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POSSIBLE EFFECTS OF FOX (AND/OR CAT) PREDATION ON GROUND NESTING BIRDS IN WESTERN AUSTRALIA

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SUMMARY

In Western Australia 65 bird species (excluding seabirds) nest on or in the ground. Of these, the Malleefowl and Bush Thick-knee (Stone-curlew) have declined significantly, at least in part because of fox predation, although more research is needed. The effect of fox predation on 38 species is unknown, but significant local effects are likely and three species (Ground Parrot, Nullarbor Quail-thrush and Australian Bustard) are believed to be at high risk and require further research. There has probably been no significant effect of predation on the remaining 25 species. Those most at risk appear to be the species spending the highest proportion of their time on the ground, but other (unknown) factors may also be involved.

INTRODUCTION

The fox (*Vulpes vulpes*) and feral cat (*Felis catus*) are widespread in Western Australia (Strahan 1983; King and Smith 1985). Both species have been regarded as serious predators of native fauna (e.g. Christensen 1980; B.J. Coman in Strahan 1983; E. Jones in Strahan 1983). Despite this, there has been very little study of the effects of either predator on individual species of native animals. One notable local exception is a study which has shown that foxes limit numbers of rock-wallabies (*Petrogale lateralis*) in the Western Australian wheatbelt (Kinnear *et al.* 1988). However, effects of foxes or cats on native birds have not been studied in Western Australia.

The primary aim of our study, therefore, was to provide a preliminary assessment of the possible magnitude of predation by foxes and/or cats on those bird species

most at risk, the ground nesting species. A further aim was to help acquaint land managers with this knowledge and to appeal for any further information.

GROUND NESTING BIRDS

Predation by foxes or cats on ground-nesting birds is likely to occur through predation on eggs, nestlings, incubating adults, brooding adults or, in some cases such as the Malleefowl, on young birds which are as yet unable to fly. Table 1 lists species according to the level of predation which is believed to occur. It does not include most seabirds, the majority of which nest on off-shore islands and are therefore mostly protected from foxes and cats. The list does include several species which nest in creek banks and similar situations. Allocation of species to categories in the list is subjective due to lack of data. Most species are therefore classified as 'U', i.e. effects unknown, but believed to be vulnerable. Some species are abundant even where foxes are common, or else nest only infrequently in places vulnerable to fox predation, and are classified 'I' (insignificant risk). A few species have declined significantly in numbers and/or range and are highly likely to be predated by foxes. These are classified as 'H' (high risk). All classifications are best considered as speculative.

Two species are believed to have suffered significantly from predation, probably primarily from foxes. Fox predation is a major cause of juvenile mortality in the Malleefowl in New South Wales and South Australia (Priddel 1989; P. Copley, pers. comm.) and presumably throughout the geographic range of the bird. The Bush Thick-knee (Stone-curlew) has disappeared from many areas and decreased in numbers in many others. This decline has often been attributed to habitat alteration (Blakers *et al.* 1984). However, its disappearance in at least some areas has been correlated with the arrival of the fox (Storr and Johnstone 1989) and the species is still common on some off-shore islands in eastern and Western Australia from which foxes are absent, even though there are developmental pressures on some islands (A.A. Burbidge pers. comm.; J.E. Kinnear pers. comm.; A.H. Burbidge pers. obs.). They are also still relatively common in hard spinifex areas of the Pilbara, where foxes are relatively uncommon (A.N. Start pers. comm.). More research is needed to determine the effects and importance of fox predation on these species in Western Australia.

For many other species, the situation is less clear. However, several seem to be at higher risk than others, and so have high priority with respect to future research. In Western Australia, the Ground Parrot has declined in numbers and range to a greater extent than in eastern Australia (Burbidge *et al.* 1989). In parts of Western Australia, this is apparently due largely to inappropriate fire regimes in the past. However, the fox has almost certainly played a role in the observed decline. Future planned fox baiting in Fitzgerald River National Park, in conjunction with monitor-

ing of Ground Parrots, will shed more light on this question. Interestingly, the Ground Parrot has declined markedly on the mainland, but apparently not in Tasmania which is now its stronghold (Meredith 1984), and where the fox is absent.

