

CENSUSES AND BREEDING RECORDS OF THE MAGPIE GOOSE *Anseranas semipalmata* ON THE COASTAL WETLANDS OF CENTRAL QUEENSLAND

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A resident but fluctuating population of Magpie Geese was recorded on the central Queensland coast during twice monthly counts on 13 wetlands between February 1987 and December 1989. The mean population on these wetlands in 1987 was $1\,225 \pm 136SE$ ($n=23$), in 1988 $771 \pm 132SE$ ($n=25$), and in 1989 $2\,848 \pm 290SE$ ($n=27$). Successful breeding was recorded in 1988 and 1989 on four wetlands dominated by *Eleocharis* spp. with goslings, fledglings and immature Magpie Geese observed amongst adult flocks on these wetlands.

INTRODUCTION

A flock of 1 000 Magpie Geese *Anseranas semipalmata* was reported in the Rockhampton area ($23^{\circ}30'S$) in 1924 during the Royal Australasian Ornithological Union Campout (Wolstenholme 1925). The population then declined with few sightings in the district over the next five decades (C. Archer, pers. comm.; H. Beak, pers. comm.). In 1974 flocks of 100 geese were observed in the area and it was reported as an uncommon breeding resident (Longmore 1978).

The Magpie Goose breeds annually at traditional breeding grounds on the coastal floodplains of the Northern Territory, northern Queensland and New Guinea (Pringle 1985; Tulloch *et al.* 1988; Bayliss and Yeomans 1990). However, apart from isolated breeding records this decade from Bool Lagoon, South Australia (Harper 1990); Tower Hill, Victoria (Blakers *et al.* 1984); the Hunter Valley, Moree, and Dormana, New South Wales (Clancy 1985; Marshall and Higgins 1990), there are few breeding records for wild Magpie Geese south of $21^{\circ}S$ since 1911, when they disappeared from the southern states (Blakers *et al.* 1984; Tulloch *et al.* 1988).

Recent evidence of the Magpie Goose breeding in the Rockhampton area, $23^{\circ}30'S$, occurred in January 1974 when two half grown birds were taken from a swamp at Bouldercombe 12 km

south of Rockhampton and relocated at Cooberrie Park 12 km north of Yeppoon (N. W. Longmore, pers. comm.). In 1983 and 1985 numerous goslings were reported on the wetlands at Rossmoya 40 km north-east of Rockhampton (P. Vize, pers. comm.). Twelve goslings were also seen on a swamp at Broadmeadows, 12 km east of Rockhampton, in 1985 (H. Beak, pers. comm.).

This paper reports an increase in the Magpie Goose population, and breeding records of this species on the coastal floodplains of Central Queensland during 1988–1989, indicating a recent expansion of their breeding range.

STUDY AREA AND METHODS

The study was carried out on the central Queensland coast in the area bounded by $23^{\circ}00'-23^{\circ}30'S$ and $150^{\circ}20'-150^{\circ}50'E$. Thirteen wetlands (Fig. 1) consisting of three permanent lagoons (Kawana 6.3 ha, Bessie Sue 8 ha, Gracemere 144 ha), a permanent dam (Farnborough 4 ha); and nine ephemeral swamps (Four Mile Creek 3 ha, Old Scenic Drive 4 ha, Serpentine Lagoon 75 ha, Keppel Sands 50 ha, Rossmoya 50 ha, Broadmeadows 50 ha, Kinka 56 ha, Lake Mary 400 ha, Iwasaki c.450 ha), were visited twice monthly between February 1987 and December 1989 to count the number of Magpie Geese present. I estimated that these sites represented 95 per cent in 1987, and 10 per cent in 1988 and 1989 of all suitable waterfowl habitats within the study area (Sheet 9051 Edition 2 Rockhampton 1:100 000 National Topographic Map Series). Casuarina Island (Fig. 1) was not a study site but I have included an anecdotal breeding record from this area during the study period.

