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THE SUNBIRD

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BIRDS OF COOMOBOOLAROO, CENTRAL QUEENSLAND, FROM 1873 TO 1999.

C.P. CATTERALL AND J.C.Z. WOINARSKI

ABSTRACT

Coomooboolaroo is a pastoral property in central Queensland, and the former home of ornithologist Charles Barnard, who published a detailed chronicle of the bird fauna of the property and its changes over the period 1873-1934. The property has since been carefully managed by only two other landholder families. We collated Barnard's records, and undertook two bird surveys of the property in 1999. The combined past and present bird list for the property totals 242 species. We also assessed the change in status for 200 species (those judged not to have ever been occasional visitors) over three time periods; 1873-1933, 1934-1999, and 1873-1999. In all time-periods, the number of species that decreased (declined or went locally extinct) exceeded the number that increased or colonised; during 1873-1999 there were more than three times as many decreaseers as increaseers. Birds of dry rainforest (softwood scrubs) were well represented among the decreaseers, which also included a wide variety of woodland, grassland and wetland birds. Increaseers and colonisers included geographically-widespread species that favour open country.

INTRODUCTION

Intensive land use since European settlement has lead to declines in bird species across southern Australia (e.g. Saunders and Curry 1990, Traill et al. 1996, Reid 1999). Even in the tropical savannas of northern Australia, where native vegetation has not been extensively cleared, there is concern about extensive bird species' declines (Woinarski 1993, Franklin 1999). However, outside of southern Australia, there is a scarcity of historical information that is sufficiently detailed to allow changes in species' status to be reliably assessed. There is one notable exception: the Coomooboolaroo property in the Dawson region of Central Queensland.

The ornithologist and former RAOU president Charles Barnard took up this property in 1873, around 20 years after initial European settlement, and remained there until his death in 1942. Barnard would have spent much time roaming the property, shooting small species for positive identifications, and he was a keen egg collector. He published a detailed chronicle of the property's bird fauna and its changes over the period 1873-1934 (Barnard 1925, 1934a, 1934b): these records provide what is still one of the most thorough accounts of any local bird fauna in the Australian literature. During Barnard's tenure, Comooboolaroo was also visited by other naturalists (e.g. Le Souef 1892, 1894, 1918).

After Barnard's death, part of the property was transferred in 1946 to the Edmistone family, who later subdivided it into what are now the Carinya and Kooralbyn holdings, while the remnant Comooboolaroo remained with the Barnard family until 1965, when it was acquired by the Dunne family. Thus, each part of the original property has been in the hands of only two landholders since 1873.

Barnard (1925) documented declines in many species during his period of stewardship, and offered speculations concerning the causes for these. He also commented on environmental changes that had occurred on the property, associated with the transition from traditional Aboriginal land management to pastoralism. Since the 1940's, the Central Queensland region has experienced further environmental changes, including ongoing vegetation clearing. Therefore, in 1999 we sought to update the history of change in Comooboolaroo's avifauna, through two brief but intensive bird surveys, that were supplemented by information from recent surveys in nearby areas, and the general region.

The purpose of this paper is to present the baseline status information for each species recorded from the property, together with our assessments of whether each has either declined or increased during three time-periods: 1873-1933, 1934-1999, and 1873-1999, and to comment generally on the avifauna. Statistical analyses of the rates and ecological correlates of species' change, together with summaries and interpretations of concurrent environmental changes on the property and the region, are presented elsewhere (Woinarski and Catterall 2004).

METHODS

Comooboolaroo homestead is located in eastern central Queensland, about 140 km inland from the coast near Rockhampton, 20 km south of Duinga township, 20 km west of the Dawson River, and 30 km south west of where it joins the Mackenzie River to form the Fitzroy River. The property covers around 440 km², and lies just to the east of the Expedition Range (an outlier of the Great Dividing Range), with its southern border following a feeder range of the Dawson Range. We researched the

property's history using past and present survey and cadastral maps (Queensland Department of Natural Resources), and obtained further information from the current landholders.

To assess the property's current avifauna, we undertook surveys on 30 January – 3 February, and 24 – 29 July, 1999 (hence potentially covering both summer and winter migrant species, but not passage migrants). This was neither an unusually dry nor an unusually wet year. We surveyed birds in a large number (476; 139 summer, 337 winter) of quadrats, each of about one ha in area (shape varying) that were spread widely across the old Coomooboolaroo property, with some limited sampling in adjacent properties. All apparent environmental variation that was accessible was visited, including the full range of different native vegetation types and different intensities of vegetation clearing and degradation. Each quadrat was searched by a single observer on foot for 5-10 mins, with all birds seen or heard being recorded, as were other bird species noted outside quadrats. Searches were undertaken throughout the day, but concentrated especially in the early morning. The time of day may have affected detectability for some species, but all habitats and broad geographic sectors of the property were sampled by many quadrats during the most favourable time periods of early morning. Spotlight searches were made on foot and in vehicles, together with play-back of recorded calls.

To assess species' status change, we scrutinised Barnard's (1925, 1934a, 1934b) list closely (both independently and in consultation), updated common and scientific names to conform with the taxonomy of Christidis & Boles (1994), and amalgamated species that are now taxonomically combined, carefully discussing ambiguous cases. We also paraphrased and condensed his comments on each species, extracting in particular any information that related to: change in frequency or abundance between 1873 and 1933; his speculations on possible reasons for the change; comments on habitat restriction or seasonal occurrence of species; and fluctuations that occurred within the time period.

To assess the extent of avifaunal change, we each used all the available information to separately assign a local status change category to all the property's recorded species for three time-periods: 1873 to 1933 (based on our interpretations of Barnard's comments), 1934-1999, and 1873-1999. Comparisons with 1999 were based on Barnard's comments together with the results from our survey, supplemented by information from other recent surveys in the region. There were five change categories: apparently extinct, other declines, no change, increase, and colonised. A sixth category of "unclassifiable" comprised species considered to be occasional visitors or for other reasons too rare or ambiguous for any change to be detected.

These methods have some limitations, for example it remains unclear whether Barnard recorded the Brown Thornbill or Inland Thornbill, and either could be possible, however since neither species has recently been recorded from the area there is no ambiguity in the interpretation of change. The long residency would have allowed Barnard to pick up many opportunistic sightings of species which visited infrequently and/or irregularly. His detailed local knowledge would have allowed him to target highly localised features, or to concentrate searching and monitoring for particular species on sites where he could most reasonably expect them to be. For example, his notes for the Singing Honeyeater record that it:

"is only seen in one locality on the station. The species is numerous about a small patch of open country in the middle of a patch of brigalow scrub twenty-five miles square. This patch of open country is dotted about with clumps of brigalow, which bear a certain amount of mistletoe, to which the bird is very partial. As soon as one comes within sight of the open country their loud cheery note is heard. Although there is mistletoe in other parts of the scrub, the birds are not in evidence."

Because of the pitfalls in comparing the qualitative but comprehensive descriptions provided by Barnard and our quantitative but short-term 1999 data, we were conservative in deducing change. This tended to increase species' representation in the "no change" or "unclassifiable" categories. When interpreting the status of species that were recorded by Barnard in 1873-1933, but not by us in 1999, we also took into consideration the species' conspicuousness, regularity in Barnard's time, and status in other reports from the study region.

The latter included records from parts of Coomooboolaroo State Forest (which partly overlaps the property), surveyed by G. Porter, M. Chuck and S. Barry (Queensland National Parks and Wildlife Service) over a few days in October 1991 (Barry 1991), and by M. Schulz and D. Hannah (Queensland Department of Natural Resources) in one day of April 1994 and two days in April 1996 (M. Schulz *pers. comm.*). We obtained data from the 1977-1981 Birds Australia Atlas (Blakers *et al.* 1984) for the 10-minute and one degree grid cells around the property; the 1998-2002 Atlas data for this region contained negligible records apart from our own. Surveys were also available for Blackdown Tablelands National Park, 40 km to the west (Eyre *et al.* 1998); Taroom Shire (100 km to the south) (Crossman & Reimer 1986); an unpublished list from Wandobah station, 30 km to the north west (B. Edmiston *pers. comm.*); and 61 sites scattered around 20-300 km from Coomooboolaroo in the Northern Brigalow and Desert Uplands bioregions (D. Hannah and others, unpublished data, 1979-1999). Other sources included avifaunal descriptions of the Rockhampton area, extending to within 50 km to the NE (Longmore 1978) and dry rainforests of south and mid-eastern Queensland, extending to within 100 km to the SE (Horsup *et al.* 1993).

Our initial status assignments were in agreement for 92% of the species, and the remainder were resolved through discussions. A number of species were later reconsidered in the light of comments on the draft manuscript, of which 12 (5%) were re-allocated. The change in status of some species will always remain uncertain, based on the available information. However, this would simply add "noise" to the data, and general trends will still be detectable when these judgments are made over a large number of species. The final list excludes one species: the "European ringed dove" or "ring-neck dove", which was apparently introduced by the Barnard family, established a semi-feral population, then was eliminated by owl predation (Barnard 1925).

RESULTS AND DISCUSSION

The combined past and present bird list for the property totals 242 species. Of these, 200 were assigned a status change for at least one of the three time-periods, and full details for these species are listed in Appendix 1. The remaining 42 species, many of which were irregular visitors during Barnard's time, are listed in Appendix 2.

In all time-periods, the number of species that decreased (declined or went locally extinct) exceeded the number that increased or colonised (Table 1). Eighty six species are considered to have decreased over the period 1873-1999 (18 of which appear to have gone locally extinct), while 24 have increased (11 of which are new colonists) (Table 1). Decreasers (extinctions plus declines) comprised 30% of 184 assessable species for the period 1873-1933, 30% of 158 for 1934-1999, and 44% of 191 over the entire time period. Increases (including colonisers) comprised 5%, 22%, and 13% respectively (see also Woinarski and Catterall 2004).

Table 1. Tallies of changed status among species that were assigned to a status change category in at least one time period. Note that the final column may not be the sum of the previous two, due to cases of uncertainty in period of local extinction, or those where species increased in one period and declined in another.

