

## SHORT NOTE

### Trends in the size of the Caspian tern (*Hydroprogne caspia*) colony on Onoke Spit, Palliser Bay, New Zealand

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In New Zealand, the Caspian tern (*Hydroprogne caspia*) typically nests in colonies on exposed sand spits and shingle banks adjacent to both the open sea and shallower sheltered waters. There they have to contend with a variable physical environment, natural predators such as the southern black-backed gull (*Larus d. dominicanus*), and disturbance by humans and introduced mammals (Barlow 1995; Taylor 2000). Surveys in 1971-75 and 1991-95 showed the national population was in the order of 1300-1400 breeding pairs, the equivalent of c.3500 birds, of which about 90% were in 16-19 colonies. Over that period some colonies increased in size while others decreased or were lost, and several new colonies formed (Bell & Bell 2008). This note describes the long term trends in the size of the Caspian tern colony on Onoke Spit, one of the colonies that decreased in size during the interval between the surveys.

Onoke Spit is a sand and shingle spit that separates Lake Onoke in southern Wairarapa from Palliser Bay. It is 3.3 km long and c.200-350 m wide. The terns nest in 1, and occasionally 2, compact groups on clear areas of fine shingle on the seaward

side of the spit about mid-way along its length. They choose sites high on the beach well above the normal tidal range and where sea inundation is unlikely in summer. The terns feed in the coastal waters of Palliser Bay, brackish Lake Onoke, and fresh water rivers and lakes further inland.

The numbers of occupied nests and their contents were counted by members of the Ornithological Society of New Zealand during 83 visits to the colony between 1936 and 1996. These surveys show the timing and nesting behaviour of the terns on Onoke Spit is similar to that described in detail for the colony near Invercargill (Barlow & Dowding 2002). Laying in the first and main nesting attempt is well synchronised and occurs between early Oct and late Nov. Incubation takes 26-29 days, and the chicks leave the nest within a few days but remain nearby until about 14 days of age (Barlow & Dowding 2002). If the first nesting attempt is abandoned the terns typically reneest at a different site nearby; this process is sometimes repeated one or more times.

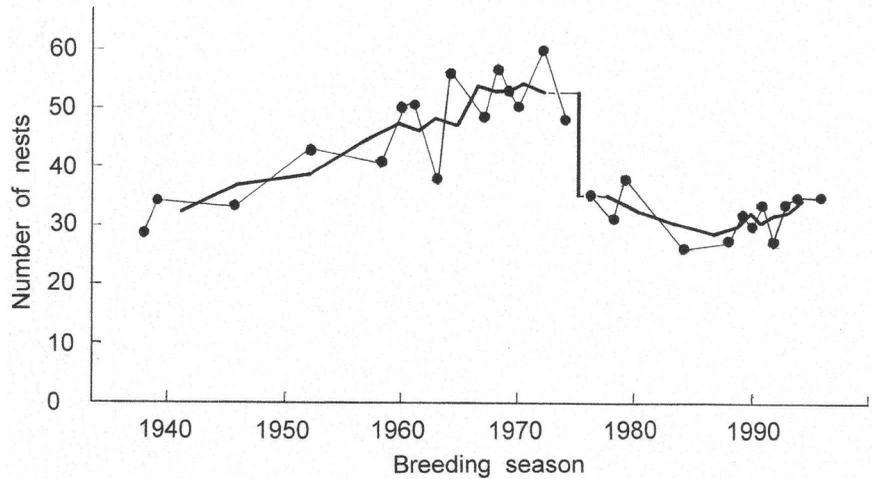
The 83 counts were made at various stages in the breeding cycle from early in the first laying to hatching in the replacement colonies. However, only those counts made during the first nesting attempt after laying had been completed were used to assess population changes. These are likely to provide the

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**Fig. 1.** Trends in the size of the Caspian tern colony on Onoke Spit between 1938 and 1996. The individual points are counts of nests made after the initial laying for the season had been completed. The bold trend lines join the 3-count moving averages calculated for both variables, and the vertical line shows the extent of the abrupt decrease in tern numbers that occurred around 1975.



best estimates of the numbers of breeding pairs in the colony. Counts were accepted only if they were made between 20 Oct and 30 Nov, and if >66% of the nests contained 2 or 3 eggs or chicks. Chicks that had left their nest were counted and one was added to the number of occupied nests for every 1.5 chicks. When 2 counts met these criteria the larger was accepted. Usable counts were obtained for 27 breeding seasons.

