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THE SUNBIRD

Volume 18 Number 4

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WADER NUMBERS AT RABY BAY, MORETON BAY: CHANGES OVER THREE DECADES

P.F. WOODALL and D.J. WATSON

ABSTRACT

Changes in wader numbers were analysed using data from the counts made by L. Amiet at Raby Bay (1953-56); and counts conducted by the Queensland Ornithological Society (1972-1983); and the Royal Australasian Ornithological Union (1981-85) at Raby Bay. Differences in counting techniques and the presentation of data make comparisons of wader numbers unreliable except where major differences are apparent. Numbers of Ruddy Turnstone, Eastern Curlew, Grey-tailed Tattler and Bar-tailed Godwit seem to have declined while Lesser Golden Plover and Great Knot may have increased since the counts made by Amiet in the 1950s.

INTRODUCTION

Waders form an important part of wetland and coastal avifaunas and therefore are susceptible to the many forms of habitat degradation which threaten these areas. Most of the coastal waders considered here are non-breeding migrants from the northern hemisphere. The Japan-Australia Migratory Birds Agreement (1974) required both countries to conserve and research their common waders. As part of this agreement, the Royal Australasian Ornithological Union (RAOU) organised

wader counts throughout Australia from 1981-85 which produced a wealth of new information about wader populations (Lane 1987). Prior to this, there was very little detailed quantitative information on wader numbers - exceptions being the counts made by Amiet (1957) in Queensland, concentrating on Raby Bay, and annual counts made by the Queensland Ornithological Society (QOS) in areas surrounding Brisbane.

This paper compares Amiet's (1957) results with counts made at the same locality two to three decades later. Raby Bay is no longer an important wader habitat in Moreton Bay, having become an extensive canal-based housing estate.

STUDY AREA AND METHODS

The data used in this study came from three sources : Amiet's (1957) published counts and unpublished QOS and RAOU counts. Amiet (1957) counted waders in six coastal Queensland localities but concentrated on the central part of Raby Bay where 100 counts were made from 1953 to 1956. He noted that there were major differences in the numbers of birds counted, depending on the height of the tide, i.e. some waders used this location as a high-tide roost and dispersed to feed at other areas on lower tides. His results were presented as the maximum number of each species counted in any month.

Area 3 of the QOS annual bird counts extends on the coast south from the Brisbane River mouth to the Logan River (Fig. 1). This area was surveyed by a team led by DJW and always counted major wader habitats including Lytton (at the Brisbane River mouth), Thorneside and Raby Bay. Other coastal areas surveyed in the QOS counts include parts of Moreton Bay to the north and south of Area 3 (Areas 1-5 : Fig. 1). Further details on the areas surveyed and the methods used on these counts are given by Woodall (1987, 1988). A major difficulty with the QOS counts is that, although they were made at the same time each year (early October), they were not timed to coincide with high tides, so that some counts included concentrations of waders at high-tide roosts while others were made at low tides, when the waders were dispersed over a much larger area. Although the QOS Area 3 extends north and south of Raby Bay, and thus can be expected to include many more waders than Raby Bay alone, it has been included here to provide additional data for the period between Amiet's (1957) counts and the RAOU counts in the 1980s.

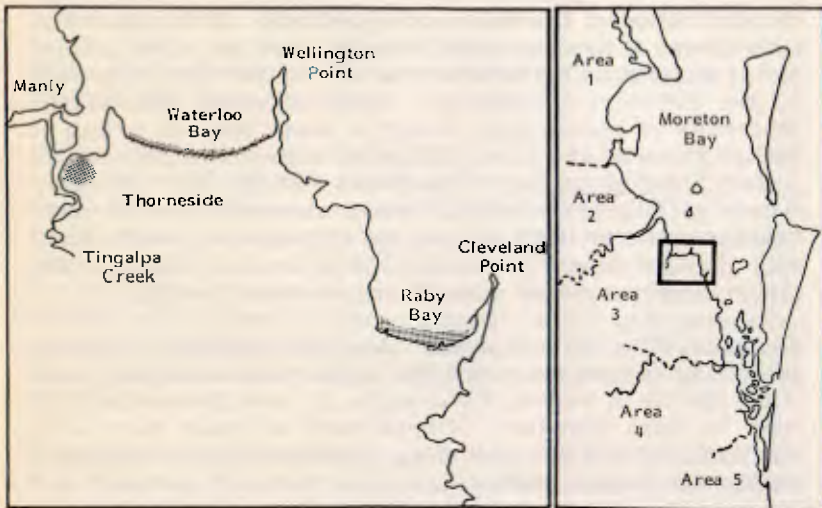


Fig. 1 : The location of Raby Bay, Thorneside and QOS Area 3 in Moreton Bay. The shaded areas represent major high-tide roosts for waders.