The Nullarbor Quail-thrush has also undergone a widespread decline, which has usually been attributed to habitat degradation. However, the fox is common on the Nullarbor and the Quail-thrush is absent from some apparently suitable areas (Blakers *et al.* 1984), suggesting that predation may be an important factor in the decline.

The Bustard has declined more in southern than in northern and desert regions of Australia, where the fox is less common. It is likely that grazing by rabbits, land use practices and predation by foxes all act to limit numbers of Bustards (Grice *et al.* 1986) but more research is needed.

Even large birds may be susceptible: brood reduction is often marked in the Emu, and this may be caused by predation of young by foxes, although this is unlikely to be a major limiting factor for this species.

The list in Table 1 should be viewed as being speculative rather than authoritative. Several other species, including chats, fairy-wrens and emu-wrens, nest near the ground and hence are susceptible to fox and cat predation, although this is not likely to be significant.

DISCUSSION

Little is known of the effects of foxes or cats on native bird populations in Western Australia. Most current work on feral predators is on foxes, but it is known that both feral and domestic cats (E. Jones in Strahan 1983; Paton 1990a, 1990b) exert some predation pressure on native birds.

An additional difficulty encountered in making assessments such as that attempted here is that foxes and cats are adaptable and opportunistic predators, capable of switching prey items quickly (E. Jones in Strahan 1983; J.E. Kinnear pers. comm.). One consequence of this is that prey species of the fox (and presumably also of the cat) vary widely between localities and between seasons, with the result that birds can be important prey items in some seasons at some localities but not others (e.g. McIntosh 1963; Ryan and Croft 1974).

TABLE 1: Possible Effects of Fox (and/or cat) predation on Western Australian Ground-Nesting Birds (excluding Seabirds).

Key: S = predation by foxes believed to have been at least partly responsible for significant decline in range or numbers
H = unknown, but risk thought to be high
U = unknown, but significant effects likely in at least some sites
I = effect of predation by foxes believed to be insignificant

Common name	Scientific name	Effect
STRUTHIONIFORMES: EMU		
Emu	*Dromaius novaehollandiae*	I
PELECANIFORMES: PELICAN		
Australian Pelican	*Pelecanus conspicillatus*	I
ANSERIFORMES: DUCKS AND GEESE		
Cape Barren Goose	*Cereopsis novaehollandiae*	I
Australian Shelduck	*Tadorna tadornoides* *	U
Pacific Black Duck	*Anas superciliosa*	U
Grey Teal	*Anas gibberifrons*	U
Chestnut Teal	*Anas castanea*	U
Australian Shoveler	*Anas rhynchotis*	U
Maned Duck	*Chenonetta jubata* *	U
GALLIFORMES: MALLEEFOWL, QUAILS		
Orange-footed Scrubfowl	*Megapodius reinwardt*	I
Malleefowl	*Leipoa ocellata*	S
Stubble Quail	*Coturnix novaezelandiae*	U
Brown Quail	*Coturnix australis*	U
King Quail	*Coturnix chinensis*	I
GRUIFORMES: BUTTON-QUAILS, BUSTARDS		
Red-backed Button-quail	*Turnix maculosa*	I
Painted Button-quail	*Turnix varia*	U
Chestnut-backed Button-quail	*Turnix castanota*	I
Little Button-quail	*Turnix velox*	I
Red-chested Button-quail	*Turnix pyrrhothorax*	I
Australian Bustard	*Ardeotis australis*	H
CHARADRIIFORMES: WADERS AND TERNS		
Bush Thick-knee (Stone-Curlew)	*Burhinus magnirostris*	S
Beach Thick-knee (Stone-Curlew)	*Burhinus neglectus*	U
Painted Snipe	*Rostratula benghalensis*	U
Pied Oystercatcher	*Haematopus longirostris*	U
Sooty Oystercatcher	*Haematopus fuliginosus*	U
Masked Lapwing	*Vanellus miles*	I
Banded Lapwing	*Vanellus tricolor*	U
Red-kneed Dotterel	*Erythrogonys cinctus*	I
Black-fronted Plover	*Charadrius melanops*	U
Hooded Plover	*Charadrius rubricollis*	U

* almost exclusively tree hollow nesters, but downy young susceptible to predation *en route* to water.

