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BIRDS OF THE JARRAH FOREST—JARRAHDALE CENTENNIAL

▲ *Western rosella* Photographed at Zoological Gardens

▲ *Red-winged wren* Courtesy Tourist Development Authority

▼ *Purple-crowned lorrikeet* Photographed at Zoological Gardens

▲ *New Holland honeyeater* L. Harman

▲ *Yellow-tailed thornbill* P. Kimber

▲ *Red-eared firetail* L. Harman

▼ *Splendid or banded blue wren* P. Kimber

Birds of the Jarrah Forest

by Silviculturist PETER KIMBER

The number of bird species represented in different vegetation types in different parts of the world has been studied fairly thoroughly. In broad terms, forests and woodlands support a larger number of species than low vegetation types and grasslands. The drier the forest however, the greater the species representation. Numbers are also greater in tropical than in temperate forests.

Orians, writing in *Ecology* Vol. 50, pp. 783-96, gives information for Central and North America, and he quotes the following numbers of species by forest type:

Lowland tropical wet forest (Panama)—40 species.
Lowland tropical dry forest (Costa Rica)—67 species.
Temperate maple-beech-hemlock (New York)—27 species.

The jarrah forest grows in a Mediterranean type climate which may be classified as falling between a temperate and a tropical type.

How do the number of bird species in the jarrah forest compare with similar forests elsewhere? I have set out to produce evidence that jarrah is as rich in bird species as any comparable forest type in spite of occasional criticism heard to the contrary. Such criticism stems from two main aspects of the jarrah forest. Firstly a lack of diversity in vegetation is quoted; secondly the regular controlled burning practised in the forest is thought to be detrimental to bird populations.

I will first deal with diversity in the vegetation.

The jarrah forest gives a general impression of uniformity due to one species dominating the upper storey of trees. Three or four other species of eucalypt are present, generally in mixture with jarrah but these others frequently dominate small areas which are unsuited to jarrah. Examples are blackbutt (*E. patens*) on moist red loams and bullich (*E. megacarpa*) in silty gulleys.

The ground vegetation presents a different picture. Ecological studies have revealed over 20 well defined plant communities in the forest. This figure does not include swamp habitats. Swamps, or flats, cover roughly one-tenth of the ground within the jarrah forest. They are dominated by a range of plant species ranging through blackboys, tea-trees and acacias, banksias or paperbarks depending on their location, soil and configuration.

Other habitats attractive to a wide range of birds are the forest edges adjacent to farmland, and the large reservoirs maintained for metropolitan water supplies and irrigation. Within the forest proper, forest management has created a wider habitat range than existed in the virgin forest. Uncut or virgin forest is characterised by a preponderance of large mature trees with a high general canopy level. The jarrah forest, when compared with many other forest types, carries only a sparse understorey of small trees and large shrubs. It has been the policy to manage the forest in an uneven-aged condition over the past 50 years. Under this system the forest consists of a mosaic of trees of all ages and sizes from small saplings to giant veterans. This in turn ensures a patchy leafy canopy extending almost to the ground. This type of cover appears to be greatly appreciated by those bird species which forage and nest below the main large-tree canopy. A range of birds seem to benefit; this includes the western warbler, golden whistler, spinebill and fantail.

Habitat diversity, therefore, is not lacking in the jarrah forest. There exists both a natural diversity due to soils and topography, and a man-induced diversity achieved as a by-product of forest management.

Fire in the forest is the second reason sometimes put forward as a factor inimical to its bird population. There is no doubt that severe, uncontrolled fires do considerable harm, both by direct injury to the birds and indirectly by temporarily disturbing their habitat. There is strong evidence that the jarrah forest has been subjected to fire for a period of at least 7,000 years. Hence we may assume that fire is not a new experience to the bird population, and that it may have adapted to it to some degree.

