

Little Egret nominate subspecies *Egretta garzetta garzetta* on mainland Australia

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INTRODUCTION

The Little Egret *Egretta garzetta* is widespread across Eurasia, Africa and Australasia. Global subspecific taxonomy has been problematic and remains somewhat unresolved. Marchant and Higgins (1990) recognised two subspecies: the nominate *E. g. garzetta* (widespread in Eurasia east to Japan, and Africa) and *E. g. nigripes* (range encompassing parts of Indonesia, New Guinea, the Solomon Islands, Australia and occasionally New Zealand), although they note that ‘the subspecific status of Australasian birds still requires further study’. Other sources (e.g. Hancock and Kushlan 1984; del Hoyo *et al.* 1992; IUCN Heron Specialist Group 2011; Clements *et al.* 2016) recognise additional subspecies.

In this paper we follow Clements *et al.* (2016), which acknowledges three subspecies (*E. g. garzetta* in Eurasia, eastern and southern Africa; *E. g. nigripes* in eastern Indonesia, the Philippines, Papua New Guinea, and northern and eastern Australia; and *E. g. dimorpha* in Madagascar and the Seychelles [including Aldabra atoll]), but acknowledge that other sources (e.g. Hancock and Kushlan 1984; del Hoyo *et al.* 1992; IUCN Heron Specialist Group 2011) consider the Australian population to be an additional, distinct subspecies (*E. g. immaculata*) (Figure 1).

In Australia, *E. g. nigripes* occurs mostly on the northeast, east, and southeast coasts, with occasional movements being made inland. It is common in northern Australia and breeds there in March and April and in southeast Australia from October to February (Pizzey and Knight 2012). In Indonesia, *E. g. nigripes* occurs throughout Wallacea (Coates and Bishop 1997), and has bred as far west as northern Sumatra (Eaton *et al.* 2016), whilst Myers (2009) considers *E. g. nigripes* and *E. g. garzetta* to occur in Borneo in roughly equal numbers.

Whilst all subspecies of Little Egret have blackish legs (sometimes with greenish-yellow patches on the tibia and tarsi), a key morphological feature separating *E. g. nigripes* and the nominate *E. g. garzetta* is the bright and distinct colouration of the feet: *E. g. nigripes* has blackish feet, usually with yellow soles, whilst *E. g. garzetta* has bright yellow on the toes, which is documented to extend up to the lower tarsus (see del Hoyo *et al.* 1992; Robson 2005; Carter and Menkhorst 2006; Brazil 2009; IUCN Heron Specialist Group 2011). This feature makes *E. g. garzetta* clearly identifiable at the subspecific level in the field. Typical lore colour also differs between the subspecies, being documented as blue-grey in *E. g. garzetta*, and yellow in *E. g. nigripes* (Carter and Menkhorst 2006; IUCN Heron Specialist Group 2011).

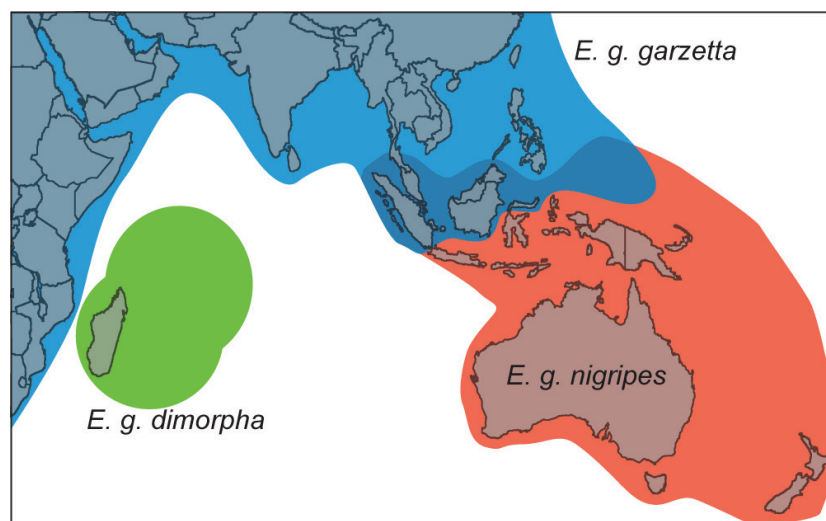


Figure 1. Approximate regional distribution of *Egretta garzetta* subspecies. Note that there is a zone of overlap between subspecies in Malaysia and northwest Indonesia.