The RAOU organised wader counts throughout Australia in summer (February) and winter (July) from 1981 to 1985. These counts were made at high-tide roosts, including Raby Bay among others in Moreton Bay, during a four hour period around the high tide. This provided a much more standard form of survey than previous studies but it was found that during winter the tides were not always high enough to concentrate waders into a restricted area, particularly at Raby Bay, so winter counts are excluded from this comparison. In addition, RAOU summer counts from Thorneside (Fig. 1) are included in Table 1. Thorneside and Raby Bay were adjacent roosts in similar habitats and there was an exchange of birds between the two (pers. obs.). Lane (1987) compared the RAOU counts from Moreton Bay with those from other locations in Australia.

The major interest in this study is to compare the counts made by Amiet (1957) in the 1950s with more recent counts. However, this comparison is made difficult because his results are presented as maxima which have the property of increasing in size as the sample size increases (i.e. as more counts are

made, there is a greater chance of obtaining extremely large counts) (Simpson, Roe & Lewontin, 1960:80). This means that comparisons of maxima should be made on similar sized samples and it is not possible to determine the statistical significance of any differences observed. Wader numbers also change seasonally so comparisons should be made between counts at similar times of the year. This limits direct comparisons to Amiet's (1957) February counts ($n=4$) with the RAOU February counts at Raby Bay ($n=3$). Comparisons can also be made between Amiet's (1957) October ($n=2$)/November ($n=9$) counts with the QOS Area 3 counts ($n=12$) in October, although the latter include a larger area than just Raby Bay (Fig. 1).

An alternative to comparing absolute numbers of waders counted is to compare their relative abundance compared with other species of waders, for example, to rank the species from most to least abundant. Comparisons of ranks were made qualitatively and by calculating a Spearman rank correlation coefficient (Siegel 1956).

RESULTS

The sample size of both Amiet's (1957) and the RAOU counts for February at Raby Bay are both small ($n=4$ and 3, respectively) and thus can be affected by chance occurrences, such as the large flock of 130 Pied Oystercatchers counted once at Raby Bay in 1982 (Table 1) compared with 0 in 1981 and 16 in 1983. However, in terms of both the maxima and ranking for most species, Amiet's (1957) February counts are similar to his October/November counts ($n=11$) (Spearman Rank Correlation : $r = 0.902$) and the RAOU counts for Thorneside ($n=5$) are similar to those for Raby Bay (Spearman Rank Correlation : $r = 0.624$) while Amiet's (1957) February counts and the RAOU February counts for Raby Bay are more dissimilar (Spearman Rank Correlation : $r = 0.521$).

Maximum numbers and ranks of 21 species of waders counted during the surveys described above are given in Table 1. Even allowing for the difficulties in interpreting these numbers, some of the differences between the maxima with similar sample sizes are so large, they suggest that the changes are real. Discussion below has been limited to those species which showed a 4- to 5-fold change in numbers but, apart from two species which showed marked increases, most species show declines of varying magnitude and this is reflected in the totals

of maxima (Table 1) which show a reduction by about 50%. It is impossible to know whether this reduction was a local feature of Raby Bay or whether it reflected a general trend in Moreton Bay as a whole.

Species which appear to have declined in numbers at Raby Bay since the 1950s include the Ruddy Turnstone, Eastern Curlew, Grey-tailed Tattler, and Bar-tailed Godwit (Table 1). For all these species, the maxima counted by Amiet are substantially higher than those recorded in the RAOU counts at Raby Bay. For the Ruddy Turnstone and Eastern Curlew, Amiet's (1957) maxima are similar to those recorded in the QOS counts for the much larger Area 3, and for the Grey-tailed Tattler and Bar-tailed Godwit, Amiet's (1957) maxima are higher than those for QOS Area 3.

Examination of the rankings show that the Bar-tailed Godwit has remained the most numerous wader in all these counts although its numbers appear to have declined. Ruddy Turnstone and Grey-tailed Tattler both show lower ranks in the QOS and RAOU counts, consistent with the reduction in their maxima noted above. Rankings for the Eastern Curlew at Raby Bay show a reduction in the RAOU counts (9th) compared with Amiet's (1957) counts (4th, 5th) but the QOS counts for Area 3 show a higher rank (2nd). This possibly reflects the importance of Lytton (in the QOS Area 3) as a roost for Eastern Curlew.

