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

Defence Housing Australia

4 elements

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Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	26.03.2025	M. Brown	27.03.2025

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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 March 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.

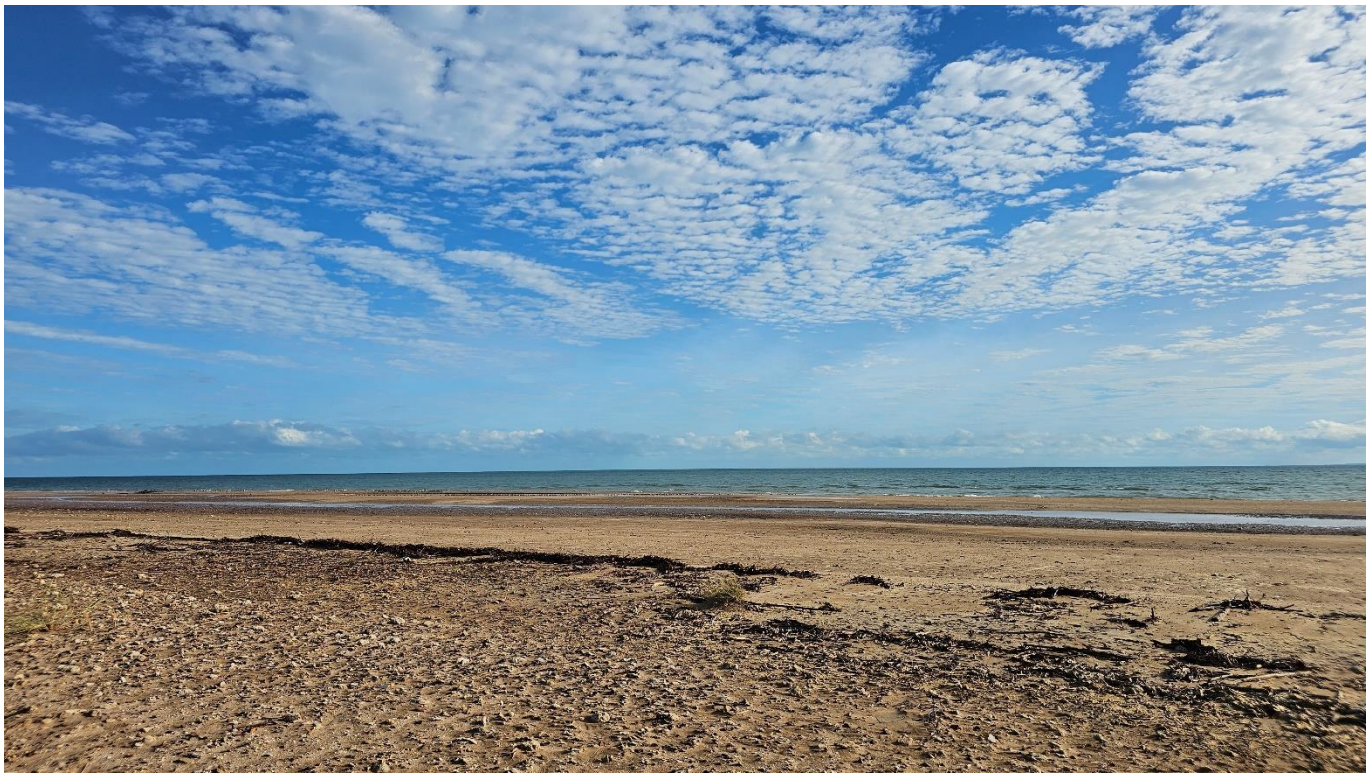

Plate 1 Lee Point

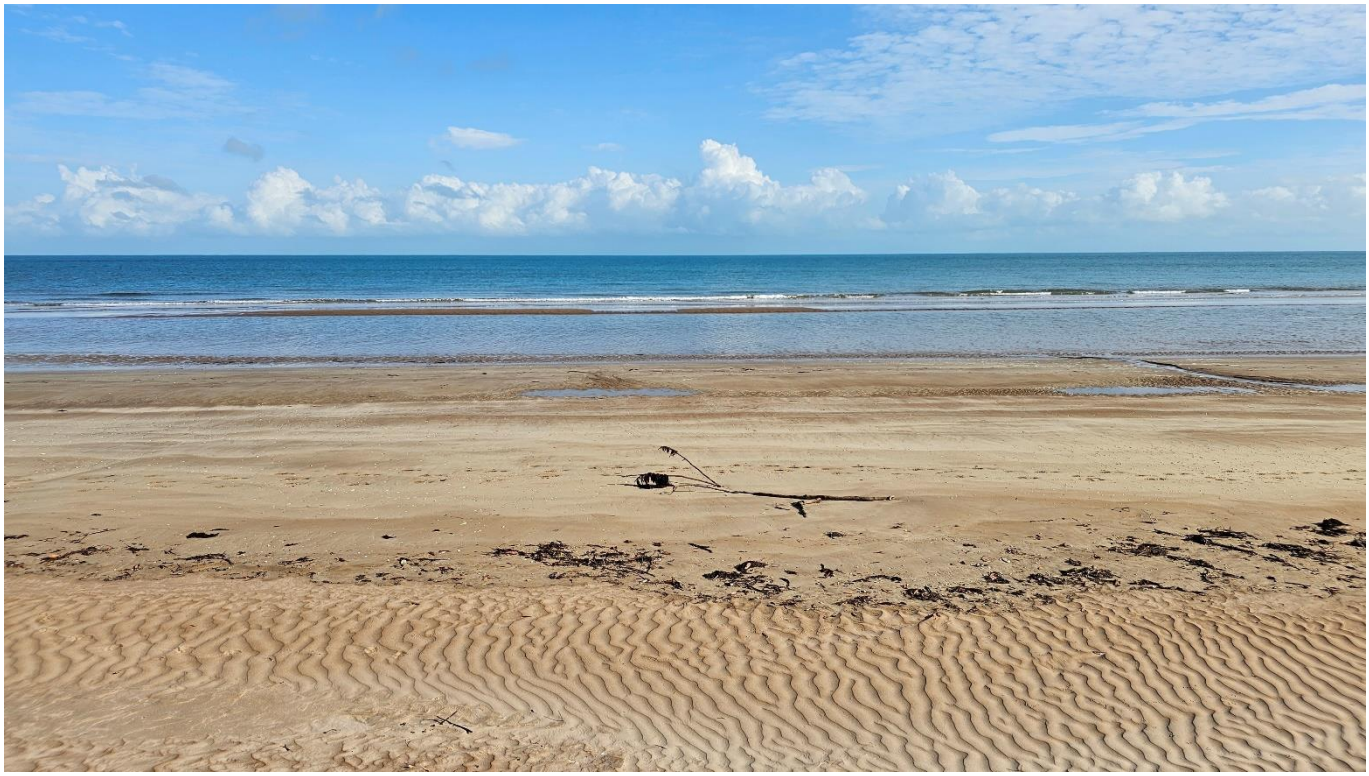

Plate 2 Sandy Creek

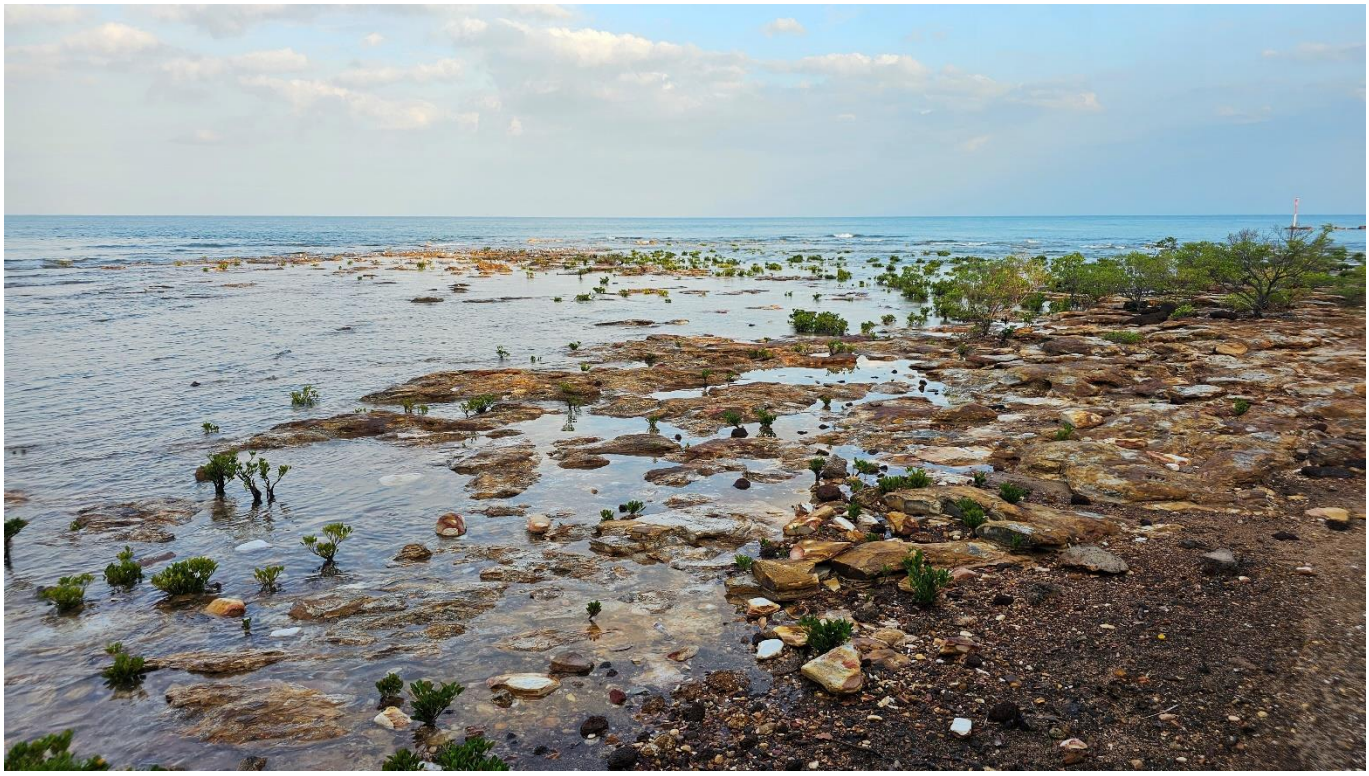

Plate 3 Nightcliff Rocks

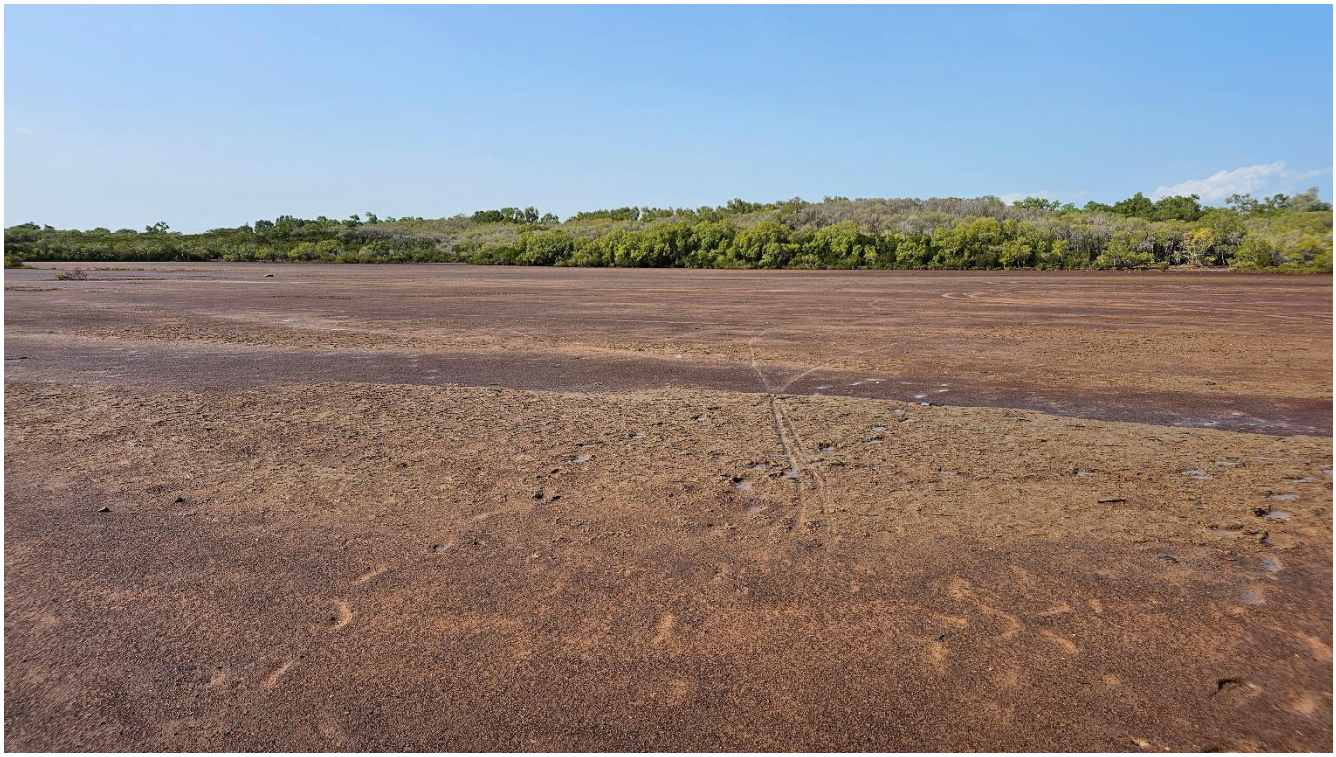

Plate 4　Spot on Marine

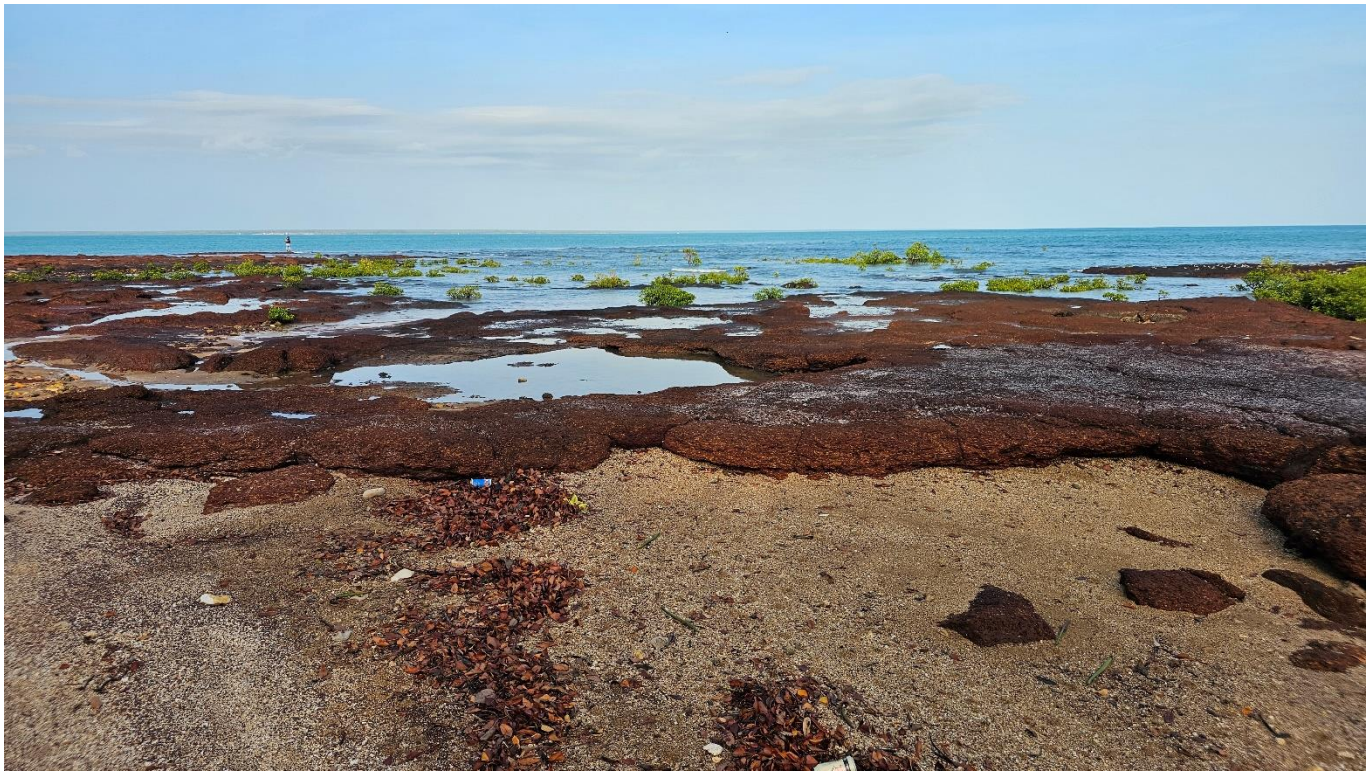

Plate 5　East Point

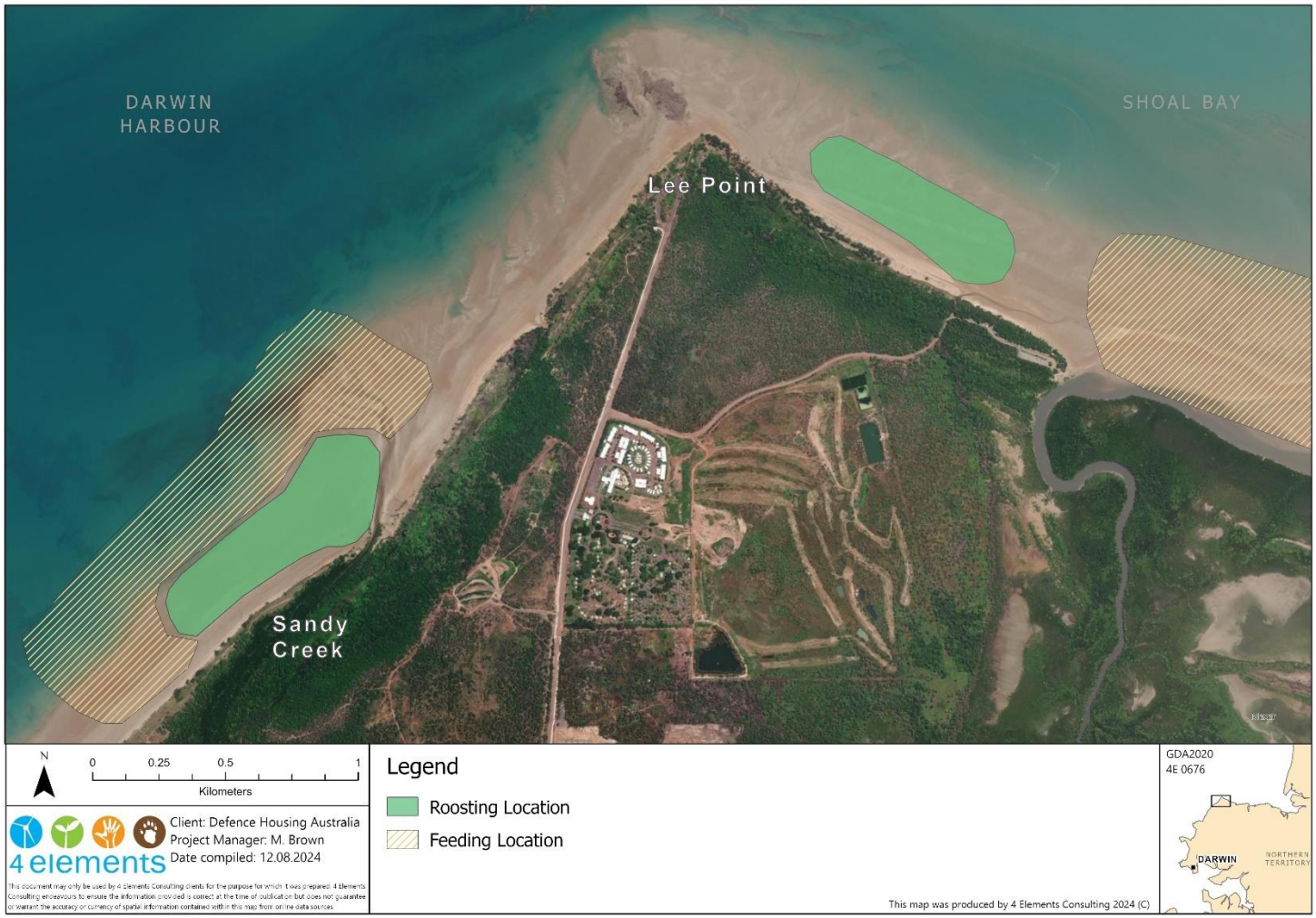