Carter and Menkhorst (2006) documented the first occurrences of *E. g. garzetta* on mainland Australia, with records in both the Northern Territory (NT) and Victoria in 2005. Their documentation included photographs of individuals with jet-black legs and bright yellow toes and lower tarsi, and they also noted the greyish lores on birds in both locations contrasting with the bright yellow lores of local *E. g. nigripes*. Carter and Menkhorst (2006) urged observers to check the subspecific identification of Little Egrets in Australia to help gain an understanding of the local status of the nominate subspecies.

Since publication of these initial records, additional sightings of *E. g. garzetta* have been reported, including on online birdwatching databases and forums, particularly in the NT. McCrie and Noske (2015) refer to 'numerous sightings and photographs' of *E. g. garzetta* from the Darwin area since 2005; however, nowhere have these records been compiled and published. Here we review reported sightings to examine the regularity and seasonality of the nominate subspecies of the Little Egret on mainland Australia.

METHODS

The online birdwatching forums, NT Birding Yahoo! group (<https://groups.yahoo.com/neo/groups/ntbirds/info>), Birding-Aus Mailing List Archives (<http://bioacoustics.cse.unsw.edu.au/birding-aus/>), and the online database eBird (Sullivan *et al.* 2009; eBird 2016; eBird Basic Dataset 2016) were searched for records of *E. g. garzetta*. To find records from the NT Birding forum and the Birding-Aus Archives, the search term 'Little Egret' was applied, combined with one of: 'nominate'; '*garzetta garzetta*'; or 'yellow feet'. Resulting reports of *E. g. garzetta* were generally obvious as observers specifically submitted sightings and accompanying descriptions because they were unusual.

To find records from eBird, all Little Egret records from Australia for the period 2005–January 2017 were obtained (from the eBird basic dataset (2016) for records prior to February 2016, and from a direct search of eBird for the records between March 2016 and January 2017). These records were then searched directly for those where the comments specifically mention that an *E. g. garzetta* individual had been identified (generally through reference to the diagnostic yellow toes, or mention of the Asian nominate race). Searching the comments in such a manner was required as eBird taxonomy has only recently (2016) been changed to allow observations to directly report these subspecies. If a photo was not included and comments did not definitely describe a record of *E. g. garzetta*, the observer(s) were contacted to confirm or exclude the record. Only records confirmed by photos and/or definitive field notes were included.

In addition to the records publicly available through the sources listed above, we also include records kept by Darwin birdwatchers Arthur and Sheryl Keates from January 2005 (the initial mainland sighting) until December 2009 during regular visits to the Leanyer Sewage Ponds (Darwin) (after which time the sewage ponds were no longer consistently open for public access), and an additional record from 2016 provided by birdwatcher Angus McNab.

In order to assess the regularity of these sightings, we reviewed and grouped records from 2005–January 2017 by location and season.

RESULTS AND DISCUSSION

We found at least one record of *E. g. garzetta* from each late dry-wet season (defined as August to April and reflecting the wet-dry tropical climate of northern Australia) between 2005 and 2017, with the exception of 2014/15 (Tables 1 and 2). The majority of records are from Leanyer Sewage Ponds (Darwin) (114; Table 1). Of the 13 other sightings, 11 were from elsewhere in the NT and 2 were from Victoria, both from the Melbourne Water Western Treatment Plant at Werribee (Table 2). Twenty-two different observers contributed sightings to this database, strengthening the overall evidence for occurrence and reinforcing the fact that subspecies can be distinguished.