Birds that were associated with softwood scrub (dry rainforest) were well represented among the deceiver species (e.g. Black-breasted Button-quail, Emerald Dove, Wonga Pigeon, Lewin's Honeyeater, Eastern Whipbird, Little Shrike-thrush, Black-faced Monarch, Varied Triller). Decreasers also included a wide variety of woodland, grassland and wetland birds. Among these were the probably globally-extinct Paradise Parrot, and a several other woodland birds (e.g. Hooded Robin, Regent Honeyeater, White-eared Honeyeater, Crested Bellbird, and Crested Shrike-tit), which appear to have disappeared from Coomooloolaroo between 1933 and

1999, and are also considered to have declined elsewhere in Australia (Traill et al. 1996, Reid 1999).

The colonisers or increasers included geographically-widespread species of open country (e.g. Crested Pigeon, Apostlebird, Cattle Egret, Galah) that are known to be expanding across the continent (Blakers *et al.* 1984), but also included aquatic species (e.g. Magpie Goose, Pied Cormorant, Dusky Moorhen, Comb-crested Jacana). Some small-bodied species displayed puzzling absences from Barnard's records but were repeatedly recorded on the property in 1999 (Western Gerygone, Buff-rumped Thornbill, Tree Martin). It remains possible that Barnard may have overlooked or misidentified some or all of these, but we have listed them as new colonists.

Analyses of the relationship between status change and four known ecological properties of species (foraging type, habitat preference, body size, residency status)

Status change category	1873-1933	1934-1999	1873-1999
Became locally extinct	11	7	18
Declined	44	41	68
Stable	119	76	82
Increased	8	26	13
Newly colonised	2	9	11
Not assessable* or absent	16	41	8
Total	200	200	200

*Species with few or irregular records across the period considered.

revealed that only habitat preference was strongly associated with status change (Woinarski and Catterall 2004). During 1873-1933 the greatest losses occurred amongst bird species associated with softwood scrubs, grasslands and swamps. During 1934-1999 decreases were most frequent among birds of softwood scrub, eucalypt forest, and woodlands. Also during 1934-1999, smaller-bodied species (< 50 g) were more likely to have declined than larger-bodied species. Foraging mode and movement patterns were poor predictors of status change.

European settlement of the area around Coomooboolaroo followed soon after Leichhardt and Gilbert's 1844 journey of exploration. At that time the land supported a diverse vegetation mosaic, including dense brigalow/softwood scrubs, widely spaced gums over rich grass and herb flats, and creeks with deep waterholes, reed beds, swamps and lagoons (Leichardt 1847). Environmental changes began with sheep and cattle grazing from the 1850's and the forced removal and decline of the Aboriginal occupants. They continued with a record drought around 1900,

clearing of scrubs from the early 1900's, prickly-pear infestation between the 1880's and 1930's, and the rise of today's cattle industry. Since the 1960's there has been an increasing wave of deforestation, beginning with the brigalow lands development scheme, and continuing with broadscale chemical and mechanised clearing of eucalypt woodland at the end of the twentieth century (Woinarski and Catterall 2004).

Given these changes, it is not surprising that the bird fauna has been highly dynamic, both during the period of Barnard's occupancy and in the decades since. More than half the bird species have shown substantial changes in abundance between 1873 and 1999. More than three times as many species appear to have declined than increased. More species have become extinct on the property than have colonised. Grazing, drought, and early land clearing are all implicated in these changes. Much of this property is still woodland, and the effects of recent local and regional land clearing will probably bring further changes to the avifauna. Although generally sobering, the situation on Coomooboolaroo may represent a better than typical case scenario of the impact of pastoral land use on bird diversity.

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APPENDIX 1.

Species list, status notes and categorisations, for species that were assigned a status change category in at least one time period (N=200 species). nr = not recorded.

Barnard abundance. Paraphrase of Barnard's (1925, 1934) comments concerning status.

1999 status. Based on our surveys, interviews with landowners (KE=Keith Edmestone; HE=Harry Edmestone; BD=Bill Dunne), and interpretations of previous surveys at Coomooboolaroo State Forest (CSF). "Homestead" refers to Coomooboolaroo. "nr" refers to the authors' surveys.

N. Number of quadrats sampled in 1999 (N= 476).

C. Records from Coomooboolaroo State Forest by either QDNR staff (S) (M. Schulz *pers. comm.*) in 1994 and/or 1996, or QNPWS staff (P) (Barry 1991) in 1991. W indicates records from the (south-west) neighbouring Woorabinda block, also by QNPWS staff in 1991.

Regional status.

H: David Hannah (QEPA) species status recorded during 1997-1999, based on unpublished surveys of 61 sites in an area centred on (and extending 150 km around) Emerald, around 150 km WNW of Coomooboolaroo.

T: Crossman and Reimer 1986 species status in the Taroomb Shire, whose northern boundary extends to 100 km S of Coomooboolaroo (unc.=uncommon, abund.=abundant)

B: QEPA survey 1997 (B1) (Eyre *et al.* 1998), and draft management plan (B2) species presence/absence recorded from Blackdown Tablelands National Park (around 40 km W of Coomooboolaroo).

BE: B. Edmestone from "Wandobah", 30 km NW of Coomooboolaroo.

Atlas 1. Presence during the first Atlas of Australian Birds (1977-1981, Blakers *et al.* 1984) in two, 10-minute survey blocks around the property (centred at 23°45' 149°45' and 24°05' 149°45'; there were no bird records from the block centred at 24°05' 149°35'); 0 not present, 1 present in one block, 2 both blocks.

1873-1933. Change in status over this period: (e = extinct on the property, d = declined, n = no change, i = increased, c = new colonist, z = no clear trend, x = not present).

1934-1999. Codes as for above.

1873-1999. Codes as for above.

Hab. Main habitat: ss = softwood scrub; ef = eucalypt forest; ew = eucalypt woodland; nw = non-eucalypt woodland; gr = grassland; sw = swamp/reeds; ow = open water).

Siz. Body weight class: <20g; 20-49g; 50-99g; 100-300g; >300g.

For. Main foraging class. ss = granivorous; ff = frugivorous; nn = nectarivorous; gi = insectivorous, with foraging on the ground or in low shrubs; ti = insectivorous, with foraging in trees; ai = insectivorous, with foraging in the air; vv = eating other vertebrates; wp = eating aquatic plants; wd = eating aquatic animals, in deep water; ws = eating aquatic animals, in shallow water.

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1873-1933	1934-1999	1873-1999	Hab	Siz	For
Emu	Increased since eagles and dingoes poisoned.	nr, still present (KE, BD)	0	nr	common (T), B2	1	i	d	ew	300+	ff
Australian Brush-turkey	Plethful in scrubs; more numerous since the blacks decreased	Two recent mounds; odd birds still seen, though fewer (KE).	2	nr	unc. (T), B2	1	i	d	ss	300+	gi
Brown Quail	Appears in good seasons with flush of grass	Several seen	9	nr	very common (H), B2	0	n	n	gr	50-99	ss
King Quail	Plethful in good seasons	nr	0	nr	rare (H)	0	n	d	sw	20-49	ss
Maggie Goose	nr	Small flock in northern swamp (year round)	5	nr	few records (H)	1	x	c	sw	300+	wp
Plumed Whistling-Duck	Formerly common, now scarce	Several seen, in groups of ca 10. occasionally nesting (KE)	3	nr	small groups on larger dams (H)	1	d	i	n	ow	ss
Wandering Whistling-Duck	Formerly common, now much scarcer	Flocks of 10-30 seen at 2 waterbodies	2	nr	small groups on larger dams (H)	2	d	i	n	ow	wp
Black Swan	Occasionally seen in lagoon; for several years they bred on an outlying swamp	Two with two young, at homestead lagoon (summer); up to 6-7 on dams, breed occasionally (KE)	1	nr	on larger dams & wetlands (H) common (T)	2	n	i	ow	300+	wp
Australian Wood Duck	Common, breeding regularly	Small numbers on dams and swamps	12	SPW	common (T), B1	2	n	n	ow	300+	wp
Cotton Pygmy-Goose	Formerly common, often seen with young in lagoon; now scarce	nr; not noted (KE)	0	nr	pairs often seen on larger dams (H) unc. (T)	1	d	z	sw	300+	wp
Pacific Black Duck	Always common, nesting	Up to 20 on dams and swamps.	24	SPW	abund. (T), B1, B2	2	n	n	ow	300+	wp
Grey Teal	Plethful (nesting)	Common, several flocks of 5-30	11	SW	abund. (T)	2	n	n	ow	300+	wp
Pink-eared Duck	Fairly common at times	nr, but recorded in CSF	0	P	nr (H)	0	n	d	ow	300+	ws
Hardhead	Formerly very common; now scarce	Single birds recorded	2	nr	nr (H) common (T)	2	d	z	ow	300+	wp
Australasian Grebe	Always a few in permanent water	1-2 on several dams	10	SW	common (T)	2	n	n	ow	100-299	wd
Hoary-headed Grebe	nr	Two at homestead lagoon; recorded from Wooraabinda	1	W	few records (H) unc. (T) B2	0	x	c	ow	100-299	wd
Darter	Almost always a few in lagoon	A few, in creeks, dams and swamps	7	nr	common (T), B1, B2	2	n	n	ow	300+	wd
Little Pied Cormorant	Common (nest in gum saplings when swamps filled)	At several waterbodies, about 30 present at N swamp	16	nr	common (T)	2	n	n	ow	300+	wd
Pied Cormorant	nr	In swamp N of homestead	3	nr	occasional (H)	0	x	c	ow	300+	wd
Little Black Cormorant	Frequent	Small numbers present	2	nr	unc. (T)	2	n	n	ow	300+	wd
Great Cormorant	Frequent	One at homestead lagoon	1	nr	rare (T)	0	n	d	ow	300+	wd

