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

Defence Housing Australia

4 elements

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Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	24.02.2025	M. Brown	24/02/2025

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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. Thus, this February survey will form part of an ongoing monitoring program aiming to quantify richness and abundance of shorebirds that spend their austral summer on Darwin's northern beaches, as well as providing a measure of 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 February 14th-16th 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
14/02/25	Lee Point	6.77	07:16	Partly sunny	27	4.4	7 WNW	06:30-08:30
14/02/25	Sandy Creek	6.77	07:16	Partly sunny	27	4.4	7 WNW	06:30-08:30
15/02/25	Spot on Marine	6.88	07:51	Overcast with light rain	26	6.8	7 S	07:00-09:00
15/02/25	East Point	6.88	07:51	Overcast with light rain	26	6.8	7 S	07:00-09:00
16/02/25	Nightcliff Rocks	6.87	08:23	Overcast with light rain	25	21	2 E	07:15-09:15

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*), black-bellied 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 February 14th 2025. One species of migratory shorebird was recorded (**Table 2**) during the survey period, as well as six species of non-migratory waterbird. No disturbances and one potential disturbance was recorded.

Table 2 Bird Observations at Lee Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
06:30	Far-eastern curlew	3	W	150	0	Roosting
06:30	Caspian tern	1	E	100	0	Roosting
06:30	Lesser crested tern	11	E	100	0	Roosting
06:30	Greater crested tern	33	E	100	0	Roosting
06:30	Common tern	6	E	100	0	Roosting
06:30	Red-capped plover	16	E	50-100	0	Feeding
06:50	Australian pelican	1	W	150	20	Flying

Table 3 Disturbance Observations at Lee Point

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
07:10	Human	10	None	-	-	-	Two humans approached shorebirds from the northern end of the beach and walked to within 150m of roost before turning around.	No response elicited from shorebirds. **Potential disturbance.**

Plate 6 Mixed Flock of Terns at Lee Point

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on February 14th 2025. Three species of migratory shorebird and two species of non-migratory waterbird were recorded during the survey period (**Table 4**). Two disturbances and no potential disturbances were recorded during the survey period (**Table 5**).

Table 4 Bird Observations at Sandy Creek

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
06:30	Sanderling	70	SW	100	0	Roosting
06:30	Greater crested tern	7	SW	100	0	Roosting
06:30	Greater sand plover	2	SW	100	0	Roosting
06:30	Great knot	12	N	120	0	Roosting
06:45	Silver gull	1	N	80	0	Roosting
07:30	Beach stone-curlew	2	N	100	0	Foraging

Table 5 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
06:35	Human/ dog	5	Flushed	Sanderling, greater sand plover, greater crested tern	79	No	Human walking their dog along the beach. Walked from south to north and exited north of Nude Beach.	Shorebirds were flushed but re-settled approximately 30m north of original roost.
08:01	Human/ dog	3	Flushed	Great knot	12	No	Human walking four off-leash dogs along the beach. The dogs ran ahead of the human, flushing roosting birds. The human and dogs entered from the northern end of the beach and walked toward the mangroves where shorebirds were roosting.	Shorebirds were flushed but re-0settled in the same location after the disturbance passed.

Plate 7 Beach Stone-curlew at Sandy Creek

Nightcliff Rocks

Twelve species of migratory shorebird and seven species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 6**). One disturbance (**Table 7**) and no potential disturbances were recorded during the survey period.

