Shorebird Monitoring: Lee Point, Darwin, Northern Territory (September 2024)

Defence Housing Australia

4 elements

Shorebird Monitoring: Lee Point, Darwin, Australia (Winter 2024)
Defence Housing Australia

Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	30.09.2024	M. Brown	30.09.2024

4 Elements Consulting
107 Scott Street
Bungalow, QLD 4870
www.4elementsconsulting.com.au

Contents

Figures

Tables

Plates

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, meaning this September survey marks the beginning of their non-breeding layover.

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 Point Survey Locations

2.2 Field Assessments

Shorebird surveys were undertaken from September 19th-21st 2024 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 approximately one hour 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 Point 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 (ºC)	Rainfall (mm)	Wind Speed (km/h)/ Direction	Survey Period
19/09/24	Lee Point	7.68	06:56	Partly sunny	26	0	17 EW	06:40-08:40
19/09/24	Sandy Creek	7.68	06:56	Partly sunny	27	0	17 EW	06:40-08:40
20/09/24	Nightcliff Rocks	7.75	07:22	Scattered clouds	27	0	6 EW	07:00-09:00
21/09/24	Spot on Marine	7.66	07:47	Partly sunny	27	<1	7 EW	07:30-09:30
21/09/24	East Point	7.66	07:47	Partly sunny	27	<1	7 EW	07:30-09:30

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, disturbances, and 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

16 species of migratory shorebird were observed during the survey period – red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), bar-tailed godwit (*Limosa lapponica*), black-tailed godwit *(Limosa limosa*), whimbrel (*Numenius phaeopus*), far eastern curlew (*Numenius madagascariensis*), sanderling (*Calidris alba*), red-necked stint (*Calidris ruficollis*), common sandpiper (*Actitis hypoleucos*), Terek sandpiper (*Xenus cinereus*), sharp-tailed sandpiper (*Calidris acuminata*), ruddy turnstone (*Arenaria interpres*), greater sand plover (*Charadrius leschenaultia*), Siberian sand plover (*Charadrius mongolus*), Pacific golden plover (*Pluvialis fulva*), 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 September 19th 2024. Fourteen species of migratory shorebird were recorded (**Table 2**), as well as 12 species of non-migratory waterbirds. One disturbance and no potential disturbances were recorded during the survey period (**Table 3**).

Table 2 Bird Observations at Lee Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
06:40	Sooty oystercatcher	4	E	100	0	Roosting
06:40	Black-necked stork	1	E	100	0	Roosting
06:40	Great knot	340	E	100	0	Roosting
06:40	Red knot	100	E	100	0	Roosting
06:40	Crested tern	15	E	100	0	Roosting
06:40	Lesser crested tern	1	E	100	0	Roosting
06:40	Bar-tailed godwit	3	E	100	0	Roosting
06:40	Black-tailed godwit	3	E	100	0	Roosting
06:40	Siberian sand plover	80	E	100	0	Roosting
06:40	Greater sand plover	420	E	100	0	Roosting
06:40	Far eastern curlew	1	E	100	0	Roosting
06:40	Red-capped plover	25	E	100	0	Foraging
06:40	Terek sandpiper	8	E	100	0	Roosting
06:40	Grey-tailed tattler	1	E	100	0	Roosting
06:40	Ruddy turnstone	32	E	100	0	Roosting
06:40	Silver gull	100	E	100	0	Roosting
06:40	Sharp-tailed sandpiper	10	E	100	0	Roosting
06:40	Common sandpiper	1	E	100	0	Roosting
06:40	Red-necked stint	85	E	100	0	Roosting
06:40	Sanderling	20	E	100	0	Roosting
06:40	Whiskered tern	4	E	100	0	Roosting

06:40	Australian pelican	8	E	100	0	Roosting
06:40	Pied oystercatcher	1	E	100	0	Foraging
07:00	Gull-billed tern	1	E	100	50	Flying
07:00	Great egret	1	E	80	0	Foraging
07:20	Beach stone-curlew	2	E	50	0	Foraging

Table 3 Disturbance Observations at Lee Point

Time	Type	Duration (min)	Shorebird Response	Species affected	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
06:45	Human	30	None	All of the above	-	No	Entry point unknown, exit point was the walking track to the west of the roost	Birder was standing approximately 60m south of the birds when we arrived and exited via the walking track west of the roost

