successfully each year? More field work is needed, but the forest red-tailed black-cockatoo is difficult to catch.

However, the news is probably good. About 2 000 forest red-tailed black-cockatoos were recorded during each of our two surveys, but it is uncertain how many birds may have been counted more than once. Based on nearly 400 censuses of birds in small, defined areas in the south-west forests between 1976 and 1991, the average density of the forest red-tailed black-cockatoo is one per 100 hectares. Extrapolation of this figure to the total area of State forest in which the cockatoo occurs suggests a total population of about 16 000 birds. If we use the estimate outlined above of one nesting pair to 116–187 hectares, the total figure could be between 16 000 and 26 000 birds. We can conclude that this is probably a satisfactory population level.

Above: Adult female red-tailed black-cockatoo eating marri seed. Note the yellow spots on the plumage and the colour of the beak (light horn).
Photo – Jiri Lochman

Below: Marri fruit, the seeds of which are a staple food in the diet of the red-tailed black-cockatoo.
Photo – Babs & Bert Wells/CALM

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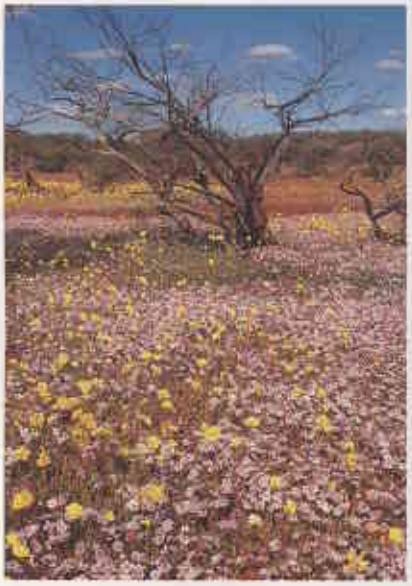
The waters off Western Australia's south coast are home to a rich diversity of marine plants and animals. Read about them on page 28.



Burnerbinmah Station, in WA's Murchison Region, fills an important gap in the State's flora and fauna reserve system. See page 42.

LANDSCOPE

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The Western Blue Gum, a commercial variety of the Tasmanian bluegum, was developed for WA conditions, but tree breeders continue to improve the strain. See page 36.

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COVER

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