

Ground-based crepuscular hunting by the Peregrine Falcon: records of birds taking adult Wedge-tailed Shearwaters

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INTRODUCTION

This article reports observations of ground-based crepuscular hunting by the Peregrine Falcon *Falco peregrinus* on Broughton Island. The island, which is located about 3 km offshore from the New South Wales coastline to the northeast of Port Stephens, is an important seabird breeding island (Carlile *et al.* 2012). The main breeding seabird is the Wedge-tailed Shearwater *Ardenna pacifica*, with the most recent population estimate being 64,500 pairs (Carlile *et al.* 2022). There is a small breeding population of Little Penguins *Eudyptula minor* (Carlile *et al.* 2012). In 2022 we (MS and MS) set up ten motion-activated cameras (“trail cameras”) on the rocky shoreline of Providence Point. The cameras were installed for a number of months at known landing sites for the Little Penguin, which we were attempting to monitor. Although the results from that effort were mixed, the cameras did record many interesting insights about wildlife on Broughton Island. This article reports one of those insights – an uncommon or under-reported behaviour by a Peregrine Falcon. Beginning from 5.26 am on 27 October 2022, one of the trail cameras captured images of a Peregrine Falcon killing and beginning to dismember and eat a Wedge-tailed Shearwater. Sunrise on Broughton Island on that date was at about 5.31 am; i.e. the event occurred about five minutes before dawn. **Figure 1** shows three examples from the 13 images captured on camera – in combination they clearly confirm the identities of the two species.

Similar series of images were taken on seven subsequent pre-dawn mornings during late October and early November 2022 ending in the same result: a single shearwater captured, partially eaten and then the carcass left *in situ* at the point of capture. In each case, the Peregrine Falcon took an individual from a gathering of shearwaters readying to take off in the pre-dawn flyout.

DISCUSSION

Worldwide there are as many as 19 subspecies of Peregrine Falcon. Three of those occur in Australia although subspecies *calidus* (the Siberian Peregrine Falcon) is an uncommon to rare migrant from the northern hemisphere. Another subspecies, *submelanogenys* (South-west Australian Peregrine Falcon), is only found in the southwestern parts of Australia. The subspecies *macropus* (Australian Peregrine Falcon) is widely distributed across much of the remainder of Australia, including on Broughton Island.

Australian Peregrine Falcon

The Australian Peregrine Falcon is usually considered to be a diurnally active raptor, hunting small to mid-sized birds as its main prey (Marchant & Higgins 1993; Olsen *et al.* 1993). Its predominant hunting technique involves fast diving attacks upon its targeted prey, using visual cues to strike and kill the prey in flight.

There are three prior reports of crepuscular/nocturnal hunting/feeding by Australian Peregrine Falcon. Calaby (1951), in an article about the hunting of rabbits by the Little Eagle *Hieraetus morphnoides*, briefly mentioned nocturnal hunting by the Peregrine Falcon. Baker-Gabb (1986) reported them taking adult Short-tailed Shearwaters *Ardenna grisea* returning to burrows at night. Similarly, Lane (1989) noted that the falcons took adult Gould’s Petrels *Pterodroma leucoptera* at night.

Marchant & Higgins (1993) listed many prey items for the Australian Peregrine Falcon, predominantly bird species (about 100 species were named) but also rabbits, hares and bats. Surprisingly, only one seabird species was mentioned even though they state elsewhere “hunts petrels returning from sea at night” (Marchant & Higgins 1993: 312). That



Figure 1. Three of the trail camera images captured on 27 October 2022, collectively showing a Peregrine Falcon taking an adult Wedge-tailed Shearwater pre-dawn using a ground-based attack.

statement presumably was based upon Lane's brief note published four years earlier (Lane 1989). The only seabird listed as an Australian Peregrine Falcon prey item was the Fluttering Shearwater *Puffinus gavia* (Marchant & Higgins 1993: 312).

A pair of Australian Peregrine Falcon are often recorded on Broughton Island (Stuart *et al.* 2017; Stuart 2020). There is at least one record of the pair with a fledged juvenile (AS pers. obs.). We have long assumed that the falcons would be predated shearwaters on their way to/from their burrows, but this has never been proven.

Nocturnal hunting by other Peregrine Falcon subspecies

In general, all the subspecies of Peregrine Falcon are considered to be diurnal raptors, but there have been several reports of crepuscular or nocturnal activity especially in city environments (Raptor Refuge 2024). For example, DeCandido & Allen (2006) reported many instances of nocturnal hunting by urban-dwelling birds in New York (probably subspecies *anatum*; there are three subspecies in North America but the other two have limited ranges).