Amiet (1957) recorded six to seven times more Eastern Curlew than Whimbrel. Recent counts from Raby Bay, and QOS Area 3 show numbers of the two species differing by a factor of one to two, and at Thorneside more Whimbrel than Eastern Curlew were counted, although for Moreton Bay as a whole the difference is 3.8 (Lane 1987). This may indicate a local reduction of Eastern Curlew numbers at Raby Bay and it is possible that with increasing human disturbance, Raby Bay became less suitable as a high tide roost (particularly for the larger species like the Eastern Curlew and Bar-tailed Godwit) and other roosts, such as Lytton, have become preferred.

Lesser Golden Plover and Great Knot appear to have increased in numbers at Raby Bay since Amiet's (1957) counts. RAOU counts of both species at Raby Bay (and also at Thorneside and the QOS counts in Area 3) show marked increases in numbers. Amiet's (1957) highest counts (all months, $n=100$) was 47 for Lesser Golden Plover and 16 for Great Knot at Raby Bay

compared with 52 and 50 respectively in the RAOU counts (n=3).

These differences are also reflected in the ranks. Lesser Golden Plover were 11th and 14th in Amiet's (1957) counts and 5th, 5th and 6th in the RAOU Raby Bay, Thorneside and QOS counts and Great Knot similarly changed from 16th and 11th to 6th, 4th and 8th.

Numbers of Red Knot were generally less than those of Great Knot and do not seem to have changed much since Amiet's counts. Recent counts of other species either show similar maxima to those recorded by Amiet (1957) or the counts are too variable to allow comparisons.

DISCUSSION

These surveys have been conducted using different methods, and the presentation of Amiet's (1957) results as maxima makes comparisons between them uncertain. This means that minor changes in numbers will be obscured and easily overlooked. However, some major differences have been identified.

A decline in numbers of the Eastern Curlew in South Australia and Tasmania has been documented by Close & Newman (1984). In the Hobart area, Newman and Fletcher (1981) compared wader counts made from 1964 to 1968 with annual wader counts from 1972 to 1981. They found significant increases in the numbers of Red-necked Stint and Curlew Sandpiper and significant decreases for Eastern Curlew and Sharp-tailed Sandpiper. Only in the case of the Eastern Curlew is there a similar change apparent from Raby Bay.

Although much data on wader numbers were collected by previous surveys, only the standardised methods introduced in the RAOU counts will allow accurate comparisons in years to come. A plea is made for careful consideration of how the data will be analysed before much effort is expended in field work, collecting numbers which have little use.

Moreton Bay, together with Hervey Bay and Great Sandy Strait, form a major wader habitat, containing nearly half the Eastern Curlew counted in Australia and nearly half the Bar-tailed Godwit, Mongolian Plover and Grey-tailed Tattler counted in Eastern Australia (Lane 1987). Since 1984 much of Raby Bay has been "developed" as a canal estate and now is of negligible

importance as a wader habitat. While Raby Bay formed a relatively small part of Moreton Bay, and displaced waders could probably find alternative roosting sites and feeding grounds nearby, the changes at Raby Bay are representative of a much wider loss of habitat in this region and the remaining habitats must reach a saturation point where they can no longer absorb displaced waders.

ACKNOWLEDGEMENTS

We are very grateful to the many members of the Queensland Ornithological Society and the Royal Australasian Ornithological Union who gave much time and energy to the bird counts. D. Jones and B.A. Lane kindly criticised an early draft of this paper.

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TABLE 1

Maximum numbers and ranks (in parentheses) of waders counted at Raby Bay, Thorneside and Moreton Bay

	Raby Bay		Thorneside RAOU	Moreton Bay QOS: Area 3	
	Amiet (1957)	RAOU			
	Oct/Nov	Feb	Feb	Feb	
	1953-56	1981-3	1981-5	1972-83	
	n=11	n=4	n=3	n=5	
				n=12	
Pied Oystercatcher <i>Haematopus longirostris</i>	0	0	130 (3)	0	70 (12)
Grey Plover <i>Pluvialis squatarola</i>	2 (17)	2 (17)	1 (18)	0	0
Lesser Golden Plover <i>Pluvialis dominica</i>	36 (11)	13 (14)	52 (5)	160 (5)	190 (6)
Double-banded Plover <i>Charadrius bicinctus</i>	1 (18)	15 (12)	0	0	0
Mongolian Plover <i>Charadrius mongolus</i>	1608 (2)	343 (2)	150 (2)	300 (2)	202 (4)
Large Sand Plover <i>Charadrius leschenaultii</i>	39 (10)	15 (12)	2 (17)	70 (7)	100 (12)
Red-capped Plover <i>Charadrius ruficapillus</i>	43 (8)	40 (7)	26 (8)	50 (9)	29 (17)
Ruddy Turnstone <i>Arenaria interpres</i>	60 (7)	73 (6)	12 (13)	20 (12)	50 (14)
Eastern Curlew <i>Numenius madagascariensis</i>	240 (5)	152 (4)	20 (9)	70 (7)	330 (2)
Whimbrel <i>Numenius phaeopus</i>	31 (12)	34 (8)	10 (14)	100 (6)	200 (5)
Grey-tailed Tattler <i>Tringa brevipes</i>	568 (4)	205 (3)	40 (7)	10 (14)	50 (14)

Table 1 : Maximum numbers and ranks (in parentheses) of waders counted at Raby Bay, Thorneside and Moreton Bay (cont.)

