

## SHORT NOTE

Eggs salvaged from an abandoned black-billed gull (*Larus bulleri*) colony on the Ashley/Rakahuri River, North Canterbury

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The black-billed gull (*Larus bulleri*) is an endemic species that is declining rapidly in numbers (McClellan 2008). It is currently classified as Endangered by BirdLife International (2018), and Nationally Critical by the New Zealand ranking scheme (Robertson *et al.* 2017). A large majority of the population breeds in dense colonies on braided gravel riverbeds, east of the main divide in the South Island (Robertson *et al.* 2007).

The braided river environment is highly dynamic, and colonies may show low site-fidelity between years (Beer 1966). They are also prone to desertion, particularly early in the nesting cycle, and it has been suggested that this is often because of an unstable food supply (Evans 1982). However, the species is susceptible to disturbance and vandalism, which can also result in desertion (McClellan 2008).

A colony of black-billed gulls was present in the Ashley/Rakahuri River about 250–500 m upstream of the Ashley road bridge for the three consecutive seasons 2011/12, 2012/13, 2013/14. In Sep–Oct 2014, the colony established 100 m downstream of the road bridge (43°16'53.6"S, 172°35'08.6"E), and about 400 m from its location the previous season. A count from photographs taken on 20 October 2014 showed that the colony contained at least 375 individuals. The colony was abandoned on or about 24 October, but the reasons for the desertion are not known.

I inspected the abandoned colony site on 05 November 2014. No gulls were present. There were about 140 nests in various stages of construction, and laying had begun before desertion. Whether eggs had been lost after the gulls deserted and before my inspection was unknown, but water had not been over the site. At the time of my inspection, three nests contained two eggs each (the usual clutch), and 23 nests contained one egg. The number of partly built nests, the high proportion of one-egg clutches, and the low proportion of nests with eggs all suggested that laying was at a very early stage when the colony was abandoned.

Of the 29 eggs, 21 were intact and were collected for the Canterbury Museum collection (Accession Number 2017.42.1). Measurements of the intact eggs ( $n = 21$ ) were 50.5 mm ( $sd \pm 2.35$ , range 46.3–55.3)  $\times$  36.9 mm ( $\pm 0.77$ , 35.5–38.7). Volumes were calculated using the method of Hoyt (1979), with  $K_v = 0.497$  (the mean volume coefficient for three gull species given by Hoyt [1979]), and averaged 34.2 ml ( $\pm 2.68$ , range 30.2–40.4). Elongation (length/width) averaged 1.37 ( $\pm 0.05$ , 1.28–1.50). Values for length and breadth are mostly within those given in Higgins & Davies (1996), but the Ashley sample contained three eggs that were longer than the maximum length of 52.8 mm quoted there.

Avian eggs can show considerable intraspecific variation in size. There may be environmental reasons for this (such as changes in food availability or temperature), but differences between individual females (in age, mass, size, or other characteristics) are also important (for a review, see Christians 2002).

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Visual inspection of the Ashley eggs suggested they were highly variable in size, shape, colouration, and patterning for a relatively small sample (Figure 1). As is usual (Preston 1969), there was greater variability in length (Coefficient of Variation = 4.7%) than in width (CV = 2.1%). The largest egg (by calculated volume) was 34% larger than the smallest. Shape (as measured by elongation) was particularly variable; although the average elongation (1.37) was typical, the range (1.28–1.50) was wider than that given by Preston (1969) for low and high values among 33 species or subspecies of gulls and terns (1.33–1.46).



**Figure 1.** Variability in size, shape, background colour and patterning of black-billed gull (*Larus bulleri*) eggs from an abandoned colony on the Ashley/Rakahuri River, October 2014. The scale bar represents 100 mm.

The fact that all the Ashley eggs were laid within a limited time in the same colony suggests that in this case the high level of variation in size and shape was probably due more to inherent differences between females than to environmental factors.

The black-fronted tern (*Chlidonias albobristatus*) is another endemic species that breeds in braided rivers; it is classified as Endangered (BirdLife International 2018) and Nationally Endangered (Robertson *et al.* 2017). The species often nests in association with black-billed gulls (Higgins & Davies 1996). At least four tern nests were located around the Ashley gull colony and were abandoned at the same time. On 05 November, three of these still contained their full clutches of two eggs, but no terns were present. All six eggs were intact

and were collected for Canterbury Museum (also Accession Number 2017.42.1); they measured 40.5 mm ( $sd \pm 1.51$ , range 38.0–42.1)  $\times$  28.3 mm ( $\pm 0.43$ , range 27.9–29.0). Calculated volumes averaged 16.4 ml ( $\pm 0.98$ , range 15.0–18.0), and elongation averaged 1.43 ( $\pm 0.05$ , range 1.36–1.47). The linear dimensions are similar to those given by Keedwell (2005), but the widths of all six Ashley eggs were below Keedwell's (2005) mean of 29.2 mm. The average calculated volume of the Ashley eggs (using the same  $K_v$  of 0.507 as Keedwell) was also lower than Keedwell's mean of 17.7 ml. As for the gull eggs, there was greater variability in length (CV = 3.7%) than in width (CV = 1.5%)

Abandoned colonies provide the opportunity to collect eggs of highly threatened species, when either the collection of live eggs or the disturbance associated with measuring them in an active colony would be illegal or unethical. In addition to increasing sample sizes in museum collections (and potentially increasing the geographic spread of samples), periodic collection of such samples may be useful to monitor long-term intraspecific changes in laying date or egg size, particularly in response to environmental change (e.g. Scharlemann 2001; Blight 2011).

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