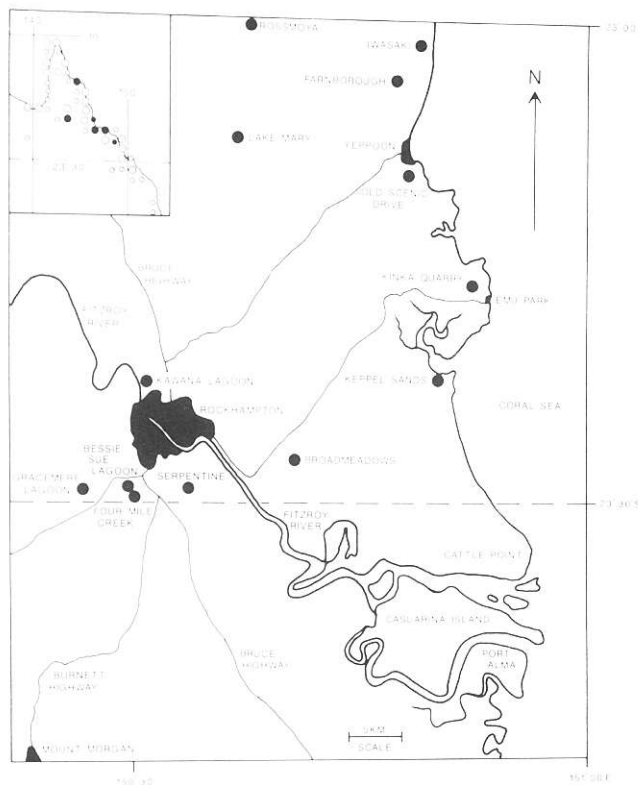


Figure 1. Location of the 13 study sites in the Rockhampton District, plus Casuarina Island, from which one breeding record is available. The insert of Queensland (modified from Blakers et al. 1984) indicates sites of recorded (open dot) and breeding Magpie Geese (solid dot) in Queensland.

The sites were chosen on the basis of past usage by the Magpie Goose, as studies of the Magpie Goose in the Northern Territory (Frith and Davies 1961) and Queensland (Blackman and Locke 1985) have shown this species is conservative in its seasonal use of wetlands.

All wetlands were surveyed between 0900 and 1700 hours on the same day, and geese counted from vantage points that afforded maximum visibility using a pair of 10×42 binoculars. Fledglings amongst adult flocks were identified by their dark blue/black bill (Todd 1979). The observation periods ranged from 10 to 45 minutes with a minimum period of 30 minutes at any site where geese were present. This appeared to be an adequate time for adults to settle and for goslings to be observed.

Between February 1987 and February 1988 the birds were readily visible and counted directly when they were on the ground. From March 1988 to December 1989, when swamps were wet and well vegetated, many birds were hidden in *Eleocharis* spp and were not available for visual census. A correction factor was determined from fifteen extra counts made from a higher observation point at Lake Mary swamp between June and July 1989. This factor was based on the

difference between those visible and those in the swamps, by comparing counts of birds in the air when disturbed with those on the ground.

I investigated reports of nests and goslings sighted by pastoralists and government sanctioned goose shooters who traversed the Rossmoya, Lake Mary, Keppel Sands and Broadmeadows wetlands twice monthly between April and October in 1988 and 1989. I recorded the number of eggs in a nest; the diameter of the nest; species of plants used to make the nest; height of nest material above the water level; height of vegetation surrounding the nest and water depth.

RESULTS AND DISCUSSION

Twice monthly counts indicated a mean population of $1\,225 \pm 136\text{SE}$ ($n=23$) Magpie Geese in the district during 1987. A correction factor of times 3.29 ($\text{SE} \pm 0.22$, $n=15$) was applied to counts of geese at Lake Mary and Iwasaki (1 April 1988–30 September 1989), and at Rossmoya (29 October 1988–30 August 1989) to adjust for wet season visibility bias. Fewer geese were counted in 1988 ($\bar{x} = 771 \pm 132\text{SE}$, $n=25$, corrected counts) with counts in June to October below those of the previous year. In 1989, corrected counts were above counts in 1987 and 1988 (Fig. 2). The mean population in 1989 was $2\,848 \pm 290\text{SE}$ ($n=27$, corrected counts).