The most efficient method of reducing the frequency and the intensity of wildfires is to prevent the build-up of the large quantities of fuel, in the form of dead leaves and twigs, necessary to support an intense fire. This is achieved in the jarrah forest by burning the litter with a mild, closely controlled fire every five years or so. Such fires cause minimal destruction of habitat. They destroy almost entirely the existing ground vegetation. But this regenerates within a few months from under-ground root-stocks and reaches its original size and conformation within two years. Swamps, which take longer to recover, are burnt on a rotation of 10 to 15 years.

It will be realised that only transient disturbance of the majority of habitats available in the forest is caused by burning operations; only the ground vegetation is removed and this recovers in a relatively short period. How important, then, is this disturbance to the forest birds?

Probably as a result of the long

association of the forest with fire, ground inhabiting species are almost absent. There are no true nightjars in the forest, quail are local and concentrate round swamp edges, and the mallee-fowl occasionally wanders into the more eastern sectors of the forest. Emus are resident but not common.

The remainder of the bird population is primarily dependent on the foliage cover of saplings, understorey species, and the main tree canopy for foraging and nesting. Recent studies have been made on the response of these populations to burns of two intensities.

Two 40-acre areas of forest were burnt in late November, early December. One was a very mild burn, typical of the prescribed fires used in controlled burning. Approximately 70 per cent of the ground vegetation was consumed and leaves of the understorey (mainly *Banksia grandis*) were slightly scorched to a height of 6 ft. The experimental area was covered systematically by two or three observers for 16 visits each of roughly three hours duration; eight were before the fire and eight after. No changes were found in the number of birds or in the number of species recorded. Two disused nests, of a brown thornbill and an unknown species of honeyeater, were destroyed by the fire. Fourteen other nests including those of brown thornbill, spinebill, western yellow robin, golden whistler, rufous tree-creeper, goshawk and squeaker were unaffected.

The second area was intentionally burnt with a more than usually severe fire. The ground vegetation was entirely consumed. The understorey, again mainly of *B. grandis*, up to 25 ft. high, was almost completely scorched over three-quarters of the study area. A similar series of observations was made to record numbers and species of birds.

Only one species appeared to be seriously affected. The brown thornbill, inhabiting the lower understorey, was reduced in numbers by 40 per cent after the fire. As no evidence of death could be found, it was assumed that the birds had left the area. The number of grey fantails was also down after the fire.

Some species remained within the study area but moved from heavily scorched to more lightly scorched forest. This was particularly noticeable with the western warbler and to a lesser extent the golden whistler. The western warbler inhabits the lower part of the main tree canopy and being a late-nester, could well have suffered more serious disturbance than most other species which had almost finished nesting at the time of the fire.

The other most numerous species in the area were apparently unaffected and no change occured in their numbers. These included the

Birds identified in State Forest within 15 miles of Dwellingup

C=common *O*=occasional *R*=rare

A. Birds of the jarrah forest growing on gravel soils. (Sparse understorey and ground vegetation.)

1. Emu, *O*
2. Whistling eagle, *C*
3. Goshawk, *C*
4. Collared sparrowhawk, *O*
5. Little eagle, *C*
6. Wedgetailed eagle, *C*
7. Little falcon, *C*
8. Brown hawk, *C*
9. Mallee fowl, *R*
10. Common bronzewing, *C*
11. Brush bronzewing, *O*
12. Purple-crowned lorikeet, *O*
13. White-tailed black cockatoo, *C*
14. Red-tailed black cockatoo, *C*
15. Smoker parrot, *O*
16. Western rosella, *C*
17. Red-capped parrot, *C*.
18. Twenty-eight parrot, *C*
19. Elegant grass parrot, *O*
20. Pallid cuckoo, *O*
21. Fantailed cuckoo, *C*
22. Narrow-billed bronze cuckoo, *O*
23. Golden-bronze cuckoo, *C*
24. Boobook owl, *C*
25. Tawney frogmouth, *C*
26. Owlet nightjar, *C*.
27. Laughing kookaburra, *C*
28. Sacred kingfisher, *O*
29. Bee eater, *C*
30. Welcome swallow, *O*
31. Tree martin, *C*
32. Black-faced cuckoo-shrike, *C*
33. White-winged triller, *R*
34. Western warbler, *C*
35. Brown thornbill, *C*.
36. Western thornbill, *C*
37. Yellow-tailed thornbill, *C*
38. Weebill, *C*
39. Scarlet robin, *C*
40. Grey fantail, *C*
41. Golden whistler, *C*
42. Western shrike-thrush, *C*
43. Black-capped sitella, *C*
44. Rufous tree-creeper, *C*
45. Spotted pardalote, *C*
46. Red-tipped pardalote, *C*
47. Brown honeyeater, *C*
48. White-naped honeyeater, *C*
49. Brown-headed honeyeater, *C*
50. Spinebill, *C*
51. Red wattle bird, *C*
52. Little wattle bird, *C*
53. Dusky wood swallow, *C*
54. Squeaker, *C*
55. Raven, *C*

