The Contribution of Queensland Birdwatchers to Ornithology: How Does it Compare With That of Other States?

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Abstract

Among the activities promoted by the original Council of the Queensland Ornithological Society (QOS, now known as Birds Queensland) in 1969 were participation in the Nest Record Scheme (NRS) of the Royal Australasian Ornithological Union (now BirdLife Australia) and involvement in bird banding studies. In this review I evaluate the contribution of Queensland birdwatchers to these two activities since 1969, and compare this with their participation in four national bird survey projects. Contrary to the aspirations of those QOS pioneers, participation in the NRS and bird banding has been poor. The number of nest records submitted in Queensland ranked fifth among the eight states and territories, and the number of participants in Queensland was second lowest. Similarly, the number of registered banders in Queensland from 1953 to 2013 ranked last and second last among all states and territories in terms of their total population and surface area. The number of birds banded in Queensland ranked third last.

During the two national bird Atlases, Queensland was the least well surveyed of the eastern states. However, in terms of its population, Queensland's contribution was 50–70% higher than that of either New South Wales or Victoria. Similarly, adjusting for its small population, Queensland was the largest contributor of the three eastern states to Eremaea-eBird from 2010 to 2014. Projects which involved counting birds, like the Annual Bird Counts (1972–1983) and Garden Bird Surveys (1979, 1999), were popular in the early days of QOS, but today, only the small, but highly dedicated Queensland Wader Study Group conducts regular counts. Predicting the responses of birds to climate change and other human-induced impacts rely on a detailed knowledge of the timing of breeding and movements, yet such information is still lacking for the majority of land bird species in Queensland. Birdwatchers and other 'citizen scientists' offer the only hope that such knowledge will be obtained before it is too late.

Introduction

The Queensland Ornithological Society (QOS), now known as Birds Queensland, was formed in October 1969 with the aim of promoting 'the scientific study and conservation of birds, by all means possible, with particular reference to the birds of Queensland' (Macdonald 1969: 1). To achieve these aims, the original Council envisaged members being involved in the following activities: (a) field outings, (b) the Nest Record Scheme (NRS), (c) bird banding studies, (d) bird photography (partly for use in the Society's journal), (e) recording of bird calls, (f) encouraging junior members, and (g) a scientific journal covering all aspects of Queensland ornithology (Straw 1969; Niland 2004). Regarding the second activity (b), the

Council hoped that 'members of the Society can be encouraged to participate in the already existing RAOU Nest Record Scheme' (Straw 1969: 3). In relation to the third activity (c), it was stated that 'members will already be fully aware of the operations of the Australian Bird Banding Scheme conducted under the auspices of the CSIRO Division of Wildlife Research. As so few bird banders are working in Queensland at present it is hoped that the Society can encourage members to take an active interest in banding projects' (Straw 1969: 3).

In this review I evaluate the contribution of Queensland birdwatchers to these two schemes since 1969, by comparing their participation levels with those of birdwatchers from other states and territories. I also examine the level of participation of Queenslanders in four national volunteer programs, comprising the two Atlases of Australian Birds, the Australian Bird Count and eBird. A review of the content of the Society's journal, *Sunbird,* is presented separately (Noske 2015).

Nest Record Scheme

Despite the impression that may be gained from the many coffee-table bird books, we know very little about the breeding biology of a large proportion of Australia's birds, especially those of the tropics (Clarke 1997; Noske & Franklin 1999; Noske 2003). In his review of studies of avian breeding biology in Australia from 1986 to 1995, Clarke (1997) showed that the vast majority of intensive studies were conducted near capital cities in temperate regions by professional researchers affiliated with academic or scientific institutions, rather than amateurs. There was also a strong bias towards sedentary species that breed colonially or cooperatively, probably due to the relative ease with which large datasets could be accumulated with the minimum amount of time and resources. Such datasets increase the chances of publishing papers in scientific journals with higher impact factors, and consequently, the researcher's potential for professional advancement (Clarke 1997).

Beginning in 1963, the Nest Record Scheme is BirdLife Australia's (formerly RAOU) longest-running bird project, allowing both amateur and professional ornithologists to contribute information about all aspects of breeding of Australian birds. Its important contribution to ornithology can be gauged from inclusion of NRS data in the breeding section of the vast majority of Australian species in the *Handbook of Australian, New Zealand and Antarctic Birds (HANZAB),* wherein it is often the only source of information on breeding seasons, nest location, clutch size, incubation and nestling periods, and breeding success (BirdLife Australia 2015).