Author MG photographed *E. g. garzetta* at Leanyer Sewage Ponds on 2 August 2009 (Figure 2 A, B). Authors MVJ or PMK photographed *E. g. garzetta* for five of the NT records: at Fogg Dam on 10 April 2011 and 28 January 2017 (Figure 2 E, F); at Leanyer Sewage Ponds on 14 December 2012 (Figure 2 C, D) and 7 January 2013; and, at Fiddler's Lane, Knuckey Lagoon on 23 January 2014. All photographs clearly show entirely yellow toes; the yellow also clearly extends up the tarsus in all instances except the 2011 record from Fogg Dam. Lore colour varied somewhat among birds, but except for the 2017 record always contained a greyish tinge (either grey-green, mostly grey, or grey-yellow; see Figure 2 A, C). Lores were never fully yellow or brightly coloured, which is consistent with the description in IUCN Heron Specialist Group (2011) and the individuals documented by Carter and Menkhorst (2006). Interestingly, the individual photographed at Fogg Dam on 28 January 2017 has pink lores (Figure 2 E), which are thought to occur only for a brief period during courtship (Pizzey and Knight 2012). This seems somewhat of an anomaly; IUCN Heron Specialist Group (2011) notes red lores during breeding, but these are normally in addition to the development of distinctive plumes on the head, chest and back which the bird in question did not have, and moreover the record was outside the usual breeding season (discussed below). In contrast to *E. g. garzetta*, Figure 3 shows similar photographs for *E. g. nigripes*, which has black legs and black tops of the toes, and bright yellow lores. Photographs are not available for the *E. g. garzetta* records from the Western Treatment Plant, but the first was well documented in Carter and Menkhorst (2006) and the second, derived from eBird, contains notes verified with the observers which detail that the yellow on the feet clearly extended above the ankle to the tarsus.

Taken together, these records indicate that the occurrence of *E. g. garzetta* in Australia is likely to be annual in the NT, but rare outside of the NT. Most sightings were of a single individual, but 2 individuals were reported 23 times (of 114) at Leanyer Sewage Ponds and possibly once outside of Leanyer, although the observer was not certain (Tables 1 and 2). For a given season, multiple records from the same location may of course include some sightings of the same individual(s) on multiple occasions; similarly, as has been observed in migrants that have gone off course, individual(s) that have found favourable conditions at a particular site may be returning annually. Nonetheless, the occurrence of records over 12 years and at multiple locations suggests that there are small, but consistent numbers visiting Australia annually.

Table 1

Mainland Australian records of the Little Egret *Egretta garzetta garzetta* at Leanyer Sewage Ponds, Darwin, Northern Territory (-12.3631, 130.9091) from 2005 to 2013 by season, noting the number of observations in each season, maximum number of *E. g. garzetta* observed at any sighting, number of observers contributing sightings in each season, and the source from which the record(s) were derived.

Season	No. of observations	Max. no. of individuals	Total no. of observers	Source
Late dry-wet* 2004/05	8	1	4	A&S Keates (6); Carter and Menkhorst 2006 (1); NT Bird forum (1)
Dry† 2005	5	1	2	A&S Keates (5)
Late dry-wet 2005/06	14	2	3	A&S Keates (13); Birding-Aus forum (1)
Dry 2006	0	n/a	n/a	n/a
Late dry-wet 2006/07	25	2	3	A&S Keates (24); NT Bird forum (1)
Dry 2007	2	1	2	A&S Keates (2)
Late dry-wet 2007/08	19	2	3	A&S Keates (18); eBird (1)
Dry 2008	3	1	2	A&S Keates (3)
Late dry-wet 2008/09	15	2	4	A&S Keates (12); NT Bird forum (2); eBird (1)
Dry 2009	0	n/a	n/a	n/a
Late dry-wet 2009/10	11	2	5	A&S Keates (8); NT Bird forum (2); eBird (1)
Dry 2010	0	n/a	n/a	n/a
Late dry-wet 2010/11	0	n/a	n/a	n/a
Dry 2011	0	n/a	n/a	n/a
Late dry-wet 2011/12	5	1	3	NT Bird forum (4); eBird (1)
Dry 2012	0	n/a	n/a	n/a
Late dry-wet 2012/13	7	1	5	NT Bird forum (3); eBird (4)
Total	114	2	15‡	

* Late dry-wet is defined as August to April

† Dry is defined as May to July

‡ As some observers provided multiple records, total number of observers is less than the sum of the column

Table 2

Mainland Australian records of Little Egret *Egretta garzetta garzetta* outside of Leanyer Sewage Ponds from 2005–2017 by date, noting for each sighting the location, number of birds observed, number of observers involved and the source from which the record was derived.