Figure 1 Lee Point and Sandy Creek Survey Locations

2.2 Field Assessments

Shorebird surveys were undertaken from 18th to 20th of March 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
18/03/25	Lee Point	7.10	08:34	Broken clouds	26	17.6	7 SENW	07:30-09:30
18/03/25	Sandy Creek	7.10	08:34	Broken clouds	26	17.6	7 SENW	07:30-09:30
19/03/25	Spot on Marine	6.91	09:01	Broken clouds	29	8.2	7 WE	08:00-10:00
19/03/25	East Point	6.91	09:01	Broken clouds	29	8.2	7 WE	08:00-10:00
20/03/25	Nightcliff Rocks	6.63	09:31	Partly sunny	29	54.5	2 EW	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

Sixteen 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*), 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 March 18th, 2025. Six species of migratory shorebirds were recorded (**Table 2**) during the survey period, along with nine species of non-migratory shorebirds and migratory or resident seabirds. Two 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
07:30	Red-capped plover	26	E	100	0	Roosting
07:30	Bar-tailed godwit	67	E	100	0	Roosting
07:30	Red-necked stint	42	E	100	0	Roosting
07:30	Pied oystercatcher	6	E	100	0	Roosting
07:30	Sooty oystercatcher	3	E	100	0	Roosting
07:30	Silver gull	6	E	100	0	Roosting
07:30	Greater crested tern	22	E	100	0	Roosting
07:30	Lesser crested tern	13	E	100	0	Roosting
07:30	Sanderling	6	E	100	0	Roosting
07:30	Little tern	115	E	100	0	Roosting
07:30	Common tern	2	E	100	0	Roosting
07:30	Caspian tern	1	E	100	0	Roosting
07:30	Greater sand plover	87	E	100	0	Roosting