The annual rainfall in Rockhampton in 1987 was 607.8 mm (Fig. 2), below the annual average rainfall of 840 mm (Bureau of Meteorology). In

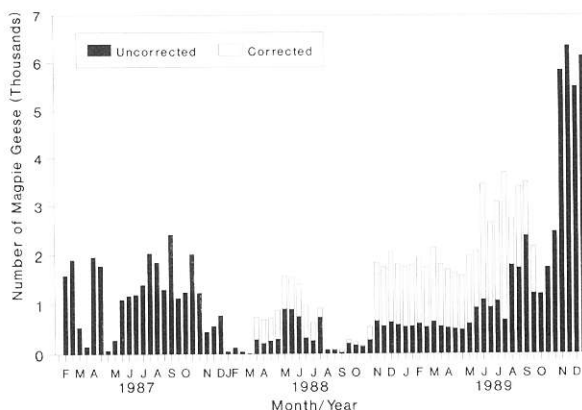


Figure 2. Counts of the Magpie Goose in the Rockhampton district from February 1987 to December 1989. Counts were at two-weekly intervals. A correction factor of $\times 3.29$ (for birds hidden in the swamp) was applied at Lake Mary and Iwasaki (April 1988–Sept. 1989), and 1989 at Rossmoya (Oct. 1988–Aug. 1989).

March 1988, the drought conditions along the central Queensland coast were broken by the rains that followed Cyclone Charlie (Fig. 2) resulting in extensive flooding in the district. Three times the average monthly rainfall was recorded at the Rockhampton Weather Bureau in each of June, July and August 1988. The total annual rainfalls for both 1988 (1 063.8 mm) and 1989 (1 315.3 mm) were above average.

The timing and intensity of rainfall is important in establishing and maintaining the ephemeral wetlands identified as the breeding sites of the Magpie Goose on the central Queensland coast. The average annual rainfall for the district is not sufficient to flood the coastal black soil plains. These wetlands only fill with heavy falls late in the wet season or in the dry season, when temperatures are less intense.

I attributed the marked decline in Magpie Goose numbers in 1988 to the birds dispersing to the large number of wetlands along the Queensland coast filled by extensive heavy rain associated with Cyclone Charlie. The increase in numbers in 1989 appeared to be the result of migrations from northern breeding grounds as breeding records in the study area were few in 1989 (Fig. 3).

In 1987, the larger ephemeral wetlands were dry, and the geese congregated on the small permanent wetlands, Kawana, Bessie Sue, and Farnborough. In March 1988, as the flood water subsided, the black soil plains filled with dense stands of sedges dominated by *Eleocharis* spp. Geese were first observed at Lake Mary on 13 February 1988. Small flocks of 20 and 60 geese respectively settled at Broadmeadows and Iwasaki from 13–24 April, but geese were not seen again at these two sites in 1988. The geese arrived at Serpentine 12 July 1988, Keppel Sands 23 July 1988, Kinka 21 September 1988 and Rossmoya 29 October 1988. A permanent flock of geese remained at Lake Mary, Rossmoya and Keppel Sands for the rest of the study. Kinka was used between May–September 1989. Broadmeadows and Iwasaki were used by flocks of 20–2 500 geese from 16 July and 30 August 1989 respectively to December 1989. The first sign of drying and deterioration in the stands of the sedges was noted in October 1989.

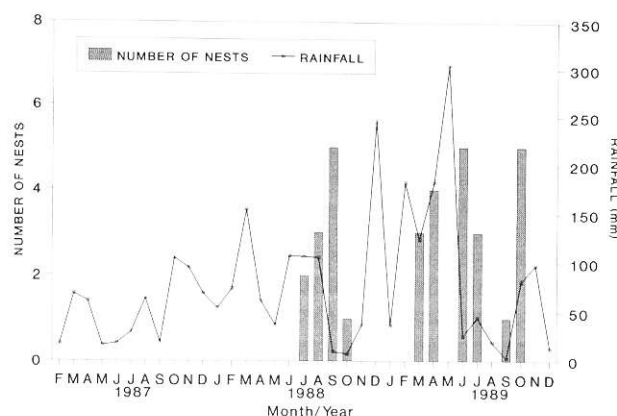


Figure 3. Rainfall and nests of the Magpie Goose in the Rockhampton district from February 1987 to December 1989. The rainfall for Rockhampton and number of Magpie Goose nests sighted in the Rockhampton District 1987 to 1989 show nesting occurring following good summer rainfall.

There was no evidence of the Magpie Goose breeding along the central Queensland coast in 1987 (Fig. 3) and the first half of 1988. However, the structural suitability of the sedge for earlier nesting was verified by the numerous black swan *Cygnus atratus* and swamp hen *Porphyrio porphyrio* nests located in the first week of April 1988 at Lake Mary and Rossmoya. Swans weigh 3 kg more than Magpie Geese (Frith and Davies 1961; Todd 1979) and build similar large floating nests of the same vegetation.

