

Notornis, 2008, Vol. 55: 159-161
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SHORT NOTE

Post-fledging parental care of a juvenile New Zealand fairy tern (*Sterna nereis davisae*)

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The New Zealand fairy tern (*Sterna nereis davisae*) is an endemic subspecies with a current population of 35-40 individuals (Hansen 2006). At present it is New Zealand's rarest breeding bird, and has a threat ranking of Nationally Critical (Hitchmough *et al.* 2007). Over the 2007/08 breeding season, the total population consisted of 11 breeding pairs using 4 breeding sites north of Auckland (G. Pulham, *pers. comm.*): Mangawhai sandspit (36°06' S, 174°36' E); Waipu sandspit (36°00' S, 174°29' E); Papakanui sandspit (36°26' S, 174°10' E); and Pakiri river mouth (36°15' S, 174°44' E). The diet of fairy terns consists almost entirely of small fish, caught by plunge-diving in shallow water (Higgins & Davies 1996).

The New Zealand fairy tern population has been managed since 1983 with conservation measures being intensified from 1991 onwards (Hansen 2006). Since the 1986/87 breeding season, eggs have been transferred between nests in the wild, or in certain circumstances, collected for artificial incubation at Auckland Zoological Park and then returned to the wild prior to hatching (Ferreira *et al.* 2005). I report

here observations of prolonged post-fledging parental care of 1 wild-reared juvenile fairy tern at Waipu sandspit during the 1998/99 breeding season and document the release of 2 other captive-reared juveniles in the same season.

The wild-reared juvenile was colour-banded for individual identification and monitored periodically from fledging at age 25 days on 28 Jan 1999 until 12 Mar 1999. Systematic behavioural observations (totaling 224 minutes) were recorded on 7 days when the juvenile was between 33 and 68 days old. Its parents were easily identified since the male parent was banded and the female parent was unbanded.

At 27 days old, the juvenile was seen flying and hovering low over the Waipu estuary. It skimmed over the shallows but was not seen diving. Two days later it was observed plunge-diving alone while both parents roosted nearby. It attempted small dives from less than 3 m above the water. By 33 days, the juvenile was again seen attempting small dives, and then begging for fish from the adult female. Aged 40 days, the juvenile was observed being fed a fish by a parent and then attempting to fish alongside a parent. The next day an adult fed

small fish to it 4 times during 8 minutes. It was then seen begging from an adult and attempting to fish alongside the adult male. At an age of 46 days, the juvenile was seen roosting close to the male and begging, and then both attempted fishing. The pair and juvenile were seen fishing together again when the chick was 57 days old. Initially, the juvenile was observed diving with an adult nearby. Later, it was seen diving alongside both parents and was then fed 5 fish in less than 5 minutes. On the following day, the juvenile was seen being fed 4 times in 14 minutes by the male. Finally, at 68 days, the juvenile was observed being fed 1 fish by the male during 35 minutes of non-continuous observation.

My observations indicate that the adult male displayed more post-fledging parental care than the female, particularly as the juvenile got older. Although the juvenile was seen begging from the female at 33 days old, this parent was not identified feeding it post-fledging. The male was seen roosting within 3 m of the juvenile when it was 41, 46 and 68 days old while the female was further away or absent. The juvenile was observed begging from or being fed by the male parent at 46, 58 and 68 days old. The male alone accompanied it at 68 days old.

Although I observed the juvenile attempting to dive for fish on several occasions, it was never seen to catch a fish. During 224 minutes of observation from 8-43 days post-fledging, the juvenile was observed being fed by a parent 15 times (5 times by the male, 10 times by an unidentified parent). This suggests that juvenile fairy terns depend on their parents for most food during this period. In the absence of parental care, survival of fairy tern juveniles may be compromised without an extended period of learning to acquire the necessary flying and fishing skills. Observations of 2 captive-reared juveniles support this suggestion.

