

NOCTURNAL FORAGING BY GREY-TAILED TATTLERS *TRINGA BREVIPES*ALAN STUART<sup>1</sup>, LOIS WOODING<sup>2</sup> AND HATTORI TAKUROU<sup>3</sup>

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Many shorebird species are known to feed at low tide during the night. However, Grey-tailed Tattlers *Tringa brevipes* are described in several sources as diurnal foragers, and nocturnal foraging by them has never been documented. Recent studies of Grey-tailed Tattlers at Port Stephens in Australia and Hakata Bay in Japan have confirmed that this species regularly forages at night at low tide. Details are provided of nocturnal foraging observations including some previously unreported records by other observers. At night, foraging birds call more frequently than in the daytime. At Najima in Hakata Bay, Grey-tailed Tattlers utilised a different substrate when foraging at night.

## INTRODUCTION

Most shorebird species feed at low tides regardless of whether it is day or night (Dann 1987, Finn 2007), and in some cases, nocturnal foraging plays an important role in maintaining the daily energy balance of migratory shorebirds (Lourenço *et al.* 2008, Santiago-Quesada *et al.* 2014). However, several sources state that the Grey-tailed Tattler *Tringa brevipes* is a diurnal bird which roosts at night (Higgins & Davies 1996, Department of the Environment 2015, ARKive 2015, BirdLife Australia 2015). The daytime foraging behaviour of Grey-tailed Tattlers is well documented (for example, Keast 1949, Andrew 1962, Domm & Recher 1973) but there appear to be no published reports about them foraging at night. Notably though, three species closely related to Grey-tailed Tattlers, Common Greenshank *T. nebularia*, Spotted Redshank *T. erythropus* and Common Redshank *T. totanus*, are known to feed at night (Thomas *et al.* 2006).

The uncertainty about whether or not Grey-tailed Tattlers forage at night may be due to the fact that they are a much under-studied species (Lappo *et al.* 2012). As part of a study of Grey-tailed Tattler behaviour (Wooding & Stuart 2013, Stuart & Wooding 2014) we decided to investigate their nocturnal habits. One of our aims was to find birds at night at low tide and establish what they were doing. If Grey-tailed Tattlers were confirmed to be solely diurnally foraging birds, our secondary aim was to determine if they would fly from feeding grounds to their normal high tide roost as dusk approached, or if they would roost elsewhere. Tattlers mainly pass through Japan and Taiwan when they migrate between Australia and their breeding grounds (Branson *et al.* 2010). Therefore, our study focussed on the behaviour of birds in Japan during the northward and southward migrations and in Australia during the austral summer.

## METHODS

Nocturnal surveys were carried out at three locations around Hakata Bay on the outskirts of Fukuoka, Japan, and at two sites around Port Stephens in New South

Wales, Australia. These locations were selected from a larger set of known Grey-tailed Tattlers feeding sites on the basis of their reliability in daytime of having Grey-tailed Tattlers feeding within 50-100 m of their high tide roost. At many other locations, birds foraging diurnally at low tide were observed to range over a much greater distance from their roost site and thus, locating them at night would be more problematic.

In Japan, the three Hakata Bay locations were Najima (33°38'52" N, 130°25'18" E), Kashi (33°39'36" N, 130°25'42" E) and on the Tatara River (33°37'45" N, 130°27'07" E). They all have artificial lighting of sufficient intensity to observe Grey-tailed Tattlers without using any additional light. The two Port Stephens locations were Salamander Bay (32°43'40" S, 152°05'24" E) and Lemon Tree Passage (32°43'53" S, 152°02'24" E). Both Port Stephens sites have only low levels of artificial lighting; observations from these sites were made at dawn or dusk, with inferred night-time behaviour. Grey-tailed Tattlers were observed from ~2 hours after high tide to ~2 hours before the next high tide, i.e. on both falling and rising tides.

Standard binoculars (not night-vision) and telescopes were used for the surveys. Some low quality digital images were collected in May 2015; they are available for viewing at <http://www.thinkingaboutbirds.com/grey-tailed-tattlers.php>. Attempts to use torches (white or red light) to locate and monitor Grey-tailed Tattlers at night were unproductive – the birds sometimes reacted strongly to such lighting, becoming agitated and flying away. In contrast, they seemed unaffected by camera flash lights.

## RESULTS

On 17 May 2014 at Najima we were observing a flock of 12 Grey-tailed Tattlers foraging around the rocks at low tide in late afternoon. As dusk approached they continued to forage and made no attempt to go to a roost. The lighting was poor on this occasion and very soon birds could no longer be seen. However, we could hear dispersed birds calling from the mudflats for the following 30 minutes that we were present. We could not find any roosting birds either at their normal high

tide roost site or elsewhere – it seemed that all 12 birds had continued to forage.

In the following two weeks we made four visits to Najima at night, finding foraging Grey-tailed Tattlers on every occasion (Table 1). We also confirmed nocturnal foraging during the southward migration, with several tattlers observed foraging at night at Najima on 3 August 2014. In 2015 during the northward migration, we made further observations on foraging Grey-tailed Tattlers at Najima and also confirmed nocturnal foraging at two other locations in Hakata Bay.

