Shorebird Monitoring: Lee Point, Darwin, Northern Territory (April 2025)

Defence Housing Australia

4 elements

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Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	07.04.2025	M. Brown	07.04.2025

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1.0 Introduction

Defence Housing Australia (DHA) is proposing an urban development on the outskirts of Darwin that will establish a residential, community, and commercial precinct in the suburb of Nightcliff. During the environmental approvals process, the proposal was identified as having potential to impact Darwin's migratory shorebird population through increased beach traffic at key roosting and feeding areas on the city's northern beaches. To mitigate any potential impacts to these populations, the Northern Territory Environment Protection Agency (NT EPA) provided the following recommendation in its assessment report for this project:

> *Recommendation 3*
> *That approvals for the proposal should include a condition that requires DHA to develop and implement a monitoring program to quantify impacts from the Proposal on local shorebirds. The program is to be designed in consultation with Flora and Fauna Division, Department of Environment Natural Resources, and Wildlife and Heritage Division, Department of Tourism and Culture Parks, and implemented before commencement of construction activities. Results and annual updates from the program should be made publicly available on the internet (NT EPA 2018).*

The environmental impact statement (EIS) for this project included a detailed report by Dr Amanda Lilleyman (Charles Darwin University) outlining the potential impacts of increased anthropogenic disturbance on Darwin's migratory shorebirds. This monitoring program was adopted in a report published by EcOz Pty Ltd (*Shorebird Monitoring Program: Lee Point Master-planned Urban Development*) in September 2022, which was updated in August 2023 (EcoZ 2023) with a few minor adjustments. This monitoring program was reviewed by Brydie Hill from the Flora and Fauna Division (Department of the Environment, Parks and Water Security) and Dean McAdam (Parks and Wildlife Division), with their assessment concluding that the proposed methodology is adequate for detecting project-related impacts to local shorebird populations. Finally, this monitoring program was adopted by Ecology and Heritage Partners (*Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory*, 2023) with a minor adjustment to the minimum tide height (from 6.5m to 6m).

Four Elements Consulting was commissioned by Defence Housing Australia to conduct the shorebird monitoring program in accordance with the *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory*, (Ecology and Heritage Partners 2023). Darwin's northern beaches provide habitat for up to 10,000 shorebirds comprising over 20 different species, with the majority breeding in the northern hemisphere in China, Russia and Alaska before migrating through eastern Asia to Australia and New Zealand each year. The birds begin arriving in Australia in August and stay through the austral summer before departing again in March/April. This April survey marks the final round of the current monitoring program, capturing end-of-season data on shorebird richness, abundance, and anthropogenic disturbance at key roosting sites.

2.0 Methodology

2.1 Study Area

The study included five survey locations on Darwin's northern beaches – Lee Point (**Plate 1**), Sandy Creek (**Plate 2**), Nightcliff Rocks (**Plate 3**), Spot on Marine (**Plate 4**) and East Point (**Plate 5**). Lee Point and Sandy Creek, which are public beaches approximately 15km north of Darwin (**Figure 1**), provide important shorebird foraging and roosting habitat and may experience increased anthropogenic disturbance as a result of the proposal (i.e., impact sites). The remaining three sites (Nightcliff Rocks, Spot on Marine and East Point) are not expected to be impacted by the proposal but will act as controls whilst also providing a greater understanding of shorebird utilisation in the Darwin area. Nightcliff Rocks and East Point are headlands with exposed intertidal rock flats located approximately 8.5km and 6.5km north of Darwin respectively, while spot on Marine is an exposed mangrove mudflat approximately 6.5km north of Darwin.

Plate 1 Lee Point

Plate 2 Sandy Creek

Plate 3 Nightcliff Rocks

Plate 4　Spot on Marine

Plate 5　East Point

Figure 1 Lee Point and Sandy Creek Survey Locations

2.2 Field Assessments

Shorebird surveys were undertaken from 2nd to 4th of April 2025 by two qualified Ecologists competent in shorebird identification and counting techniques. Monitoring was conducted in accordance with the methods outlined in *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory* (Ecology and Heritage Partners, 2023). Each of the five survey locations was surveyed once by one person for a two-hour period within two hours either side of the high tide (see **Table 1**). In accordance with the Shorebird Monitoring Program (Ecology and Heritage Partners, 2023), the high tides on these days exceeded 6m (see **Table 1**). Sandy Creek and Lee Point were surveyed simultaneously as shorebirds are known to move between these proximate roosts (i.e., shorebirds roosting at Lee Point one day may roost at Sandy Creek the next day), thus ensuring an accurate count of birds utilising the area. Surveys were conducted at least 100m from roosts to ensure birds were not disturbed, with each surveyor equipped with binoculars (10 x 42) and a spotting scope (20-60 x magnification).