07:30	Siberian sand plover	12	E	100	0	Roosting
07:30	Ruddy turnstone	2	E	100	0	Roosting
07:50	Australian pelican	1	W	150	30	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
07:30	Human	120	None	-	-	-	Birdwatcher sitting on sand >100m away from roosting birds throughout the entire survey.	No response observed from shorebirds. **Potential disturbance.**
07:49	Human /dog	5	None	-	-	-	Person walking their dog westward along the shore, approximately 200m from roosting birds.	No response observed from shorebirds. **Potential disturbance.**

Plate 6 Sand Plovers at Lee Point Showing Breeding Plumage

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on March 18th, 2025. Five species of migratory shorebird and one species of non-migratory waterbird were recorded during the survey period (**Table 4**). Two 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
07:30	Bar-tailed godwit	3	W	100	0	Roosting
07:30	Sanderling	26	W	100	0	Roosting/Feeding
07:30	Grey plover	9	W	100	0	Roosting
07:30	Greater sand plover	1	W	100	0	Roosting
07:30	Silver gull	3	W	100	0	Roosting
07:30	Far eastern curlew	5	W	150	0	Roosting

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
08:36	Human/ dog	2	None	-	-	-	Person walked a dog off-leash north along the beach >100m from roosting birds.	No response observed from shorebirds. **Potential disturbance.**
09:01	Human/ dog	2	None	-	-	-	Person walked a dog on-leash north along the beach >100m from roosting birds.	No response observed from shorebirds. **Potential disturbance.**