The wetlands used for breeding were similar but much smaller than those described in the Northern Territory (Frith and Davies 1961; Tulloch *et al.* 1988). Wild rice *Oryza* found in abundance on the Northern Territory wetlands and important to the gosling diet (Frith and Davies 1961; Tulloch *et al.* 1988) was not found on the Central Queensland wetlands. The local wild rice *Leersia hexandra* was present on the breeding swamps but sparsely distributed and crop analysis indicated that it was not an important food resource for Magpie Geese (unpubl. data).

The first Magpie Goose nests in the study area were observed in July 1988 with 11 nests being discovered over the next three months at the following sites, Serpentine (n=4), Keppel Sands (n=4) and Rossmoya (n=3). No nests were found

between November 1988 and March 1989. Nesting activity began again in March 1989 and continued through to October 1989 with 21 nests being discovered during this period (Fig. 2) at four wetlands, Rossmoya (n=9), Kinka (n=3), Keppel Sands (n=5) and Lake Mary (n=4). A lag period of four months in 1988, and three months in 1989 was observed between the start of the heavy rain and the first nests. The shorter lag period of the second breeding season (1989) was possible because the wetlands remained full between the two breeding seasons, and hence the reeds were already well established.

Nests were built of *Eleocharis sphacelata* (69%), *Cyperus* sp. (22%), and *Typha* sp. (9%). Only one of the nests examined had lining. This was built of *Eleocharis spicelata* with swamp couch *Paspalum* sp. in the central depression. Nests in *Typha* sp. (n=3) and *Cyperus* sp. (n=7) were much closer to each other (4–8 m) than those in *Eleocharis* spp (10–20 m, n=11). The average height of the *Typha* sp., *Cyperus* sp. and *Eleocharis* spp containing nests were 2 200 mm, 1 300 mm and 1 200 mm respectively. Nests were found in mean water depths of 642 mm±71SE (n=6) in 1988 and 829 mm±115SE (n=15) in 1989. The mean nest diameter was 543 mm±36SE (n=15), and mean height (top of nest platform above water level) was 417 mm+48SE (n=7).

Of the 21 accessible nests (n=6 1988; n=15 1989) 50 per cent and 47 per cent contained eggs and 17 per cent and 5 per cent broken shell when first found in 1988 and 1989 respectively. The mean number of eggs per nest was $\bar{x}=6\pm0.85SE$ (n=10). Only two of the clutches, with six and eight eggs respectively, were checked for the full incubation period. Magpie Geese are known to build courtship nests prior to building nests for egg laying (Johnsgard 1961; Davies 1962; Todd 1979). It is thus likely some of the nests observed without eggs were constructed solely for courting. As the number of eggs in a nest was only counted once, the mean number of eggs reported per nest is an underestimate of the clutch size.

Goslings were sighted on five wetlands between September 1988 and September 1989 (Table 1), with a maximum of 17 goslings accompanied by 28 adults being observed. Once, two goslings were observed riding on the back of an adult.

TABLE 1

The number of Magpie Goose goslings and accompanying adult birds sighted on five wetlands on the central Queensland coast, 23°00'–23°30'S and 150°20'–150°50'E, between February 1987–December 1989. (U = Unknown). Area: Lake Mary 400 ha; Rossmoya 50 ha; Iwasaki c.450 ha; Serpentine 75 ha.

Date	Site	Number	
		Goslings	Adult
18.09.88	Lake Mary	7	3
23.09.88	Lake Mary	6	3
7.10.88	Lake Mary	2	3
7.10.88	Rossmoya	3	2
15.10.88	Casuarina Island	7	2
5.11.88	Lake Mary	5	3
15.11.88	Lake Mary	16	12
20.11.88	Lake Mary	8	28
23.11.88	Lake Mary	16	10
28.11.88	Lake Mary	17	12
4.02.89	Iwasaki	4	12
28.03.89	Lake Mary	3	3
17.05.89	Serpentine	5	2
18.09.89	Rossmoya	6	U

Fledged young were observed amongst adult flocks at Lake Mary (5.11.88, n=4), Serpentine (14.6.89, n=1), Rossmoya (25.10.89, n=2), and Broadmeadows (11.11.89, n=2). Two carcasses of immature birds were obtained from shooters at Rossmoya (29.10.89) and Broadmeadows (11.11.89).