Up until 2006, the NRS had amassed almost 87,000 records of nests of Australian birds. Although 271 observers (14% of the total number) submitted nesting records of Queensland birds, the number of submitted

records ranked fifth among the eight states and territories (Table 1). In terms of the state's area, the number of nest records from Queensland ranked second last, the only lower effort coming from the NT, where the population is roughly 5% of that of Qld. In terms of its population, the number of observers in Queensland was also the second lowest among all states and territories (Table 1). Thus the Queensland contribution to the Nest Record Scheme is considerably less than that of most other parts of Australia, indicating that the initial QOS aim of assisting this scheme was over-optimistic.

A breakdown of Queensland nest records by individual species shows some woeful sample sizes and alarming gaps. Of an estimated 470 breeding species in the state (Noske, unpublished data), less than half (206) were represented in the NRS by Queensland records, and of these, 41% were represented by one to four records only. Among those species with only one record from Queensland are the Mangrove Honeyeater, Barred Cuckoo-shrike and Spectacled Monarch (Table 2), species whose range falls largely or wholly within this state. Similarly, it seems almost inconceivable that there was only one Queensland record for such common, widespread species as the Rainbow Lorikeet, Varied Sittella and Fuscous Honeyeater. Likewise, the White-throated Treecreeper, Brown Thornbill and Bell Miner, highly abundant species in southeast Queensland, were each represented by only two or three records. On the other hand, the number of records submitted for common urban species, such as the Noisy Miner, Magpielark and Willie Wagtail was relatively high (Table 2).

Table 1. Numbers of participants to the Nest Record Scheme (to 2006) from each state and territory in terms of human population, and numbers of NRS records in terms of state's area.

State/territory	Observers		Records		
	No.#	Per head of mean population* x 10^4	No.#	% total	Per sq km^4
New South Wales	461	0.88	30,089	34.6	37.6
Victoria	499	1.26	21,527	24.8	94.7
Western Australia	192	1.46	11,409	13.1	4.5
South Australia	238	1.82	8,744	10.1	8.9
Queensland	**271**	**1.13**	**6,334**	**7.3**	**3.7**
Tasmania	112	2.62	4,231	4.9	61.9
ACT	68	3.12	2,677	3.1	1135.3
Northern Territory	96	7.72	1,953	2.2	1.4
Total	**1,937**	**1.29**	**86,964**	**100**	**11.3**

Data provided by BirdLife Australia.
*As 99% of records were submitted before 1999, average state populations for years 1963 to 1998 were calculated from Australian Bureau of Statistics (2015) data.

Table 2. Queensland nest records for 25 selected species to 2006 (source: BirdLife Australia Nest Record Scheme).

Species	No. records
Rainbow Lorikeet *Trichoglossus haematodus*	1
Crimson Rosella *Platycercus elegans*	1
Fan-tailed Cuckoo *Cacomantis flabelliformis*	1
Spectacled Monarch *Symposiachrus trivirgatus*	1
Barred Cuckooshrike *Coracina lineata*	1
Common Cicadabird *Coracina tenuirostris*	1
Varied Sittella *Daphaenositta chrysoptera*	1
Mangrove Honeyeater *Gavicalis fasciogularis*	1
Fuscous Honeyeater *Ptilotula fusca*	1
Spiny-cheeked Honeyeater *Acanthagenys rufogularis*	1
Satin Bowerbird *Ptilonorhynchus violaceus*	1
Buff-banded Rail *Gallirallus philippensis*	2
Pied Oystercatcher *Haematopus longirostris*	2
Pheasant Coucal *Centropus phasianinus*	2
White-throated Treecreeper *Cormobates leucophaea*	2
Eastern Cattle Egret *Bulbulcus coromandus*	2
Shining Bronze Cuckoo *Chrysococcyx lucidus*	3
Little Shrikethrush *Colluricincla megarhyncha*	3
Brown Thornbill *Acanthiza pusilla*	3
Bell Miner *Manorina melanophrys*	3
Australian Magpie *Gymnorhina tibicen*	68
Welcome Swallow *Hirundo neoxena*	87
Noisy Miner *Manorina melanocephala*	125
Magpie-lark *Grallina cyanoleuca*	129
Willie Wagtail *Rhipidura leucophrys*	149

