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Habitat Use by Eastern Bristlebirds in Barren Grounds Nature Reserve

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Considerable cause for concern exists with regard to the long-term survival of the Eastern Bristlebird *Dasyornis brachypterus*. Though apparently widespread during the Tertiary Period (Smith 1977), this species is now restricted to a few small, isolated populations (Smith 1977; Blakers *et al.* 1984). The species is listed as endangered by Burbidge & Jenkins (1987) and CONCOM (1988), as threatened on Schedule 12 of the N.S.W. National Parks & Wildlife Act, 1974, and as vulnerable by Kennedy & Burton (1986). It appears to have declined in abundance in some areas during recent times (Blakers *et al.* 1984; Holmes 1989).

Little is known about the biology of the Eastern Bristlebird. It is apparently a species which is usually found near an ecotone, either between woodland and heath in the southern part of its range (e.g. Jordan 1987) or between open forest/woodland and rainforest in the northern part of its range (Holmes 1989). It is believed to feed predominantly on insects obtained from the leaf litter (Holmes 1989) but it may also eat seeds as its congeners *D. longirostris* and *D. broadbenti* do (Smith 1987, pers. comm.). Most nests have been found in grass tussocks, 10-45 cm above ground (McNamara 1946; Holmes 1989) and the most common clutch size is two eggs (Holmes 1989). It is extremely shy and difficult to observe (McNamara 1946; Robertson 1946) so that most of the information available for this species is anecdotal; no comprehensive behavioural or ecological study has been carried out.

Habitat use by Eastern Bristlebirds remains largely unknown. The ecotones associated with the species have been defined (see Jordan 1987; Holmes 1989) but the extent to which the species utilises areas at different distances from an ecotone has not been quantified and it