Table 6 Bird Observations at Nightcliff Rocks

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
07:15	Whimbrel	6	W	100	0	Roosting
07:15	Grey-tailed tattler	12	W	100	0	Roosting/foraging
07:15	Common sandpiper	10	W	100	0	Roosting/foraging
07:15	Silver gull	3	W	100	0	Roosting
07:15	Masked lapwing	2	W	100	0	Roosting
07:15	Pacific golden plover	5	W	100	0	Roosting
07:15	Ruddy turnstone	6	W	100	0	Roosting
07:15	Great knot	2200	W	100	0	Roosting
07:15	Red knot	212	W	100	0	Roosting

07:15	Greater sand plover	200	W	100	0	Roosting
07:15	Siberian sand plover	31	W	100	0	Roosting
07:15	Common tern	2	W	100	0	Roosting
07:15	Little tern	5	W	100	0	Roosting
07:15	Sooty oystercatcher	3	W	100	0	Roosting
07:15	Red-necked stint	1	W	100	0	Roosting
07:15	Greater crested tern	2	W	100	0	Roosting
07:15	Sanderling	3	W	100	0	Roosting
08:20	Lesser crested tern	1	W	100	0	Roosting
09:01	Terek sandpiper	12	W	100	0	Roosting

Table 7 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
08:08	Human/dog	1	Flushed	All species from survey	~2200	No	Entered via staircase to rocks and walked south along the shore.	Shorebirds were flushed but re-settled in the same location after the disturbance passed.

Plate 8 Mixed Flock at Nightcliff Rocks

Spot on Marine

Seven migratory shorebirds were recorded at Spot on Marine during the survey period (**Table 6**). No disturbances or potential disturbances were recorded during the survey period.

Table 8 Bird Observations at Spot on Marine

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
07:30	Whimbrel	56	SE	100	0	Roosting
07:30	Far eastern curlew	33	SE	100	0	Roosting
07:30	Bar-tailed godwit	2	SE	100	0	Roosting
07:30	Black-bellied plover	16	SE	100	0	Roosting
07:30	Radjah shelduck	6	SE	100	0	Roosting
07:30	Great knot	12	SE	100	0	Roosting
07:30	Pied oystercatcher	3	SE	100	0	Roosting
07:45	Common sandpiper	1	W	100	0	Foraging
08:00	Striated heron	1	W	80	0	Foraging