A good example of the paucity of information available on the breeding biology of eastern tropical-subtropical birds is the White-eared Monarch *Carterornis leucotis,* which is endemic to coastal Queensland and the far northeast corner of New South Wales. Despite its occurrence on the outskirts of Brisbane, it was represented in NRS by one record concerning a nest found in Innisfail in 1966 (Higgins *et al.* 2006). Aside from descriptions of its nest and eggs from collectors during the first half of the 20th century, the only information available on the breeding biology of this species derives from Beruldsen (1978), who described the dates, sites and contents of six nests in Noosa National Park. The incubation and nestling periods, and the roles of the sexes in incubation and provisioning of young of this species are unquantified, despite estimates or statements given in secondary sources (e.g. Schodde & Tidemann 1986; Boles 1988). Clearly many opportunities remain for Queensland birdwatchers to contribute to our understanding of the breeding biology of this and many other tropical and sub-tropical species.

Bird banding

Much of what is known about the demography or life history of birds, including longevity, survival rates, mobility, migration routes and timing, social organisation, breeding biology and success, has derived from studies employing banding. The forerunner of the Australian Bird and Bat Banding Scheme (ABBBS) began in 1953 under the auspices of CSIRO Division of Wildlife Research, which passed administration of the scheme over to the Australian National Parks & Wildlife Service (now the Department of Sustainability, Environment, Water, Population and Communities) in 1984. Apart from storing banding data, ABBBS issues bands and oversees the recruitment of bird and bat banders in Australia (ABBBS 2015).

Queensland trails well behind most other states in respect of the number of people conducting bird banding studies. Though the number of active registered banders in Queensland in 2014 ranked fourth among the eight states and territories, in terms of its total human population size, this state ranks last (Table 3). In terms of banders per square kilometre, too, Queensland ranks equal second last with Western Australia. Finally, in terms of numbers of birds banded, Queensland ranks third last, with a mere 5.9% of all banded birds being banded in this state; only the two territories (ACT and NT) have lower totals. However, unlike most states, the number of birds banded per annum since 2006 has risen in Queensland, largely due to the efforts of Jon Coleman and his team of volunteers working in southeast Queensland.

Table 3. Numbers of bird banders (to March 2012) by state and territories in terms of total population*, area of state and numbers of birds banded - including mean numbers before and after 2006. All data supplied by Australian Bird and Bat Banding Scheme.

State/territory	No. banders	Per head population x 10^6	Per 10^5 km^{-2}	No. birds banded	% all birds	Mean no. banded per annum 1953–2005	Mean no. banded per annum 2006–2012
Victoria	132	2.4	58.0	791,307	25.11	13,475	9,389
New South Wales	117	1.6	14.6	682,437	21.65	11,798	6,830
Western Australia	90	3.9	3.6	503,322	15.97	10,868	14,283
Queensland	**61**	**1.4**	**3.5**	187,146	**5.94**	**2,893**	**4,316**
South Australia	46	2.8	4.7	602,774	19.13	7,406	2,847
ACT	45	12.33	1908.4	68,066	2.16	1,207	464
Tasmania	27	5.3	39.5	257,346	8.17	4,490	2,286
Northern Territory	20	8.7	1.5	59,011	1.87	1,018	608
Total	**538**			**3,151,409**		**53,154**	**41,023**

*Based on 2010 values (Australian Bureau of Statistics 2015).

Part of the reason for the poor banding effort in Queensland prior to 2006 is historical. The *Fauna Conservation Act* of 1952 had no provisions for research, and even in the late 1960s, the Queensland government had reluctantly agreed to allow only 50 bird-banding permits to be issued in the state (Dow 2003). One of those first licenced banders was John ('Jack') Robertson, who banded many thousands of birds on his property at Wellington Point, c. 20 km southeast of Brisbane, between 1963 and 1978, and published several papers on morphometrics and migration of honeyeaters (Robertson 1966; Robertson & Woodall 1982a, b; Robertson & Woodall 1983). The first long-term banding project on birds of the Australian tropical rainforest was conducted by Cliff and Dawn Frith on the Paluma Range, northeast Queensland, over 20 years (1978–1997). In addition to their many publications on the biology of the bowerbirds, Frith & Frith (2005) provided the first data on the survival, longevity, moult, breeding, ageing and sexing characters, territoriality and movements of many other species endemic to the Wet Tropics.