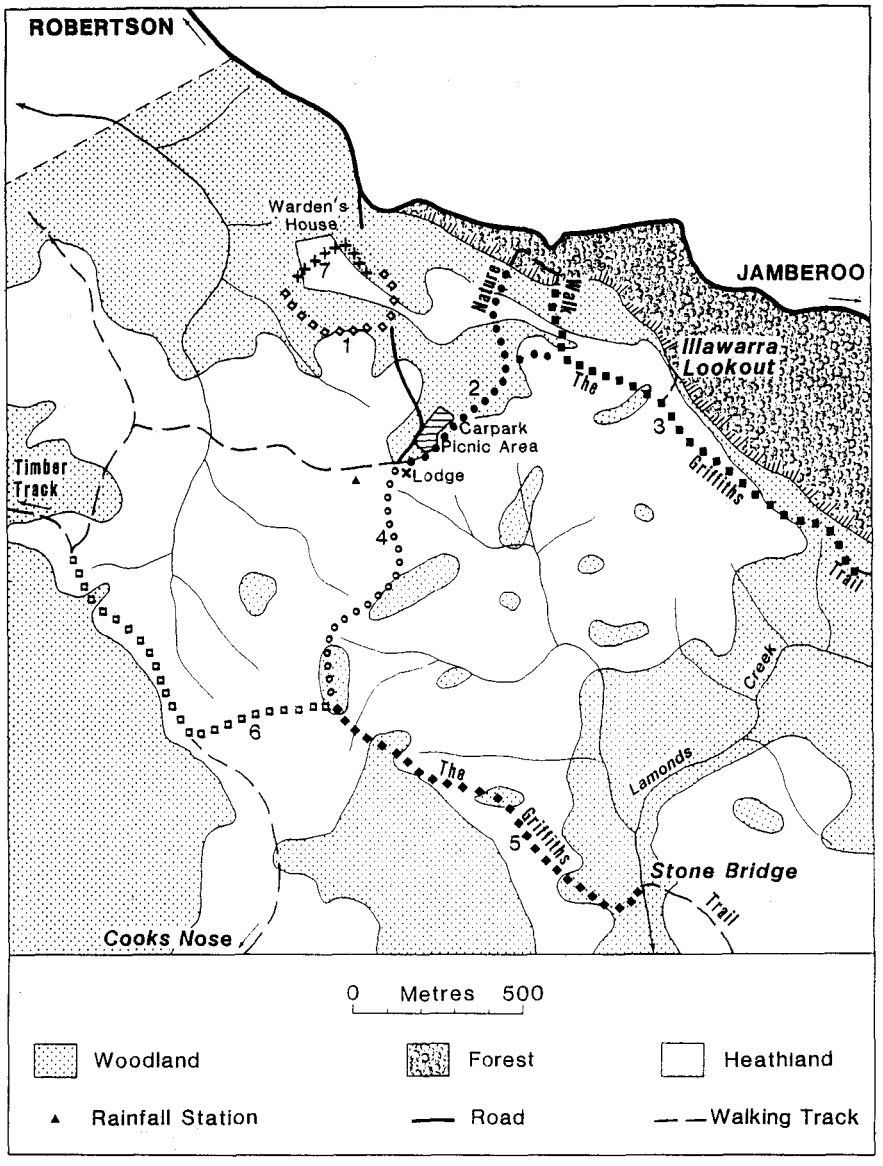

Figure 1 Map of study area showing heath and woodland habitat and the locations of the seven survey routes (Route 1 – ◇; 2 – ●; 3 – ■; 4 – ○; 5 – ◆; 6 – □; 7 – +).

is not clear why some ecotonal situations are frequented by the species while others are not (Holmes 1989).

Time since the last fire influences the suitability of an area for Eastern Bristlebirds (Blakers *et al.* 1984; Jordan 1984; Holmes 1989). In Barren Grounds Nature Reserve in New South Wales, Jordan (1984) found that there were no Eastern Bristlebirds present immediately after a fire and that their numbers increased steadily for the next two years. At Two Peoples Bay in Western Australia the heath may take 4-14 years after a fire to regenerate to a suitable stage for the congeneric Western Bristlebird (Smith 1977, 1987).

The aims of the present study were to determine habitat utilisation by Eastern Bristlebirds (hereafter bristlebirds) in relation to the distance from a well-defined ecotone between woodland and heath and to compare estimates of abundance in areas with different times since the last fire.

Methods

The study was carried out from 21 September to 1 December 1989 in the Barren Grounds Nature Reserve near Jamberoo, New South Wales (134°40′S, 150°45′E; elevation: 600 m asl). Seven census routes were established along existing walking tracks (Fig. 1).

Censusing was carried out when weather conditions permitted estimation of the location of calling bristlebirds; windy days were avoided. Most censuses were done between 0700 and 1200 h, mostly by a single observer but occasionally by two to three observers. Eight censuses were carried out between 1800 and 1900 h, all along routes 1 and 7. Observations were made while walking along the tracks at a slow pace and during occasional stops of up to about 5 min to listen for calling bristlebirds. The number of times a census trail was walked is given in Table 2. Whenever a bristlebird was heard or seen, its location was plotted on an enlarged map of the census route. From these maps the following data were subsequently recorded for each location: (a) vegetation type (heath or woodland); (b) distance from heath-woodland ecotone (see below); and (c) minimum distance from walking track. Each observer was experienced in estimating directions and distances to calling bristlebirds from situations in which a bristlebird was heard or seen at the same time. From a pilot study it seemed that calling Eastern Bristlebirds could be accurately located up to about 50 m from the walking track. The observer's experience and the use of enlarged maps enabled the location of birds to be estimated to within 10 m. However, because the locations of birds at greater distances from the walking track could not be estimated with confidence, the analysis below is restricted to those observations that were closer than 50 m to the track.

Classification of vegetation types and the boundaries between them were based on a vegetation map of the study area produced by R. Jordan (Fig. 1). Three vegetation types were recognised — heathland, woodland and forest. The heathland consists mostly of shrubs a metre or less in height. The woodland contains a relatively even density of small trees up to 10 m in height and with a grassy understorey mixed with 1-3 m shrubs. The forest is dominated by an overstorey of taller trees up to about 15 m in height and an understorey of ferns, grasses and 3-4 m shrubs.

We estimated the total survey area for each route by multiplying the length of each route by 100 m and calculated the area of each survey route that was within heath rather than woodland. The amount of the survey area that was within 20 m of the heath–woodland boundary was also calculated for each route. We refer to this latter area as the ecotonal area.

The proportion of the total censused area that was within 20 m of the heath–woodland ecotone was 20%. This was calculated as follows, allowing for repeated surveys along the same routes. The total area censused during the study was 515.75 ha. This was obtained by first multiplying the survey area for each route by the number of times the route was censused during the study and then adding the resulting areas for all the routes. The total ecotonal area censused during the study was 104.19 ha (i.e. 20% of the total area censused) and was similarly calculated. The proportion of the total censused area that was within heath rather than woodland was calculated in a similar fashion and found to be 57%.