Table 1 Survey Periods, Tide Data and Weather Data

Date	Site	High Tide Height (m)	High Tide Time	Weather	Temperature (°C)	Rainfall (mm)	Wind Speed (km/h)/ Direction	Survey Period
02/04/25	Lee Point	7.77	08:55	Partly sunny	29	54.5	2 EW	08:00-10:00
02/04/25	Sandy Creek	7.77	08:55	Partly sunny	29	63.6	24 WNW	08:00-10:00
03/04/25	Spot on Marine	7.31	09:35	Partly sunny	29	63.6	24 WNW	08:00-10:00
03/04/25	East Point	7.31	09:35	Cloudy	29	0	7 WSW	08:30-10:30
04/04/25	Nightcliff Rocks	6.70	10:19	Cloudy	29	0	7 WSW	08:30-10:30

All shorebirds and waterbirds seen during the survey period were identified, counted and recorded. The behaviour of all birds was recorded (i.e., roosting, foraging etc), as were any changes to the environment, any disturbances to shorebirds, and any potential disturbances. As per the Shorebird Monitoring Program (Ecology and Heritage Partners, 2023), disturbances were defined as proximate stimuli (e.g., humans, dogs, raptors etc.), and the response of shorebirds to each disturbance was recorded (i.e., flight, walk away, no response). Distant disturbances were categorised as potential disturbances, and although these do not elicit a response from shorebirds, they provide a measure of anthropogenic disturbance on the beach. The time and type of each disturbance and potential disturbance was also recorded.

3.0 Results

Fifteen species of migratory shorebird were observed during the survey period – red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), bar-tailed godwit (*Limosa lapponica*), whimbrel (*Numenius phaeopus*), far eastern curlew (*Numenius madagascariensis*), red-necked stint (*Calidris ruficollis*), common sandpiper (*Actitis hypoleucos*), grey plover (*Pluvialis squatarola*), Terek sandpiper (*Xenus cinereus*), ruddy turnstone (*Arenaria interpres*), greater sand plover (*Charadrius leschenaultia*), Siberian sand plover (*Charadrius mongolus*), Pacific golden plover (*Pluvialis fulva*), sanderling (*Calidris alba*) and grey-tailed tattler (*Tringa brevipes*). All observations made during the survey period are detailed below.

Lee Point

Lee Point was surveyed simultaneously with Sandy Creek on April 2nd, 2025. Nine species of migratory shorebirds were recorded, along with four species of non-migratory shorebirds and migratory or resident seabirds (**Table 2**). No disturbances or potential disturbances were recorded during the survey period.

Table 2 Bird Observations at Lee Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:00	Great knot	1650	E	100	0	Roosting
08:00	Red knot	420	E	100	0	Roosting
08:00	Greater sand plover	225	E	100	0	Roosting
08:00	Siberian sand plover	45	E	100	0	Roosting
08:00	Red-necked stint	42	E	100	0	Roosting
08:00	Sanderling	12	E	100	0	Roosting
08:00	Bar-tailed godwit	28	E	100	0	Roosting
08:00	Ruddy turnstone	10	E	100	0	Roosting
08:00	Grey plover	12	E	100	0	Roosting
08:00	Greater crested tern	22	E	100	0	Roosting
08:00	Lesser crested tern	12	E	100	0	Roosting
08:00	Red-capped plover	18	E	100	0	Roosting
08:00	Little tern	12	E	100	0	Roosting

Plate 6 Mixed Flock at Lee Point

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on April 2nd, 2025. One species of migratory shorebird and one species of non-migratory waterbird were recorded during the survey period (**Table 3**). One potential disturbance was recorded during the survey period (**Table 4**).

Table 3 Bird Observations at Sandy Creek

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:00	Beach-stone curlew	1	N	100	0	Roosting
08:00	Far eastern curlew	1	W	50	3	Fly over

Table 4 Disturbance Observations at Sandy Creek

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
08:00	Human	20	None	-	-	-	Person sitting on bank >300m from roost at start of survey. Exited south along beach.	No response observed from shorebirds. **Potential disturbance.**

Plate 7 Beach Stone-curlew at Sandy Creek

Nightcliff Rocks

Nightcliff Rocks was surveyed on the 4th of April 2025. Ten species of migratory shorebirds, along with two species of resident waterbirds, were recorded during the survey period (**Table 5**). One potential disturbance was recorded during the survey period (**Table 6**).