Since 1990, banding has also been conducted at 2 or 3-yearly intervals in tropical rainforest at Iron Range National Park, Cape York, by a large number of banders from around Australia. The data have yet to be analysed, except for the White-faced Robin *Tregellesia leucops,* which was found to be highly sedentary and long-lived, with 15% of the recaptured birds (n=68) being at least 10 years old, and the oldest individual being 18 years old (Coleman *et al.* 2012). Given the uniqueness of the Cape York avifauna, where many species are endemic or shared only with New Guinea (Frith & Frith 1991), it is unfortunate that the Queensland Department of Environment and Resource Management chose to discontinue this banding project in 2013.

Banding and leg-flagging have been vital in illuminating the migration routes and duration of most of the 36 species of waders that migrate annually from the Northern Hemisphere to Australia. Mist-netting or cannon-netting began in 1970 in New South Wales, soon to be followed by Western Australia in 1972, Victoria in 1975, and Tasmania in 1979 (Minton 2005). However, wader banding did not start in Queensland until 1989, and was temporarily suspended in 1999, when the only licenced cannon-netter, Peter Driscoll, became unavailable, then moved away from the area (Minton 2005). Meanwhile wader counts undertaken around Brisbane proved that Moreton Bay was an internationally important wintering site for several wader species (Thompson 1993; Harding 1998), including the Grey-tailed Tattler *Tringa brevipes* and Bar-tailed Godwit *Limosa lapponica.*

Since 2006 all waders banded in Moreton Bay have been fitted with individually engraved leg flags. Monthly high tide roost counts by the Queensland Wader Study Group (QWSG) provided multiple re-sightings of 41 individual Grey-tailed Tattlers one season after banding, 18 of which

were re-sighted two seasons after banding, mostly at the roost site where they had been banded (Coleman & Milton 2012). An even higher proportion of the flagged Bar-tailed Godwits returned to their banding roosts two seasons after banding, demonstrating that year after year, a high proportion of these two species return to the same roosting and feeding sites in Moreton Bay (Coleman & Milton 2012).

Since 2011, tiny light sensing geo-locators have been attached to the leg flags of 41 Grey-tailed Tattlers in Moreton Bay, three of which have since been re-captured (Coleman 2012; QWSG 2015). The data downloaded from the geo-locators showed that although all three travelled northward to Kamchatka Peninsula in far eastern Russia, they each took different routes and it took them as little as 27 days to get there. Their southbound migration routes to Brisbane, on the other hand, were similar and more direct (Coleman 2012). Knowledge of the migration routes and staging sites is of paramount importance in determining the causes of the now well-established declines of several wader species visiting the region (Wilson *et al.* 2011).

Bird Atlases and eBird

The two national Atlases of Australian birds were organised by the RAOU and its successor Birds Australia (now BirdLife Australia). The first *Atlas of Australian Birds* (Blakers *et al.* 1984) began only seven years after the inauguration of QOS, spanning the five years from 1977 through 1981. During that period, the percentage of all Atlas sheets and records emanating from Queensland totalled approximately 16% and 19%, considerably less than those from New South Wales and Victoria (Table 4). Relative to the area of each state, the numbers of both surveys and records submitted for Queensland was about a third of those of New South Wales, and 11% of those of Victoria (Table 4). Twenty years later, the second Atlas (Barrett *et al.* 2003) showed little change in the relative contributions of these three states in terms of their total area. However, in terms of its total population, Queensland's contribution is superior to that of the other states. In the first Atlas, the number of surveys per head of the population of Queensland was 50% higher than those from either New South Wales or Victoria, and in the second Atlas, it was 70% higher (Figure 1).

Eremaea Birds, launched in 2003, offered the first open access, online checklist program in Australia and it soon became very popular with both birdwatchers and scientists. In February 2014, Eremaea Birds merged with eBird, originally launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society in USA (Eremaea-eBird 2015). From 2010 to 2014, the proportion of all checklists submitted for Queensland almost rivalled that for Victoria, and was 38% higher than that for New South Wales (Table 4). In terms of the size of the state, Queensland again fared worst (Table 4), but in terms of its population, it remained the largest

Table 4. The contribution towards national Bird Atlases and eBird from Queensland, compared to those of other eastern states in terms of the area of each state. Highest values in each row are in bold type.

