

when they are away from the nest than the Peregrine. This suggests that a greater fear of humans is not the sole reason for the difference. The defensive response was closely linked with the distress calls of the young in all species. The calls increased the intensity of defence in Peregrines and determined whether a brood would be defended or not in the Brown Falcons that we visited regularly.

Defence by Australian Kestrels and Black Falcons was very similar, being nearly vertical and silent. These two species have lighter wing loadings than the Peregrine (pers. obs.) and can pull out of a stoop closer to an object or the ground given a similar rate of descent.

In the Australian Kestrel defence is similar to that described by Balgooyen (1976) for the American Kestrel *Falco sparverius* (although the American Kestrel usually defends with greater intensity, J. Olsen, pers. obs.). Both of these Kestrels are thought to belong to a single super-species (Brown and Amadon 1969). Peregrines, worldwide, all appear to use a similar pattern of attack against man (e.g. Craighead 1956; Cade 1960; Beebe 1960).

ACKNOWLEDGEMENTS

We wish to thank R. W. Nelson, M. Brooker, N. Mooney and J. Jolly for reading the manuscript.

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16 May 1979.

THE EFFECTS OF CONTROLLED BURNING ON SOME BIRDS OF THE UNDERSTOREY IN KARRI FOREST

Controlled burning of accumulated litter in the State Forests of Western Australia is designed to reduce the possibility of much hotter wildfires. The effects of fire on forest wildlife are only partly understood (Christensen and Kimber 1975, Proc. ecol. Soc. Aust. 9: 85-106) and this paper presents information on some of the birds present before and after a burn.

Birds were caught in mist-nets on the Eastern Break Road in the Treen Brook State Forest near Pemberton in south-western Australia during May 1978 and again in May 1979. In the intervening spring the understorey was deliberately burned, which reduced its foliage from about eighty to twenty-five per cent. The main large trees in the area were Karri *Eucalyptus diversicolor* with smaller numbers of Jarrah *E. marginata* and Marri *E. calophylla* and an understorey dominated by *Casuarina decussata* and *Bossiaea laidlawiana*.

Table I shows that the species and number of birds caught after the burn were remarkably similar to those caught in the preceding year, particularly if allowance is made for the slight difference in catching effort between years. This Table only presents those birds caught and a

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fuller list of all birds observed will be published elsewhere (Milewski in prep.). Little can be inferred about those species for which only one or two individuals were caught but a number of trends are apparent in more numerous species.

Almost all birds caught were insectivores, most of them apparently unaffected by fire. Although there is a general reduction in abundance of invertebrates after fire, some groups are much more severely affected than others and some insects increase in abundance shortly after a burn (Springett 1976, Aust. J. Ecol. 1: 77-82; Hindmarsh and Majer 1977, Res. Pap. 31, Forests Dept. West. Aust.). The smaller number of fairy-wrens after the burn may result from a reduction in the insects that they eat or from the loss of a dense understory. Conversely, the increased numbers of Black-faced Cuckoo-shrikes and Rufous Treecreepers may be because the more open vegetation after the burn favoured their foraging habits.

A most interesting observation concerned the six individuals, representing five species, that were banded in 1978 and caught in the same area in 1979. If note is

TABLE I

The numbers of birds mist-netted in the Treen Brook Forest, near Pemberton, south-western Australia, on 31 net-days in May 1978 and 37 in May 1979.

SPECIES	No. caught		No. banded 1978- retrapped 1979
	1978	1979	
White-breasted Robin <i>Eopsaltria georgiana</i>	19 (3)	20 (5)	2
White-browed Scrubwren <i>Sericornis frontalis</i>	9 (2)	13 (1)	1
Golden Whistler <i>Pachycephala pectoralis</i>	7	8 (1)	1
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	-	8	
Scarlet Robin <i>Petroica multicolor</i>	3 (1)	7 (2)	
Inland Thornbill <i>Acanthiza apicalis</i>	4	5	
Rufous Treecreeper <i>Climacteris rufa</i>	-	5 (1)	
Red-winged Fairy-wren <i>Malurus elegans</i>	10 (2)	4 (1)	
White-naped Honeyeater <i>Melithreptus lunatus</i>	1	4	1
Grey Fantail <i>Rhipidura fuliginosa</i>	4	3	
Red-eared Firetail <i>Emblema oculata</i>	2	2	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	2	1 (1)	1
Dusky Woodswallow <i>Artamus cyanopterus</i>	-	1	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	-	1	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	-	1	
Splendid Fairy-wren <i>Malurus splendens</i>	4	-	
Silvereye <i>Zosterops lateralis</i>	1		
Total	66	83	6

Numbers in parentheses are the numbers of each species retrapped during each year.

taken of the small numbers of the most common species that were re-trapped within each year, then many individuals probably remain in the same area after burning.

We are grateful to the Forests Department for their continuing co-operation and to Dr P. Christensen and Mr A. V. Milewski for their helpful comments.

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15 June 1979.

SEASONAL FLUCTUATIONS IN NUMBERS OF THREE SPECIES OF TERN IN NORTHERN TERRITORY

Storr (1977) reviewed records of Crested *Sterna bergii*, Lesser crested *S. bengalensis* and Whiskered *Chlidonias hybrida* Terns from the Northern Territory. Notes on feeding of *C. hybrida* in sub-coastal areas have been given by Crawford (1977). In the Indian region, Henry (1971) and Ali and Ripley (1969) described *S. bengalensis* as 'a blue-water species' and *S. bergii* as neritic. Observations on the northern Australian coast indicate that *S. bengalensis* regularly occurs inshore often in the company of *S. bergii* (Crawford 1972; Serventy *et al.* 1971).

All three species are known to undergo seasonal movements. Here, I describe fluctuations of numbers of these species as shown by weekly censuses on the coast and for *C. hybrida* at Fogg's Dam. The Dam is forty-five kilometres south-east of Darwin and the five coastal study sites were in Darwin Harbour and along the coast

east of the city. A map of the area appears in Crawford (1972).

ENVIRONMENT AND METHODS

The climate is described by McAlpine (1969). The wet season usually starts in December and ends in March or April. Hot humid weather occurs from late September to November and during April but little of the annual rain (av. 1,500 mm) is received during these periods. The cool and almost rainless dry season lasts from May to September.

During the wet season, the extensive subcoastal plains are usually inundated and other habitats for waterbirds occur well inland. In the dry season, the wet lands are reduced to a small fraction of their wet-season area, and waters like Fogg Dam become important refuges for many birds (Crawford 1979a). The Fogg Dam area con-