

SHORT NOTE

An unlikely native prey for the New Zealand falcon (*Falco novaeseelandiae*): the little penguin (*Eudyptula minor*)

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The New Zealand falcon (*Falco novaeseelandiae*) or karearea is the only falcon breeding in New Zealand. It exploits a wide variety of habitats including native forest, grazed hill country, tussock land, pine forest, vineyards and even urban areas. Around 4,000 pairs breed across the main islands of New Zealand, and also visit small offshore islands (Fox 1978). This bird can be encountered from sealevel up to 2,100 m (Soper & Jardine 1957; Child 1975). Three forms of the New Zealand falcon are recognised: bush, eastern and southern (Fox 1977). While falcons feed predominantly on live prey, they can also feed on carrion (N. Hyde, D. Falconer, *pers. obs.*): they have been observed scavenging fish heads, sheep (*Ovis aries*), New Zealand fur seal (*Arctocephalus forsteri*) and chamois (*Rupicapra rupicapra*) carcasses (Fox 1977; Lawrence & Gay 1991; Russ 1990 in Marchant & Higgins 1993; Taylor 1977). Although New Zealand falcons have been observed feeding on animals as large as hares (*Lepus europaeus*), it is unlikely they killed any of these larger animals. Instead, their main prey are small to medium-sized birds, which are killed by breaking the neck with their beak (Fox 1977). Quantitative studies of their diet showed that falcons primarily feed on more abundant species (Seaton *et al.* 2008). Where falcons occur near the coast, a variety of species of prions (Heather & Robertson 2015), shearwaters

and petrels (Marchant & Higgins, 1993) are also recorded as prey. More uncommonly, birds larger than falcons are occasionally caught, including for example, ring-necked pheasants (*Phasianus colchicus*; Hyde & Seaton 2008), black shags (*Phalacrocorax varius*; Seaton & Hyde 2013), herons and ducks (Marchant & Higgins 1993). In this study, I report on an observation of a New Zealand falcon possibly killing, or at least scavenging, a little penguin (*Eudyptula minor*).

I observed a New Zealand falcon feeding on a little penguin on Motuara Island (41°06' S, 174°16' E), in Queen Charlotte Sound. This island comprises 59 ha area of regenerating native bush, and 1 or 2 "bush" falcons have been seen at the same time, often doing noisy aerial displays. Falcon nests have been observed prior to 2015 (I. Graham, *pers. comm.*) suggesting the island was used as a breeding area during this study. Other breeding falcons (adults and nestlings) have been seen at nearby Titi Island (40°57' S, 174°8' E) in Pelorus Sound (S. Waugh, *pers. comm.*). Motuara Island is managed as a predator-free bird sanctuary by the Department of Conservation. South Island robins (*Petroica australis*), South Island saddlebacks (*Philesturnus carunculatus*), bellbirds (*Anthornis melanura*), kakariki (*Cyanoramphus auriceps*), and kereru (*Hemiphaga novaeseelandiae*) are encountered in high densities on the site. Motuara Island is also used as a site for housing young kiwi (*Apteryx rowi*) prior to their release on the mainland. Seabirds that breed on the island include pied shags



Fig. 1. Penguin carcass at discovery. Feathers removed on the left, injury at neck and lesions on the neck and head. Photo: Timothee Poupart.



Fig. 2. New Zealand falcon consuming a fresh penguin carcass. Photo: Timothee Poupart.

(*Phalacrocorax varius*), sooty shearwater (*Puffinus griseus*), fluttering shearwater (*P. gavia*) and little penguin. Penguins breed in loose colonies on the island, and use either shearwater burrows, tree stumps, nest boxes or scree cavities as nest sites. They come ashore, starting at dusk and throughout the night. After landing, they climb the hillsides into steep gullies to reach their nests. The Museum of New Zealand Te Papa Tongarewa ran a penguin monitoring programme at Motuara Island and carried out daily observations for 44 days between 14 September 2015 and 08 November 2015.

On the morning of 19 September 2015 a penguin was found dead on the ground, approximately 100 m a.s.l. into the bush and far away from the public

path, with an injury at the neck and the head (Fig. 1). This individual had been observed the day before, incubating in a nearby nesting box (the box remained intact after the death). A second penguin was found on 28 September 2015 morning in the same patch of bush and in close proximity to the first. The second carcass showed the same injuries and was still warm and flexible, suggesting it was freshly killed. Both penguins had a usual body mass (respectively 850 g and 975 g), suggesting they were in good health. In both cases, the cause of death appeared to be predation. Penguin carcasses have not recorded on this island before. Motuara Island is free from mammalian predators, and during the study no other likely native predator such as morepork (*Ninox novaeseelandiae*), swamp harrier (*Circus approximans*) which is able to feed on little penguin (Hawke *et al.* 2005), weka (*Gallirallus australis*) or fur seal (*Arctocephalus forsteri*) were seen or heard. The strict mooring requirements for vessels had been adhered to during our visit at the island and no dogs were present on the island. Later in the day, a New Zealand falcon was observed removing feathers and eating meat on the carcass on the ground (Fig. 2). When not on the carcass, it was often on a perch nearby. Two or 3 days later, the first carcass disappeared. The second carcass had been moved a few metres and was eaten until only the skin, the spine and the feet remained.

As the little penguin is normally nocturnal on land, it would appear to be an unlikely prey for a falcon which is primarily active only at twilight and during the day. However, this observation is consistent with reports from elsewhere that the New Zealand falcon will hunt in low light conditions (Fox 1977; Hyde & Worthy 2010), and takes advantage of nocturnal prey, including some species up to 6 times its body weight (N. Hyde, *pers. comm.*). The passerine species inhabiting Motuara Island in high densities are likely to be the falcon's main diet, but my observations suggest that some of the larger seabirds may be taken as well. The falcon, manoeuvrable enough to weave through dense bush and often searching from perches by listening (Fox 1977) appear to be the most likely predator of the penguins, which move noisily through the leaf litter, with frequent vocalisations. Also, these penguin kills occurred in an area where previous treefalls had slightly opened the canopy, perhaps making the penguins more exposed and vulnerable to an avian predator.

Nevertheless, some questions remain unanswered: was there a possible unidentified predator which killed the penguins but the falcons used the carcasses as food after the kill (*e.g.*, an undetected weka)? Were these penguins caught in the night or at dusk or dawn? Why did no further predation of the penguins occur in chick-

rearing stage when the penguins were travelling back and forth on land more frequently (almost daily) compared to the incubation stage when their foraging trips take 2 – 14 days?

This observation should be kept in mind for intensive bird management activities, for example for kiwi species or penguins, on these offshore island sites, and may influence the choice of nest box design or placement in areas where falcons and managed species are sympatric. Predation is known as a major selective force in the evolution of behavioural characteristics of animals (Lima & Dill 1990), and birds of prey could be one of the constraints which make the little penguin the only penguin nocturnal on land.

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