Between 1938 and 1996 Caspian terns at Onoke Spit showed a pronounced fluctuation in numbers (Fig. 1). Initially, surveys indicated a lengthy period of increasing numbers, but this was followed by an abrupt decrease, and then a period of relative stability. Between 1938 and 1974 the colony increased by about 25 pairs at a rate of *c.*2.0% per annum, with the highest count being 60 nests in 1972. The decrease occurred around 1975, possibly as the result of a single event. The means of the 3 counts before and after 1975 were 53 and 35 nests, respectively, a nominal loss of 18 pairs. This effectively eliminated most of the growth in the colony between 1938 and 1974. All of the counts between 1976 and 1996 were in the range 26 to 38 (mean 32) nests. No usable counts were made between 1997 and 2009.

The increasing trend in the size of the colony up to 1974 shows the terns were raising enough young to breeding age to more than replace losses from all causes. Nesting attempts over this period were generally successful and free from outside interference. Good numbers of chicks were fledged during 8 of the 9 seasons observed between 1958 and 1969. These were predominantly from the first laying, although on at least 2 occasions, small additional groups of nests formed nearby while the first site was still occupied. The numbers of chicks banded during the 8 successful seasons ranged from 31 to 68 (mean 54). Overall this was equivalent

to 1.1 chicks banded for each nest in the first laying. The exception was in 1962 when 2 nesting attempts were abandoned at an early stage and no chicks fledged.

The abrupt decrease in Caspian tern numbers at the Onoke Spit colony around 1975 would more than account for the 21% reduction in the size of the colony during the interval between the 2 national surveys (Bell & Bell 2008). While it clearly resulted from a large scale loss of adult birds, the cause is unknown. Part of the colony might have shifted to another site, or the birds might have died/been killed in the vicinity of the Spit. As no new Caspian tern colonies have been found around the southern end of the North I the latter is more likely. It is possible they were shot in an act of vandalism as happened at the South Kaipara Head colony in the 1950's (Anon. 2001).

Since 1975, the colony at Onoke Spit has fluctuated in size within a relatively narrow range. The counts suggest it decreased by the equivalent of about 6 pairs during the 1980's, then increased again by a similar amount during the 1990's. The rate of increase over this period was comparable with that between 1938 and 1974 and followed a succession of successful breeding seasons. Good numbers of chicks were reared during the 4 breeding seasons between 1988 and 1991; these birds would have reached breeding age around 1991 to 1994. The colony appears to have reduced in size again after 1998 to approximately 25 to 30 pairs, although there are no counts to confirm this. Few if any chicks were reared during 4 of the 5 breeding seasons between 1996 and 2000, and there have not been enough successful seasons since to compensate for the apparent decline after 1998. A total of 55 adult terns were seen (by CES) at the site of the first laying in 2005 showing there was the equivalent of at least 25 pairs present that season.

The changes in the size of the tern colony appear to closely follow the pattern of breeding successes and failures; although the reduction around 1975 appears to be an exception. In general, more chicks are reared during a breeding season when the first laying is successful than when it is abandoned and one or a series of new nesting attempts are made. Observations on Onoke Spit suggest that most nesting failures result from outside interference with only a small proportion from natural causes such as severe weather events. The principle causes of abandonment appear to be related to human visitation, vehicle use in and around colonies, and vandalism. This problem has been linked to the increasing use of off-road vehicles on the Spit (Elsworth 2004).

It is recommended that a programme of nest counts is continued to provide an ongoing assessment of the colony's status. This record provides useful baselines for interpreting these counts. Disturbance should be kept to a minimum by optimising the timing and number of visits, and being as non-threatening as possible around the colony. Ideally, the first count each season should be made around the first week in Nov with subsequent counts, if necessary, at 10-day intervals until the first laying is completed. Observers should record the total number of occupied nests, the number of eggs or chicks in each, and the number of chicks that have already left their nests. Disturbance is minimised if the count is made quickly by one person who then moves well away from the colony allowing the terns to settle straight back on their nests.

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