Notornis, 2010, Vol. 57: 204-206
0029-4470

SHORT NOTE

Nest relocation by banded dotterel (*Charadrius bicinctus*)

PETER G.H. FROST
87 Ikitara Road, Wanganui 4500, New Zealand

Nests are generally viewed as relatively permanent structures, at least for the duration of a given breeding attempt. Prior to egg-laying, birds select a nest site and, depending on the species, may invest considerable time and energy preparing it, collecting nest material and constructing the nest. On rare occasions, however, some birds may relocate their nests (e.g. Maclean 1965; Kutilek 1974; Wiltermuth *et al*. 2009). Here, I report on a case of apparent nest relocation by a banded dotterel (*Charadrius bicinctus).*

In early Aug 2010, the Maintenance and Security Officer at Wanganui Airport found the nest of a banded dotterel on the grass apron adjacent to the aircraft service area and taxi-way, about 100 m in front of the airport buildings. He placed a 60 cm high orange traffic cone next to the nest to prevent any aircraft or airport maintenance vehicles from driving over it. A pair of birds had nested in this particular area for the previous 3 years. They were remarkably tolerant of disturbance, even attempting to face-down the tractor mowing the grass, which is how this and previous nests were found (Brian Hill, *pers. comm*.). Some days after the cone was placed next to the nest, staff noticed that the birds had moved the eggs from the nest north-west of the cone to a new position to the south-west (Fig. 1a).

These observations were brought to my attention on 19 Aug. Together with a colleague, I examined the nest and photographed the bird. The female, which was incubating 3 eggs at the time, allowed close approach (Fig. 1b). When flushed, she gave both the 'rodent-run' and 'broken-wing' distraction displays (Bomford 1986; Marchant & Higgins 1993), suggesting that the eggs were near hatching. I returned to the nest on 23 Aug, but the nest was empty, the eggs presumably having hatched. The birds were found to have moved to an area of longer grass on the outer perimeter of the airport, diagonally across the runway from the nesting site, an area to which birds had moved with their chicks in previous years (Brian Hill, *pers. comm*.).

Measurements taken at the site showed that the nest had been moved 65 cm in a southerly direction from a position about 330° and 0.40 m away from the nearest edge of the cone (0.55 m from the cone's centre), to a new position 230° and 0.15 m from the cone's base (0.30 m from the centre of the cone). In both cases, the nests were no more than simple depressions in the short turf, unlike those banded dotterel nests found in nearby dune systems. The nests and nest sites most closely resemble those of 2 nests found in salt marsh at Moana Roa, adjacent to the Rangitikei Estuary, Manawatu-Wanganui, in

Received 2 Dec 2010; accepted 22 Jan 2011
Correspondence: *pghfrost@xtra.co.nz*

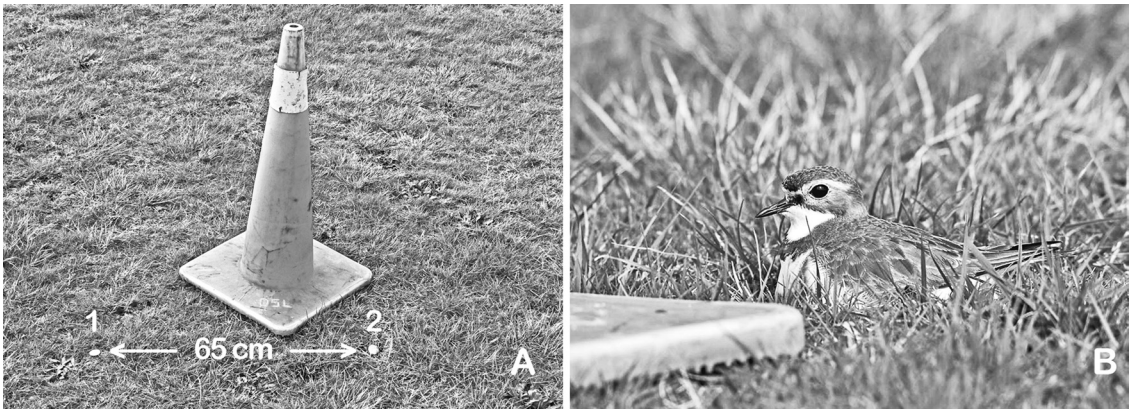

Fig. 1. A. Banded dotterel nest site on Wanganui airport showing positions of the marker cone relative to the original (1) and the relocated (2) nests. **B**. Female banded dotterel incubating eggs within 0.15 m of the marker cone. Photos by Peter Frost (A) and Paul Gibson (B).