Table 5 Bird Observations at Nightcliff Rocks

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:30	Ruddy turnstone	4	W	100	0	Roosting
08:30	Great knot	48	W	100	0	Roosting
08:30	Red knot	10	W	100	0	Roosting
08:30	Whimbrel	4	W	100	0	Roosting/foraging
08:30	Terek sandpiper	3	W	100	0	Roosting
08:30	Greater sand plover	28	W	100	0	Roosting
08:30	Siberian sand plover	8	W	100	0	Roosting
08:30	Common sandpiper	6	W	100	0	Foraging
08:30	Pacific golden plover	1	W	100	0	Roosting
08:30	Grey-tailed tattler	4	W	100	0	Roosting/foraging
08:30	Masked lapwing	2	W	100	0	Roosting
09:10	Pacific reef heron	1	SW	100	0	Foraging

Table 6 Disturbance Observations at Nightcliff Rocks

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
08:45	Human	10	None	-	-	-	Person walked along shoreline from boat ramp and exited via staircase towards Sunset Park.	Person stayed >100 m away from roosting shorebirds, eliciting no response. **Potential disturbance.**

Plate 8 Mixed Flock at Nightcliff Rocks

Spot on Marine

Spot on Marine was surveyed on the 3rd of April 2025. Two species of migratory shorebirds, along with four species of resident waterbirds were recorded during the survey period (**Table 7**). No disturbances were recorded during the survey period.

Table 7 Bird Observations at Spot on Marine

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:30	Whimbrel	24	SE	100	0	Roosting
08:30	Far eastern curlew	12	SE	100	0	Roosting
08:30	Little egret	1	SE	100	0	Roosting
08:30	Beach stone-curlew	1	SE	100	0	Roosting
08:30	Australian ibis	1	SE	100	0	Roosting
08:30	Striated heron	1	SE	100	0	Foraging

East Point

East Point was surveyed on the 3rd of April 2025. Seven species of migratory shorebird and two species of non-migratory waterbird were recorded during the survey period (**Table 8**). One disturbance was recorded during the survey period (**Table 9**).

Table 8 Bird Observations at East Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:30	Ruddy turnstone	19	W	100	0	Roosting
08:30	Pacific golden plover	2	W	100	0	Roosting
08:30	Greater sand plover	18	W	100	0	Roosting
08:30	Terek sandpiper	1	W	100	0	Roosting
08:30	Common sandpiper	2	W	100	0	Foraging
09:20	Pacific reef heron	1	W	100	0	Foraging
09:20	Sooty oystercatcher	1	W	100	0	Roosting
09:30	Whimbrel	1	W	100	0	Roosting/foraging
09:30	Pacific golden plover	9	W	100	0	Roosting
09:30	Terek sandpiper	6	W	100	0	Roosting
09:30	Grey-tailed tattler	14	W	100	0	Roosting/foraging
09:30	Greater sand plover	4	W	100	0	Roosting

Table 9 Disturbance Observations at East Point

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
10:11	Human	5	Flushed	All species from survey	78	Yes – approx. 40 birds	Group of 13 people walked onto the rocks from the south and exited the same way.	All birds were flushed. Some left the site, others flew into the mangroves. 38 birds resettled in the same location around five minutes after the group departed.

Plate 9 Grey-tailed Tattler at East Point

4.0 Conclusion

The aim of this survey was to quantify richness and abundance of migratory shorebirds on Darwin's northern beaches during the month of April, as well as gather data on anthropogenic disturbance at five key feeding and roosting locations. Monitoring was conducted in accordance with the *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory* (Ecology and Heritage Partners 2023).

Fifteen species of migratory shorebird were recorded across the five survey sites. The highest abundance was at Lee Point, with over 2000 migratory shorebirds recorded. This represents a divergence from the March and February surveys, where the highest abundance was recorded at Nightcliff Rocks, with very few migratory shorebirds seen at Lee Point. This suggests that migratory shorebirds move between these roosts, with roost selection likely dependent on a variety of factors including tide height, weather, and disturbance.

This survey marks the end of this monitoring program for the 2024/25 austral summer. Many of the shorebirds observed during this survey period were showing breeding plumage, suggesting they will soon begin their journey to the northern hemisphere to breed. This monitoring program will continue in June to monitor over-wintering shorebirds on Darwin's northern beaches.

5.0 References

Ecology & Heritage Partners (2023). *Shorebird Monitoring: Lee Point, Darwin, Northern Territory (Winter 2023)*. Report prepared for Defence Housing Australia, Darwin, Northern Territory.

EcOz Environmental Consulting (2022). *Shorebird Monitoring Program Lee Point Master-planned Urban Development*. Defence Housing Australia, Darwin, Northern Territory.

Lilleyman, A. (2017). *Report on Potential Impacts from Disturbance to Migratory Shorebirds in Darwin: Defence Housing Australia – Lee Point Master-planned Urban Development.* Defence Housing Australia, Darwin, Northern Territory.

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