

Site fidelity of Far Eastern Curlew in Port Stephens estuary

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INTRODUCTION

This note details the presence of a banded and flagged Far Eastern Curlew *Numenius madagascariensis* during three consecutive non-breeding seasons within the Swan Bay region of Port Stephens estuary. Such sightings show that this individual is demonstrating estuary-level site fidelity upon returning to Australia after its southward migration from the northern hemisphere.

Port Stephens estuary is an elongate east-west waterway located at the mouth of the Karuah River, approximately 30km NNE of Newcastle in New South Wales, Australia (see **Figure 1**). The study site is located at the western end of the estuary (see **Figure 2**).

METHODS

A female Far Eastern Curlew *Numenius madagascariensis* was caught during evening shorebird mist netting activities at Gir-Um-Bit National Park, Swan Bay (32.706509°S, 151.971343°E), on 16 January 2022. Based on plumage, it was aged as a first-year bird. This capture was part of a larger research program investigating the movement and foraging behaviour of shorebirds in the Hunter Region. The bird was fitted with a metal band on the left leg and two engraved and coloured leg flags bearing the code 'AAA' on the right leg – an orange leg flag on the tibia and a green one on the tarsus (**Figure 3**) and then released unharmed. This study was carried out under Australian Bird and Bat Banding Scheme (ABBBS) Project 851601, Banding Authority 3289, and NSW Scientific Licences SL102458 and SL101909.

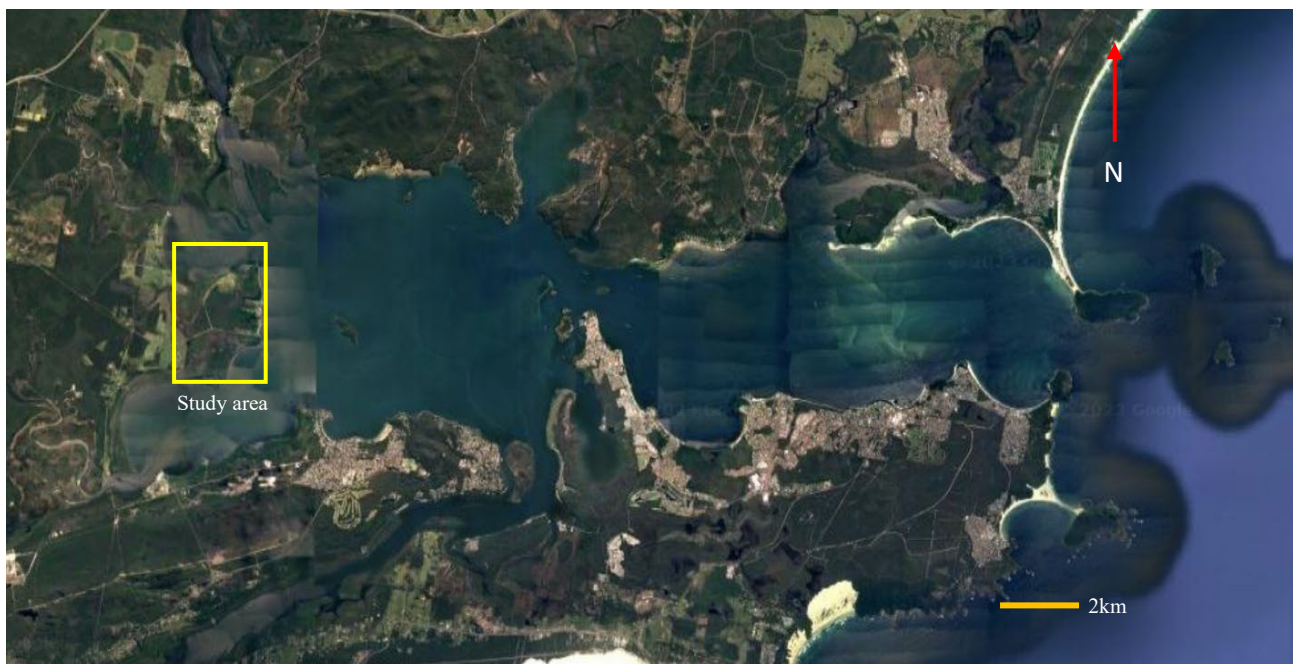


Figure 1: Port Stephens estuary showing Swan Bay study area (Google Maps 2023)

Subsequent detections of the flagged bird in Port Stephens were through incidental re-sightings made using spotting telescopes. Only positive readings of the 'AAA' leg flag engraving were used for this report.



Figure 2: Study area showing location of initial capture (red), foraging (blue), and roosting re-sightings (yellow) (Six Maps 2023).