At Salamander Bay and Lemon Tree Passage in Port Stephens, it was not possible to confirm that Grey-tailed Tattlers were foraging at night. The records from these sites (Table 1) are based on the following strong circumstantial evidence: Grey-tailed Tattlers could be heard calling on the mudflats in the dark; foraging shorebirds of about the correct size could be seen by using a red torch, but not positively identified; Grey-tailed Tattlers were able to be positively identified on the mudflats at dawn or dusk, when it was possible to see them in natural light and confirm the foraging behaviour.

## DISCUSSION

### Frequency of Nocturnal Foraging

Although some sources describe the Grey-tailed Tattler as diurnal foragers, nocturnal foraging by them during migration seems unsurprising. Nocturnal foraging maximises the opportunity to replace post-migratory condition loss and increase the energy reserves needed to complete the migratory journey and breed successfully (Lourenço *et al.* 2008, Santiago-Quesada *et al.* 2014). However, several of the nocturnal records lie outside the migration period. It is generally considered that Grey-tailed Tattlers begin to depart Australia from mid-April, returning from late September onwards (Higgins & Davies 1996). Observations of nocturnal foraging in February-March lie well outside of the migration period, and at the time of our late October observation, birds had been back in Australia for several weeks. These observations suggest that nocturnal foraging by Grey-tailed Tattlers is by no means uncommon at any time. Given the relative ease by which we obtained records of foraging at night, it is unclear how the Grey-tailed Tattler ever came to be described as a diurnal bird. However, a shorebird's nocturnal foraging frequency is affected by the availability of diurnal prey (Dodd & Colwell 1996) and there may be periods when tattlers do not need to feed at night.

After some preliminary findings were presented at a conference (Stuart and Wooding 2014), additional instances of Grey-tailed Tattler nocturnal foraging were brought to our attention. Those instances involved birds foraging in the Penrhyn Estuary, Sydney Australia (33°57'43" S, 151°12'24") (P. Straw *pers. comm.*) and at Roebuck Bay (centred around 17°58' S, 122°18' E) near Broome Australia (D. Rogers *pers. comm.*). The details for those records are included in Table 1.

**Table 1.** Instances of nocturnal foraging by Grey-tailed Tattlers.

Site	Date	Time of Observation
Najima	23 May 2014	1:00-2:00
	24 May 2014	23:00-24:00
	27 May 2014	1:00-1:45
	29 May 2014	0:20-1:30
	3 August 2014	22:00-22:40
	15 May 2015	23:00-23:30
	18 May 2015	0:10-1:50
	19 May 2015	1:10-2:15
	20 May 2015	3:00-4:25
	Kashi	15 May 2015
Tatara River	18 May 2015	2:00-2:30
Salamander Bay	29 September 2014	17:00-18:35 (dusk at 17:55)
	24 October 2014	4:45-6:15 (dawn at 5:35)
	10 February 2015	5:35-6:35 (dawn at 6:25)
Lemon Tree Passage	10 February 2015	5:35-6:35 (dawn at 6:25)
Penrhyn Estuary <sup>1</sup>	5 March 2013	20:00-22:00
Roebuck Bay <sup>2</sup>	1997-2003	Several instances noted

<sup>1</sup>P. Straw *pers. comm.* <sup>2</sup>D. Rogers *pers. comm.*

### Behaviour during Nocturnal Foraging

By day, Grey-tailed Tattlers generally are silent when foraging, usually only calling as they take to wing when a disturbance occurs. However, when foraging at night, they call more frequently. There has been no obvious disturbance happening on most of the occasions when birds have been heard calling at night. Possibly their vocalisations at night enable them to maintain contact with other birds from the group. In contrast, Dunlins *Calidris alpina* have been found to call less frequently at night in order to avoid predation by owls (Mouritsen 1992).

At Najima, where most of the observations were made, a change in foraging behaviour occurred. By day, whenever intertidal areas had begun to become exposed, Grey-tailed Tattlers flew from their roost site to a small cove where they foraged along the shoreline seeking prey on the mudflat and in the shallow water alongside it. As the tide dropped further, many small rocks within the bay became exposed and the tattlers foraged in the crevices of them and amidst the seaweed and mud around their base. Birds were observed eating large numbers of small crabs. In contrast, at night as the water levels dropped they did not return to the cove but instead, flew to some rock platforms and foraged upon these. They were only rarely been observed to go near the edge of the rock platforms, and they spent most of their time walking slowly over the main body of the rock platform.

Grey-tailed Tattlers have never been observed to feed on the rock platforms at Najima in the daytime. Their change in behaviour for nocturnal foraging may relate to prey availability. We noticed that the crabs which they mainly take in the daytime from mudflats seemed not to be active in the cove at night.

Foraging Grey-tailed Tattlers at Roebuck Bay had no difference in pace length by day and night (D. Rogers *pers. comm.*), suggesting that their hunting style does

not change substantially at night. That fits with our observations at Najima, where the birds appeared to walk purposefully and watchfully at night, much like in the daytime, although albeit hunting on a different substrate.

## CONCLUSION

Studies of Grey-tailed Tattlers at Port Stephens in Australia and Hakata Bay in Japan have confirmed that they forage at night at low tide. This is a previously unreported behaviour by Grey-tailed Tattlers. Nocturnal foraging occurs regularly during the migration period and birds also have been shown to feed at night during the austral summer. At night, foraging birds call more frequently than in the daytime. At Najima in Japan, Grey-tailed Tattlers utilised a different substrate when foraging at night.

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