Date	Location	Coordinates	No. of individuals	No. of observers	Source
11-Jun-05	Western Treatment Plant (Werribee), Vic.	-37.9979, 144.5918	1	2	Birding-Aus forum
16-Aug-08	Buffalo Creek, Darwin, NT	-12.3379, 130.9079	1	1	NT Bird forum
16-Aug-08	Fiddler's Lane, Knuckey Lagoons, NT	-12.4295, 130.9458	1, possibly 2	1	NT Bird forum
10-Apr-11	Fogg Dam, NT	-12.5634, 131.3035	1	2	NT Bird forum
16-Apr-11	Western Treatment Plant (Werribee), Vic.	-37.9979, 144.5918	1	1	eBird
6-Dec-11	Lagoon Rd, Knuckey Lagoons, NT	-12.4262, 130.9369	1	1	NT Bird forum
08-Apr-13	Buffalo Creek, Darwin, NT	-12.3379, 130.9079	1	1	eBird
06-Sep-13	Palmerston Sewage Ponds, NT	-12.5070, 130.9496	1	1	eBird
24-Oct-13	Anbangbang Billabong, Kakadu NP, NT	-12.8644, 132.7988	1	1	NT Bird forum
12-Dec-13	Dinah Beach boat ramp, NT	-12.4516, 130.8501	1	1	NT Bird forum
23-Jan-14	Fiddler's Lane, Knuckey Lagoons, NT	-12.4295, 130.9458	1	2	eBird
3-May-16	Legune Station, NT	-15.2066, 129.3846	1	1	A McNab
28-Jan-17	Fogg Dam, NT	-12.5608, 131.3004	1	2	eBird
Total	13		2 (max)	15‡	

‡ As some observers provided multiple records, total number of observers is less than the sum of the column

Frequent visits to the Leanyer Sewage Ponds by Arthur and Sheryl Keates indicate that *E. g. garzetta* has regularly been present at that site since its initial sighting in 2005. They report that whilst visits in which sightings were recorded were opportunistic, effort was reasonably consistent from 2005–2009 inclusive, except for a period of low effort from late October 2008 to early August 2009, and that *E. g. garzetta* was recorded on the majority of visits. After 2009, access to the Leanyer Sewage Ponds varied, with a number of periods occurring where

the area was closed to birdwatchers. Since 2013 there has been almost no access to this site, which unsurprisingly corresponds to there being no further records from this site.

The breeding season for the Little Egret varies across its range, but nesting generally occurs during the northern summer (March – July in Europe and northern Asia). Whilst tropical populations appear to be non-migratory, all populations are highly dispersive, with dispersal of northern breeding populations of