Scheme	Period	Metric	Qld	NSW	Vic
Atlas 1*	1977–1981	Percentage of all surveys	16.3	**24.1**	19.0
		No. surveys per 1000 km^2	8.4	26.8	**74.6**
		Percentage of all records	18.8	**27.6**	22.7
		No. records per 1000 km^2	29.5	93.6	**270.5**
		No. records per head population	**22.8**	14.6	15.8
Atlas 2#	1998–2002	Percentage of all surveys	18.3	**24.7**	18.6
		No. surveys per 1000 km^2	29.4	85.7	**226.8**
eBird§	2010–2014	Percentage of all checklists	28.1	20.3	**29.4**
		No. checklists per 1000 km^2	34.8	54.4	**277.1**

* Extrapolated from Blakers *et al.* (1984; Table 1).
\# Extrapolated from Barrett *et al.* (2003; Appendix 2); number of records not shown.
§ Data downloaded on 7 June 2015 (Mat Gilfedder, pers. comm.).

contributor, with over three times more checklists per head of population than New South Wales (Figure 1). These results suggest that Queensland remains under-surveyed because of its large area, yet considering its small population relative to the other eastern states, its coverage has been exceptionally high.

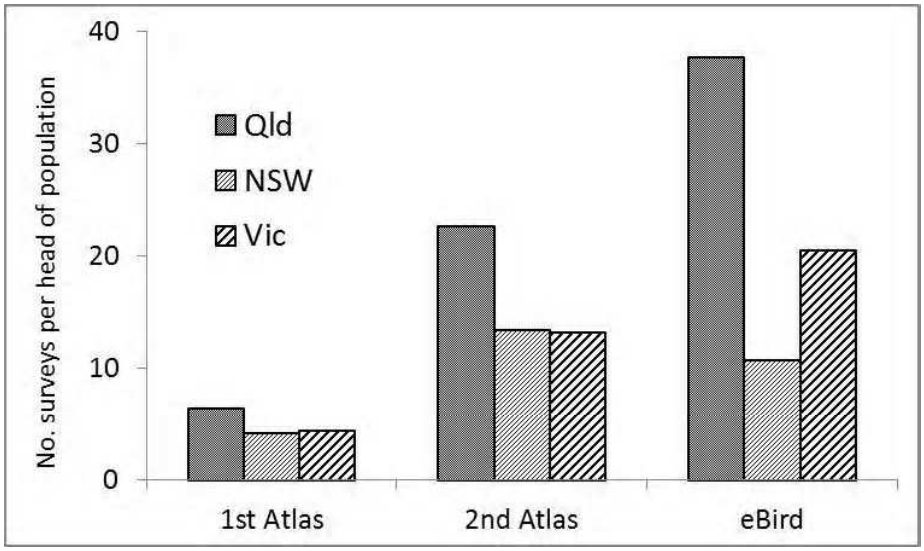

Figure 1. The relative contribution of the three eastern states to the two national Bird Atlases and eBird, based on number of surveys submitted per head of population.

Bird counting projects

While species lists can furnish information on seasonal movements if surveys are repeated several times per year in multiple locations (Griffioen & Clarke 2002; Barrett *et al.* 2003), detecting changes in the size of local populations requires repeated counting of individual birds. In 1989 Birds Australia embarked on an ambitious project called the Australian Bird Count (ABC) to gain greater insight into the extent and nature of movements of migratory bush birds. By mid-1995, almost 80,000 surveys had been completed at over 2,000 sites spread across the continent (Clarke *et al.* 1999). The state with the most 'Cabbies' (Counters of Australian Birds) was New South Wales, but Queensland boasted the second highest number of contributors (Table 5). Three Queenslanders were among the top 20 most diligent contributors, all of whom submitted over 400 surveys (data supplied by A. Silcocks). Analyses of data from both the ABC and Atlases provided the first empirical evidence of north-south migration by Australian Pipits *Anthus australis* and Scarlet Myzomelas *Myzomela sanguiolenta,* and of inland-coastal movements by Australian Golden Whistlers *Pachycephala pectoralis* (Clarke *et al.* 1999).

Members of QOS were engaged in counting birds very early in the history of the Society. Inspired by annual bird counts in the USA, and the first bird count in Australia organised by the Bird Observers' Club in Melbourne four years before, QOS members embarked on the first Annual Bird Count of the Brisbane region in January 1972 (QOS 1972). Their first count involved just 14 participants in three teams, but by 1974, the number of participants had more than quadrupled to 63 people divided among 11 teams, each of which covered different parts of the region (QOS 1975). Sadly, these bird counts were discontinued after 1983 (Noske 2015).

Table 5. Contributions to Australian Bird Count by state. Based on data supplied by BirdLife Australia (8 June 2015).