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1933-1999	1873-1934-1999	Hab	Siz	For
Australian Pelican	Frequently visits lagoon	Few recorded, visit occasionally (KE)	3	nr	common (T)	2	n n n	ow	300+	wd
White-faced Heron	Resident, nests far from water	Seen at two wetlands, 12 at N swamp	10	P	common (T) B2	2	n n n	ow	300+	ws
White-necked Heron	Nests in swamps	Seen at two wetlands, 15 at N swamp	12	nr	common (T), B1	2	n n n	ow	300+	ws
Great Egret	Generally about lagoon	nr	0	nr	common (T)	2	n z z	ow	300+	ws
Intermediate Egret	Single birds often near lagoon	About 50 in northern swamp	10	nr	unc. (T)	2	z i i	sw	300+	ws
Cattle Egret	nr	Single bird (winter); recorded in region	1	nr		0	x c c	gr	300+	gi
Nankeen Night Heron	Uncommon resident, cryptic	About 20 at homestead lagoon	2	nr	unc. (T), B1, B2	2	n i i	ow	300+	ws
Black Bittern	Once frequently seen (nesting) on creek banks; not seen for years	nr	0	nr	B1	0	e x e	sw	300+	ws
Australian White Ibis	Often in small flocks at swamps	About 40 in N swamp; few elsewhere	7	nr	common (T)	2	n n n	sw	300+	ws
Straw-necked Ibis	Flocks 50-100, often in paddocks	About 50 in N swamp	15	nr	common (T)	2	n n n	sw	300+	ws
Royal Spoonbill	Common (not nesting)	common (KE)	2	nr	occasional at large dams (H) common (T)	1	n n n	ow	300+	ws
Yellow-billed Spoonbill	Common & nesting in swamps	Several records at dams	3	nr	occasional records at larger dams (H) common (T)	2	n n n	ow	300+	ws
Pacific Baza	Not often noticed, holding its own	Seen year round	6	nr		0	n n n	ef	100-299	vv
Black-shouldered Kite	Formerly frequently seen over cleared land; now only at intervals	nr; a few sometimes present (KE)	0	nr	common (H) unc. (T)	0	d z d	gr	100-299	vv
Square-tailed Kite	Was regularly present, though not common; more scarce recently	nr; but recorded in CSF	0	P	2 records in area (H)	0	d z d	ew	300+	vv
Black-breasted Buzzard	Formerly often seen high up; not seen in recent years	nr	0	nr	nr (H)	0	e x e	ew	300+	vv
Black Kite	Numerous in early days; now seldom seen (? decline may be due to sheep moving away)	nr	0	nr	common in area (H) unc. (T)	1	d z d	ew	300+	vv
Whistling Kite	Common	regularly recorded	12	S	common (T)	2	n n n	ew	300+	vv
Spotted Harrier	Often seen years ago - in paddocks near homestead; seldom seen now	nr	0	nr	occasional in area (H)	0	d z d	gr	300+	vv

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1873-1933	1873-1934-1999	1873-1934-1999	Hab	Size	For
Brown Goshawk	Common (and around homestead)	Only 1 seen	1	nr	occasional (H) rare (T), B1	0	n	d	ef	300+	vv
Red Goshawk	Always rare; now seldom seen	nr	0	nr	1 record from Duaringa (H)	0	d	z	ef	300+	vv
Wedge-tailed Eagle	Once quite numerous; seldom seen now (?dingo poison)	Several birds (winter); odd birds (KE)	8	SW	abund. (T), B1, B2	0	d	i	d	300+	vv
Brown Falcon	Common	Several birds seen	5	S	common (H) abund. (T), B2	0	n	n	n	300+	vv
Australian Hobby	Fairly plentiful, generally about swamps	nr	0	nr	occasional (H) unc. (T), B2	1	n	d	ef	100-299	vv
Black Falcon	Occasionally seen in former years, but none for many years past	nr	0	nr	1 record from near Alpha (H)	0	d	x	d	300+	vv
Nankeen Kestrel	Formerly common (not breeding)	Several birds seen	10	S	common (H) abund. (T), B1, B2	2	d	n	d	100-299	vv
Brolga	Usually a pair at home lagoon more when swamps are filled	Two near grassy banks of small creek, both seasons; breeding most years (KE)	3	nr	common in cropping areas (H) rare (T), B1	1	n	n	n	300+	vv
Buff-banded Rail	Once numerous in cover; now very rarely seen	nr, but a crane or rail noted occasionally by KE	0	nr	nr (H)	0	d	z	d	100-299	gi
Bailion's Crake	Once fairly common in swamps	nr	0	nr	nr (H)	0	d	z	d	May-19	ws
Purple Swamphen	Plentiful in permanent swamps; formerly nested freely	Common (c. 50) in northern swamp	2	nr	occasional, (H) common (T)	2	d	n	n	300+	wp
Dusky Moorhen	nr	One at homestead lagoon, with 4 young	7	nr	few records (H) common (T)	2	x	c	c	300+	wp
Black-tailed Native-hen	Sometimes about the lagoon (implied recent decline)	nr	0	nr	nr (H) seen one year (BE)	0	d	z	d	300+	wp
Eurasian Coot	Used to nest freely in the swamps; still often seen on the lagoon	Few seen in winter	1	nr	occasional, (H) common (T)	2	d	n	d	300+	wp
Australian Bustard	Visits during drought - occasional; more common by the early 1930s, because of clearing	Several birds recorded; very common (nesting) after brigalow cleared (KE)	2	nr	common on pasture (H) common (T)	1	i	i	i	300+	vv
Little Button-quail	Common when plenty of grass	nr	0	nr	nr (H)	0	n	d	d	20-49	ss
Painted Button-quail	Occurs in rough brushy parts	nr	0	nr	relatively common (H) rare (T), B1	0	n	z	z	50-99	ss

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1933	1873-1934 1933	1873-1934 1933	1873-1934 1933	Hab	Siz	For
Black-breasted Button-quail	Was frequent in the big scrub; not seen for >25 years	nr	0	nr	nr (H)	0	e	x	e	ss	50-99	ss
Painted Snipe	Singly or in pairs after rain	nr	0	nr	nr (H) rare (T)	0	n	d	d	sw	100-299	ws
Comb-crested Jacana	Rare visitor to lagoon, resident in the early 1930s, up to 5 on the homestead lagoon	Single birds seen at several swamps; and 8 at homestead lagoon	5	nr	occasional on wetlands (H) unc. (T)	2	i	i	i	sw	50-99	ws
Bush Stone-curlew	Were seen regularly at several places; now very rarely seen or heard (?due to wild cats)	common (seen and heard)	2	nr	occasional (H) unc. (T), B1, B2	1	d	i	n	ew	300+	gi
Black-fronted Dotterel	Always a few pairs on edge of lagoon	nr; (see comments for Red-kneed Dotterel)	0	S	unc. (T)	1	n	n	n	ow	20-49	ws
Masked Lapwing	A few visit now & then	Common	14	SPW	common (H) common (T)	2	z	i	i	gr	300+	gi
Emerald Dove	Occasionally seen in the big scrub	nr	0	0	nr (H) rare (T)	0	n	d	d	ss	100-299	ss
Common Bronzewing	Quite numerous	Scattered birds; still around (KE).	2	SP	common (H) common (T), B1, B2	0	n	d	d	ef	300+	ss
Crested Pigeon	Noted on 3 occasions in last 3 years. Never seen until recently	Several recorded; very common, increased (KE)	7	SW	abund. (T)	2	c	i	c	ew	100-299	ss
Squatter Pigeon	Plentiful until 1904, when absent; began returning around 1930	Common on roadsides in cleared areas; plenty about in eucalypt forest (KE)	9	SC	relatively common (H) unc. (T), B1, B2	0	d	i	n	ew	20-49	ss
Peaceful Dove	Always plentiful	Common	29	SPW	common (T), B1, B2	2	n	n	n	ef	50-99	ss
Bar-shouldered Dove	Common in scrub	A few birds; common (KE)	10	SP	common (H) common (T) B2	0	n	n	n	ss	100-299	ss
Wonga Pigeon	Now scarce; absent from parts of scrub where formerly present	One record from remnant of scrub where formerly brigalow/softwood scrub	1	nr	nr (H) unc. (T)	0	d	z	d	ss	100-299	ss
Glossy Black-Cockatoo	Nested in gums on creeks; fed on bear cones; absent for many years	nr	0	nr	nr (H) unc. (T), B1, B2	0	e	x	e	nw	300+	ss
Yellow-tailed Black-Cockatoo	Uncommon, bred yearly in gums along creek	nr; not seen for 10-15 years (KE)	0	nr	occasional groups (H) unc. (T)	0	n	d	d	ef	300+	ss
Galah	nr	One recorded; recently arrived (KE)	1	nr	common (H) common (T)	0	x	c	c	ew	300+	ss
Sulphur-crested Cockatoo	Always plentiful; in open paddocks	small groups in forests and around water	33	SP	common (H) abund. (T), B1, B2	2	n	n	n	ef	50-99	ss
Cockatiel	Common in 1902 drought; seen occasionally	4 small groups; resident (KE)	4	S	millions (H) common (T)	2	z	i	i	ew	50-99	ss

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1933	1873-1934- 1933	1873- 1933	Hab	Siz	For
Rainbow Lorikeet	Numerous in flowering gums	Very common, hundreds (?) thousands) roosting at Koorabyn homestead	90	SPW	common (H) abund. (T), B1, B2	2	n	n	ef	100-299	nn
Scaly-breasted Lorikeet	Numerous in flowering gums	Common (less so than Rainbow Lorikeet) in flowering gums	35	P	abund. (T), B1, B2	1	n	n	ef	50-99	nn
Musk Lorikeet	Often large flocks, in flowering trees	nr	0	nr	nr (H) B2	0	z	d	ef	50-99	nn
Little Lorikeet	Numerous in flowering gums	nr	0	S	nr (H) common (T), B1, B2	0	n	d	ef	20-49	nn
Australian King-Parrot	Frequently seen in rugged country	One seen in ranges; not a lot, but still present (KE)	1	S	nr (H) common (T), B1, B2	0	n	d	ef	100-299	ff
Red-winged Parrot	Common	Some birds seen; quite a few (HE)	10	W	common (H) unc. (T), B1	1	n	n	ef	50-99	ss
Pale-headed Rosella	Common	Common	44	SPW	common (H) abund. (T), B1, B2	2	n	n	ef	50-99	ss
Swift Parrot	One year only, in flocks feeding on lerps	nr	0	nr	nr (H)	0	z	d	ef	50-99	nn
Paradise Parrot	"before 1902, not very uncom- mon to see a pair" (Barnard 1917); none since (drought; heavy stocking).	nr	0	nr	nr (H)	0	e	x	ew	50-99	ss
Budgerigar	First seen and most during 1902; occasionally seen, "plentiful for the last year" (early 1930s) Common in summer	nr; occasionally 20-30 in flocks (KE)	0	nr	large flocks, west of Alpha (H) rare (T)	0	i	z	ew	20-49	ss
Pallid Cuckoo	Common in summer	One record	1	nr	occasional (H) unc. (T), B2	1	n	d	ef	50-99	ti
Fantailed Cuckoo	Appears in brush/scrub (spring)	A few recorded	2	S	very few (H) unc. (T), B2	0	n	n	ef	20-49	ti
Horsfield's Bronze-Cuckoo	Common	A few recorded	2	nr	occasional (H) rare (T), B1, B2	0	n	n	ew	20-49	ti
Shining Bronze-Cuckoo	Common	A few recorded in winter	2	nr	rare (T), B1, B2	0	n	n	ef	20-49	ti
Common Koel	Common summer visitor	Two recorded	1	nr	autumn visitor (H) unc. (T), B1, B2	1	n	d	ss	100-299	ff
Channel-billed Cuckoo	Common at times	nr; "in reasonable numbers" (KE)	0	P	occasional (H) unc. (T), B1, B2	1	n	n	100-299	ff	ff
Pheasant Coucal	Often on creek banks now only in rough country and scrubs	Fairly common	9	P	common (H) unc. (T), B1, B2	2	d	i	gr	100-299	wv
Barking Owl	Fairly common; but not seen in the early 1930s	nr	0	nr	occasional, especially in tall trees in riparian strips (H) B2	0	d	z	ef	300+	wv
Southern Boobook	Fairly common	Fairly common	2	SP	common (H) unc. (T), B1, B2	0	n	n	ef	300+	wv

