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A USEFUL STRATEGY FOR THE MANAGEMENT OF EGGS DISLODGED FROM THE NESTS OF LITTLE TERNS *Sterna albifrons*

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Little Terns nest on beaches, often just above the tidal line, making the nest and eggs highly susceptible to inundation. Whenever eggs are dislodged from the nest the usual management practice is to either collect these eggs for museum specimens or to destroy them while examining them for signs of fertility. In New South Wales, however, the Little Tern is an endangered species, and any procedure that maximizes hatching success should be adopted wherever possible. Based on an experience gained while monitoring the Little Tern colony in Botany Bay during the 1999/2000 breeding season, we suggest an alternative strategy of dealing with eggs dislodged from the nest.

OBSERVATIONS

Throughout the 1999/2000 breeding season, the Little Tern colony in Botany Bay was inspected thrice weekly. On 3 January 2000, a nest was located on the eastern shoreline of the Towra Spit Island. This nest (No. 33), overlooked on previous visits due to its close proximity to the high tidemark, would have been inundated by the impending 1.7 metre tides forecast for 6–10 January (Table 1). Accordingly, the nest was relocated to a position approximately one metre above the high tidemark. Relocation of nests at risk from inundation is a standard management practice involving either the lateral movement of eggs away from the water's edge or the *in situ* elevation of nests on sandbags.

After each relocation, observations are made to ascertain whether brooding birds return to the modified nest site. Shortly after nest No. 33 was relocated, an adult tern returned to the nest and recommenced incubation of the two eggs. The identity of the parent bird was confirmed by the colour combination of leg flags on both tarsi. When next checked, on 5 January 2000, both eggs were present and were still being incubated.

On 8 January 2000, nest No. 33 showed signs of having been inundated, although fresh scratch marks were evident within the nest scrape. The two eggs from this nest were found approximately 1 metre further up the beach, in a north-easterly direction from the nest site. There was no sign of activity around the eggs, which were lying about 40 cm apart, entangled in dead seagrass flotsam.

Although it was doubtful that they were still viable, both eggs were replaced in the nest, which despite showing signs of recent activity remained damp from inundation. Later observations revealed that the previously identified parent was again incubating the replaced eggs.

Surprisingly, on 17 January 2000 there was no trace of the eggs, but two hatchlings were found nearby. These chicks were at least 12 hours old, and probably hatched the previous day. No other nests with near-term eggs or newly hatched chicks were located near nest No. 33. After weighing and banding, the chicks were observed from a distance through spotting scopes. When the parents returned to brood and feed the chicks, one parent was again identified as the same banded bird observed previously.

Meteorological observations made at Sydney Airport recorded wind gusts of up to 31 knots from the SSW during the two hours around the high tide peak of 1.7 m at 0931ED 7 January 2000 — the date prior to the displaced eggs being found (Table 1). This combination of storm and peak tide appears the most likely cause of the eggs being displaced from the nest. Evidence at the nest site is consistent with the eggs having been washed up the beach by wave action.

The displaced eggs were unattended for approximately 25 hours before they were replaced in the nest scrape at 1030ED on January 8. The eggs would have been chilled rapidly on contact with seawater, and would have been exposed to overnight rainfall of .2 mm. The temperature over the period they were out of the nest was 17.6°–19.7°C (mean 18.7 ± 0.54°C).

It is estimated from the date of hatching (16 January 2000) that the eggs commenced incubation around December 27 (based on incubation period of 20 days). However, as the eggs were cold during the day they remained out of the nest, incubation in this instance probably took at least 21 days, suggesting that incubation began on December 26 and that the eggs had been incubated for 12 days prior to being dislodged from the nest.

On 19 February 2000 the leg-flagged parent from nest No. 33 was seen feeding a juvenile on the rock shoreline at Boat Harbour, 4 km south-east of Botany Bay, indicating that at least one of the chicks fledged successfully.

CONCLUSION

One of the major factors contributing to the vulnerability of Little Terns is the reduction of open, sandy habitat suitable for nesting. This situation forces many breeding pairs to nest in areas below spring tide levels, potentially severely compromising breeding success. During the 1999/2000 breeding season, the majority of nests on Towra Spit Island would have been lost if it were not for timely intervention.

TABLE 1
Time-line of events and development of eggs at nest No. 33.

Date	Day	Events	Tide (m)	Wind Speed Speed (Knots)	Dir.
26 Dec. 1999	0	Eggs laid (presumed)			
27 Dec. 1999	1		1.8	18.1	NE
28 Dec. 1999	2		1.6	8.9	SSE
29 Dec. 1999	3		1.5	34.0	SSE
30 Dec. 1999	4		1.3	15.9	ESE
31 Dec. 1999	5		1.4	34.0	ESE
01 Jan. 2000	6		1.4		
02 Jan. 2000	7		1.5	2.9	SSW
03 Jan. 2000	8	Nest found and moved higher	1.5	5.1	SSW
04 Jan. 2000	9		1.6	7.0	NNW
05 Jan. 2000	10	Eggs brooded	1.6	1.3	SW
06 Jan. 2000	11		1.7	22.0	SSW
07 Jan. 2000	12	Eggs washed out (presumed)	1.7	30.9	SSW
08 Jan. 2000	13	Eggs found dislodged and replaced	1.7	12.0	SSE
09 Jan. 2000	14		1.7	13.0	ESE
10 Jan. 2000	15	Eggs brooded	1.7	15.0	NE
11 Jan. 2000	16		1.6	18.1	ESE
12 Jan. 2000	17	Eggs brooded	1.6	22.0	ESE
13 Jan. 2000	18		1.5	16.9	ESE
14 Jan. 2000	19		1.4	18.1	ESE
15 Jan. 2000	20	Eggs brooded	1.4	15.0	ENE
16 Jan. 2000	21	Chicks hatched (presumed)	1.5		
17 Jan. 2000	22	Chicks found near nest site	1.6		

The clutch of eggs in nest No. 33 survived (and at least one young fledged) because the eggs, thought to be no longer viable, were replaced into the nest rather than collected or destroyed. Without such intervention, this clutch would not have survived. We recommend that replacement of eggs back into the nest be the preferred strategy for dealing with all eggs that have been inundated or dislodged from the nest because it may, as in this case, permit the clutch to survive.

Aside from our intervention, the factor that contributed most to the successful hatching of this clutch was the strong fidelity that adult terns have to their nests during incubation. The parent's strong drive to care for the eggs was the underlying reason why they resumed incubation so soon after the eggs were replaced. Strong fidelity towards the eggs has been observed on many occasions in the past when nests have been elevated up to 40 cm or moved several metres (in one-metre increments) away from the original nest site to raise them above the high tidemark. Clearly, the Little Tern is well adapted to survive and breed successfully provided it is afforded nesting habitat that is well managed and maintained in a condition where the potential for inundation of the nests is minimized.

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