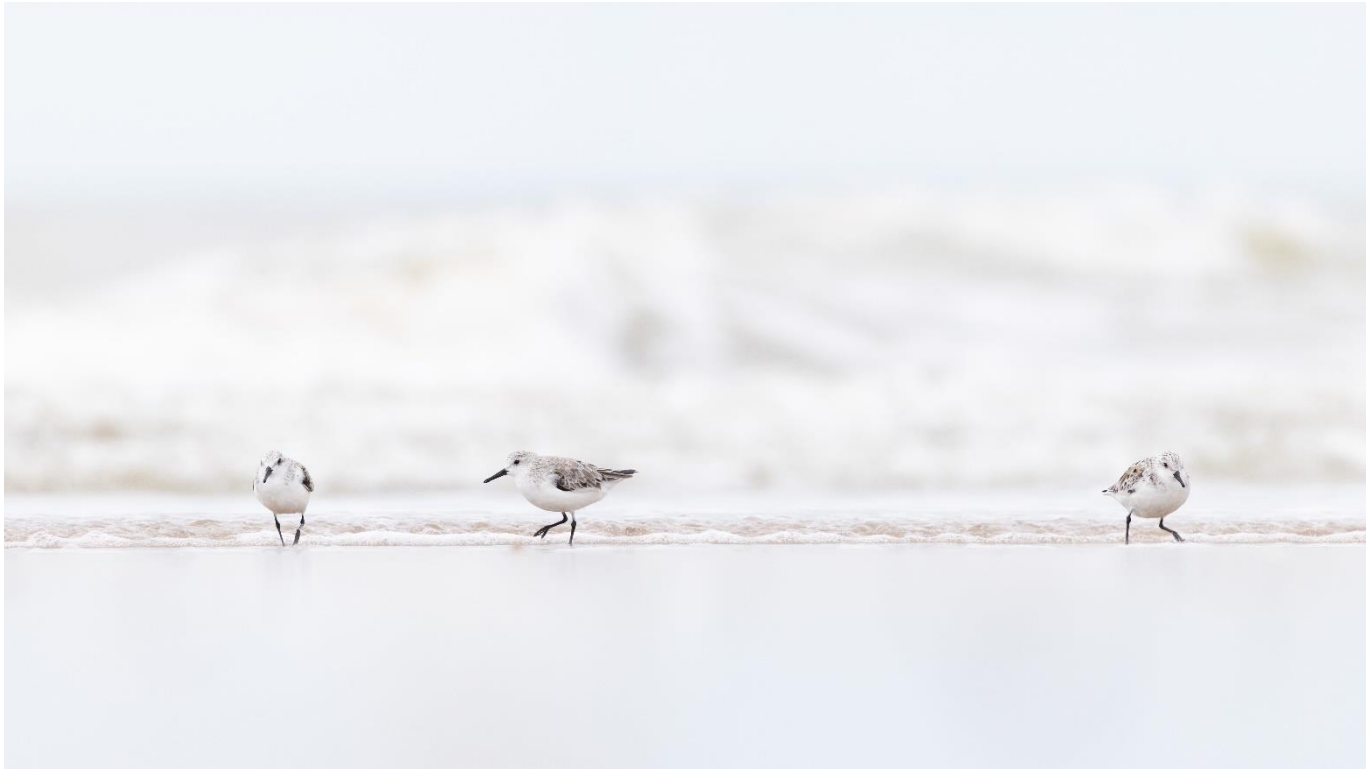

Plate 7 Sanderlings at Sandy Creek

Nightcliff Rocks

Nightcliff Rocks was surveyed on the 20th of March 2025. Nine species of migratory shorebirds, as well as with six species of migratory or resident waterbirds, were recorded during the survey period (**Table 6**). One disturbance and one potential disturbance were recorded during the survey period (**Table 7**).

Table 6 Bird Observations at Nightcliff Rocks

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:30	Terek sandpiper	7	W	100	0	Roosting
08:30	Red knot	410	W	100	0	Roosting
08:30	Great knot	3250	W	100	0	Roosting
08:30	Greater sand plover	135	W	100	0	Roosting
08:30	Siberian sand plover	22	W	100	0	Roosting
08:30	Ruddy turnstone	6	W	100	0	Roosting/foraging
08:30	Whimbrel	1	W	100	0	Roosting
08:30	Little tern	6	W	100	0	Roosting
08:30	Greater crested tern	66	W	100	0	Roosting
08:30	Lesser crested tern	8	W	100	0	Roosting

08:30	Common sandpiper	3	W	50-100	0	Foraging
08:30	Pied oystercatcher	2	W	100	0	Roosting
08:30	Grey-tailed tattler	3	W	100	0	Roosting/foraging
08:30	Silver gull	3	W	100	0	Roosting
08:30	Masked lapwing	2	W	100	0	Roosting
09:00	Eastern Reef Egret	1	E	50	0	Foraging

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
09:18	Human	30	Walked away	Red knot, great knot, greater, sand plover	~200	No	Human walked along shoreline from boat ramp and exited via staircase towards Sunset Park.	Photographer walked towards the roosting shorebirds and stopped when they started walking away. Photographer sat down and took photos for approx. 30 min causing no further disturbance.
09:27	Human	5	None	-	-	-	Person entered and exited rocks via staircase towards Sunset Park.	Person stayed >100 m away from roosting shorebirds and elicited no response. **Potential disturbance.**