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas			Hab	Siz	For	
						1873-1933	1873-1933	1934-1999				
Barn Owl	Formerly fairly common	Several recorded	1	S	common (H) rare (T), B2	0	d	i	n	gr	300+	w
Tawny Frogmouth	Fairly common	Fairly common	6	S	common (H) unc. (T), B1, B2	0	n	n	n	ef	300+	w
White-throated Nightjar	Common (breeding)	Fairly common in ridge forests	0	nr	rare (H) rare (T), B1	0	n	n	n	ef	100-299	ai
Australian Owlet-nightjar	Occasionally flushed; no change in numbers	Several heard in ridge forest	1	S	rare (T) B2	0	n	n	n	ef	20-49	gi
Azure Kingfisher	Once seen regularly (creek banks); none seen for many years	nr; not seen (KE)	0	nr	nr (H) unc. (T), B1, B2	0	e	x	e	ow	20-49	ws
Laughing Kookaburra	Common? (reduced in 1902)	Common	55	SPW	common (H) abund. (T), B1, B2	2	n	n	n	ef	300+	w
Blue-winged Kookaburra	Common	Few groups seen in riparian forest; "a few around" (KE)	4	P	occasional (H)	2	n	d	d	ef	300+	w
Forest Kingfisher	Common, summer migrant	Common, including winter records	17	nr	occasional (H) rare (T), B1, B2	2	n	n	n	ef	20-49	w
Red-backed Kingfisher	Usually rare; common in some years, breeding	A few seen	2	nr	occasional (H) rare (T)	0	n	n	n	ew	20-49	w
Sacred Kingfisher	Common, resident	A few birds recorded; not in winter	2	S	common (H) common (T), B1, B2	2	n	n	n	ef	20-49	w
Rainbow Bee-eater	Plentiful in summer, but also few in winter; breeding	Moderately common in winter; bred but not common (KE)	30	SPW	common (H) common (T), B1, B2	2	n	n	n	ef	20-49	ai
Dollarbird	More plentiful years ago than now (decline may be due to fewer cicadas, in turn because of stock)	Frequently along creeks; not a lot (KE)	10	nr	common (H) common (T), B1, B2	2	d	i	n	ef	50-99	ti
White-throated Treecreeper	Fairly common in scrubs & range country	A few in ridge forest; "quite a few" treecreepers (?species) KE	3	S	only at one site (H) unc. (T), B1, B2	0	n	d	d	ef	20-49	ti
Brown Treecreeper	Common in forest	A few birds in woodlands	4	nr	common (H) unc. (T) B2	0	n	d	d	ew	20-49	gi
Variegated Fairy-wren	Fairly common in scrubs	Several groups, in brigalow regrowth and remnants; no blue wrens seen (KE)	8	nr	common (H) unc. (T), B1, B2	1	n	d	d	ss	May-19	gi
Red-backed Fairy-wren	Once plentiful in long grass; scarce since 1902; by early 1930s "becoming more plentiful"	Common; "common" (KE)	68	nr	common (H) common (T), B1, B2	2	d	i	n	ew	May-19	gi
Spotted Pardalote	Occurs (tree-tops)	nr	0	nr	nr (H) unc. (T), B1, B2	0	n	d	d	ef	May-19	ti
Red-browed Pardalote	Seldom seen but present (one nesting record)	One record	1	nr	nr (H)	0	n	d	d	ew	May-19	ti
Striated Pardalote	Common, nesting creek banks	Very common	195	SPW	common (H) abund. (T), B1, B2	2	n	n	n	ef	May-19	ti

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1873- 1933	1934- 1999	1873- 1999	Hab	Siz	For
White-browed Scrubwren	Formerly common, scrub edges	One group of 3-5 birds, in remnant softwood scrub One record	1	nr	nr (H) common (T), B1,B2	0	d	d	ss	May-19	gi
Speckled Warbler	Frequent in brush country; formerly nested on ridges	Very common	1	nr	occasional (H) unc. (T)	0	d	d	nw	May-19	gi
Weebill	Common in forest country		84	SP	very common (H) abund. (T), B1,B2	1	n	n	ew	May-19	ti
Western Gerygone	nr	A few birds, year round	4	nr	few individuals (H) rare (T)	0	x	c	ew	May-19	ti
White-throated Gerygone	Fairly common	Common	54	SP	occasional (H) common (T), B1	0	n	n	ef	May-19	ti
Inland Thornbill (?Brown)	Formerly fairly common in scrubs	nr; recorded in CSF	0	P	occasional (H) rare (T) B2	0	d	z	nw	May-19	gi
Buff-rumped Thornbill	nr	Common; possibly misidentified by Barnard	33	nr	occasional to E and SE of Emerald (H) common (T), B1,B2	0	x	c	nw	May-19	gi
Yellow-rumped Thornbill	Fairly common in brush country	In cleared grassy brigalow, and CSF (not Buff-rumped Thornbill?)	5	P	common (H) rare (T)	0	n	d	gr	May-19	gi
Yellow Thornbill	Common in scrubs	Few small flocks	4	nr	few records (H) unc. (T), B1,B2	0	n	d	nw	May-19	gi
Striped Honeyeater	Common	A few birds seen	3	S	common (H) common (T), B2	2	n	d	ew	20-49	ti
Noisy Friarbird	Very common	Common, especially in flowering gums	50	SPW	common (H) abund. (T), B1,B2	1	n	n	ef	100-299	nn
Little Friarbird	Very common	Common, especially in flowering gums	24	SPW	common (H) abund. (T), B1,B2	1	n	n	ef	50-99	nn
Regent Honeyeater	Plentiful one year; not seen again	nr	0	nr	nr (H)	0	z	d	ew	20-49	nn
Blue-faced Honeyeater	Common, including garden	Moderately common, also in gardens	28	SPW	common (H) common (T), B1,B2	2	n	n	ef	100-299	nn
Noisy Miner	Very common	Common	81	SP	common (H) abund. (T), B1,B2	1	n	n	ef	50-99	ti
Yellow-throated Miner	One year only (common 70 mile away); [1902 drought]	Flocks observed at several sites	9	W	common (H) unc. (T), B1	1	z	i	ew	50-99	ti
Lewin's Honeyeater	Common in scrubby country	Seen in remnant softwood scrub	1	nr	nr (H) unc. (T) B2	1	n	d	ss	20-49	ff
Yellow-faced Honeyeater	Formerly fairly common; now scarce	nr; recorded in CSF	0	S	on creeklines (H) unc. (T), B1,B2	0	d	z	ef	May-19	nn
Singing Honeyeater	One site, numerous in small patch of open country in brigalow	nr	0	nr	common (H) rare (T)	0	n	z	ew	20-49	ti
White-eared Honeyeater	Once fairly common, mainly hills	nr	0	nr	few records (H) common (T), B1,B2	0	d	e	ef	20-49	ti

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1873-1933	1934-1999	1873-1999	Hab	Siz	For
Yellow-tufted Honeyeater	Once very common in scrubs; now absent	nr	0	nr	nr (H) unc. (T), B1,B2	0	e	x	ef	20-49	ti
Fuscous Honeyeater	Common	Restricted in summer; locally common in riparian forest in winter	8	nr	nr (H) unc. (T)	1	n	d	ew	May-19	ti
White-throated Honeyeater	Common in forest	Common in forests and woodlands	62	S	common (H) unc. (T), B1,B2	1	n	n	ef	May-19	ti
White-naped Honeyeater	Common in rangy country	Few records; recorded in CSF (but no White-throated Honeyeater?)	2	P	nr (H) unc. (T), B1,B2	0	n	d	ef	May-19	ti
Brown Honeyeater	Formerly very common (& garden)	A few birds in summer; more in winter	54	nr	very few (in box-ironbark)(H) unc. (T), B1,B2	1	d	i	n	May-19	nn
Scarlet Honeyeater	Common when trees in bloom	Several records, winter only	7	S	nr (H) rare (T), B1,B2	0	n	d	ef	May-19	nn
Jacky Winter	Noticeable all over the country	Winter records in open forest and woodland/grassland edges	10	SP	common (H) common (T), B1	1	n	d	ew	May-19	gi
Red-capped Robin	Generally appears about May and 1-2 pairs seen throughout winter	nr; seen, but not recently (KE)	0	nr	occasional, during autumn/winter (H) rare (T)	0	n	z	nw	May-19	gi
Hooded Robin	Fairly common	nr	0	nr		0	n	e	nw	20-49	gi
Eastern Yellow Robin	Fairly common in scrub & ridges	One heard in forest on ridge	0	nr	nr (H) unc. (T), B1,B2	0	n	d	ef	May-19	gi
Grey-crowned Babbler	Common	Common; very many (KE)	38	SPW	common (H) abund. (T), B1,B2	1	n	n	ef	50-99	gi
Eastern Whipbird	Formerly a few in the scrub; now disappeared from the district	nr	0	nr	nr (H) rare (T) B2	0	e	x	ss	50-99	gi
Varied Stitella	Fairly numerous (breeding)	Several flocks observed; common (KE)	4	S	reasonably common (H) common (T), B1,B2	0	n	n	n	May-19	ti
Crested Shrike-It	Fairly common (breeding)	nr	0	nr	nr (H)	0	n	e	ef	20-49	ti
Crested Bellbird	Formerly regular on dead-timbered ridges; now almost gone (possibly because of cats)	nr	0	nr	common, west of Alpha (H)	0	d	e	ew	50-99	gi
Golden Whistler	Fairly common in dense scrubs (breeding)	A few birds seen, mainly in winter,	5	nr	nr (H) unc. (T) B2	0	n	d	ss	20-49	ti
Rufous Whistler	Common in forest country (thicker) (breeding)	Regularly seen; more common in winter	90	SP	common (H) common (T), B1,B2	2	n	n	n	20-49	ti