The ecotonal areas for each route were also divided on the basis of when the last fire had occurred (Table 2). Parts of the study area were burnt in October 1980 and January 1983 and part of survey route 7 was burnt during the present study. After this most recent fire, observations for survey route 7 were restricted to the remaining portion that last burnt in 1983.

Results

Bristlebirds were generally heard rather than seen; in only 23% of 132 detections were the birds seen. The proportion of sightings was not significantly different between heath and woodland (16/79 *vs* 14/53; $\chi^2 = 0.72$; $P > 0.1$).

Bristlebirds were more likely to occur within 20 m of the heath-woodland ecotone than further away from

Table 1 Percentages of Eastern Bristlebird detections at varying distances from the heath-woodland ecotone within the two habitats.

Distance (m)	Woodland	Heath
0-20	66	42
20-40	19	29
40-60	4	13
60-80	4	9
80-100	8	8
Sample size	53	79

Table 2 Survey areas, ecotonal areas, numbers of birds observed and number of censuses for each survey route.

Census route	Survey area (ha)	Ecotonal area in 1980 burn (m^2)	Ecotonal area in 1983 burn (m^2)	Total ecotonal area (m^2)	Birds in 1980 burn area	Birds in 1983 burn area	Number of times censused
1	7.05	—	5455	5455	—	15	9
2	9.50	—	20000	20000	—	11	6
3	12.00	11440	13430	24870	26	7	8
4	8.20	13120	10730	23850	18	9	10
5	11.50	29420	—	29420	22	—	7
6	12.00	2550	17850	20400	4	6	9
7 (before 1989 fire)	3.20	—	5085	5085	—	6	3
7 (after 1989 fire)	2.24	—	3560			8	6
		56530	76110	132640	70	62	

it. Fifty-two per cent of the recorded birds were within 20 m of the boundary (Table 1), whereas only 20% of the total censused area was within this region. The difference is significant ($P < 0.01$, Student t-test based on Normal approximation to Binomial, assuming observations can be regarded as essentially independent).

The density of bristlebird detections was greater in heath than in woodland. The percentage of detections within woodland was 40% (Table 1, $n = 132$), which is significantly less than one half ($P < 0.05$, Student t-test based on Normal approximation to Binomial).

The density of bristlebird detections was greater in areas that last burnt in 1980 than in areas that were last burnt in 1983. The ecotonal area last burnt in 1980 accounted for 53% of bristlebird detections but represented only 43% of the total censused ecotonal area (Table 2). The difference is significant ($P < 0.05$, Student t-test based on Normal approximation to the Binomial).

Discussion

In the present study Eastern Bristlebirds were found to occur mostly near to the heath–woodland boundary, thus supporting earlier statements by Jordan (1987) and Holmes (1989). The density of detections was not different between woodland and heath. Assuming the birds were equally detectable in the two habitats, this suggests that bristlebird densities were about the same in the two habitats.

The density of detections was greater in the area last burnt in 1980 than in that burnt in 1983. Assuming the birds were equally detectable in areas with different times since the last fire, this suggests that bristlebird density was greater nine years after a fire than within six years after a fire. Differences between areas in detectability of bristlebirds may have affected census results but such differences should not be great for this species as almost all detections were based on sound rather than sight. Radio-tracking could provide less biased data on habitat use and could also lead to estimates of home range size and the extent to which neighbouring birds overlap.

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Application published in the *Bulletin of Zoological Nomenclature*

The following Application was published on 19 December 1991 in Vol. 48, Part 4 of the *Bulletin of Zoological Nomenclature*. Comment or advice on this Application is invited for publication in the *Bulletin* and should be sent to the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London SW7 5BD, U.K.

Case 2746 ***Anas arcuata*** **Horsfield, 1824 (currently *Dendrocygna arcuata*; Aves, Anseriformes): proposed conservation of the specific name**

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Secretariat, International Commission on Zoological Nomenclature

Abstract. The purpose of this application is to conserve the specific name of *Dendrocygna arcuata* (Horsfield, 1824), which is currently in use for the wandering tree duck of Indonesia, other East Indies islands and northern Australia. The name was first proposed as a replacement for *D. javanica* (Horsfield, 1821), the valid name for the Indian tree duck.