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

Defence Housing Australia

4 elements

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Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	17.01.2025	M. Brown	17.01.2025

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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 January 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 January 15th-17th 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
15/01/25	Lee Point	6.35	06:24	Mostly cloudy with scattered showers	28	<1	7 SW	06:15-08:15
15/01/25	Lee Point	6.35	06:24	Mostly cloudy with scattered showers	28	<1	7 SW	06:15-08:15
16/01/25	Nightcliff Rocks	6.49	07:09	Mostly cloudy with scattered showers	27	<1	7 S	06:30-08:30
17/01/25	Spot on Marine	6.52	07:51	Mostly cloudy with scattered showers	27	<1	7 WSW	06:30-08:30
17/01/25	East Point	6.52	07:51	Mostly cloudy with scattered showers	27	<1	7 WSW	06:30-08:30

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

Sixteen 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*), sharp-tailed sandpiper (*Calidris acuminata*), 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*), common greenshank (*Tringa nebularia*) 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 January 15th 2025. Four species of migratory shorebird were recorded (**Table 2**) during the survey period, as well as seven 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
06:15	Bar-tailed godwit	2	E	100	0	Roosting
06:15	Sanderling	5	E	150	0	Roosting
06:15	Grey-tailed tattler	1	E	100	0	Roosting
06:15	Far-eastern curlew	3	E	150	0	Roosting
06:15	Lesser crested tern	72	E	100	0	Roosting
06:15	Greater crested tern	21	E	100	0	Roosting
06:15	Caspian tern	1	E	100	0	Roosting
06:15	Silver gull	24	E	100	0	Roosting
06:15	Red-capped plover	15	E	20-100	0	Feeding
06:30	Pied oystercatcher	2	E	150	0	Feeding
06:45	Lesser frigatebird	1	W	150	100	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
07:15	Human	5	None	-	-	-	Single human approached shorebirds from the northern end of the beach and walked to within 200m of roost before turning around.	No response elicited from shorebirds. **Potential disturbance.**

Plate 6 Lesser Frigatebird at Lee Point

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on January 15th 2025. Nine species of migratory shorebird and 7 species of non-migratory waterbird were recorded during the survey period (**Table 4**). No disturbances and one potential disturbance were recorded (**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	Great knot	420	SW	100	0	Roosting
06:30	Red knot	65	SW	100	0	Roosting
06:30	Far-eastern curlew	18	SW	100	0	Roosting
06:30	Red-necked stint	115	SW	100	0	Roosting
06:30	Sanderling	8	SW	100	0	Roosting
06:30	Whimbrel	2	SW	100	0	Roosting
06:30	Grey-tailed tattler	1	SW	100	0	Roosting
06:30	Red-capped plover	16	SW	50-100	0	Foraging
06:30	Greater crested tern	24	SW	100	0	Roosting
06:30	Silver gull	17	SW	100	0	Foraging
06:45	Common sandpiper	2	SW	120	0	Foraging
06:45	Ruddy turnstone	5	SW	120	0	Foraging
07:10	Pacific reef heron	1	N	150	40	Flying

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
07:00	Human	10	None	-	-	-	Single human approached shorebirds from the south and came to within 150m of roost before turning around.	No response elicited from shorebirds. **Potential disturbance.**

Plate 7 Great Knot at Sandy Creek

Nightcliff Rocks

Twelve species of migratory shorebird and eight species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 6**). Two disturbances (**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
06:30	Common sandpiper	7	W	100	0	Roosting
06:30	Whimbrel	6	W	100	0	Roosting
06:30	Grey-tailed tattler	5	W	100	0	Roosting
06:30	Ruddy turnstone	9	W	100	0	Roosting
06:30	Little tern	1	W	100	0	Roosting
06:30	Silver gull	6	W	100	0	Roosting
06:30	Pacific golden plover	12	W	100	0	Roosting
06:30	Greater sand plover	95	W	100	0	Roosting

06:30	Siberian sand plover	20	W	100	0	Roosting
06:30	Greater crested tern	32	W	100	0	Roosting
06:30	Lesser crested tern	4	W	100	0	Roosting
06:30	Red-necked stint	19	W	100	0	Roosting
06:30	Terek sandpiper	11	W	100	0	Roosting
06:30	Great knot	730	W	100	0	Roosting
06:30	Red knot	30	W	100	0	Roosting
06:30	Sooty oystercatcher	2	W	100	0	Roosting
06:30	Common tern	2	W	100	0	Roosting
06:45	Masked lapwing	2	W	50	0	Foraging
07:30	Caspian tern	1	N	120	80	Flying

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
07:23	Human/dog	5	None	-	-	No	Approached birds from the west and exited to the east.	Person walked their dog to within 60m of roosting birds, eliciting no response.
07:50	Helicopter	1	Flushed	Greater crested tern, lesser crested tern	25	No	-	Terns flushed and circled the roost before settling again in the same position.

Plate 8 Caspian Tern 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
06:30	Whimbrel	46	SE	100	0	Roosting
06:30	Far eastern curlew	28	SE	100	0	Roosting
06:30	Bar-tailed godwit	6	SE	100	0	Roosting
06:30	Pacific golden plover	6	SE	100	0	Roosting
06:30	Siberian sand plover	2	SE	100	0	Roosting
06:30	Great knot	84	SE	100	0	Roosting
06:30	Greenshank	2	SE	100	0	Roosting

Plate 9 Whimbrels at Spot On Marine

East Point

Nine species of migratory shorebird and nine species of non-migratory waterbird were recorded at East Point during the survey period (**Table 9**). A single disturbance and 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
06:30	Common sandpiper	9	W	100	0	Foraging
06:30	Whimbrel	1	W	100	0	Roosting
06:30	Beach stone-curlew	2	W	100	0	Roosting
06:30	Greater crested tern	6	W	100	0	Roosting
06:30	Ruddy turnstone	22	W	100	0	Roosting
06:30	Terek sandpiper	4	W	100	0	Roosting
06:30	Grey-tailed tattler	7	W	100	0	Roosting
06:30	Greater sand plover	112	W	100	0	Roosting
06:30	Siberian sand plover	11	W	100	0	Roosting
06:30	Masked lapwing	4	W	100	0	Roosting
06:30	Silver gull	2	W	100	0	Roosting
06:30	Pacific golden plover	2	W	100	0	Roosting

06:30	Red-necked stint	4	W	100	0	Roosting
07:00	Striated heron	1	W	60	0	Foraging
07:10	Pacific reef heron	3	W	80	0	Flying

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
07:40	Human	30	-	-	2	-	Walked from northern end of the beach towards birds before exiting via the trail adjacent to the roost.	Two people fishing on rocks approximately 100m from roosting shorebirds. No response elicited.
08:00	Human	15	-	-	-	-	Walked north-south along the walking track and stopped at the look out. Did not descend to the beach.	A group of 5 birders observed the shorebirds from the walking track. **Potential disturbance.**

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 December, 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).

Sixteen species of migratory shorebird were recorded across the five survey sites, with the highest diversity and abundance recorded at Nightcliff Rocks. This represents a divergence from previous survey results, which have consistently recorded the highest diversity and abundance of migratory shorebirds at Lee Point. Shorebirds on Darwin's northern beaches are known to move between roosts at Lee Point and Sandy Creek if they are disturbed (Lilleyman 2017). However, abundance was not observed to be significantly higher at Sandy Creek, despite this area being surveyed simultaneously with Lee Point. The reason behind this absence of shorebirds from both roosts is unknown, and it is impossible to make accurate predictions about causation without further survey effort. 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.

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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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