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1873-1933	1873-1934-1999	Hab	Siz	For
Little Shrike-thrush	Formerly rare, in the scrub; now disappeared	nr	0	nr	nr (H) rare (T)	0	e x	ss	20-49	ti
Grey Shrike-thrush	Formerly a very common bird; still numerous	Regularly seen.	24	SP	in larger remnants (H) common (T), B1, B2	1	d n	ef	50-99	gi
Black-faced Monarch	A few in thick scrub many years ago; not seen for past 30 years	nr	0	nr	nr (H)	0	e x	ss	20-49	ti
Leaden Flycatcher	"In evidence in spring", breeding along creeks and slightly brushy areas.	Several birds seen along creeks	8	nr	occasional to common (H) common (T), B1, B2	0	n n	ef	May-19	ti
Restless Flycatcher	More or less plentiful in waterholes, swamps; often seen in garden	Several seen, around homestead lagoon and riparian areas	7	SW	occasional to common (H) common (T), B1, B2	2	n n	ew	20-49	gi
Magpie-lark	Resident in paddocks, gardens	common; plenty (KE)	46	SPW	common (H) abund. (T), B1, B2	2	n i	ew	50-99	gi
Rufous Fantail	Formerly frequent in scrubs, summer	nr	0	nr	nr (H) rare (T)	0	d z	ss	May-19	gi
Grey Fantail	Scattered in scrubs & thick rangy country; occasional in garden	Very common winter migrant	139	SP	winter migrant - fairly common (H) common (T) B2	1	n i	ef	May-19	ti
Willie Wagtail	Always in paddocks, garden	Moderately common; plenty (KE)	58	SP	common (H) abund. (T), B1, B2	2	n i	ew	20-49	gi
Spangled Drongo	Seen regularly in summer & migration	Several birds seen	8	nr	occasional (H) rare (T), B1, B2	1	n n	ef	50-99	ti
Black-faced Cuckoo-shrike	Common (breeding)	Common, especially in summer	23	SP	common (H) abund. (T), B1, B2	2	n n	ew	100-299	ti
White-bellied Cuckoo-shrike	Common but not noticeable	Several sightings, especially in summer	8	S	common (H) common (T), B1, B2	1	n n	ef	50-99	ti
Cicadabird	Fairly plentiful summer visitor; chiefly in scrubs	Several recorded	3	SP	seasonally common (H) unc. (T), B1	0	n n	ef	50-99	ti
White-winged Triller	Much in evidence during summer	Few birds recorded	2	P	common (H) unc. (T)	2	n d	ew	20-49	gi
Varied Triller	Formerly common in scrubs; not seen in recent years	nr	0	nr	nr (H)	0	e x	ss	20-49	ti
Olive-backed Oriole	Common in scrubby country	Several sightings, especially in summer	9	SP	occasional (H) unc. (T), B1, B2	2	n n	ef	50-99	ti
Figbird	Formerly occasionally in garden	Few in garden & remnant brigalow	2	nr	occasional (H) rare (T) B2	1	d i	ss	100-299	ff

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	Atlas 1 1873-1933	1873-1934-1933	1873-1934-1933	Hab	Siz	For	
White-breasted Woodswallow	Once always seen along lagoon around homestead; none now for many years, though still within a few miles of the place	nr, but recorded in CSF	0	S	occasional (H) unc. (T)	2	d	z	d	ow	20-49	ai
Masked Woodswallow	Large flocks appear in summer	Small flock high overhead	0	S	occasional (H) B2	0	n	z	z		20-49	ai
White-browed Woodswallow	Large flocks appear in summer	nr, but recorded in CSF	0	S	occasional (H) rare (T), B1,B2	1	n	z	z		20-49	ai
Black-faced Woodswallow	Common (most of year)	A few birds recorded, summer and winter	5	nr	occasional (H) rare (T)	1	n	d	d	ew	20-49	ai
Dusky Woodswallow	Common (less in flocks)	nr	0	nr	very few (H) rare (T)	0	n	e	e	ef	20-49	ai
Little Woodswallow	Likes a dead-timbered ridge (breeding)	Several small groups	4	P	relatively common (H) rare (T)	0	n	n	n	ew	20-49	ai
Grey Butcherbird	Latterly very frequent about garden; appears to have increased	Moderately common.	32	SPW	common (H) common (T), B1,B2	2	i	n	i	ef	50-99	vv
Pied Butcherbird	Very common	Common	48	SPW	common (H) common (T), B1,B2	2	n	n	n	ew	100-299	vv
Australian Magpie	Very common; temporary decline in 1902, but back to former numbers	Common.	85	SPW	common (H) common (T), B1,B2	2	n	n	n	ew	100-299	gi
Pied Currawong	Formerly very common, has declined but still in ranges	Moderately common, mostly in ranges; "common" (HE)	27	SW	occasional (H) common (T), B1,B2	1	d	i	n	ef	100-299	vv
Torresian Crow	Plentiful everywhere (spread prickly pear)	Common	63	SPW	common (H) abund. (T), B1,B2	2	n	n	n	ew	300+	vv
White-winged Chough	Always common; no change in numbers	Several birds recorded; "not very common" (HE)	5	P	occasional (H) common (T), B1,B2	1	n	n	n	nw	300+	gi
Apostlebird	First seen around 1884; then increased; now one of the commonest birds in the district	Moderately common; "very common" (HE)	22	PW	common (H) abund. (T), B1,B2	3	c	n	c	nw	100-299	gi
Spotted Bowerbird	Keeps mainly to scrubby parts, but visits garden	A few in softwood scrub remnant; common, including in garden (ate fruit of sandalwood) HE	2	nr	occasional to common (H) unc. (T) B2	1	n	n	n	ss	100-299	ff
Singing Bushlark	Visitor; very numerous in some seasons	A few birds only seen	1	nr	occasional (H) unc. (T)	0	n	z	z	gr	20-49	gi
Richard's Pipit	Like the poor, is always with us	Several birds seen	7	nr	common in pasture (H) common (T)	0	n	n	n	gr	20-49	gi

Bird species	Barnard abundance (1873-1933)	1999 status	N	C	Regional status	1873-1934-1873- 1933 1999 1999		Hab	Siz	For
						Atlas 1	Atlas 1			
Zebra Finch	Seems more plentiful than formerly	Two groups seen in cleared grassy brigalow area	2	nr	occasional to common (H) common (T)	0	i d	ew	May-19	ss
Double-barred Finch	Very plentiful at times	Moderately common	32	SP	occasional to common (H) common (T), B1, B2	2	n n n	ef	May-19	ss
Black-throated Finch	Fairly common in forest country	nr	0	nr	nr (H)	0	n e e	ew	May-19	ss
Plum-headed Finch	Appears in large numbers whenever seasons are good (for long grass)	One flock of 30 near a dam	1	S	occasional (H) unc. (T)	0	n z z	ew	May-19	ss
Red-browed Finch	Fairly common in scrubby places	nr; recorded in CSF	0	S	nr (H) unc. (T), B1, B2	0	n d d	ef	May-19	ss
Diamond Firetail	Seems more plentiful than formerly	nr	0	nr	3 individual records (H) rare (T)	0	i e e	ew	May-19	ss
Chestnut-breasted Mannikin	Was very plentiful years ago; nesting in long grass	A group of 20 near homestead	0	nr	nr (H) rare (T) B2	0	d z d	sw	May-19	ss
Mistletoebird	Common	Moderately common	25	S	common (H) rare (T), B1, B2	0	n n n	ef	May-19	ff
Welcome Swallow	Used to nest at homestead; now only odd birds seen	Recorded nesting at Kooralbyn	2	S	occasional (H) unc. (T) B2	1	d i n	gr	May-19	ai
Tree Martin	nr	Around two dams (one flock of about 30); scattered, other records of small flocks	12	S	unc. (T)	0	x c c	ef	May-19	ai
Fairy Martin	Always plentiful, nesting around creeks and buildings	A few records of groups, winter	2	nr	common (H) common (T), B1, B2	1	n n n	gr	May-19	ai
Tawny Grassbird	Formerly much in evidence in some seasons	nr	0	nr	nr (H) unc. (T)	2	d z d	gr	May-19	gi
Rufous Songlark	Always about, but not much in evidence until good crop of grass	Moderately common	15	nr	common west of Alpha (H) unc. (T)	0	n n n	ew	20-49	gi
Brown Songlark	Once a regular visitor; now very seldom seen	nr	0	nr	1 record (H)	1	d z d	gr	20-49	gi
Golden-headed Cisticola	Formerly often in long grass (summer); now not often seen	A few recorded.	5	nr	occasional (H) unc. (T)	1	d i d	gr	May-19	gi
Silvereye	At times numerous in scrubs, used to visit garden	A small flock in softwood scrub (summer); a few small flocks (winter)	5	nr	nr (H) unc. (T), B1, B2	0	d n d	ss	May-19	ff
Russet-tailed Thrush	Seen years ago (Expedition Ra.)	nr	0	nr	nr (H)	0	d z d	ss	100-299	ff

APPENDIX 2.

The occurrence of rarely recorded (unclassified) species (N=42).