Sep and Nov 2010. These latter nests were minimally lined with small fragments of plant material and the sites had a lawn-like appearance.

Despite the lack of any obvious lining, the initial nest at the airport was still recognisable as such, being a distinct depression in the turf. The airport staff confirmed that they had not moved the cone. Access to this part of the aerodrome is controlled, and anyone going out to the site would have been seen. In any event, there was no reason to move the cone less than 1 m. Although no one saw the birds moving the eggs, I have no reason to doubt the word of the Maintenance and Security Officer that they did.

Wanganui experienced a cold snap a few days before the airport staff noted that the nest had been moved. On the nights of 10/11 Aug and 11/12 Aug, respectively, mean minimum night-time (1800-0600 h) air temperatures, recorded hourly at the nearby Wanganui Automatic Weather Station (NIWA climate network station number E95906), were 4.8° C (SD ±0.4) and 5.0° C (SD ±1.0), respectively, less than half the corresponding temperatures recorded during the preceding 10 days (NIWA 2010). Temperatures at ground level would have be even lower (ground-level minimum temperatures are not recorded at this weather station, but night-time grass minimum temperatures recorded at Spriggens Park, climate network station number E95902, 3.1 km away, were on average 1.7° C lower than the corresponding screen temperatures). The wind during this period was predominantly from the north-east: mean bearing 37 ± 28°; mean wind speed 3.4 ± 1.8 m s^{-1} (both ± 1 SD). Given the position of the cone relative to the second nest, this meant that the incubating bird was now sitting more or less in the lee of the cone. This suggests that the birds moved the nest to be more sheltered from the cold wind. Interestingly, Bomford (1988) notes that at her study site in upland Canterbury, banded dotterel did not nest close to large stones or other objects that would shelter the incubating bird from the strong prevailing winds. Thus, it is possible the dotterel at Wanganui Airport moved the nest in response to something other than the change in weather conditions.

There are few instances of *Charadrius* plovers relocating their nests, and none previously recorded for banded dotterel. In South Africa a three-banded plover (*C. tricollaris)* removed a broken egg from its nest and transferred the remaining egg to a new site about 0.3 m away (Maclean 1965). In East Africa, Kutilek (1974) described 4 instances of egg translocation in Kittlitz's plover (*C. pecuarius)*, 2 of which included relocating the nest following flooding by heavy rain, and the other 2 involving the same bird moving its eggs to the rim of the nest scrape, which had become flooded after rain, and then back again when the water drained away. Stojanovic *et al*. (2009) report instances of hooded plover (*Thinornis rubricollis)* in Australia relocating and incubating displaced eggs but provide no details. Finally, Wiltermuth *et al*. (2009), working on piping plover (*C. melodus)* in the upper Missouri River, USA, recorded 8 instances of nest relocation at 7 nests (1 bird moved its eggs twice) and 1 instance of the birds recovering eggs displaced by flooding. Piping plover nest along shorelines subject to intermittent rising water levels and occasional flooding. Apart from 1 case, where the nesting bird moved its eggs 0.30 m to a nearby depression made by a cow hoof-print, all other cases involved the birds moving their nests up to 4.7 m upslope, away from rising waters. On 5/9 occasions, photographs confirmed that at least some of the eggs in the original and relocated nests were the same. Across

these species, most instances of egg translocation were in response to actual or imminent flooding or some other disturbance, but at least 1 was to take advantage of a more favourable nest site.

Ground-nesting species that breed along New Zealand's lowland rivers, such as banded dotterel, black-fronted dotterel (*C. melanops)* and wrybill (*Anarhynchus frontalis)*, are all intermittently threatened by flooding (Phillips 1980; Hughey 1985; although Rebergen *et al*. 1998 reported no losses to flooding in their study). I have only 1 record of a banded dotterel nest being flooded, albeit temporarily and without the birds relocating the nest. A nest on a salt marsh at Moana Roa was briefly flooded during heavy rains in early Sep 2010, the water rising half-way up the eggs (determined from sediment residues left on the eggs). The birds continued incubating after the water had drained away. That these birds did not move their nest may have been due to the briefness of flooding, or because there was no higher ground nearby.