State/territory	Observer's state (%)	Mean surveys per observer	Surveys in state (%)
New South Wales	39.0	62.1	33.4
Queensland	**16.5**	**66.3**	**15.2**
Victoria	15.7	90.2	18.1
Western Australia	11.6	102.5	16.5
South Australia	7.7	78.0	7.5
Tasmania	4.0	69.6	4.0
ACT	3.2	63.7	2.3
Northern Territory	2.3	94.3	3.1
n	1,063	74.2*	78,884

*Mean no. surveys for all observers.

Wader counting is the core activity of QWSG, which was established in 1992 as a special interest group of QOS with the purpose of monitoring wader populations in Queensland and supporting research concerning their conservation. Count data collected by this group at 180 coastal sites in Moreton Bay over 16 years (Milton & Driscoll 2006) were vital in demonstrating significant declines in the populations of seven of the 22 migratory wader species visiting the region (Wilson *et al.* 2011). QWSG continues to monitor waders of the Bay on a monthly basis.

In 1998 Birds Australia launched its award-winning Birds in Backyards (BIBY) program, designed to address the loss of native bird species from urban landscapes through volunteer surveys, research, education and conservation action (Birds in Backyards 2015). Yet, the idea of counting birds in backyards had been championed by QOS almost two decades before the instigation of BIBY. During 1979–1980, QOS members conducted a year-long Garden Bird Survey to investigate seasonal and spatial variation in the abundance of birds in cities and towns of Queensland. Nearly 100 members participated in the survey, many counting birds on a weekly basis. A total of 2,826 lists were submitted, and 136,388 individual birds belonging to 257 species counted (Woodall 1995). Twenty years later, during 1999–2000, the Garden Bird Survey was repeated (Woodall 2002). Some results of these surveys are highlighted in Noske (2015).

Conclusions

This review demonstrates that, contrary to the aspirations of the pioneers of QOS, participation of Queensland birdwatchers in the NRS and in bird banding projects has been poor compared with that of birdwatchers from other states of Australia. Until 2006, participation in bird banding projects in Queensland had been limited, possibly partly due to state legislation which hampered attempts by amateur ornithologists to be involved in such research. Similarly, the contribution of Queenslanders towards the NRS has been disappointing, especially given the large gaps in our knowledge of the breeding biology of Australian tropical birds, and the considerable potential for tropical-temperate comparisons which have been so important in the development of life history theory (e.g. Martin 1996; Russell 2000).

In contrast to the above, the participation level of birdwatchers from Queensland to national Bird Atlases, Eremaea-eBird and ABC compares very favourably with that from other states. Historically, bird counting projects have been popular among QOS members as evidenced by the pioneering QOS Annual Bird Counts (1972–1983) and Garden Bird Surveys (1979, 1999). Today, however, this tradition continues only through the small, but highly dedicated QWSG, whose longstanding efforts have helped to reveal the shocking decline of many migratory waders wintering in Australia (Wilson *et al.* 2011). Ironically, due to the application of satellite

transmitters and geo-locators, we now arguably know more about the migration routes and schedules of many migratory shorebirds that fly over 22,000 km back and forth to Far East Russia each year, than we do about most of our common land birds that migrate only c. 2,000–5,000 km up and down the eastern seaboard. Of 472 land bird species breeding in Australia, almost 40% are partial migrants, with both sedentary and migratory populations (Chan 2001). We are still largely ignorant of the relative proportions of these populations in any part of Queensland, and of the sources, destinations and routes of their migratory populations, in the vast majority of these species. Monthly, or preferably weekly, counts across multiple sites, preferably simultaneously, would help to fill in these knowledge gaps (Noske 2013).

Studies of the responses of birds to climate change, and the development of actions to address them, rely on a detailed knowledge of the phenology or timing of their reproduction and movements (e.g. Chambers & Keatley 2010). Yet such information is still lacking for the majority of land bird species in Queensland (Noske 2015). While some of this information was furnished by scientists in the past, the collection of such data has increasingly become the responsibility of birdwatchers and other 'citizen scientists'. Echoing the optimism of the original QOS Council, almost three decades earlier, Clarke (1997) beseeched ornithological societies to actively encourage and facilitate the study of breeding behaviour in Australian birds. Sadly, the achievement of this objective remains as elusive today as ever, and it seems inevitable that we will never have the phenological knowledge that is required to accurately predict the responses of most of Queensland's land birds in the face of multiple threatening processes. Nevertheless, a well-designed project may yet furnish such information for selected species, assuming the involvement of a large number of birdwatchers. The future of our birds may depend on it.

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