Seen only before 1933	Rose-crowned Fruit-Dove	Collared Sparrowhawk
Australasian Shoveler	Brush Cuckoo	Black-winged Stilt
Great Crested Grebe	Black-eared Cuckoo	Red-kneed Dotterel
Chestnut Teal	Masked Owl	Banded Lapwing
Little Egret	Spotted Nightjar	Whiskered Tern
Glossy Ibis	White-throated Needletail	Diamond Dove
Black-necked Stork	Fork-tailed Swift	Red-tailed Black-Cockatoo
Osprey	Orange Chat	Powerful Owl
Swamp Harrier	Ground Cuckoo-shrike	Rose Robin
Grey Goshawk	Little Crow	Australian Raven
Little Eagle	Regent Bowerbird	Seen only since 1999
Peregrine Falcon	White-backed Swallow	Oriental Cuckoo
Plains-wanderer	Clamorous Reed-Warbler	White-plumed Honeyeater
Pacific Golden Plover	Seen before and since 1933 #	Black-chinned Honeyeater
Australian Pratincole	White-bellied Sea-Eagle	Satin Flycatcher

Recent sightings include indirect evidence of occurrence in or near Coomooboolaroo.

**FORAGING BEHAVIOUR OF THE YELLOW-TAILED BLACK COCKATOO FOR
LARVAE OF THE GIANT WOOD MOTH IN HARDWOOD PLANTATIONS IN SOUTH-
EAST QUEENSLAND**

GEOFFREY R. DICKINSON, JOHN R. HUTH
AND SIMON A. LAWSON

ABSTRACT

During the autumn and winter of 2001 hardwood plantations in south-east Queensland were damaged by Yellow-tailed Black Cockatoos (*Calyptorhynchus funereus*) foraging for the larvae of the Giant Wood Moth (*Endoxyla cinerea*). We describe the foraging behaviour of the Yellow-tailed Black Cockatoo observed in a mixed hardwood plantation near Imbil (August 2001) and present the results of a damage assessment conducted in two rose gum (*Eucalyptus grandis*) plantations near Caboolture (May 2002). The results of the damage assessment indicate that approximately 13% of young rose gum trees suffered some degree of cockatoo damage. Innovative and environmentally sustainable control techniques for the Giant Wood Moth are proposed as the most practical and economic solutions to minimise future cockatoo damage to hardwood plantations in south-east Queensland.

INTRODUCTION

Yellow-tailed Black Cockatoos (*Calyptorhynchus funereus*) are highly nomadic and commonly seen foraging throughout south-east Queensland over the autumn and winter months. Their mandibles are characteristically narrow and protruding with the tip of the upper mandible elongated and pointed, as in all *Calyptorhynchus* cockatoos. These features enable them to efficiently dig into the stems of trees and extract insect larvae (Forshaw & Cooper 1981). Wood-boring insect larvae in stems of *Acacia* spp. (Simpson 1972) and *Eucalyptus* spp. (Forshaw & Cooper 1981; McInnes & Carne 1978) form an important component of the diet of this species.

Cossid moths (*Endoxyla* spp.) form an important part of the diet of this cockatoo, particularly during the breeding season from May to August (Higgins 1999). In New South Wales, McInnes and Carne (1978) found Yellow-tailed Black Cockatoos searching for the wood-boring larvae of Cossid moths caused major damage to rose gum (*Eucalyptus grandis*) hardwood plantations. They described how the cockatoos gouged the large insect larvae from the tree stems, weakening the stems sufficiently so that they often broke and toppled during strong winds. In the most severe case near Coffs Harbour tree losses of up to 40% were recorded across large areas of young (<5 years) rose gum plantations.

Commercial hardwood plantations for wood production are a new industry in Queensland. Hardwood plantations established prior to 1995 are generally small in size (<10 ha) and widely scattered across the state (Dickinson *et al.* 1998). The area of hardwood plantations in Queensland has recently increased, with approximately 3900 ha established in 2000 (Wood *et al.* 2001) and an estimated 8000 ha established in 2001 (Dickinson *et al.* 2001). Some tree species planted are susceptible to attack by wood-boring larvae of *Endoxyla* spp., and include rose gum, Dunn's white gum (*E. dunnii*), forest red gum (*E. tereticornis*) and various hybrids involving rose gum and other eucalyptus species (Lawson 1998; Lawson & Ivory 2000). Carne & Taylor (1978) identified rose gum as being particularly susceptible to attack by the Giant Wood Moth (*Endoxyla cinerea*) in Queensland and causing a substantial reduction in sawn-timber quality. In pulpwood plantations where wood quality is less important, rose gum has been widely planted for its rapid early growth and wide site adaptability throughout south-east Queensland.

Past reports of damage to hardwood plantations in Queensland by the Yellow-tailed Black Cockatoo have been minor and isolated (Lees 2000, Wylie & Peters 1993) and the commercial significance of this damage has generally been unrecognised. This paper details observations and assessments of damage by the Yellow-tailed Black Cockatoo to recently established large-scale commercial hardwood plantations in Queensland.

OBSERVATIONS

Between May and September 2001, nomadic flocks of Yellow-tailed Black Cockatoos were infrequently observed in south-east Queensland. Over this period, cockatoo damage to young (<4 years old) hardwood plantations was recorded at Beaudesert, Caboolture, Imbil, Gympie and Tiaro. During a routine site inspection of the plantations at Imbil, we witnessed cockatoo foraging behaviour and subsequently recorded the damage to the trees (see Figure 1).

At approximately 8.30 am on 22 August 2001, a flock of about eight Yellow-tailed Black Cockatoos was observed in a 2.5-year-old mixed species hardwood plantation at Imbil State Forest, 5 km west of Imbil (latitude 26°28'S, longitude 152°37'E, altitude 90 m, mean annual rainfall 1186 mm). These cockatoos were actively foraging and were perched on the lower tree branches and stem, and in some cases standing on the ground beside the stem. The birds were initially startled by the observers' arrival and, screeching loudly, briefly departed the plantation to roost on several tall, natural forest red gum trees on the plantation boundary along the



Figure 1: Yellow-tailed Black Cockatoo with Giant Wood Moth larva at Imbil State Forest.

nearby Yabba Creek. Approximately thirty minutes later, the birds returned to the plantation some 300 meters from their previous location and recommenced their foraging. Closer inspection revealed that many trees had been recently damaged by the cockatoos searching for the larvae of the Giant Wood Moth. Of the twenty-two plantation tree species present on this site, most of the damage was observed on rose gum. Some damage was also observed on other tree species including forest red gum and hybrids of rose gum and forest red gum. Local forestry workers confirmed that cockatoos had been seen in the vicinity of this plantation over several days prior to this observation. We were able to observe the foraging behaviour of one of these birds at close range.

The bird, suspected to be a female, initially alighted in the upper branches of an 8 m tall rose gum. It then progressed tail-first down the stem, using its feet and bill alternately in its descent. Due to the young age of the trees, both live and dead branches were still present down to ground level and these were used by the bird to assist its movement. At a stem height of approximately 100 cm above ground level, the bird located a frass ejection hole of a Giant Wood Moth larva. It appeared to give a 'test bite' at this hole, similar to behaviour observed by Simpson (1972) and McInnes and Carne (1978), and then started to extract a Giant Wood Moth larva from within the center of the tree stem. Using its grip on the stem and adjacent branches, it began gouging and stripping away the bark and soft timber. It is interesting to note that in all examples of tree damage at this site, none of the characteristic 'chopping platforms' described by McInnes and Carne (1978), comprising a perch of partially stripped bark constructed by the cockatoo directly below the excavation point, were observed. It is possible that due to the

characteristic heavy branching of these trees, such platforms were unnecessary. After approximately fifteen minutes, the bird had broken through to the wide larval tunnel within the center of the stem and immediately extracted a Giant Wood Moth larva, approximately 10 cm long. The bird then flew to an upper branch in an adjacent rose gum tree, where the larvae was held in its left foot and progressively eaten in a number of bites (Figure 1). The bird then flew to another section of the plantation in which other birds were foraging. At approximately 10.00 am the flock of Yellow-tailed Black Cockatoos left the plantation. It appears that the flock did not return to this plantation again in 2001, as no further tree damage was observed in the following months.

DAMAGE ASSESSMENTS

As a result of widespread Yellow-tailed Black Cockatoo damage in hardwood plantations during the period May–September 2001, a comprehensive assessment of damage was made in two of the worst effected plantations (site one – 85 ha and site two – 250 ha) in May 2002. These two plantations are only 5 km apart, and are located near Caboolture (latitude 27°05'S, longitude 152°53'E, altitude 40 m, mean annual rainfall 1400 mm). Both plantations were established for commercial pulpwood production and are monocultures of rose gum. At each site, damage was widespread across the plantation, with the assessment conducted in existing growth monitoring plots (0.8 ha) on each site, with 970 trees assessed at site 1 and 843 trees assessed at site 2.

Before the cockatoo damage, measurements of tree DBH (stem diameter at 1.3 m) and height were routinely conducted for both sites in April 2001, at a tree age of three years. These measurements are presented to give an indication of tree size at the time of attack (Tables 1 and 2). Cockatoo damage was assessed in May 2002, with trees allocated to the following four categories:

- (1) Nil damage.
- (2) Minor damage, stem will heal with little long-term effects on tree health.
- (3) Severe damage, tree health compromised and future stem breakage likely.
- (4) Severe damage with stem breakage already present (Figure 2).

The tree height at which the damage had occurred was also measured at this time. It is important to note that young trees with stem breakage represent a major productivity loss to the plantation, with any subsequent stem coppice below the breakage, generally of poor vigour and multi-stemmed. The results of the damage assessments for sites one and two are presented in Tables 1 and 2 respectively. (See next page)

The results identified considerable cockatoo damage at both sites at age four years, with the most severe attack at site 1. Within sites, tree size appeared to have little effect on cockatoo damage levels, with average tree size immediately before cockatoo attack relatively consistent across the four damage categories. At site 1, 13% of trees were damaged, with 85% of these trees having broken or severely weakened stems. Cockatoo damage occurred at heights between 0.3 m and 4.5 m, but was most common between 1.2 m and 1.9 m. At site 2, 11.5% of trees were damaged, with 9% of these trees having broken or severely weakened stems. Cockatoo damage occurred at heights between 0.2 m and 4.0 m, but was most common between 0.8 m and 0.9 m.



Figure 2: Severe cockatoo damage to a rose gum tree at Caboolture (site 1), resulting in stem breakage.

CONCLUSIONS

The identification of cockatoo damage levels of up to 13% in four-year-old commercial rose gum hardwood plantations is a major cause for concern for the management of these plantations. While most attacks by the Giant Wood Moth are recorded within the first 3-4 years, repeated attacks have been recorded up to age 10 years (Lawson *et al.* 2002) and it is probable that the trees assessed in this study will continue to be seasonally attacked by nomadic flocks of Yellow-tailed Black Cockatoos.