B. Birds preferring the low dense vegetation of swamps, jarrah forest on red-loam soils, and riverside forest.

1. Brown quail, *C*.
2. Spotless crake, *C*
3. Little grass bird, *R*
4. Banded blue wren, *C*
5. Red winged wren, *O-C*
6. Spotted scrub wren, *C*
7. White-breasted robin, *C*
8. Silvereye, *C*
9. New Holland honeyeater, *C*
10. Red-eared firetail, *C*

C. Birds of clearings and forest edges.

1. Black-shouldered kite, *R*
2. Swamp harrier, *O*
3. Kestrel, *O*
4. Australian pipit, *C*
5. Willy wagtail, *C*
6. Magpie lark, *C*
7. Grey butcher-bird, *O*
8. Western magpie, *C*

D. Birds of the rivers and dams.

1. Little grebe, *O*
2. Black cormorant, *O*
3. Little black cormorant, *C*
4. Little pied cormorant, *O*
5. Darter, *O*
6. White-faced heron, *C*
7. White-necked heron, *R*
8. Black bittern, *O*
9. Black swan, *R*
10. Black duck, *C*
11. Maned goose, *C*
12. Blue-singed shoveler, *O*
13. Musk duck, *C*
14. Dusky moorhen, *R*

red-tipped pardalote, black-capped sitella, spinebill, white-naped honeyeater, tree martin, rufous tree-creeper, western shrike thrush and red-capped parrot.

Further work is to be done to investigate the effect of fire on nesting success. Over 30 nests were located in the two study areas, but most were out of use at the time of the fires. Those that were occupied, three nests of the western yellow robin including one in the severely burnt area, were apparently unaffected and young were raised from each one.

