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

Defence Housing Australia

4 elements

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Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	16.08.2024	M. Brown	16.08.2024

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

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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 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. Birds that are too young to breed or adults that are not strong enough for the journey north will stay in Australia the whole year, and these birds are the focus of this study.

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 July 25th-27th 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
25/07/24	Lee Point	7.42	09:05	Partly cloudy	25	0	11 W	08:00-10:00
25/07/24	Sandy Creek	7.42	09:05	Partly cloudy	25	0	11 W	08:00-10:00
26/07/24	Nightcliff Rocks	7.24	09:35	Sunny	27	0	24 SW	08:30-10:30
27/07/24	Spot on Marine	6.94	10:04	Partly cloudy	28	0	9 W	09:00-11:00
27/07/24	East Point	6.94	10:04	Partly cloudy	28	0	9 W	09:00-11:00

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 (eg: 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

11 species of migratory shorebird were observed during the survey period – Red knot (*Calidris canutus*), Great knot (*Calidris tenuirostris*), Sanderling (*Calidris alba*), Red-necked stint (*Calidris ruficollis*), Common sandpiper (*Actitis hypoleucos*), Curlew sandpiper (*Calidris ferruginea*), 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 July 25th 2024. Five species of migratory shorebird were recorded (**Table 2**), as well as 14 species of non-migratory waterbirds. Two disturbances 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
08:00	Sooty oystercatcher	2	NW	100	0	Roosting
08:00	Great knot	90	NW	100	0	Roosting
08:00	Crested tern	25	NW	100	0	Roosting
08:00	Caspian tern	1	NW	100	0	Roosting
08:00	Red-capped plover	25	NW	20-100	0	Foraging
08:00	Masked lapwing	5	SW	50	0	Foraging
08:00	Common tern	2	NW	100	0	Foraging
08:00	Silver gull	1	E	100	0	Foraging
08:00	Eastern reef egret	1	NW	100	0	Foraging
08:00	Lesser crested tern	1	NW	100	30	Flying
08:00	Red knot	10	NW	100	0	Roosting
08:00	Gull-billed tern	1	NW	100	80	Flying
08:00	Curlew sandpiper	1	NW	100	0	Roosting
08:00	Red-necked stint	3	NW	100	0	Roosting
08:00	Sanderling	5	NW	100	0	Roosting
08:00	Whiskered tern	2	NW	100	0	Roosting
08:30	Australian white ibis	1	SW	50	0	Foraging
08:45	Striated heron	1	S	60	0	Foraging
09:00	Pied oystercatcher	2	NW	80	0	Foraging

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
09:00	Human	20	None	Great knot, Red knot, Red-capped plover, Curlew sandpiper, Sanderling, Red-necked stint	-	No	Walked along beach from NW to SE	Birder walked to within 40m of birds and elicited no response
09:35	Black kite	1	Flight	Great knot, Red knot, Curlew sandpiper, Sanderling, Red-necked stint	130	No	-	Birds flushed and circled before returning to their roost

Plate 6 Flushed Shorebirds at Lee Point

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on July 5th 2024. No migratory shorebirds and one species of non-migratory shorebird 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
09:15	Beach stone-curlew	1	SW	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
09:35	Human/dog	2	Flight	Beach stone-curlew	1	Yes	Entered from north end of beach	Bird returned approximately 10min later

Nightcliff Rocks

Two species of migratory shorebird and five species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 6**). No disturbances or 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
08:30	Common sandpiper	1	W	100	0	Roosting
08:30	Grey-tailed tattler	1	W	100	0	Roosting
08:30	Masked lapwing	4	W	100	0	Roosting
08:30	Silver gull	6	W	100	0	Roosting
08:30	Lesser crested tern	2	W	100	100	Flying
09:00	Pacific reef egret	2	W	40	0	Foraging
09:20	Beach stone-curlew	2	W	50	0	Foraging

Plate 7 Beach Stone-curlew 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 7**). No disturbances or potential 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
10:30	Beach stone-curlew	1	SW	30	0	Walking

East Point

Seven species of migratory shorebird and seven species of non-migratory waterbird were recorded at East Point during the survey period (**Table 8**). Two disturbances and no potential disturbances were 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
09:00	Pacific golden plover	6	W	100	0	Roosting
09:00	Ruddy turnstone	4	W	100	0	Roosting
09:00	Red-necked stint	14	W	100	0	Roosting
09:00	Greater sand plover	14	W	100	0	Roosting
09:00	Siberian sand plover	4	W	100	0	Roosting
09:00	Grey-tailed tattler	12	W	100	0	Roosting
09:00	Common sandpiper	8	W	100	0	Roosting
09:00	Masked lapwing	2	W	100	0	Foraging
09:30	Striated heron	1	W	80	0	Foraging
09:30	Silver gull	4	S	60	0	Roosting
09:45	Pied oystercatcher	2	W	80	0	Foraging
09:50	Lesser crested tern	1	W	100	80	Flying
10:00	Beach stone-curlew	3	E	40	0	Roosting
10:10	Pacific reef heron	2	W	40	0	Foraging

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
10:15	Human	2	No response	-	-	No	Walked from south to north along beach	Walked to within 60m of shorebirds and elicited no response
10:30	Human	10	Flight	Pacific golden plover, Ruddy turnstone, Red-necked stint, Greater sand plover, Siberian sand plover, Grey-tailed tattler, Common sandpiper	62	No	Entered and exited beach from the south	Two people walked out onto rocks. Birds flushed, circled and returned once the people had left.

Plate 8　Roosting Migratory Shorebirds at East Point

Plate 9　Flushed Migratory Shorebirds at East Point

4.0 Conclusion

The aim of this survey was to quantify richness and abundance of shorebirds that remain on Darwin's northern beaches during the northern hemisphere breeding season, 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).

11 species of migratory shorebird were recorded across the five survey sites, with the highest diversity and abundance recorded at Lee Point and East 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.