

SHORT NOTE

Swamp harrier (*Circus approximans*) predation of white-fronted tern (*Sterna striata*) chicks on the Noises Islands, New Zealand

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The white-fronted tern (*Sterna striata*) is a small (160 g) native seabird with breeding colonies found the length of the New Zealand archipelago. The species nests colonially in a range of habitats from shingle riverbeds, and estuarine and coastal beaches, to offshore coastal cliffs, rock stacks, and islands. Birds maintain pair bonds throughout the year, though the degree of lifetime monogamy is uncertain. Breeding occurs between October and January and birds lay 1–2 eggs (rarely 3) in a scrape nest, and provision chicks through a chick rearing period of 29–35 days (Mills 2013).

Populations of white-fronted terns have declined over the past 40 years and the species is currently listed under the New Zealand threat classification scheme as 'at risk/declining' (Robertson *et al.* 2017). Recent surveys in the North East of New Zealand, including the Hauraki Gulf, have indicated this decline is acute in this region (Frost 2017), though the driving factors are uncertain.

Predation is one factor likely driving population declines. Introduced mammals, including cats (*Felis catus*), mustelids (stoats *Mustela erminea*, ferrets *Mustela furo*, and weasels *Mustela nivalis*), rats (Norway rats *Rattus norvegicus*, and ship rats *R. rattus*) and possums (*Trichosurus vulpecula*) are predators of white-fronted tern adults, chicks, and

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eggs (Taylor 2000). Southern black-backed gull (*Larus dominicanus*), hereafter referred to simply as 'black-backed gull', is a known avian predator (Miskelly 2013). However, to our knowledge, predation by swamp harriers (*Circus approximans*) on white-fronted tern chicks has not been previously documented.

The Noises are a group of islands, islets, and rock stacks centred at 36.693°S, 174.970°E on the outer edge of the inner Hauraki Gulf, approximately 20 km northeast of Auckland city. The islands have been pest free since 2002 following the eradication of Norway rats, and are home to a regionally significant seabird community of at least ten breeding species (Cunningham & Moors 1985; Mackay *et al.* 2007; MJR *pers. obs.*), including the white-fronted tern. White-fronted terns breed at seven sites on the Noises, but no more than three sites are used in a season as birds shift each year. Similar to the trend in the wider Hauraki Gulf region, colony sizes of white-fronted terns at the Noises have declined significantly over the past 50 years (RN, SN, ZN, *pers. obs.*). Breeding sites are typically shared with small numbers of breeding red-billed gulls (*Larus novaehollandiae*) and/or single pairs of black-backed gulls.

Since the mid-1970s we have made annual observations of white-fronted tern breeding efforts concurrently with summer visits to the Noises for field work and family holidays between November and February. Since 2013 we have observed seasonal predation of white-fronted tern chicks by swamp harrier, something that was not observed prior to 2013. Attacks typically begin with a single harrier harassing the tern colony, circling and diving, which brings adult terns into the air to defend their nests. During white-fronted tern incubation, larger red-billed and/or black-backed gulls that nest close to tern colonies aid in driving the harriers away. At times, these confrontations are violent. For example, this summer we witnessed a resident adult male black-back gull receive severe cuts about the head whilst defending its nest from harrier attack. However, both gull species breed earlier than white-fronted terns at the Noises, and as the gull chicks begin to fledge their parents are less inclined to harass or attack harriers. Subsequently, the terns, which are typically feeding chicks at this stage, are unable to drive off an attacking harrier. Once the harrier has put adult terns into the air, it is able to swoop down to snatch a single tern chick and fly off to nearby vegetation to consume it. Since 2013, during the period December to February, we have observed successful attacks on tern chicks up to twice daily, with at least 40 successful attacks witnessed overall.