	Raby Bay		Thorneside RAOU Feb 1981-5 n=5	Moreton Bay QOS: Area 3 Oct 1972-83 n=12	
	Amiet (1957) Oct/Nov 1953-56 n=11	RAOU Feb 1981-3 n=4			
Common Sandpiper <i>Tringa hypoleucos</i>	0	0	0	1 (17)	2 (18)
Greenshank <i>Tringa nebularia</i>	10 (14)	2 (17)	4 (16)	30 (11)	52 (13)
Marsh Sandpiper <i>Tringa stagnatilis</i>	0	0	0	1 (17)	35 (16)
Terek Sandpiper <i>Tringa terek</i>	42 (9)	25 (9)	6 (15)	6 (16)	150 (10)
Bar-tailed Godwit <i>Limosa lapponica</i>	1784 (1)	1385 (1)	500 (1)	400 (1)	520 (1)
Red Knot <i>Calidris canutus</i>	10 (14)	8 (16)	20 (9)	10 (14)	126 (11)
Great Knot <i>Calidris tenuirostris</i>	3 (16)	16 (11)	50 (6)	200 (4)	170 (8)
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	139 (6)	22 (10)	14 (12)	20 (13)	180 (7)
Red-necked Stint <i>Calidris ruficollis</i>	615 (3)	77 (5)	100 (4)	220 (3)	170 (8)
Curlew Sandpiper <i>Calidris ferruginea</i>	28 (13)	11 (15)	20 (9)	50 (9)	220 (3)
Total	5259	2438	1157	1718	2846

A SOUTHERN BREEDING RECORD OF THE
CRIMSON FINCH *Neochmia phaeton*

GARY W. WILSON

The Atlas of Australian Birds (Blakers *et al.* 1984) contains few records of the Crimson Finch *Neochmia phaeton* south of 20°S and the species has not been sighted south of 21°S since 1900. Breeding was not recorded south of 20°S during the period of the Field Atlas. Pizzey (1980) suggests a range south to Proserpine (20°21'S, 148°36'E) and formerly to Rockhampton (23°22'S, 150°32'E) whilst Slater (1974) gave the southern limit at Rockhampton but amended this to Proserpine in 1986 (Slater *et al.* 1986).

I observed a pair of Crimson Finches constructing a nest in a tree on the bank of the Connors River (22°25'S, 148°59'E) during the period 14 - 16 April, 1988. The nest was located on debris wedged between the twin trunks of a eucalypt by the receding floodwaters following Cyclone Charley. The nest was four m above the ground and the nest tree was eight m above the watercourse and 50 m from it. This tree-lined permanent water course was flanked by open woodland and shrubland with a dense understorey of native grasses. The grasses were fruiting prolifically. The area was being grazed by cattle but few were in the immediate area and the effects of their grazing were not obvious. No other species of finch was observed in the area.

The nest was in the final stages of completion when I arrived on the evening of the 14th and the birds were less active on the two following days. I observed them using 10 x 40 binoculars from a distance of six m. Neither bird appeared disturbed by my presence and on the 15th I watched the female carry a 200 mm long piece of grass and position it in the outside of the nest and then enter the nest and spend two minutes inside it. During that time the nest was being re-shaped from the inside judged by the easily discernible movements of the wall structure. This suggests that laying had not commenced.

DISCUSSION

Only 14 records of breeding of this species had been previously lodged (Jon Starks, RAOU Nest Record Scheme, pers. comm.). The most southerly in Queensland was at South Johnstone (17°36', 146°00') in 1966. This record of *N. phaeton* at 22°25'S is of interest as it raises the question of the true status of the species south of 20°S and of the effect, if any, of Cyclone Charley on the presence of the bird. The area in which the birds were observed is not often visited by ornithologists, particularly since the opening of the coastal road between Rockhampton and Mackay, and is worthy of closer attention both in regard to this and other species.

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SOME OBSERVATIONS OF THE FOOD OF WATERFOWL
IN THE BUNDABERG REGION OF QUEENSLAND

LESTER J. ROY

Observations of food utilization by the duck species Wandering Whistling-Duck *Dendrocygna arcuata*, Plumed Whistling-Duck *Dendrocygna eytoni*, Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons*, Hardhead *Aythya australis* and Maned Duck *Chenonetta jubata* and by the Magpie Goose *Anseranus senupalmata* were made in the Bundaberg region (24°53', 152°21') within the five year period 1984-88. The agricultural area of Bundaberg has become a waterfowl drought refuge of some value since the early 1970s when many large farm irrigation dams were constructed. Average annual rainfall is 1,159 mm with 58% of this normally falling in the months December through March.