(Table 1 cont.)

Common name	Scientific name	Effect
Red-capped Plover	*Charadrius ruficapillus*	U
Inland Dotterel	*Peltohyas australis*	U
Black-winged Stilt	*Himantopus himantopus*	U
Banded Stilt	*Cladorhynchus leucocephalus*	I
Red-necked Avocet	*Recurvirostra novaehollandiae*	U
Australian Pratincole	*Stiltia isabella*	I
Fairy Tern	*Sterna nereis*	U
COLUMBIFORMES: PIGEONS		
Flock Bronzewing	*Phaps histrionica*	I
White-quilled Rock-Pigeon	*Petrophassa albipennis*	I
Spinifex Pigeon	*Petrophassa plumifera*	U
PSITTACIFORMES: PARROTS		
Ground Parrot	*Pezoporus wallicus*	H
Night Parrot	*Geopsittacus occidentalis*	U
Rock Parrot	*Neophema petrophila*	I
CAPRIMULGIFORMES: NIGHTJARS		
Spotted Nightjar	*Caprimulgus guttatus*	U
CORACIIFORMES: KINGFISHERS		
Red-backed Kingfisher	*Halcyon pyrrhopygia*	I
Rainbow Bee-eater	*Merops ornatus*	I
PASSERIFORMES: SONGBIRDS		
Pittas		
Rainbow Pitta	*Pitta iris*	I
Larks		
Singing Bushlark	*Mirafra javanica*	I
Swallows		
White-backed Swallow	*Cheramoeca leucosternum*	I
Pipits		
Richard's Pipit	*Anthus novaeseelandiae*	I
Scrub-robins		
Southern Scrub-robin	*Drymodes brunneopygia*	U
Quail-thrushes		
Chestnut Quail-thrush	*Cinclosoma castanotum*	U
Cinnamon Quail-thrush	*Cinclosoma cinnamomeum*	U
Nullarbor Quail-thrush	*Cinclosoma alisteri*	H
Songlarks		
Rufous Songlark	*Cinclorhamphus mathewsi*	U
Brown Songlark	*Cinclorhamphus cruralis*	U
Scrubwrens & allies		
Shy Hylacola	*Sericornis cautus*	U
Redthroat	*Sericornis brunneus*	U
Calamanthus	*Sericornis fuliginosus*	I
Pardalotes		
Spotted Pardalote	*Pardalotus punctatus*	I
Yellow-rumped Pardalote	*Pardalotus xanthopygus*	I

While the extent of predation effects on birds is therefore unknown, it can be seen from Table 2 that up to about 10% of the breeding birds of Western Australia may be affected to some extent by predation by introduced predators. Predation by foxes is believed to be implicated in the decline of at least two species of birds in Western Australia. Predation is very likely implicated in the decline of a number of other species, but data are lacking.

As pointed out above, almost all seabirds nest on off-shore islands, where foxes and cats do not occur. However, one example of presumed fox predation on seabirds is the loss of the breeding colony of Wedge-tailed Shearwaters (*Puffinus pacificus*) on Wedge Island (north of Lancelin) following development of a tombolo joining of the island to the mainland around 1960 (Ford 1965; P.J. Fuller pers. obs.).

Table 2: Summary of known and possible effects of fox and/or cat predation on ground-nesting birds in Western Australia.

Category	No. of species	% of total *	% of breeders* *
Significant	2	< 1	1
Unknown- high risk	3	1	1
- moderate risk	35	7	10
Insignificant	25	5	7
Total	63	13	18

* including seabirds and species not nesting in Western Australia (ca. 492)

* * 356 breeding species, excluding Procellariiformes, tropicbirds, frigatebirds and boobies, but including terns

CALM land managers are encouraged to document any perceived changes in the abundance of native birds (or other animals) following any fox baiting programs on reserves or elsewhere. Please communicate any observations to either Allan Burbidge or Phil Fuller at:

WA Wildlife Research Centre
PO Box 51
WANNEROO 6065
Tel. (09) 405 5100

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