Swamp harriers are adaptable and opportunistic predators which take a broad range of vertebrate

prey including seabirds (Wilcox & Spotswood 2011; Ismar *et al.* 2012). In New Zealand, harriers are known predators of black-fronted terns (*Chlidonias albostratus*) in South Island river catchments (Steffens *et al.* 2012; Bell 2017) but to our knowledge there are no published accounts of the species taking white-fronted tern chicks. Despite a long history of making seasonal observations of white-fronted tern colonies on the Noises we had not observed attacks by harriers prior to 2013. A possible explanation for this change in harrier behaviour could relate to prey availability. Harriers frequently move between the Noises and the larger nearby islands of Rakino (146 ha), Motutapu (1,510 ha), and Rangitoto (2300 ha) which are part of their home range. These islands are now free of mammal pests following 2011 eradications of rats (*R. rattus*, *R. norvegicus*), rabbits (*Oryctolagus cuniculus*) and hedgehogs (*Erinaceus europaeus*), the 1997 eradication of possums and brush-tailed rock wallaby (*Petrogale penicillata*) from Motutapu and Rangitoto, and the 2002 eradication of Norway rats from Rakino. For the harriers that visit the Noises, these eradications within their wider home range present a significant loss of prey types and overall prey availability, and are likely a major factor in prey switching as observed previously in this species, further illustrating its dietary flexibility (Pierce & Maloney 1989; Haselmayer & Jamieson 2001).

Given the frequency of observed successful attacks we believe chick predation by harriers may be having a significant impact on breeding productivity of white-fronted terns at the Noises. What role these attacks are playing in the long-term declines in tern numbers at the Noises is unclear, especially given that tern numbers appear to have declined regionally as a result of ecosystem-level effects related to prey availability. Further empirical studies are required to investigate this phenomenon, and we would be interested to hear of other observations of harrier predation on white-fronted terns.

LITERATURE CITED

- Bell, M. 2017. Population size, breeding success and predators of black-fronted tern (*Chlidonias albostratus*) in the Upper Clarence River catchment, New Zealand. *Notornis* 64: 154–161.
- Cunningham, D.M.; Moors, P.J. 1985. The birds of the Noises Islands, Hauraki Gulf. *Notornis* 32: 221–243.
- Frost, P.G.H. 2017. *Population status and trends of selected seabirds in northern New Zealand* (Project No. INT 2016-04). New Zealand Department of Conservation. <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/>

- reports/pre-2019-annual-plans/status-and-trends-non-procellariform-seabirds-final.pdf
- Haselmayer, J.; Jamieson, I.G. 2001. Increased predation on pukeko eggs after the application of rabbit control measures. *New Zealand Journal of Ecology* 25: 89–93.
- Ismar, S.M.H.; Taylor, G.; Gaskin, G.; Rayner, M.J. 2012. First breeding report of black-winged petrel (*Pterodroma nigripennis*) on Burgess Island, Mokohinau group, Hauraki Gulf. *Notornis* 59: 167–170.
- Mackay, J.W.B.; Russell, J.C.; Anderson, S.H. 2007. Birds of Motuhoropapa I, Noises Group, Hauraki Gulf, North Is, New Zealand. *Notornis* 54: 197–200.
- Mills, J.A. 2013 [updated 2022]. White-fronted tern | tara. In: Miskelly, C.M. (ed.) *New Zealand Birds Online*. www.nzbirdsonline.org.nz.
- Miskelly, C.M. 2013 [updated 2022]. Southern black-backed gull | karoro. In: Miskelly, C.M. (ed.) *New Zealand Birds Online*. www.nzbirdsonline.org.nz
- Pierce, R.J.; Maloney, R.F. 1989. Response of harriers in the Mackenzie basin to the abundance of rabbits. *Notornis* 36: 1–12.
- Robertson, H.A.; Baird, K.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Miskelly, C.M.; McArthur, N.; O'Donnell, C.F.J.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2017. Conservation status of New Zealand birds, 2016. *New Zealand Threat Classification Series* 19. Wellington, New Zealand Department of Conservation.
- Steffens, K.E.; Sanders, M.E.; Gleeson, D.M.; Pullen, K.M.; Stowe, C.J. 2012. Identification of predators at black-fronted tern *Chlidonias albostratus* nests, using mtDNA analysis and digital video recorders. *New Zealand Journal of Ecology* 36(1): 38–55.
- Taylor, G. 2000. Action plan for seabird conservation in New Zealand, part a: threatened seabirds. *Threatened Species Occasional Publication* 16. Wellington, NZ, New Zealand Department of Conservation.
- Wilcox, R.; Spotswood, E. 2011. Introduced predators and seabird predation on Mo'orea, French Polynesia. *Notornis* 58: 39–42.

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