STUDY AREA AND METHODS

The study area lies immediately inland of the 15 km wide, flat coastal strip. It is a sugar cane, fruit and vegetable growing district with an undulating topography dissected by numerous small creeks and gullies, most of which are dammed for irrigation purposes. The majority of the farm water storages are prime waterfowl habitat as they support a wide variety of aquatic vegetation. Most dams normally remain full or near full for the first six months of the year due to the predominantly summer rainfall. A channel and underground reticulation system distributes water to farms from an irrigation scheme, now nearing completion, giving many farms dual water supplies. Some of the farms run their irrigation scheme water directly into their dams and pump from the dams rather than directly from the reticulation system. This practice makes these dams more reliable food sources for waterfowl since those farmers who pump from both sources always use their dam water first, it being more economic. However, dams are never kept full while irrigating by any farmer, since a capacity to catch any intermittent run-off is prudent.

Food was extracted from wild ducks shot during duck open season (June through August [approx.]). The birds were first skinned, then the crop and oesophagus were removed and their contents squeezed into a container for washing and identification. For Magpie Geese, food identification was by field observation due to their protected status.

RESULTS AND DISCUSSION

Ducks : The most commonly-eaten foods were : Water-lily *Nymphaea* (seeds and immature seedheads), *Azolla*, Hornwort *Ceratophyllum*, Duckweed *Lemna*, Water couch *Paspalum*, the seed of rushes *Guncus*, seeds and sometimes tubers of sedges in *Cyperns*, *Carex* and *Eleocharis*, fresh-water mussels (family *Corbiculidae*), various crustaceans including yabbies, *Cherax*, the aquatic insects, water boatmen and backswimmers (family *Corixidae*), and water beetles (order *Coleoptera*). The stomach with the greatest volume and variety of food items (Fig. 1) was that of a Hardhead taken at the end of the 1987 open season when the duck population was low due to the high shooting pressure placed upon it. Probably, the food supply was high at the time of shooting due to the underutilization.

Magpie Goose : Although uncommon in the area, the Magpie Goose was present in large numbers in 1987 and early 1988. Its usual diet was observed to be both native and introduced pasture grasses with a preference for the shorter native couch *Cynodon dactylon*. Areas where grasses were kept short by grazing cattle proved most attractive. On two occasions a large flock (ca. 600) was seen foraging on bare freshly cultivated soil and once on cultivation with small weed growth. The foraging on bare cultivation was thought to be for the nuts of common nut grass *Gyperus rotundus*. If so, this habit would make the bird beneficial to farmers.

During late February 1988, large numbers of Magpie Geese fed around the perimeter of a large farm dam which had been pumped out during the very dry summer. Rainfall recorded at the Bundaberg Post Office for the months of December 1987, January 1988 and February 1988 was, in each case, less than 50% of the respective monthly averages. Close inspection of a typical 10 m² area showed the tubers of every Water-lily *Nymphaea gigantea* to have been eaten out to a depth of around 100 mm. The area of harvest was estimated to be 4,000

m², so with an estimated density of 3 tubers per m² about 12,000 were consumed.

During mid-1987 a sugar plantation manager reported that he often observed Magpie Geese foraging on harvested cane fields following the harvester. Unable to get close enough to verify it, he suspected they were feeding on the cut stools, scraping out the sugary pith from the stalks. There was nothing else available to them as the cane was always burnt before harvesting.