During the 1998/99 breeding season, 2 eggs (1 each from Papakanui and Waipu) were salvaged due to abandonment during storms and transferred to Auckland Zoological Park for incubation. Both eggs hatched and the chicks were reared in captivity (K. Hansen, *pers. comm.*). Birds were given access to live fish (first by hand, then in trays and later in ponds) to provide them with the opportunity to learn to catch fish. The older juvenile became competent at catching live prey in the still water of the aviary ponds but was not observed hovering (G. Pulham, *pers. comm.*). The 2 captive-reared chicks were released in fine, calm conditions at Mangawhai close to high water on 27 Jan 1999. At release, the Papakanui juvenile was aged 54 days and the Waipu juvenile was aged 46 days. Live fish were put in trays at the release site like those the chicks had fed from in captivity. Neither bird was seen to feed from the trays, and both had left Mangawhai by the following day (K. Hansen, *pers. comm.*). The

Papakanui juvenile was seen at Papakanui (53 km from Mangawhai) the day after release, where it begged for food from the warden. It was found dead at Papakanui on 20 Feb 1999 (24 days after release), but the condition of the corpse indicated it had died much earlier (D. Campbell, *pers. comm.*). The Waipu juvenile was not seen again despite extensive searches over the following month (K. Hansen, *pers. comm.*).

As the wild-reared Waipu juvenile tern was still being fed and usually attended by at least one parent beyond the age at which the captive-reared juveniles were released, it is likely the 2 captive-reared juveniles did not yet have the ability to forage independently. A review of the fairy tern recovery programme (G. Taylor *et al. unpubl.*) later concluded that the 2 captive-reared birds died because they were unable to find sufficient food without parental support. By comparison, the wild-reared juvenile tern survived and was recorded nesting for the first time over the 2005/06 breeding season at Mangawhai (R. Williams, *pers. comm.*).

Given the current size of the New Zealand fairy tern population, sample sizes are inevitably small. While my observations involved only 1 wild-reared juvenile, there have been subsequent observations of fairy tern parents feeding juveniles for an extended period post-fledging. In Jan 2004, a Department of Conservation warden observed 2 juveniles at Waipu (aged 44 and 45 days old) "looking for fish, making swoops, but never hitting the water" "with one fledgling seen making 3 unsuccessful dives the next day (F. Maguire, *pers. comm.*). In Jan 2007, a warden at Papakanui observed a juvenile (aged 40 days old) being fed once by the female and 6 times by the male parent over a 1.5 hour period (G. McElroy, *pers. comm.*). Similarly, in Feb 2008 a male was seen feeding a juvenile estimated to have fledged about 2 weeks earlier at Papakanui (G. Pulham, *pers. comm.*). These sightings, together with my observations, further support the suggestion that the male does most of the parental care post-fledging in fairy terns (Treadgold 2000).

Observations of fairy terns displaying prolonged parental care are consistent with the post-fledging feeding of young documented in other tern species. For example, Caspian terns (*S. caspia*) feed their young for several months after fledging (Cuthbert & Wires 1999); white-fronted terns (*S. striata*) feed their young for up to 3 months after leaving the colony (Heather & Robertson 2005); and the Australian little tern (*S. albifrons*), which appears closely related to *S. nereis*, also feeds its young "long after fledging" (NSW National Parks & Wildlife Service 2003).

The prolonged dependency of fairy tern juveniles on their parents has implications for the recovery programme. First, more data are needed

to determine the age at which juveniles are capable of feeding independently (Hansen 2006). Second, extension of captive-rearing methods is required if future releases of fledglings are considered (Taylor *et al. unpubl.*). In particular, it seems clear that captive juveniles need a facility that provides them with the opportunity to learn to source live prey in moving water replicating estuarine conditions before being released into the wild. The latest fairy tern recovery plan (Hansen 2006) lists both determining the extent of parental care and improving captive-rearing techniques as high-priority research actions if resources become available.

ACKNOWLEDGEMENTS

My observations at Waipu were made while on contract to the Department of Conservation as a Shorebird Warden over the 1998/99 summer. I would like to acknowledge Richard Parrish and Katrina Hansen for training and support at this time. I thank John Dowding for reviewing this manuscript and providing additional sources of information. Both Tony Beauchamp and Katrina Hansen made useful comments. Gwenda Pulham gave valuable feedback and access to unpublished data. I had support or assistance from Andrea Booth, Dan Breen, John Gardiner, Abby Meagher, Loraine Wells, Reuben Williams, and David Wilson (all from the Department of Conservation) and Andrew Nelson from Auckland Zoo. I also thank former shorebird wardens Doug Campbell, Katrina Hansen, Guy McElroy, Fiona Maguire and Rex Williams for the inclusion of observations from their unpublished reports.

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Keywords New Zealand fairy tern; *Sterna nereis davisiae*; parental care