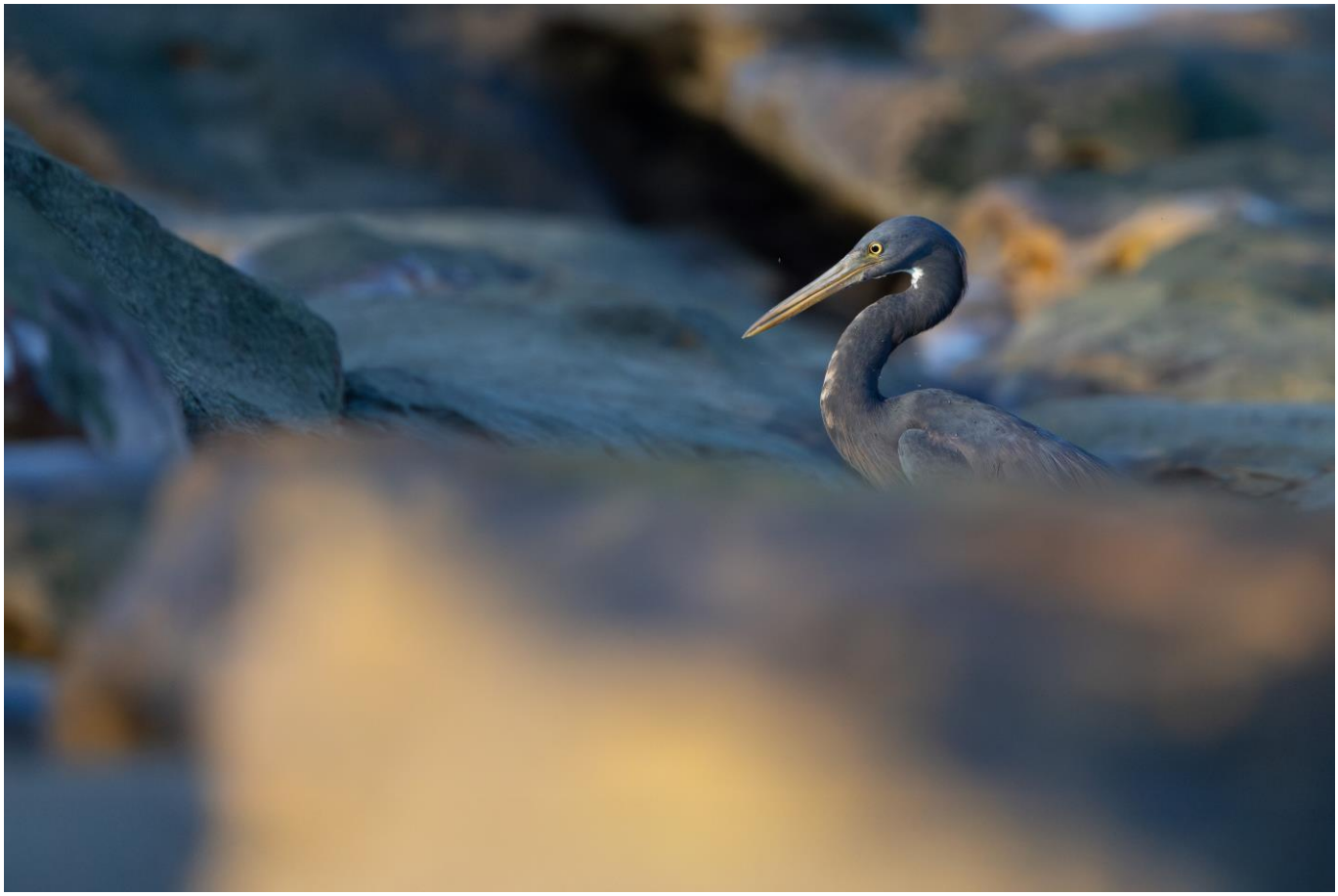

Plate 8 Eastern Reef Egret at Nightcliff Rocks

Spot on Marine

Spot on Marine was surveyed on the 19th of March 2025. Three species of migratory shorebirds, as well as three species of resident waterbirds, were recorded during the survey period (**Table 8**). No 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
08:00	Beach stone-curlew	2	SE	100	0	Roosting
08:00	Masked lapwing	3	SE	100	0	Roosting
08:00	Grey plover	6	SE	100	0	Roosting
08:00	Bar-tailed godwit	4	SE	100	0	Roosting
08:00	Whimbrel	22	SE	100	0	Roosting
08:00	Great egret	1	SE	100	0	Roosting
08:15	Little egret	1	S	150	50	Flying

East Point

East Point was surveyed on the 19th of March 2025. 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
08:00	Ruddy turnstone	21	W	100	0	Roosting
08:00	Whimbrel	1	W	100	0	Roosting
08:00	Grey-tailed tattler	5	W	100	0	Roosting/foraging
08:00	Greater sand plover	74	W	100	0	Roosting
08:00	Siberian sand plover	12	W	100	0	Roosting
08:00	Common sandpiper	7	W	100	0	Roosting/foraging
08:00	Masked lapwing	6	W	100	0	Roosting
08:00	Silver gull	4	W	100	0	Roosting
08:00	Pacific golden plover	5	W	100	0	Roosting
08:00	Terek sandpiper	2	W	100	0	Roosting/foraging
09:05	Black-tailed godwit	6	W	100	0	Roosting
09:05	Bar-tailed godwit	8	W	100	0	Roosting
09:05	Ruddy turnstone	6	W	100	0	Roosting
09:50	Common sandpiper	3	NW	100	0	Roosting
09:50	Terek sandpiper	3	NW	100	0	Roosting
09:50	Whimbrel	1	NW	100	0	Foraging
09:50	Grey-tailed tattler	2	NW	100	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
09:26	Human	120	Flushed	Greater sand plover, pacific golden plover, common sandpiper	30	No	Fisherman accessed rocks north of mangroves via walking track, stayed the duration of the survey.	Small roost of shorebirds flushed but joined the larger flock south of mangroves.