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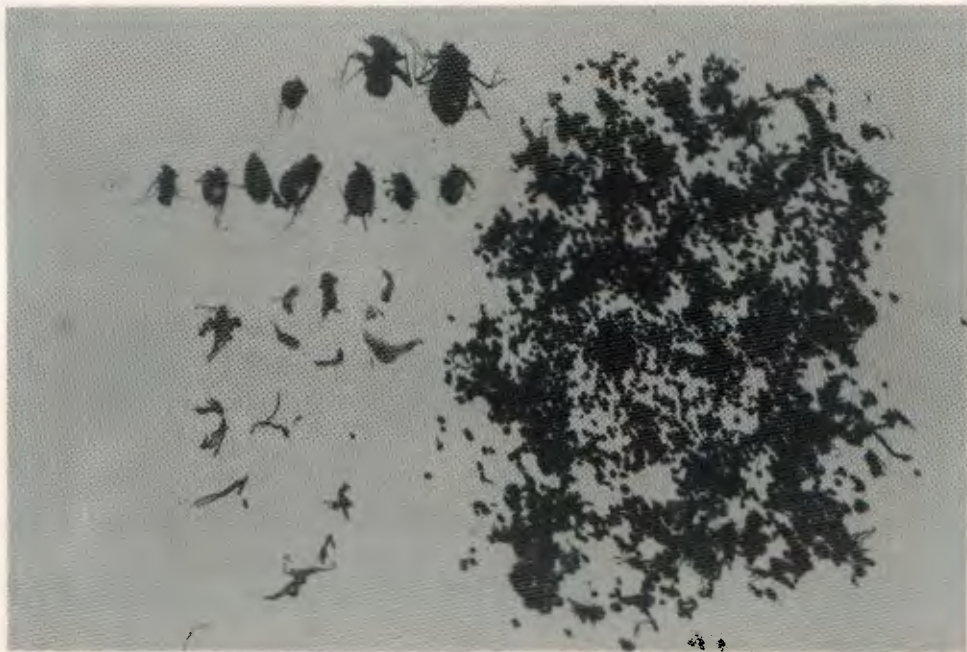


Fig. 1 : Hardhead Stomach Contents

Right - Water-lily seeds. Top Left - assassin bugs *Pristhesancus papuensis*.
Middle Left - fresh water shrimps. Bottom Left - bloodworms (gnat larvae).

NOTES ON THE RED GOSHAWK IN THE WIDGEE AREA OF SOUTH-EAST QUEENSLAND

Peter and Bevly Hughes

The Red Goshawk *Erythrotriorchis radiatus* has been an irregular visitor to the Widgee area (26°14'S, 152°18'E) over the past ten years. Over the past three years the visits have become more frequent usually from late summer through winter (i.e. outside the breeding season). Both individual birds and pairs have been seen. Feeding behaviour, prey species and interaction with other bird species is poorly documented. Barnard (1934) mentions prey species and mobbing, while Lord (1952) mentions an attack method. Our paper deals with habitat, identification, hunting behaviour, prey and feeding behaviour.

HABITAT

The observation area consists of a valley surrounded by mountains, the highest of which is 670 m. The montane flora is dominated by Hoop Pine *Araucaria cunninghamii* vine scrub with small areas of subtropical rainforest in gullies (Williams, Harden and MacDonald 1984). The lower slopes have a covering of wet and dry sclerophyll forest, open grassland and areas of regrowth consisting of *Acacia maidenii* and *A. aulacocarpa* (Lebler 1979) on cleared scrub areas and eucalypt suckers on forest areas. South of the valley the mountainous region continues for about 80 km to the Conondale Range. Rainfall is about 800 mm per year with a change over the past ten years away from summer wet season rain to a more even rainfall each month.

IDENTIFICATION

Field identification of the Red Goshawk is best made by comparison with the better-known Brown Goshawk *Accipiter fasciatus*. The criteria used are size, wing shape, flight and colour. The Red is larger with a wider wing span. The

trailing edge of the Red Goshawk wing is much straighter than in the more oval shape of the Brown Goshawk wing. When gliding, the Red Goshawk has a slight downward bow to the wing. The Red has more wing beats between each glide and when flapping the Red Goshawk has a definite "flick" to each wing beat.

Colour identification is difficult with raptors but in broad terms the adult female Red Goshawk has a slightly brownish grey back from above, while from underneath it has a flattened V-shaped area of rich rufous flecked with black.

BEHAVIOURAL OBSERVATIONS

Red Goshawks are usually first seen when flying. Once perched they are difficult to see as a rule as the chosen perch is under the canopy and generally towards the centre of the tree. However on one occasion an adult female perched in a leafless White Cedar *Melia azedarach* on top of a ridge, a very exposed position, for well over two hours. Most observations have been of birds flying within 10 m of the ground and, though not flying through trees, they have been below the level of nearby forest canopy.

Although more falcon-like in flight and behaviour than the Brown Goshawk, the Red Goshawk is capable of relatively long glides, a downhill glide of about 150 m being observed. Soaring may be a more difficult task. As a comparison, a pair of Red Goshawks was observed in upward spiral flight similar to that of Wedge-tailed Eagles *Aquila audax* observed five minutes earlier in the same location. While the Eagles were capable of rising and circling without flapping their wings, the Red Goshawks had to flap on each circle and their circling was not as tight.

The Red Goshawk does not seem to alarm the local birds such as Pied Butcher Birds *Cracticus nigrogularis* or various honeyeaters but does cause a great deal of consternation among the White Leghorn poultry, even though the poultry yard is surrounded and roofed with wire netting and they have a shed

into which they retreat.

