

## SHORT NOTE

### Habitats and factors affecting breeding success at eleven Caspian Tern (*Sterna caspia*) colonies in New Zealand

In New Zealand, Caspian Terns (*Sterna caspia*) breed in widely separated colonies and as solitary pairs. Breeding sites of solitary pairs on Canterbury riverbeds and at Lake Ellesmere were described by Pierce (1984). There is little recorded information about the nest sites used by and predators of colonially breeding Caspian Terns in New Zealand. Concurrently with a census of Caspian Terns initiated in 1992 by Brian D. Bell, a questionnaire about nest sites and predators was sent to OSNZ Regional Representatives of the 12 regions where colonies were believed to occur. Eight responses were received providing information about 11 colonies. These colonies were at Mangawhai Estuary; Rangaunu, Whangarei, Whangapoua and Kawhia Harbours; Matakana Island and Ocean Beach; Onoke Spit in Palliser Bay; Farewell Spit; Waimea and Invercargill Estuaries.

The colonies were sited on shellbanks (6), sand (4) and a gravel bank (1). Four colonies used different sites from the main site within seasons after colony washout or other disturbance in different years, three remained at the same location, and no information was available for the remaining four colonies. Where different sites were used, the distance between sites ranged from 75 to 600m. Adjacent cover was available at nine sites and this comprised low scrub and/or maritime grasses (8) or driftwood (1). When no adjacent cover was available, the distance to the nearest cover ranged from 50 to 100m. The distance to the nearest water ranged from 0.5 to 300m at high tide and 60 to 4000m at low tide. Mud and/or sand flats occurred between the nest sites and water at ten of the colonies and a gravel bank at the remaining colony.

Typical nest sites were, therefore, exposed shellbanks or sandbanks immediately above high tide level. For each colony, at least one boundary adjoined extensive flats at low tide and may have been lapped by water at high spring tides. This gave unfledged chicks unimpeded access to the flats and tideline. Low scrub or maritime grasses provided some shelter and possible protection from aerial predators for chicks not being brooded.

Breeding sites in the northern hemisphere are in the open, on sand, gravel or stony beaches or flat rocks. (Cramp 1985).

Known and potential predation or disturbance at colonies were caused by humans, cats, dogs, sheep, cattle, mustelids, Red-billed Gulls (*Larus novaehollandiae*), Southern Black-backed Gulls (*L. dominicanus*), and skuas (Brown Skua *Catharacta skua lonnbergi* and Arctic Skua *Stercorarius parasiticus*). Southern Black-backed Gulls were considered to be the main predators with major effects at nine colonies and moderate effects at two. At three colonies, these gulls attacked eggs and small chicks following human disturbance. Red-billed Gulls were considered to have a major effect at two colonies, moderate at three and minor at four. Mustelids had a moderate effect at four colonies and minor effect at three; dogs a moderate effect at two and minor effect at two; cats a moderate effect at one colony and minor effect at three; sheep and cattle a minor effect at two; skuas a minor effect

at five colonies. Although humans were considered to have a low impact on the terns, they were mentioned at ten colonies. One colony was "virtually wiped out by one human, with some help from a storm", and at another egg-stealing was suspected.

The effects of habitat changes were noted at colonies in the Bay of Plenty, Nelson and Southland regions. Bare shellbanks in Tauranga Harbour which formerly held 40-60 pairs were eroded by storms between 1990 and 1992. The birds probably joined the Matakana Island colony, 19 km away, which held c.70 pairs in 1980 and 148 pairs in 1992. A sand island in Ohiwa Harbour held c.20 pairs in 1982, but became increasingly vegetated and from 1983 to 1987 the birds attempted to breed on the open beach of Ohope Spit at the mouth of the harbour. However, after 1988 this sand area eroded and the only Caspian Terns found in Ohiwa Harbour were a pair which bred in 1991.

In the Nelson region, 2-4 solitary pairs which formerly nested on the Nelson Boulder Bank are believed to have joined a small colony on a shellbank island in the Waimea Estuary. This colony increased from 2 to c.40 nests in 15 years as the shellbank built up. At Farewell Spit, a long-established colony was formerly preyed upon by birds from an adjacent Red-billed Gull colony. In recent years the gulls have been displaced by Gannets (*Morus serrator*), which occupied most of the high shellbanks. This has left the Caspian Terns to nest on the lower shellbanks where they are frequently washed out. However, when not washed out, the breeding success of the terns has been greater because of reduced predation from gulls.

At the Invercargill estuary, Southland, invasion by the maritime grass *Spartina townsendii* of mudflats adjacent to the highest tern colony site prevented chicks from reaching the tide edge to escape from ground predators and practise developmental behaviour related to prey catching and prey retention. Subsequently, breeding was moved to lower sites where the colony was more vulnerable to washouts.

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#### LITERATURE CITED

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