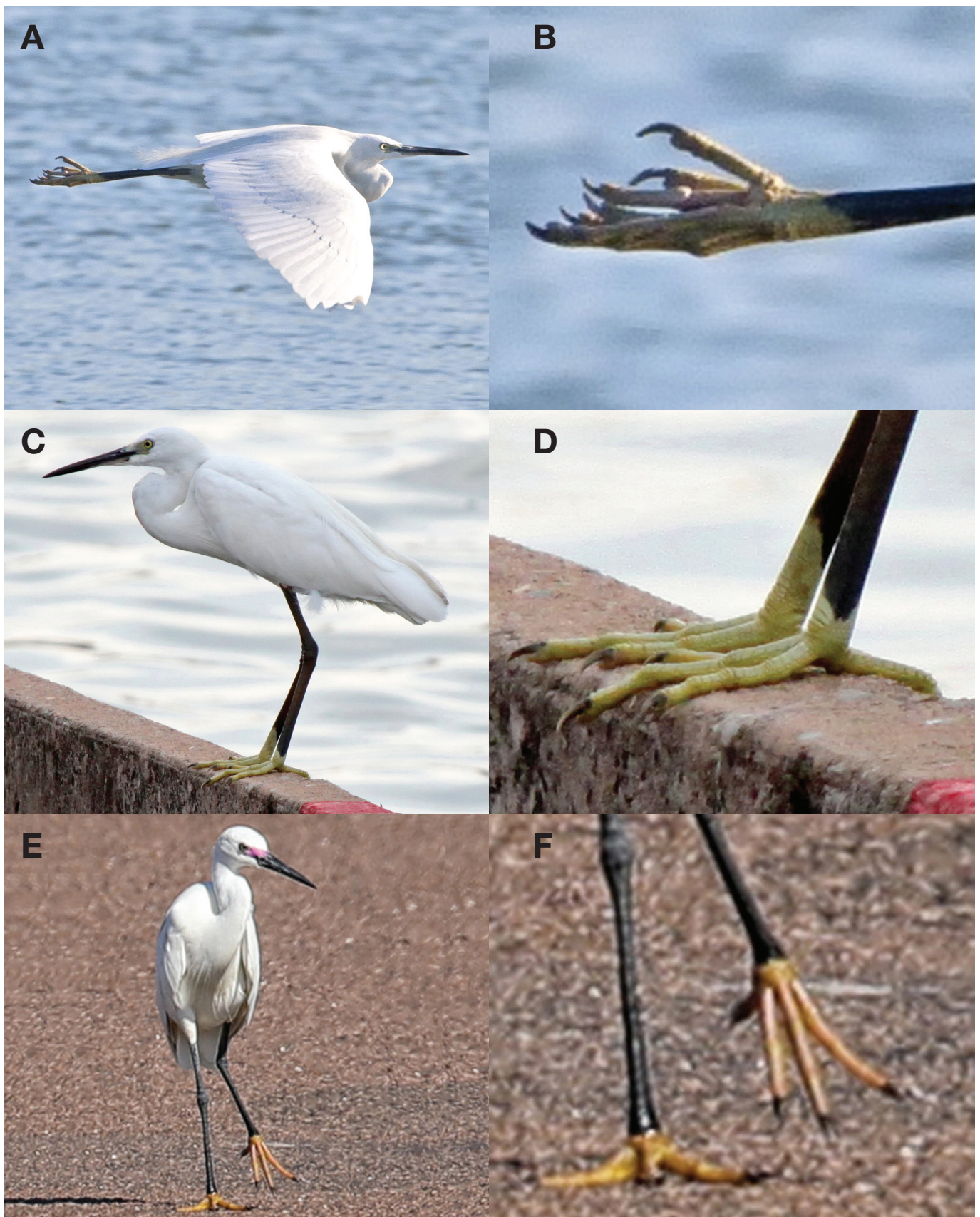


Figure 2. *Egretta garzetta garzetta* at Leanyer Sewage Ponds (Darwin, Northern Territory) on 2 August 2009 (2A, 2B: photographed by MG) and 14 December 2012 (2C, 2D: photographed by MVJ), and at Fogg Dam on 28 January 2017 (2E, 2F: photographed by PMK). Note the yellow toes and distal tarsus, and the lore colour.



Figure 3. *Egretta garzetta nigripes* at Leanyer Sewage Ponds (Darwin, Northern Territory) on 2 August 2009 (3A, 3B: photographed by MG), and in Cairns (Queensland) on 26 September 2015 (3C, 3D: photographed by MG). Note the dark skin on the top of the toes and lower tarsus, and the bright yellow lores.

E. g. garzetta occurring from July to September (IUCN Heron Specialist Group 2011). The northern breeding populations which migrate are known to commonly ‘overshoot’ on spring migration, taking the species outside its normal breeding range (IUCN Heron Specialist Group 2011). The seasonality of the records from Leanyer shows that few sightings of *E. g. garzetta* occurred from May to July and the bulk of sightings are from the late dry-wet season, particularly August to December (Fig. 4), when many northern breeding migrants generally overwinter in Australia. This pattern suggests that occurrence in Australia could possibly correspond with post-breeding dispersal or ‘migrational overshoot’.