On one occasion a pair of Red Goshawks were chased for about 800 m by four Australian Magpies *Gymnorhina tibicen*. The Goshawks took evasive action by twisting and turning and flying through the forest. Mobbing was also carried out by Pied Butcher Birds as a female Red Goshawk was leaving a kill after being disturbed by us. Torresian Crows *Corvus orru* did not mob the Goshawk but sat a short distance away from a kill calling loudly and when the Goshawk returned the Crows left.

HUNTING AND ATTACK METHODS

Two types of hunting methods and two types of attack have been observed. The terminology of Baker-Gabb (1980) is followed here. *Perch hunting* : the Goshawk sits concealed under and inside the canopy of a fairly dense tree. The Goshawk has clear egress from the perch in the event of sighting prey. *Soaring and prospecting* : this has only been observed above rainforest. The Goshawk is then so high that it is difficult to see with the naked eye. *Glide attack* : is carried out from the perch. When prey is sighted the Goshawk glides quietly without wing movement and lowers its feet when a short distance from the prey. *Stooping* : steep dive with wings folded.

The Red Goshawk appears to favour edges of rainforest or sclerophyll forest or clearings such as roads through thick vegetation when using perch hunting and glide attack.

PREY ITEMS AND FEEDING BEHAVIOUR

An adult female Red Goshawk was observed to chase, eat or capture prey on four occasions. Soaring and prospecting followed by stooping were used to capture a Topknot Pigeon *Lopholaimus antarticus*. The Pigeon feeds on fig trees *Ficus sp.* that grow in the rainforest. A flock of twenty Pigeons broke out of the forest canopy when the Goshawk was only a speck in the sky. As the Pigeon flock gained height the Goshawk commenced a short dive with its wings folded into the

stoop position and this continued until impact with a Pigeon. The Goshawk continued down into the canopy with its prey. The Pigeons had seemed unaware of the Goshawk and took no evasive action.

In predated a White Leghorn hen, a Red Goshawk dropped from its perch in a nearby *Acacia* tree onto the head and neck of the hen which protruded through the wire of its enclosure. The White Leghorn was eaten from the head with all the viscera eaten. After about four hours all that was left was a hollow feathered carcass.

A Red Goshawk attacked an Australian Brush Turkey *Alectura lathami* walking along a farm track between patches of Lantana *Lantana camara* and overhanging acacia. The Goshawk attacked from the uphill gliding down towards the Turkey which was about 50 m away. When the Goshawk was about 5 m from the Turkey and about 2 m above it, the Turkey realised its danger and ran into a small tunnel under the Lantana. Without an appreciable slackening of speed the Goshawk followed and for the next few minutes there were flapping and struggling noises from the thicket. The Goshawk then emerged about 20 m from where it had entered the Lantana and glided away downhill. It was not possible to see if the Turkey had escaped.

In another likely instance of a Red Goshawk attack on a Brush Turkey an unusual noise was heard at 0540 h in mid July in a tangle of vegetation 6 m from our house. About an hour later one of us went past that area and surprised a Red Goshawk which flew from under a tree where lay the very fresh carcass of a Brush Turkey with the head and neck removed. During that day and the next the Goshawk returned frequently to its kill. When disturbed the Goshawk glided downhill to an area of rainforest about 50 m distant to perch under the canopy of a fig tree. Return visits to the kill were made within half an hour. It seemed that no effort was made to move the carcass, the Goshawk being content to return frequently to feed. The Brush Turkey was also eaten from the head and the viscera completely eaten out. The hind legs were not touched but some breast feathers were removed and some breast meat eaten.

An indication that only live prey is taken is given by the presence of a White Leghorn carcass about 20 m from the Brush Turkey kill. The carcass was there prior to the killing of the Brush Turkey and the Red Goshawk did not attempt to touch it.

CONCLUSION

We have been observing birds at Widgee for twenty years. Over the past ten years it seems as if conditions, judging by the more frequent sightings, have become more favourable for the Red Goshawk. Environmental changes in that period have included, Brush Turkeys no longer being shot in the district, no "burning off" on our property, cessation of cattle grazing, all of which seem to have resulted in a large increase in Brush Turkey numbers. An increase in one prey species may be a reason for the increase in sightings of the Red Goshawk.

ACKNOWLEDGEMENTS

We wish to thank Stephen Debus for his helpful comments and for the provision of previously-published Red Goshawk articles.

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BOOK REVIEW

WHERE TO FIND BIRDS IN AUSTRALIA

by

JOHN BRANSBURY

Century Hutchinson 539 pp.

\$35.00

John Bransbury must be an optimist. One would have to be to tackle a project of this sort. To compile such a "directory" for a continent as large and varied as Australia and with so many bird species, is no small task.