Assuming that this instance of nest relocation is not an aberration, has this behaviour been overlooked up to now? A clutch of 3 banded dotterel eggs is equivalent to about 50% of the body mass of the female. Any behaviour that protects this investment should be favoured, including the strategy to move the eggs to a safer location, where necessary and possible. The observations reported here and in the literature show that at least some birds can do this, even over relatively long distances (>4 m: Wiltermuth *et al*. 2009). Although the birds at Wanganui moved their nest for reasons other than to escape flooding, evidence from the literature suggests that flooding is likely to be the main selective force behind this behaviour.

Detecting instances of nest relocation first requires being aware of the possibility. Detailed observations of nest locations and eggs are needed, so that any movement of nests and eggs can be detected. The ease and minimal cost of digital photography now makes this easier to document (Wiltermuth *et al*. 2009). Within areas subject to occasional flooding, nest relocation, if it occurs, is only likely at sites where the rate of water-level rise is slow enough for the birds to have time to respond, and where the micro-topography is suitable: a low enough slope up which the eggs can be moved to take them above the flood level. This intriguing possibility might repay further investigation.

ACKNOWLEDGEMENTS

I thank Graeme Goldsmith, Operations Manager, Wanganui Airport, and Brian Hill, Maintenance and Security Officer, for information about the nesting dotterel, and for allowing me access to the site. Paul Gibson accompanied me on the initial visit and kindly provided one of his photographs for use here. I am most grateful to Mark Wiltermuth, U.S. Geological Survey, for providing a copy of his paper and getting 2 older papers for me. Two reviewers made useful suggestions for improving this note.

LITERATURE CITED

Bomford, M. 1986. Breeding displays and calls of the banded dotterel (*Charadrius bicinctus*). *Notornis 33*: 219-232.

Bomford, M. 1988. Breeding of the banded dotterel, *Charadrius bicinctus*, on the Cass River Delta, Canterbury. *Notornis 35*: 9-14.

Hughey, K.D.F. 1985. Hydrological factors influencing the ecology of riverbed breeding birds on the plains' reaches of Canterbury's braided rivers. PhD thesis, Lincoln College, University of Canterbury: Lincoln, New Zealand.

Kutilek, M.J. 1974. Notes on Kittlitz's sandplover and the blacksmith plover at Lake Nakuru. *East African Wildlife Journal 12*: 87-91.

Maclean, G.L. 1965. Nest transfer in the three-banded sandplover, *Charadrius tricollaris* Viellot. *Ostrich 36*: 62-63.

Marchant, S.; Higgins, P.J. (*eds*.) 1993. *Handbook of Australian, New Zealand and Antarctic Birds: Vol. 2 Raptors to Lapwings*. Melbourne: Oxford University Press.

NIWA 2010. *National Climate Database*. National Institute for Water and Atmospheric Research, Auckland, New Zealand (URL http://cliflo.niwa.co.nz/, data for stations E95902 and E95906).

Phillips, R. E. 1980. Behaviour and systematics of New Zealand plovers. *Emu 80*: 177-197.

Rebergen, A.; Keedwell, R.; Moller, H.; Maloney, R. 1998. Breeding success and predation at nests of banded dotterel (*Charadrius bicinctus*) on braided riverbeds in the central South Island, New Zealand. *New Zealand Journal of Ecology 22*: 33-41.

Stojanovic, D.; Maguire, G.; Weston, M.A.; Dickman, C.R.; Crowther, M.S. 2009. Attempted incubation and nest-maintenance behaviour of artificially deployed quail egg clutches by hooded plovers *Thinornis rubricollis*. *Wader Study Group Bulletin 116*: 41-43.

Wiltermuth, M.T.; Anteau, M.J.; Sherfy, M.H.; Shaffer, T.L. 2009. Nest movement by piping plovers in response to changing habitat conditions. *Condor 111*: 550-555.

Keywords banded dotterel; *Charadrius bicinctus*; flooding; nest relocation; shelter