The presence of goslings and immature geese amongst adult flocks shows a Magpie Goose breeding population has become re-established on the central Queensland coast. Breeding success of the Magpie Goose along the central Queensland coast is clearly dependent on the timing and intensity of rainfall, which assures an adequate growth of sedges for food and nesting material. However, continued breeding success in this and other marginal areas also depends on a combination of sympathetic management of both the birds and the wetlands.

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REFERENCES

- Bayliss, P. and Yeomans, K. M. (1990). Seasonal distribution and abundance of Magpie Geese, *Anseranas semipalmata* Latham, in the Northern Territory, and their relation to Habitat, 1983–1986. *Aust. Wildl. Res.* 17: 15–38.
- Blackman, J. G. and Locke, D. K. (1985). Quantitative analysis of seasonal wetlands in the Burdekin–Townsville region with special reference to waterbird habitat. *Proc. Ecol. Soc. Aust.* 13: 139–152.
- Blakers, M., Davies, S. J. J. F. and Reilly, P. N. (1984). 'The Atlas of Australian Birds'. (RAOU and Melbourne University Press: Carlton.)
- Clancy, G. P. (1985). Recent records of Magpie Geese in New South Wales. *Aust. Birds.* 19: 41–45.
- Davies, S. J. J. F. (1962). Aspects of the behaviour of the Magpie Goose, *Anseranas semipalmata*. *Ibis* 105: 76–98.
- Frith, H. J. and Davies, S. J. J. F. (1961). Ecology of the Magpie Goose, *Anseranas semipalmata* Latham (Anatidae). *CSIRO Wildl. Res.* 6: 91–141.
- Harper, M. J. (1990). The re-establishment of magpie geese at Bool Lagoon, South Australia. *South. Aust. Ornithol.* 31: 44–47.
- Johnsgard, P. A. (1961). Breeding biology of the Magpie Goose. *Wildlife Trust 12th Annual Report*. pp 92–103.
- Longmore, N. W. (1978). Avifauna of the Rockhampton Area, Queensland. *The Sunbird* 9: 25–53.
- Marchant, S. and Higgins, P. J. (Eds) (1990). 'Handbook of Australian, New Zealand and Antarctic Birds'. (Oxford University Press: Melbourne.)
- Pringle, J. D. (1985). 'The waterbirds of Australia'. (Angus and Robertson: North Ryde.)
- Todd, F. S. (1979). 'Waterfowl: Ducks, geese and swans of the world'. (Sea World Press: New York.)
- Tulloch, D., Cellier, K. M. and Hertog, A. L. (1988). The Distribution of the nests of the Magpie Goose (*Anseranas semipalmata* Latham) at Kapalga, NT: a Four-year Study. *Aust. Wildl. Res.* 15: 211–221.
- Wolstenholme, H. (1925). Notes on the birds observed during the Queensland Congress and Campout 1924. *Emu* 24: 230–236, 243–251.

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BREEDING SUCCESS OF THE AUSTRALIAN PELICAN *Pelecanus conspicillatus* ON LAKE EYRE SOUTH IN 1990

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A large colony of pelicans bred on three islands in Lake Eyre South during early 1990. A maximum of 90 000 chicks fledged from an estimated 104 000 eggs laid. The chicks which hatched late in the season experienced a greater mortality than the chicks which hatched early. Banding the young was a useful tool for determining nestling survivorship and appeared to have a minimal effect on the mortality of late-hatched young.

INTRODUCTION

Australian Pelicans *Pelecanus conspicillatus* are large piscivorous birds endemic to Australasia. In Australia the usual feeding and breeding grounds of the Australian Pelican are in the estuaries, rivers and lakes of the coastal regions (Blakers *et al.* 1984) but periodically they migrate to the arid inland to capitalize on favourable conditions there. Heavy local rains or floods in the Cooper

or Diamantina River systems occasionally fill large lakes facilitating the breeding of fish and fish-eating birds in this otherwise dry environment. Colonies of approximately 4 000 pairs were recorded from Lake Eyre North in 1977 and 1984 (Lane 1984) and one of 1 000 pairs in 1974 (Blakers *et al.* 1984). Pelicans have also bred at several other inland lakes (Vestjens 1977; Marchant and Higgins 1990). The largest recorded pelican breeding colony was 50 000 to 100 000 nests at