The book is in the form of many travel guides, in that it gives regional coverage. There is a chapter for each state/territory and each chapter is divided into subheadings dealing with particular regions. Birding localities are listed with descriptions of the areas, and lists of the birds observers could expect to see in these areas at the appropriate seasons. The names of birds used are those given in the 1978 RAOU list and not those used in the 1984 *Atlas of Australian Birds*. This book is obviously meant to be used with a field guide. This format will prove useful to those who are least familiar with the particular areas listed - travellers, both interstate and overseas.

Most of us when travelling combine our birdwatching with business or other interests and we often have set or limited itineraries. The book caters for such travellers by describing some of the best birding spots in or near major cities. The best spots in well-known national parks are also dealt with, as are some good spots in areas less frequently visited. The author has also tried to cover a wide variety of habitat types, although I thought some of the areas in the far north could possibly have been given more attention. Rainforest and reef areas north of Cairns are examples. These features will certainly appeal to and assist those who are able to plan their travels with birding more specifically in mind.

All the areas listed are readily accessible (no parachutes, crampons, hot air balloons, or Sherpas required) and there are maps throughout the text showing roads, tracks, campgrounds and access points. There are also good, clear photos throughout, which show some of the birds and areas described in the text. The maps are basic, and I would certainly not use them for bushwalking or orienteering. I would have liked some additional detail - perhaps showing habitat or vegetation types - but for the majority of users I am sure the maps will be more than adequate. The author has, sensibly, included the addresses of major bird and ornithological organisations in each state/territory. These are listed at the beginning of each chapter. For those who require additional information on areas they plan to visit, or who would like the advice/company of local experts, this is useful. An additional source of (printed) information is the bibliography, with publications listed by state or territory.

An alternative format for the book would have been to list bird species and the best spots for seeing each. This would have been unweildy, and probably most useful to very hardened tickers. The index, however, does list birds mentioned in the text (by common names) with appropriate page numbers.

This book covers a great deal of ground, and I believe it does so in a logical and thorough fashion. At the same time, the book is very portable, as the author has avoided unweildiness and clutter. It is a useful, practical book which fills a glaring hole in the Australian Ornithological literature.

SCOTT O'KEEFE, C/- Newspaper Room, Department of Government, University of Queensland, St. Lucia. Q. 4067.

BOOK REVIEW**THE BIRDS OF AUSTRALIA : A BOOK OF IDENTIFICATION
- 760 BIRDS IN COLOUR**

by

KEN SIMPSON AND NICHOLAS DAY, 1986Lloyd O'Neil Pty. Ltd., Melbourne
Second Edition. 352 pages. RRP \$35.95.

When the first edition of this book was published, I rushed out and bought a copy. I was not disappointed, and have used this book as my home reference on return from field trips. The second edition is essentially very similar to the first, with changes to four of the colour plates, a revised text and new distribution maps.

The book is divided into two main sections. The first is the "Field Information" comprising around 130 superbly illustrated colour plates with accompanying text and distribution maps on the opposite page. A limited use of pointers has been made to highlight not so obvious differences in similar species. I would have liked to see greater use made of these. The second section is entitled "The Handbook". It has 70 pages of information about biology, distribution, habitats and history of Australian birds. There is a brief part on hints for birdwatchers, and "The Handbook" concludes with a view of Australian families of birds showing a breeding calendar for most species.

This book is a must for all serious Australian bird watchers. It compares most favourably and complements other recently published guides.

RALPH COBCROFT, 5 Castile Street, Indooroopilly, Qld. 4068.

INSTRUCTIONS TO AUTHORS

The Sunbird is published quarterly by the Queensland Ornithological Society to further the knowledge of birds in Queensland and adjacent northern regions of Australia.

Papers are invited from non-members as well as members on all aspects of ornithology, e.g. life history, taxonomy, distribution, behaviour, and ecology. Articles may take the form of major articles on specific birds, birds in specific areas or habitats, or short notes on either birds themselves or the literature on birds, such as reviews of books or comments on published articles.

Submission of a paper implies that the results reported have not been published and are not being considered for publication elsewhere. The editor reserves the right to submit records of rare birds to the Records Appraisal Committee of the Royal Australasian Ornithologists Union.

Manuscripts should be typed (if possible), double-spaced and two (2) copies sent. Papers longer than four (4) typed A4 pages should have a summary. If needed, help may be given to authors to find relevant literature. Common names, scientific names and order of names should follow "Recommended English Names for Australian Birds", in *The Emu* Volume 77, Supplement, 1978. Intending authors should consult recent issues of *The Sunbird* to see acceptable forms of contributions.

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- SLATER, P. 1970. *A Field Guide to Australian Birds. Non-Passerines*. Adelaide: Rigby.

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