Wynn *et al.* (2010) reported that subspecies *pelegrinoides* (the "Barbary Falcon") was taking adult and juvenile Balearic Shearwaters *Puffinus mauretanicus* at night at the shearwater breeding grounds on Menorca Island in Spain. Compounding the problems for that endangered shearwater, subspecies *britannicus* also was hunting Balearic Shearwater in southern United Kingdom waters in in the post-breeding season (but only by day; no nocturnal events were noted).

A Peregrine Falcon in Hokkaido, Japan (subspecies *japanensis*) was observed to kill a Mallard *Anas platyrhynchos* about 40 minutes before sunrise (Hirata *et al.* 2013). The area was dimly lit and the authors concluded that it suggested the potential of the Peregrine Falcon to forage successfully in non-urban habitat under low-light conditions.

A trail camera at a nest of subspecies *britannicus* in Nottingham, England, recorded several instances of a male bringing food to its chicks at night (Kettel *et al.* 2016). Although the authors did not observe any nocturnal activity at two other *britannicus* nests in their study, they mentioned some other examples and commented that "nocturnal behaviours at the nests are increasingly observed" as a result of the use of trail cameras at urban nest sites (Kettel *et al.* 2016).

In bright light, the Peregrine Falcon has very fast speed of vision, as measured by its flicker fusion frequency (FFF). At lower light levels its FFF slows to less than half (Potier *et al.* 2020). However, it seems that is sufficient for it to be able to hunt successfully in low-light conditions.

Peregrine Falcon and seabirds

It is common for Peregrine Falcons to take seabirds, and there are numerous reports from around the world. For example, the largest subspecies, *pealei* ("Peale's Falcon"), feeds almost exclusively on seabirds, flying long distances at sea to capture its prey (White 1975). The Barbary Falcon (subspecies *pelegrinoides*) regularly takes adult and young Manx Shearwaters *Puffinus puffinus* from around the breeding colonies (Wynn *et al.* 2010). It seems surprising that the Marchant & Higgins (1993) list of prey items of the Australian Peregrine Falcon contains so few seabirds.



Figure 2. Fairy Prion wings found at a Peregrine Falcon feeding roost at Shark Island Nature Reserve in June 2021.

It is evident from some locally used Peregrine Falcon island feeding sites that seabirds are a component of the diet. At Shark Island Nature Reserve on 15-16 June 2021 and on 28 October 2021, several Fairy Prion *Pachyptila turtur* wings were found strewn around the ground at a Peregrine Falcon feeding site (**Figure 2**). Additional seabird remains found at this feeding site were from a Fluttering Shearwater *Puffinus gavia* and three White-faced Storm-petrels *Pelagodroma marina* (Schulz 2021a). Also, a single set of Fairy Prion wings was found below a Peregrine Falcon's nocturnal roost at Fingal Island lighthouse on 16 June 2021 (Schulz 2021b). These seabirds are likely to have been taken aerially by a Peregrine Falcon while it was hunting offshore, because none of them breed on either Shark or Fingal islands.

Ground-hunting by the Peregrine Falcon

The Peregrine Falcon's prey is mostly taken in flight, although there have been occasional reports of it feeding on carrion (Marchant & Higgins 1993). Catching of prey while the falcon is on the ground appears not to have been reported previously in Australia; for example, such behaviour is not reported in Marchant & Higgins (1993). Similarly, in detailed studies of the feeding habits of the Peregrine Falcon elsewhere in the world such observations were not reported. For example, that hunting method was not described in a detailed study of foraging behaviour conducted over eight years in three areas of South Africa (Jenkins 2008). Neither was it mentioned in a study of 355 foraging observations of the species in the Grand Canyon (Stevens *et al.* 2009), or in 328 hunting sequences observed in a study in Italy (Zoratto *et al.* 2010). However, this ground-catching behaviour may be more widespread than previously reported, particularly by individuals at seabird nesting colonies.

Other species taking advantage of the kills

When the falcons had finished feeding on the shearwater carcasses, the remains were left *in situ* on the rock platform/vegetation edge. As the sun rose, the carcasses were then fed upon by White-bellied Sea-Eagles *Haliaeetus leucogaster*, Whistling Kites *Haliastur sphenurus* and Australian Ravens *Corvus coronoides*.

CONCLUSIONS

A crepuscular feeding event by an Australian Peregrine Falcon on Broughton Island is one of the few documented instances of that behaviour by this subspecies, and also one of the few times it has been confirmed as preying upon a seabird. Given that most other Peregrine Falcon subspecies are known to display both of those behaviours, it seems probable that the behaviours are under-reported for the Australian subspecies *macropus*. The capturing of prey whilst the Peregrine Falcon itself was on the ground appears to be an unusual prey-catching tactic, not previously reported for this species.