Figure 3: Metal band and engraved colour flags fitted to the legs of the Far Eastern Curlew (L. Williams 2022).

RESULTS

Since banding, Far Eastern Curlew individual 'AAA' has been detected within the Swan Bay area on four separate occasions during both high tide and low tide over three consecutive non-breeding seasons: 2021-22, 2022-23 and 2023-24 (see **Table 1** and **Figure 2**). No sightings were recorded during the austral winter months even though the site was visited at least once every month. During high tide 'AAA' was observed roosting as part of a larger flock of Far Eastern Curlew, while during low tide she was observed foraging alone.

DISCUSSION

Records of the presence of Far Eastern Curlew individual 'AAA' in the same area of Port Stephens for three consecutive non-breeding seasons demonstrates inter-year site fidelity. This individual is probably returning to the Swan Bay region because this site affords the bird high quality and predictable roosting and foraging areas.

Inter-year site faithfulness has been frequently documented in migratory shorebird species both at their breeding sites (for example, Antonov 2010; Ruthrauff *et al.* 2021; Sandercock & Gratto-Trevor 2022) and their migration stop-over sites (for example, Buchanan *et al.* 2012; Taylor & Bishop 2008). Few published studies, however, have reported site fidelity between years in migratory shorebirds within Australia. Coleman & Milton (2012) observed Bar-tailed Godwit *Limosa lapponica* and Grey-tailed Tattler *Tringa brevipes* returning annually to Moreton Bay, Queensland, based on flagging studies, while Ross *et al.* (2023) recorded inter-annual site fidelity rates of between 84.1% and 98.2% for recaptured banded and flagged adult Curlew Sandpiper *Calidris ferruginea* and Red-necked Stint *Calidris ruficollis* at Melbourne Water Western Treatment Plant (Werribee) and Yallock Creek in Victoria over a 40-year period.

Likewise, there are few published reports on migratory shorebird site fidelity in the Hunter Region. Crawford & Herbert (2013) discussed observations of flagged Bar-tailed Godwit returning to the Hunter Estuary for successive austral summers, and other individuals using the estuary as an inter-annual stop-over during their southward passage to New Zealand or Victoria. Similarly, small numbers of flagged Red Knot *Calidris canutus* have been observed to stop-over at Stockton Sandspit and Kooragang Dykes during

consecutive southward migrations (Crawford & Herbert 2017). The use of geolocators on Ruddy Turnstone *Arenaria interpres* confirmed migration stop-over site fidelity in successive years at Newcastle Beach (Gosbell *et al.* 2018). Double-banded Plover *Charadrius bicinctus* are reported to have high site fidelity on wintering grounds in the Hunter Region, including in the Hunter Estuary (historically), Port Stephens, Manning Estuary and at Worimi Conservation Lands (Lindsey & Fraser 2022).

Regarding the Far Eastern Curlew, a report by the Threatened Species Recovery Hub outlines that this species shows high inter-annual site fidelity based on GPS and satellite tracking of 22 individuals captured across sites in the Northern Territory, Western Australia, Queensland and Victoria (NESP

Threatened Species Recovery Hub 2021). We found no prior published evidence that Far Eastern Curlew return repeatedly to the same overwintering estuary within New South Wales. To our knowledge, this is therefore the first published evidence of this trait in Far Eastern Curlew of New South Wales estuaries.

The use of the same non-breeding site each year highlights the importance of the Swan Bay area as a critical roost and foraging site for Far Eastern Curlew. This finding reinforces the need for ongoing protection and management of this site, especially given the Far Eastern Curlew's federal listing as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment 2023).

Table 1. Sightings of Far Eastern Curlew 'AAA' within Port Stephens estuary.

Date	Location	Coordinates	Notes	Observer
16 Jan 2022	Gir-Um-Bit National Park	32.706509°S, 151.971343°E	Caught in mist net. Banded and flagged	HBOC and University of Newcastle bird banding team
05 Feb 2022	Gir-Um-Bit National Park	32.706509°S, 151.971343°E	Roosting in saltmarsh	T. Clarke
08 Oct 2022	Gir-Um-Bit National Park	32.705622°S, 151.969706°E	Roosting in saltmarsh	N. Fraser
05 Jan 2023	Swan Bay	32.696333°S, 151.978957°E	Foraging	L. Williams
18 Sept 2023	Gir-Um-Bit National Park	32.709224°S, 151.970743°E	Roosting in saltmarsh	G. Little

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AUTHOR CONTRIBUTIONS

LAW and JL wrote the manuscript; JL and GL led the catching efforts; ASG contributed to the draft; all other authors contributed to the catching and survey efforts and are listed in alphabetical order.

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