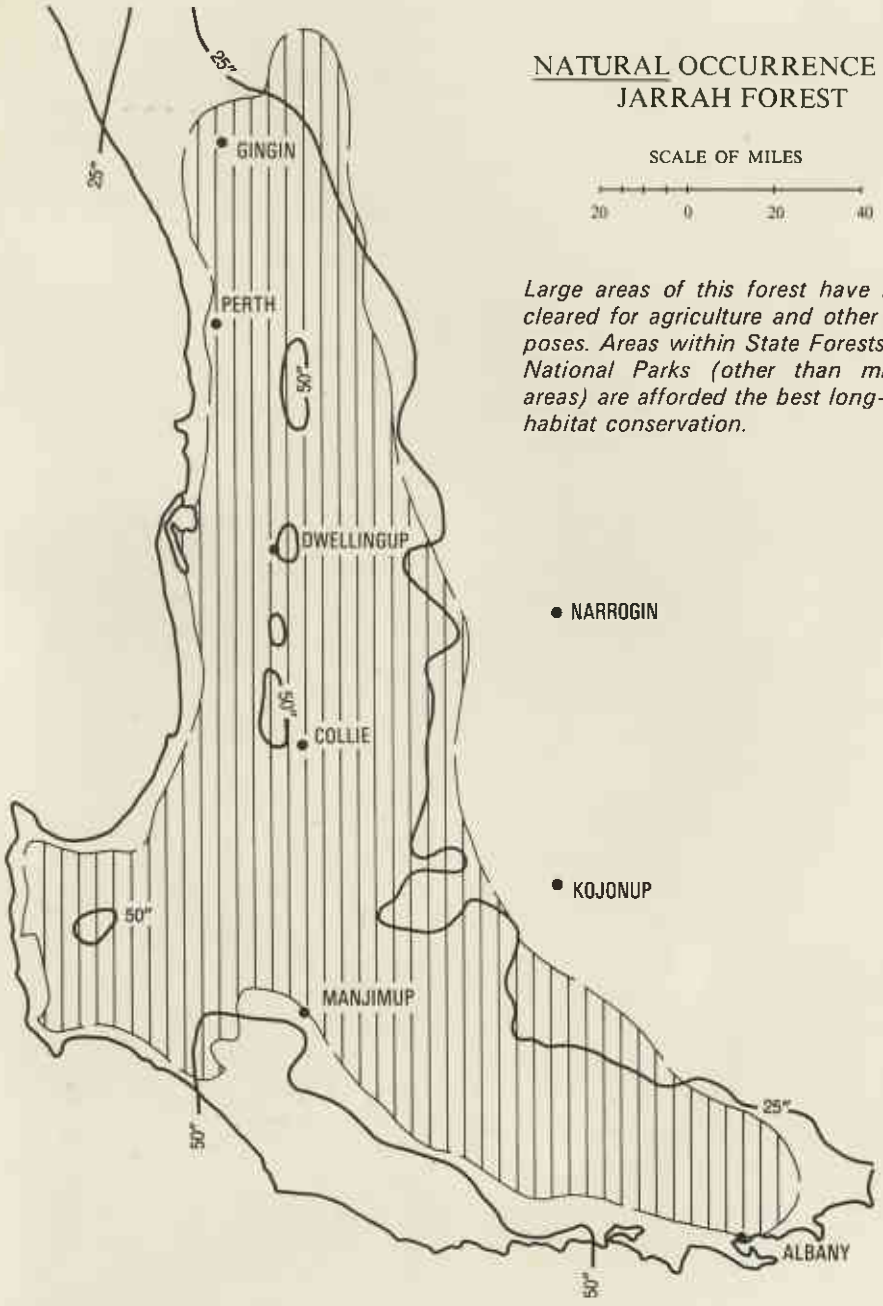
Now to consider the range of species represented in the jarrah forest and their numbers. A checklist has been made of the birds observed within a 15-mile radius of Dwellingup—a settlement within the high-rainfall jarrah zone. Eighty-seven species are recorded. Of these, eight can be associated with large clearings and forest edges, and 14 with water in the form of rivers or dams. This leaves a total of 65 species associated with the forest proper. The mixed species eucalypt forest of the Trentham/Daylesford region of Victoria, similar in many respects to the jarrah forest, has 56 species represented. The jarrah forest thus seems to be well endowed as far as numbers of bird species are concerned, and compares favourably with similar forests in Australia and South America.

The final point of interest is just how many birds are there in the forest; what is the population density? Some data on this subject is available from the fire study mentioned earlier. The study only covered forest on gravel soils and was confined to the hours of daylight. Hence both species preferring thick cover, and nocturnal birds, are not included. The number of birds assessed as resident in the two areas, totalling 80 acres, is shown in the following table.

Species	*Number of residents per 80 acres*
Brown thornbill	56
Red-tipped pardalote	40
Western warbler	30
Golden whistler	26
Spinebill	24
Western yellow robin	22
Western thornbill	18
White-naped honeyeater	16
Tree martin	16
Grey fantail	10
Rufous tree-creeper	10
Others	49
Total	317

This estimate of 317 residents in 80 acres is likely to be on the low side due to observers missing some birds.

Those who wish to see the birds are advised to visit the forest in the early morning or late afternoon when their activity is at a peak. Also, it is more rewarding to sit down and wait for birds to appear rather than walking around which causes some disturbance. Do not expect to see large numbers in one visit. The maximum number of birds seen on any one of a total of 32 visits to the two study areas was less than one-quarter of the total population of the area.



Large areas of this forest have been cleared for agriculture and other purposes. Areas within State Forests and National Parks (other than mining areas) are afforded the best long-term habitat conservation.