The Yellow-tailed Black Cockatoo is fully protected under Queensland government legislation and due to its highly nomadic nature, may only visit individual plantations a few days in a year. As a result, cockatoo population control measures are not appropriate and physical cockatoo exclusion techniques would be impractical,

Table 1. Results of tree measurement (average DBH and height) and damage assessment (number and per cent of trees in each category and average height of damage) for site 1.

Damage category	Tree measurement (April 2001)		Damage assessment (May 2002)		
	DBH (cm)	Height (m)	No. of trees	Per cent	Height (m)
No damage	9.9	10.9	844	87	–
Minor damage	10.2	10.9	17	2	1.2
Severe damage	9.7	10.6	41	4	1.3
Severe damage/ stem broken	9.8	10.7	68	7	1.9

Table 2. Results of tree measurement (average DBH and height) and damage assessment (number and per cent of trees in each category and average height of damage) for site 2.

Damage category	Tree measurement (April 2001)		Damage assessment (May 2002)		
	DBH (cm)	Height (m)	No. of trees	Per cent	Height (m)
No damage	7.7	7.6	745	89	–
Minor damage	8.1	7.7	20	2	0.9
Severe damage	7.4	7.2	53	6	0.8
Severe damage/ stem broken	8.1	8.0	25	6	0.9

particularly as commercial plantations are very extensive in area. It is the view of the authors, that the only practical and economic solution to minimise cockatoo damage in hardwood plantations, is to reduce the population of the Giant Wood Moth within a plantation. A reduced incidence of this moth will also produce benefits of increased plantation productivity and improved wood quality. Currently, the Queensland Department of Primary Industries is investigating a wide range of insect control techniques, the most promising of which is the use of pheromone trapping and disruption techniques (Lawson *et al.* 2002). Assessment of variation in rose gum provenance susceptibility to Giant Wood Moth attack has identified a significant heritable variation in this trait. This indicates that tree-breeding techniques including

the development of rose gum clones with greater tolerance to the Giant Wood Moth may be another alternative, however this would take considerable time to achieve.

As an immediate approach to this problem, it is recommended that the establishment of tree species with a greater natural tolerance to the Giant Wood Moth (e.g. Dunn's white gum) is the most practical solution to minimise the risk of severe damage caused by the foraging behaviour of the Yellow-tailed Black Cockatoo.

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**OBSERVATIONS OF GROUND-FORAGING BY
RUFIOUS-BANDED HONEYEATERS *Conopophila albogularis***

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ABSTRACT

Observations of Rufous-banded Honeyeaters *Conopophila albogularis* ground-foraging amongst tall grass near Darwin are described. Previous published studies indicate that ground-foraging is rare for this species. These observations suggest that ground-foraging may constitute an established foraging behaviour at certain times.

OBSERVATIONS

The following account describes little-recorded foraging behaviour of the Rufous-banded Honeyeater *Conopophila albogularis* at the Casuarina Coastal Reserve (12°20'S, 130°53'E), to the north of Darwin, Northern Territory. Approximately 10 Rufous-banded Honeyeaters were observed for over 30 minutes on each day of 5-6 January 2003, foraging in 50 cm-high grasslands dominated by Buffel Grass *Cenchrus ciliaris* and Purpletop Rhodes Grass *Chloris inflata*, both exotic species.

The grasslands are artificially derived and maintained as part of a fire break (PWCNT 2002) and form a linear corridor 15-20 m wide along a walking track. This corridor is bordered by monsoon forest and mangroves associated with Sandy Creek and large specimens of *Casuarina equisetifolia* lining the beach. The grasslands provided inter-tussock patches of bare ground.

The Honeyeaters commonly alighted on the higher stands of grass, most often the peduncle, and would then move down the stem to the ground or ground-pounce from the stem. When undisturbed, the Honeyeaters would remain at ground level for between 10-30 seconds before moving to another area. When flushed, individuals would fly to a nearby shrub or lower branches of a tree from where they would usually re-enter the grassland.

The prey items of the honeyeaters were unable to be determined, but it was presumed insects were the focus (see Higgins *et al.* 2001). The birds remained mostly silent at ground level. In contrast, Rufous-banded Honeyeaters observed foraging amongst the canopy and shrub layer in other parts of the reserve vocalised readily. Interestingly, areas of shorter grassland (approximately <30 cm) within the linear corridor did not appear to be utilised by the Honeyeaters during these observations.

DISCUSSION

The foraging behaviour of this species is poorly known, with only two detailed published studies (i.e. Brooker *et al.* 1990, Noske 1998), from which Higgins *et al.* (2001) conclude foraging to be mostly arboreal, but very occasionally terrestrial. At the Northern Territory University (Casuarina Campus), adjacent to the Casuarina Coastal Reserve, Noske (1998) observed the species to ground-pounce on only five occasions (2.6% of all foraging observations). Furthermore, Brooker *et al.* (1990) recorded all foraging activity for the species in monsoon forest to be at heights greater than 4 m. However, Thompson & Goodfellow (1987 p. 51) note that “unlike many other honeyeaters, it perches out in the open, sometimes on powerlines and comes down to the ground while foraging”, while Longmore (1991 p. 289) states that insects are occasionally “taken on the ground or among forest litter”.

In the Darwin region, single birds or small groups have been regularly observed feeding on roads and adjacent nature strips (typically with low-cut lawns) (J. Woinarski pers. comm.). On Cape York Peninsula the species was observed occasionally, but uncommonly, foraging on bare ground for winged ants and termites (M. Antos pers. comm.).

Although Higgins *et al.* (2001) state that the closely related Rufous-throated Honeyeater *Conopophila rufogularis* rarely forages on the ground, Immelmann (1961) reported that this species forages predominantly on the ground in semi-arid savannas and grasslands. Immelmann (1961) considered this behaviour unique amongst the honeyeaters. The Rufous-throated Honeyeater has also been recorded feeding on water emergent wetland annuals (Boekel 1980), in long grass (Hall 1901), and in grass on an inundated floodplain (R. Noske pers. comm.). This species is also known to sally-pounce from low perches to catch insects on the ground (Higgins *et al.* 2001), however within the Darwin region most foraging activity occurs in the canopy (R. Noske pers. comm.).

That the Rufous-banded Honeyeaters moved freely amongst the grassland and re-entered following disturbance suggests that the use of grassland and bare ground as foraging substrates may constitute an established foraging behaviour for both *Conopophila* species. Further studies of the foraging behaviour (and diet) of Rufous-banded Honeyeaters may show that the species, in suitable habitat, frequently uses the ground at certain times.

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**A FIRST RECORD OF A LAND-BIRD BEING
TRAPPED BY *PISONIA UMBELLIFERA*.**

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The sticky fruits of the tree species *Pisonia umbellifera* and *P. grandis* (Nyctaginaceae) have been recognised as significant sources of mortality on some off-shore seabird colonies. Both adults and nestlings of seabirds such as Gould's Petrel *Pterodroma leucoptera leucoptera* (Priddel & Carlile, 1995, 1998) and Black Noddy *Anous minutus* (Ogden, 1993) can become ensnared in the numerous sticky fruits and die. Indeed, the mortality of Gould's Petrels due to *P. umbellifera* is a key threatening process for this vulnerable species (Garnett & Crowley, 2000; Priddel & Carlile, 1995), and even single fruits have been recorded as causing mortality (Priddel & Carlile, 1995).

Despite the regularity of bird deaths attributed to *Pisonia* spp. on off-shore islands, there are no published examples of a land-bird becoming ensnared in a similar way. Here, we report on one such case. While conducting field research on the Buff-breasted Paradise Kingfisher *Tanysiptera sylvia* in the Goldsborough Valley (17° 15'S, 145° 47'E) south of Cairns in December 2002, we found an adult female that was stuck in the fallen fruits of *P. umbellifera*. Paradise Kingfishers forage by pouncing on invertebrates and small vertebrates on foliage and the forest floor. The bird may have become stuck after pouncing on a prey item. She was completely immobilised, unable even to flap her wings. It is likely that she had been stuck for many hours, and if we had not freed the bird, she would have surely died of starvation or perhaps been preyed upon. Her condition was quite poor, probably from a combination of muscle wasting and water loss endured while struggling. Her mass was 42g which is 26% under-weight (average body mass for females in the Cairns area = 56.7g, n=5).

At the Goldsborough Valley the area of forest floor covered by fallen *P. umbellifera* fruits from a single tree was large, covering some c. 150m². Such areas must be extremely hazardous, or even unusable by ground dwelling birds and other wildlife. On the mainland, *P. umbellifera* extends up the eastern coastal forests in New South Wales and Queensland. *P. grandis* occurs mainly on sandy sites on off-shore islands within this range. It is possible that on the mainland mortality by entrapment is a geographically widespread but uncommon phenomenon, given the dearth of records in the literature. Compared to other years fruit-set in *P. umbellifera* in late 2002 seemed unusually extensive, presumably due to widespread dry conditions, and so the risk to ground-dwelling wildlife may have been higher in this season compared with others. Our search of the literature found records of land-bird species dying on becoming ensnared in other naturally sticky substances e.g. spider

webs (Dean, 1984), pine resin (Locke et al., 1979), and the sticky exudate of scale insects (Hindwood, 1965) but none from entrapment by the fruits of *P. umbellifera*.

The fruits of *P. umbellifera* and *P. grandis* are stickier than required to be effective in dispersal. Indeed, in our observation the extreme stickiness of the fruit actually prevented dispersal because the vector (i.e. the bird) did not get the chance to move away from the site. Alternatively, it has been suggested for off-shore islands that the sticky fruit is an adaptation to trap and kill animals, thereby creating pockets of nutrients in the immediate soil environment for seedlings. This could be particularly important on islands or other areas that are nutrient poor, and may also be a plausible adaptive explanation in mainland rainforests.

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BREEDING BY WHISKERED TERN AND RED-NECKED AVOCET IN THE TORILLA PLAIN WETLANDS, BRIGALOW BELT COAST

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ABSTRACT

Breeding by Whiskered Tern *Chlidonias hybridus* and Red-necked Avocet *Recurvirostra novaehollandiae* in April-May 2003 in the Torilla Plain wetlands of the Brigalow Belt coast is documented. We report a substantial north-eastern extension of the known breeding range for both species.