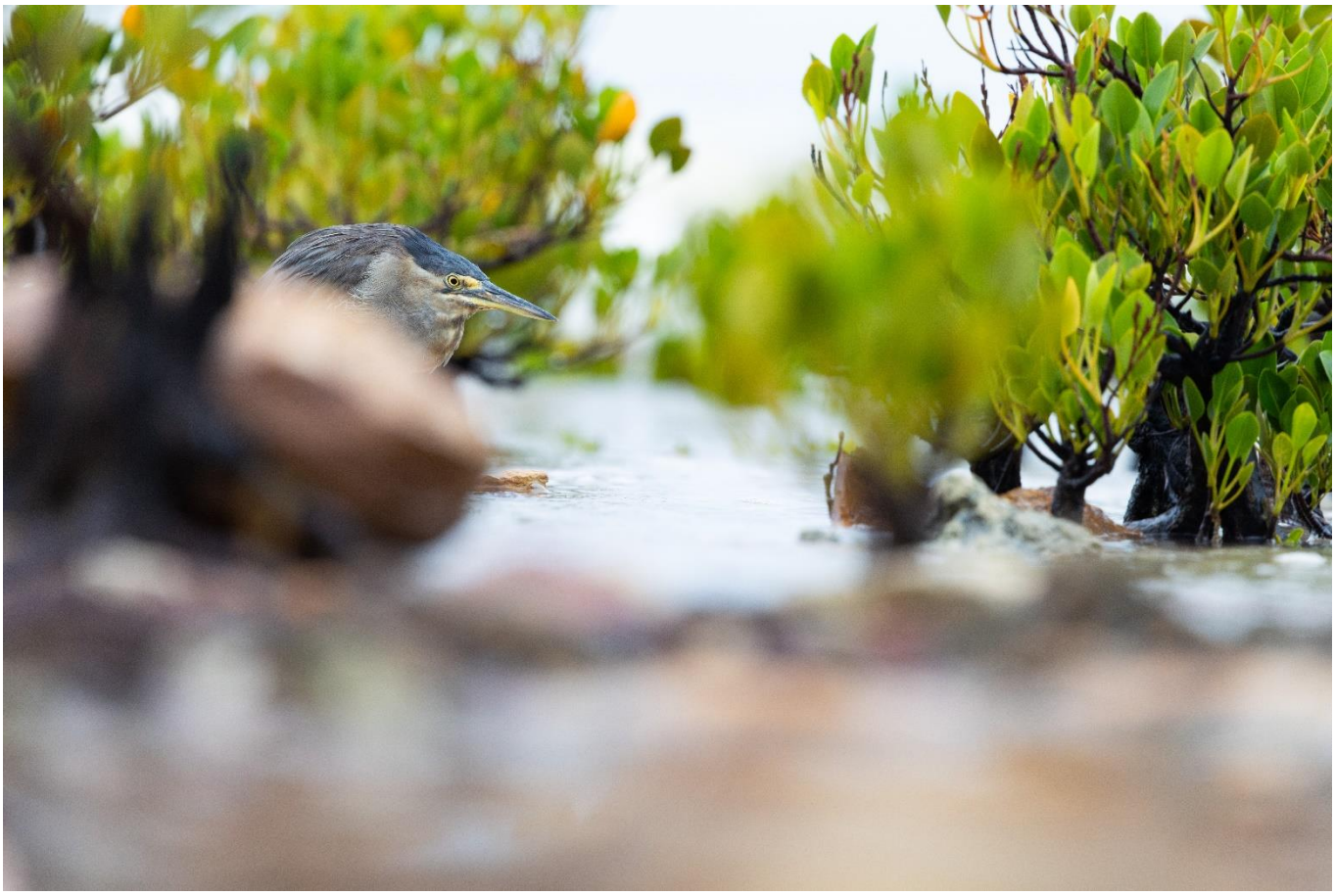

Plate 9 Striated Heron at Spot On Marine

East Point

Eight species of migratory shorebird and three species of non-migratory waterbird were recorded at East Point during the survey period (**Table 9**). Three disturbances and no potential disturbances were recorded during the survey period (**Table 10**).

Table 9 Bird Observations at East Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
07:00	Ruddy turnstone	29	W	100	0	Roosting
07:00	Common sandpiper	11	W	20-100	0	Roosting/foraging
07:00	Pacific golden plover	7	W	100	0	Roosting
07:00	Greater sand plover	105	W	100	0	Roosting
07:00	Siberian sand plover	4	W	100	0	Roosting
07:00	Grey-tailed tattler	1	W	100	0	Roosting
07:00	Whimbrel	1	W	100	0	Roosting
07:00	Masked lapwing	3	W	100	0	Roosting
07:00	Terek sandpiper	4	W	100	0	Roosting

07:58	Pacific reef heron	2	W	100	0	Foraging
08:00	Striated heron	1	E	80	0	Foraging

Table 10 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
07:49	Human	1	Flushed	All species from survey	165	No	Fisherman accessed rocks from the walking track, flushing roosting shorebirds before exiting south along the beach.	Shorebirds flushed but re-settled in the same location after the disturbance passed.
07:51	Human	2	Flushed	All species from survey	120	No	Person walked south along the beach.	Shorebirds flushed but re-settled in the same location after approximately 10 min.
08:23	Human	10	Flushed	All species from survey	135	No	Fisherman accessed rocks from the walking track, before exiting south of the roost.	Shorebirds flushed with approximately half resettling in the same location, and the rest moving slightly north to a new roost.

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 February, 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. Consistent with the January survey, the highest diversity and abundance was recorded at Nightcliff Rocks, which represents a divergence from previous survey results. From October to December, Lee Point was the most abundant and diverse roost, with up to 5000 shorebirds recorded during a single survey. Although these numbers haven't been replicated at Nightcliff rocks, the sharp increase in the number of shorebirds recorded at Nightcliff during recent surveys (eg: from 65 great knots in December to 2200 in February) suggests that shorebirds are utilising this roost preferentially over Lee Point. This survey will be repeated monthly for the remainder of the wet season, providing greater insight into shorebird movements 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.

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