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REFERENCES

- Baker-Gabb, D.J. (1986). Peregrine Falcon hunting Short-tailed Shearwaters at dusk. *Australasian Raptor Association News* 7: 36.
- Calaby, J.H. (1951). Notes on the Little Eagle, with particular reference to rabbit predation. *Emu* 51: 33-56.
- Carlile, N., Priddel, D. and Callaghan, S. (2012). Seabird Islands No. 18/1. Broughton Island, New South Wales. *Corella* 36: 97-100.
- Carlile, N., Callaghan, S. and Garrard, M. (2022). Expansion of *Ardenna* shearwater breeding colonies on Broughton Island after eradication of the European Rabbit and Black Rat. *Corella* 46: 27-30.
- DeCandido, R. and Allen, D. (2006). Nocturnal Hunting by Peregrine Falcons at the Empire State Building, New York City. *The Wilson Journal of Ornithology* 118 (1): 53-58.
- Hirata, K., Nakahama, S. and Yoshioka, T. (2013). Hunting in the dark by a peregrine falcon (*Falco peregrinus*). *Slovak Raptor Journal* 7: 85-87. <https://doi.org/10.2478/srj-2013-0002>
- Jenkins, A.R. (2008). Hunting mode and success of African peregrines *Falco peregrinus minor*, does nesting habitat quality affect foraging efficiency? *Ibis* 142: 235-246.
- Kettel, E.F., Gentle, L.K. and Yarnell, R.W. (2016). Evidence of an urban Peregrine Falcon (*Falco peregrinus*) feeding young at night. *J. Raptor Research* 50(3): 321-323. <https://dx.doi.org/10.3356/jrr-16-13.1>
- Lane, S.G. (1989). Peregrine Falcon Prey. *The Bird Observer* 632: 196.
- Marchant, S. and Higgins, P.J. (Eds) (1993). 'Handbook of Australian, New Zealand and Antarctic Birds, Vol. 2, Raptors to Lapwings'. (Oxford University Press: Melbourne, Australia.)
- Olsen, P., Crome, F. and Olsen, J. (1993). 'Birds of Prey and Ground Birds. The National Photographic Index of Wildlife'. (Australian Museum Trust: Sydney, Australia.)
- Potier, S., Mindaugas, M., Kelber, A. (2020). Visual adaptations of diurnal and nocturnal raptors. *Seminars in Cell and Developmental Biology* 106: 116 - 126. <https://doi.org/10.1016/j.semedb.2020.05.004>.
- Raptor Refuge (2024). Peregrine Falcon. <https://www.raptorrefuge.com.au/the-peregrine-falcon/> Accessed 14/1/2024.

- Schulz, M. (2021a). Fauna of Shark Island Nature Reserve. (Unpublished report to NSW National Parks and Wildlife Service, Nelson Bay.)
- Schulz, M. (2021b). Fauna of Fingal Island, Tomaree National Park. (Unpublished report to NSW National Parks and Wildlife Service, Nelson Bay.)
- Stevens, L. E., Brown, B. T. and Rowell, K. (2009). Foraging ecology of Peregrine Falcons (*Falco peregrinus*) along the Colorado River, Grand Canyon, Arizona. *The Southwestern Naturalist* **54**: 284-299.
- Stuart, A. (2020). Bird studies on Broughton Island 2017-2020. Hunter Bird Observers Club Special Report #9. (Hunter Bird Observers Club: New Lambton, NSW, Australia.)
- Stuart, A., Clarke, T., van Gessel, F., Little, G., Fraser, N. and Richardson, A. (2017). Results from surveys for terrestrial birds on Broughton Island, 2012-2016. *The Whistler* **11**: 46-53.
- White, C. M. (1975). Studies on Peregrine Falcons in the Aleutian Islands. In 'Population Status of Raptors' (Eds J. R. Murphy, C. M. White, and B. E. Harrell), Pp. 33-50. (Raptor Research Report No. 3, Raptor Research Foundation, Inc.: Vermillion, South Dakota.)
- Wynn, R., McMinn, M. and Rodriguez-Molina, A. (2010). The predation of Balearic Shearwaters by Peregrine Falcons. *British Birds* **103**: 350-356.
- Zoratto, F., Carere, C., Chiarotti, F. and Santucci, D. (2010). Aerial hunting and predation success by Peregrine Falcons *Falco peregrinus* on Starling flocks *Sturnus vulgaris*. *Journal of Avian Biology* **41**: 427-433.