E. g. garzetta has significantly expanded its range in northwest Europe (including the UK) in recent decades (Musgrove 2002; Kleefstra *et al.* 2009), and Carter and Menkhorst (2006) question whether a worldwide expansion may be occurring. Whilst the records here indicate an annual presence of *E. g. garzetta* in Australia, the low numbers reported

raise the question of whether occurrences of the subspecies have really increased or if it simply went unnoticed previously. Conceivably, an increase in observer awareness after the first documented sighting and/or an increase in reported sightings with the increased ease of using online forums as a database for records could be responsible for an apparent increase.

This compilation of *E. g. garzetta* records highlights the usefulness of publicly available, online forums for documenting distribution data over time. Databases such as eBird provide an archive for observers to report their sightings with high precision in time and space, and to directly embed media files to document the observation in a very accessible way. Note that as of the 2016 taxonomic update to eBird, Little Egret observations can be directly reported as the “Little Egret (Western)” *Egretta garzetta garzetta*, “Little Egret (Australasian)” *Egretta garzetta nigripes*, or “Little Egret (Dimorphic)” *Egretta garzetta dimorpha* subspecies, which will enable more automated reporting and data collation using this medium.

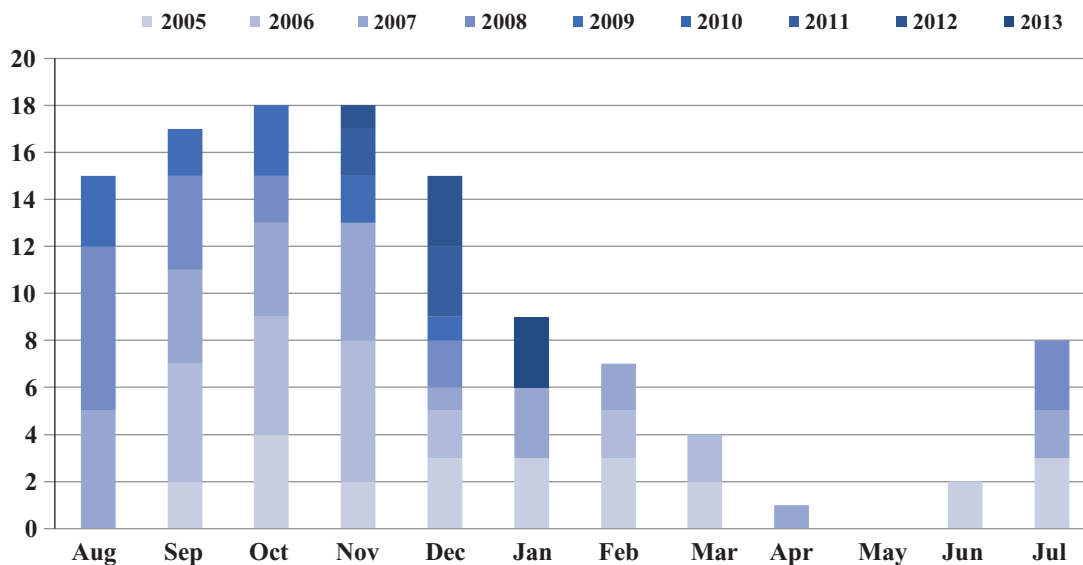


Figure 4. Observations of *Egretta garzetta garzetta* at Leanyer Sewage Ponds by month, 2005–2013. Key to years in which sightings were made is shown above the bar chart.

We do not expect that this paper will have captured all sightings of *E. g. garzetta* in Australia; observers may have private records that are not available through the forums that we have searched. Nonetheless, the records presented here are adequate to demonstrate the subspecies' regular occurrence in Australia. The extensive records of Arthur and Sheryl Keates demonstrate that regular, ongoing monitoring at the Leanyer Sewage Ponds (if birdwatcher access is reinstated, and assuming that the habitat has not changed significantly) would likely yield regular sightings. This raises the possibility that the same could be true in other less frequently visited sites in the NT, or even more widely across northern Australia. To refine our understanding of the extent and regularity of the bird's occurrence, we encourage birdwatchers to actively report and photograph sightings of *E. g. garzetta*, and to contribute these records to publicly available databases.

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