INTRODUCTION

During 2003, we conducted surveys of waterbirds on the central Queensland coast, at a coastal plain that is known locally as the 'Torilla Plain'. The Plain is in the north-western part of the Torilla Peninsula, immediately east of Broad Sound and 125 km NNW of Rockhampton. It lies in the Brigalow Belt North biogeographic region (DEH 2003). The Plain has an area of about 25,000 ha and supports a diverse assemblage of wetlands derived from the macro-tidal influence of Broad Sound and from the fresh-water discharge of a suite of short creeks. Principal wetland types of the open plain are: bare saline flats; complex networks of supra-tidal channels; shallow fresh-water ponds; wet grass meadows; and swamps densely vegetated with spike-rush *Eleocharis dulcis* and other forbs.

This wetland system had not been systematically surveyed for waterbirds before 2003, but some anecdotal observations of its waterbirds have been published (Campbell 1917). Wetlands International conducted comprehensive surveys of representative wetland sites on Torilla Plain in 2003, to improve the knowledge of waterbird populations in the Brigalow Belt. Observers counted birds by wading through, or scanning from the margins of wetlands. This note describes observations of breeding by Whiskered Tern and Red-necked Avocet arising from that work.

RESULTS

During a waterbird survey on 30 April 2003 we encountered a small breeding colony of Whiskered Tern on the Torilla Plain. At least 150 of these terns were flying over a drying spike-rush swamp (22° 14.8' S, 150° 1.5' E) that had a central open pond and was connected to similar but drier wetlands. The water supported mats of nardoo *Marsilea mutica* and bog lily *Monochoria cyanea* and was surrounded by bare mud and low grassland. Adult birds frequently alighted in the spike-rush (in water to 0.4 m deep) and our inspection revealed several scattered broods of juvenile Whiskered

Terns sheltering in this vegetation. Our approach caused some juveniles to escape into the dense spike-rush and others to fly short distances. Many of the strongly flying birds had the typical brown mottled plumage of immature Whiskered Terns. At least 50 first year (juvenile or immature) birds were present. It was difficult to estimate the number of pairs of adult Whiskered Terns that might have been involved in breeding at this locality.

No nests of Whiskered Tern were found on 30 April. The species builds a flimsy semi-floating nest (Higgins & Davies 1996, R.J. pers. obs.) so it is possible that nests in the semi-erect spike-rush had disintegrated as the swamp dried down. Water levels had fallen substantially since the swamp filled in February 2003 because there had been little rainfall subsequently (Bureau of Meteorology data, landholder advice). Alternatively, the nests may have been constructed in a nearby swamp, now dry, or on higher ground atop low samphire shrubs *Halosarcia* sp. that would have been inundated at the peak of flood. Nestlings are capable of swimming to alternative refuges where parents can continue feeding them; movement of a colony over 800 m within 12 days of hatching has been recorded (Higgins & Davies 1996). One of us (R.J.) saw, at some distance, several hundred Whiskered Terns over these *Eleocharis* swamps and surrounds on 29 March 2003 and suspected that some birds may have been attending nests at that time.

The breeding site was revisited on 3 July 2003. Water was still present but most of the spike-rush had collapsed and/or desiccated and no Whiskered Terns were present.

Further investigations by R.J. and J.W. in another part of the Plain on 2 May 2003 revealed two nests of Red-necked Avocet. While surveying a complex network of saline channels and ponds landward of the mangrove system we noticed two avocets sitting on a sheltered low island (22° 20.2' S, 150° 2.1' E). The island was about 5-10 m wide and 30 m long, it was bare at the edges and it had dead-looking samphire in its interior. This tree-less habitat was replicated extensively in the surrounding saline flats.

A brief visit to the island revealed a nest with three eggs and a nest with two eggs, a few metres apart, where the avocets had been sitting. The nests were 1-3 m from the water edge and about 0.3 m above water level. They were shallow scrapes encircled by fine twig fragments that may have been collected by the adult birds from among flotsam on the island's shore. The incubating adults returned to the nests soon after our departure. Another 65 avocets were 100 m distant, in the open water of the largest pond.

This nesting site was not revisited in July 2003.

CONCLUSIONS

These breeding records of Whiskered Tern and Red-necked Avocet greatly extend the known breeding ranges of both species. The principal accounts of Australian breeding ranges for both species (Blakers *et al.* 1984, Marchant & Higgins 1993, Higgins and Davies 1996, Barrett *et al.* 2002) and observations by one of us (RJ) indicate that most records are south of 25° S latitude. Intermittent breeding has been recorded farther north: in both species, at least as far as 18-19° S in wetlands of the Barkly Tableland in the Northern Territory (RJ pers. obs.), and for the Whiskered Tern at the Mandora Marshes (19° S, 121° E) in far north-western Australia (Barrett *et al.* 2002, S. Halse pers. comm., RJ pers. obs.).

In Queensland, published breeding records (at least two for each species) are only from the south-western border districts (Blakers *et al.* 1984, Marchant & Higgins 1993, Higgins and Davies 1996, Barrett *et al.* 2002). Longmore (1978) knew of no breeding records for either species in the Rockhampton area. Two of us (J.M., W.H.) have not recorded Whiskered Tern breeding on or near the tropical coast of central Queensland, despite actively observing waterbirds over the past few decades (eg. Houston & McCabe 1996).

We believe that breeding may occur in these and other remote sites more frequently than has been documented because waterbird surveys tend to target dry season refuges rather than wet season breeding habitat and observers commonly skirt, but do not probe into, broad shallow wetlands. Whiskered Tern nests and young in the interior of swamps therefore are likely to be overlooked.

There is insufficient information from which to conclude whether breeding by either the Whiskered Tern or Red-necked Avocet at the Torilla Plain in 2003 was an opportunistic or regular event. Heavy rainfall (around 500 mm) occurred on much of the Central Queensland coast in February 2003, which is within the usual 'wet' season, but local landholders advised that, despite extensive inundation, wetland conditions on the Torilla Plain in 2003 were drier than average. Both species commonly breed in the inland (Marchant & Higgins 1993, Higgins and Davies 1996, RJ pers. obs.), but although inland Australia was subject to severe drought during 2002-3 (Bureau of Meteorology data), it does not necessarily follow that Whiskered Tern and Red-necked Avocet would opt to breed at coastal wetlands that had suitable breeding habitat at that time. There are no long-term monitoring data that would indicate how regularly Whiskered Tern and Red-necked Avocet occur on the Torilla Plain and thus if regular local breeding by either species is possible.

We have not identified any immediate or long-term threats to further breeding by Whiskered Tern or Red-necked Avocet on the Torilla Plain. In general, the Plain has not been substantially modified for agriculture. Small block banks have been in place on some tidal channels for many years, thereby limiting the landward influence of saline water but probably extending the seasonal persistence of close-by freshwater swamps that otherwise would have drained seaward earlier in the year. Pastoral grazing of cattle and/or horses on the Plain has occurred for more than a century but stock possibly do not limit the persistence of spike-rush because it regrows from rhizomes after re-flooding. Non-native pasture grasses (notably para grass *Brachiaria mutica*) have been introduced to parts of the Plain but were not persistent in the vicinity of the Whiskered Tern or Red-necked Avocet breeding sites. Research into possible impacts of changes to hydrology and vegetation on breeding by Whiskered Tern, Red-necked Avocet and other waterbirds in wetlands of the central Queensland coast could prove helpful to land managers.

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A SEA SNAKE IN THE DIET OF A WHITE-CAPPED ALBATROSS

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ABSTRACT

An Elegant Sea Snake *Hydrophis elegans*, is reported from the small intestine of a beach-washed immature White-capped Albatross *T. steadi* found on Fraser Island, Queensland. This is the first published record of an albatross eating a sea snake, probably whilst foraging on by-catch near a local fishing trawler.

OBSERVATIONS

On the 20 August 2002 John Schwarzrock found a beach-washed albatross of the *Thalassarche cauta* complex approximately 5 km south of Dilli Village, Fraser Island 25° 38' 54"S, 153° 05' 00"E. He froze the specimen and sent it to the Moggill QPWS Office with several other albatross specimens for identification and necropsy. The specimen was subsequently identified by DNA analysis as a White-capped Albatross *T. steadi* (Mike Double ANU pers. comm.).

On necropsy it was found to be an immature female that had died from drowning. The leading edge of her right wing was bruised and it had lost many feathers. There were no fat reserves and her pectoral muscles were wasted but otherwise she appeared healthy. A large object could be felt through the wall of her small intestine, so a small incision was made and the sea snake was removed. It had been swallowed head first. The snake was identified as an Elegant Sea Snake *Hydrophis elegans* (snout vent length 1.47 m) (R Hobson pers comm.). It appeared to be fresh and undamaged.

CONCLUSIONS

Albatrosses in the *Thalassarche cauta* complex (*T. cauta*, *T. steadi*, *T. salvini* and *T. erimita*) forage mainly on cephalopods and fish, particularly mackerel and red bait (Marchant and Higgins 1990). Prey is taken from the surface of the ocean (Ainley and Boekleide 1983; Barton 1979) by surface plunging (Gibson, 1960; Nicholls 1979), or by attending fishing boats to feed on offal and by-catch (Bartle 1974).

The Elegant Sea Snake is a common marine snake (Cogger 2000) that occurs mostly in turbid deep water (Heatwole 1999) and occasionally in estuaries (Limpus 1975). It commonly occurs in water between 10 and 35 m in depth, but maximum depths recorded include 80 metres deep 32 km offshore from Bundaberg, Queensland (Limpus 1975). Adults can grow to 1.7 m, though occasionally 2.0 m specimens are

been recorded (Cogger 2000). It is the most common species of sea snake taken as by-catch by prawn trawlers in the Bundaberg area (Limpus 1975; Ward 2000).

Sea snakes are not known in the diet of albatrosses in the *T. cauta* complex or any other albatross species (Cherel and Klages 1998; Tickell 2000). It is probable that this albatross took the sea snake as offal from a prawn trawler or fishing boat. Alternatively, it might have hunted the sea snake, since the dietary studies of the *T. cauta* complex have been conducted in southern latitudes where sea snakes occur only as rare vagrants. Given the severe bruising of the one wing it is concluded that the bird died from drowning following a collision at sea rather than the bite of the sea snake.

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