09:40	Human	5	Walked away	All species from survey	~160	No	Fisherman accessed and exited rocks south of mangroves via the beach. Stayed ~50 m away from roosting birds.	Shorebirds walked away slightly but did not flush.
09:50	Human	10	Flushed	Common sandpiper, Terek sandpiper, whimbrel, grey-tailed tattler	9	No	Couple walked south along the beach, onto rocks near mangroves, flushing birds roosting in the mangroves.	Shorebirds flushed and resettled on rocks adjacent to mangroves.

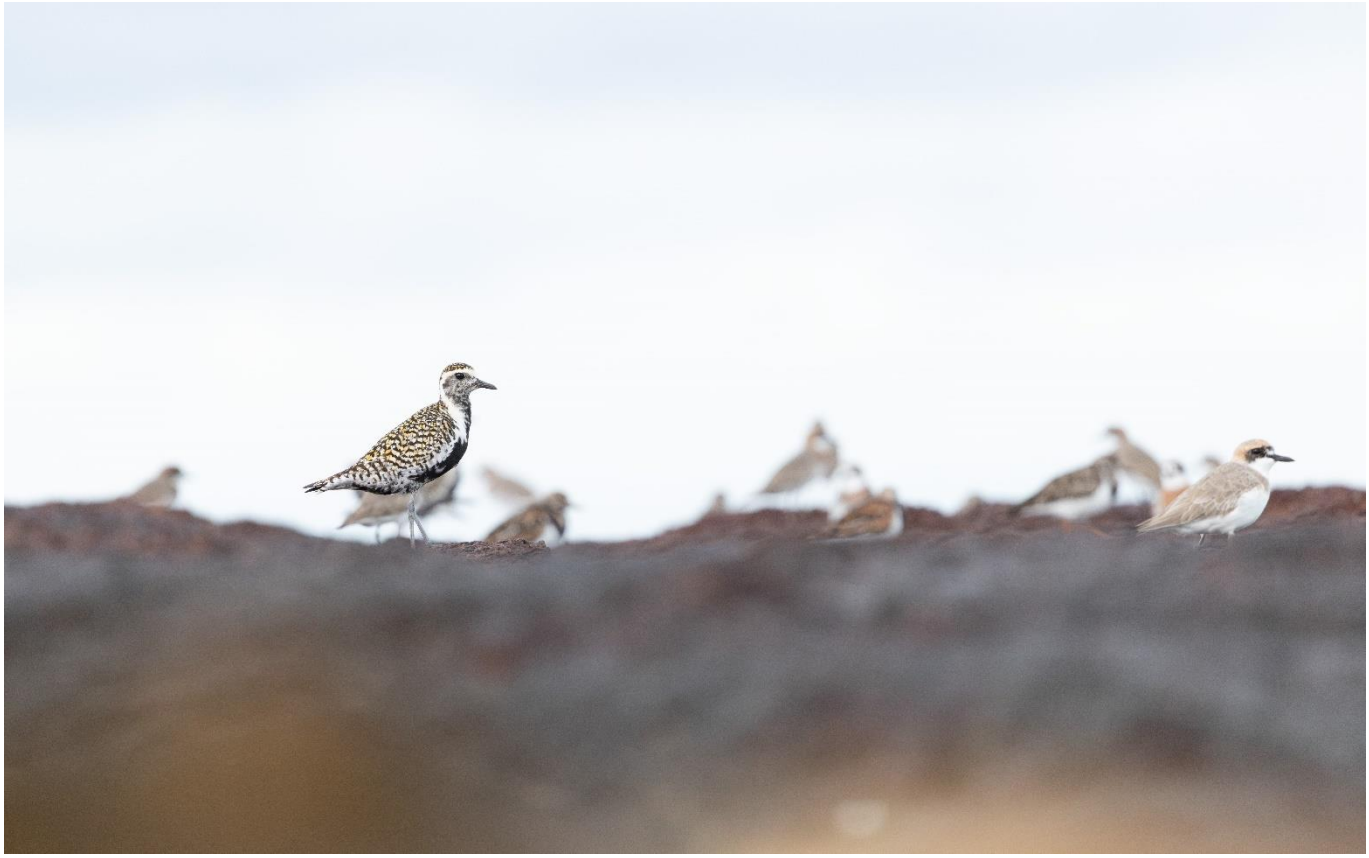

Plate 9 Pacific Golden Plover in Breeding Plumage at East Point

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 March, 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. Consistent with the February survey, the highest diversity and abundance was recorded at Nightcliff Rocks, which represents a divergence from early season 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 (e.g., from 65 great knots in December to 3250 in March) 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.

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