Plate 6 Mixed Flock at Lee Point

Plate 7 Bar-tailed godwit at Lee Point

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on September 19th 2024. No migratory shorebirds and four species of non-migratory waterbird were recorded during the survey period (**Table 4**). One disturbance 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
06:40	Silver gull	12	SW	100	0	Roosting
06:40	Red-capped plover	6	SW	60	0	Foraging
06:40	Beach stone-curlew	2	SW	60	0	Foraging
07:10	Crested tern	1	N	60	80	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
07:30	Human	5	None	Silver gull, red-capped plover, beach stone-curlew	-	No	Entered and exited via walking track at the north end of the beach	Two walkers came within 50m of the roosting waterbirds before turning around

Plate 8 Red-capped Plover at Sandy Point

Nightcliff Rocks

Eight species of migratory shorebird and seven species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 6**). Due to the large high tide, the rocky outcrop utilised as a roosting site was completely inundated at the beginning of the survey, with shorebirds either roosting in nearby mangroves or arriving as the tide receded. 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
07:00	Whimbrel	7	W	250	2	Roosting
07:00	Great knot	20	W	250	2	Roosting
07:00	Terek sandpiper	15	W	250	2	Roosting
07:00	Striated heron	1	W	50	0	Foraging
07:00	Gull-billed tern	1	W	250	2	Roosting
07:00	Buff-banded rail	1	W	60	0	Foraging
08:15	Ruddy turnstone	5	W	100	0	Roosting
08:15	Crested tern	40	W	100	0	Roosting
08:15	Greater sand plover	80	W	100	0	Roosting
08:15	Lesser sand plover	40	W	100	0	Roosting
08:15	Grey-tailed tattler	5	W	100	0	Roosting
08:15	Silver gull	30	W	100	0	Roosting
08:15	Lesser crested tern	2	W	100	0	Roosting
08:15	Beach stone-curlew	1	W	100	0	Roosting
08:15	Common sandpiper	3	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
07:00	Jet ski	5	Flushed but returned to roost	Whimbrel, great knot, Terek sandpiper, striated heron, gull-billed tern, buff-banded rail	46	No	-	Birds were flushed multiple times by a jet ski but returned to roost each time.

Plate 9 Striated Heron at Nightcliff rocks

Spot on Marine

No migratory shorebirds and one species of non-migratory shorebird were recorded at Spot on Marine during the survey period (**Table 8**). 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	Black-fronted dotterel	2	W	50	0	Foraging

East Point

Nine species of migratory shorebird and five species of non-migratory waterbird were recorded at East Point during the survey period (**Table 9**). Due to the large high tide, the rocky roosting site utilised as a roost was completely inundated at the beginning of the survey, with shorebirds either roosting in nearby mangroves or

arriving as the tide receded. 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
07:30	Common sandpiper	3	W	100	0	Roosting
07:30	Striated heron	3	W	100	0	Foraging
07:30	Buff-banded rail	1	S	50	0	Foraging
07:30	Whimbrel	1	W	100	0	Roosting
08:15	Gull-billed tern	3	W	100	0-50	Foraging
08:15	Silver gull	1	W	50	0	Foraging
08:15	Ruddy turnstone	15	W	100	0	Roosting
08:30	Terek sandpiper	1	W	100	0	Foraging
08:30	Grey-tailed tattler	4	W	80	0	Foraging
08:30	Pacific golden plover	1	W	60	0	Roosting
08:30	Greater sand plover	35	W	80	0	Foraging
08:30	Lesser sand plover	10	W	100	0	Flying
08:30	Masked lapwing	1	S	40	0	Foraging
08:30	Common sandpiper	1	W	40	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
08:00	Human	15	Flushed	Common sandpiper	1	No	Entered and exited via walking track adjacent to roost	Man walked onto beach and sat approximately 100m from shorebirds roosting in mangroves.
08:10	Human	45	None	-	-	-	Entered and exited via walking track adjacent to roost	Man fished along rocks approximately 100-150m from shorebirds.
08:40	Human	2	None	-	-	-	Entered via walking track adjacent to roost and walked NW along beach	-

Plate 10　Roosting Migratory Shorebirds at East Point

Plate 11　Beach-stone Curlew 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 September, 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).

16 species of migratory shorebird were recorded across the five survey sites, with the highest diversity and abundance recorded at Lee Point. Relatively few disturbances were recorded, and no potential disturbances were recorded at any of the sites.

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.

Northern Territory Environmental Protection Authority (2018). *Assessment report 88 – Lee Point master-planned urban development.* Defence Housing Australia, Darwin, Northern Territory.