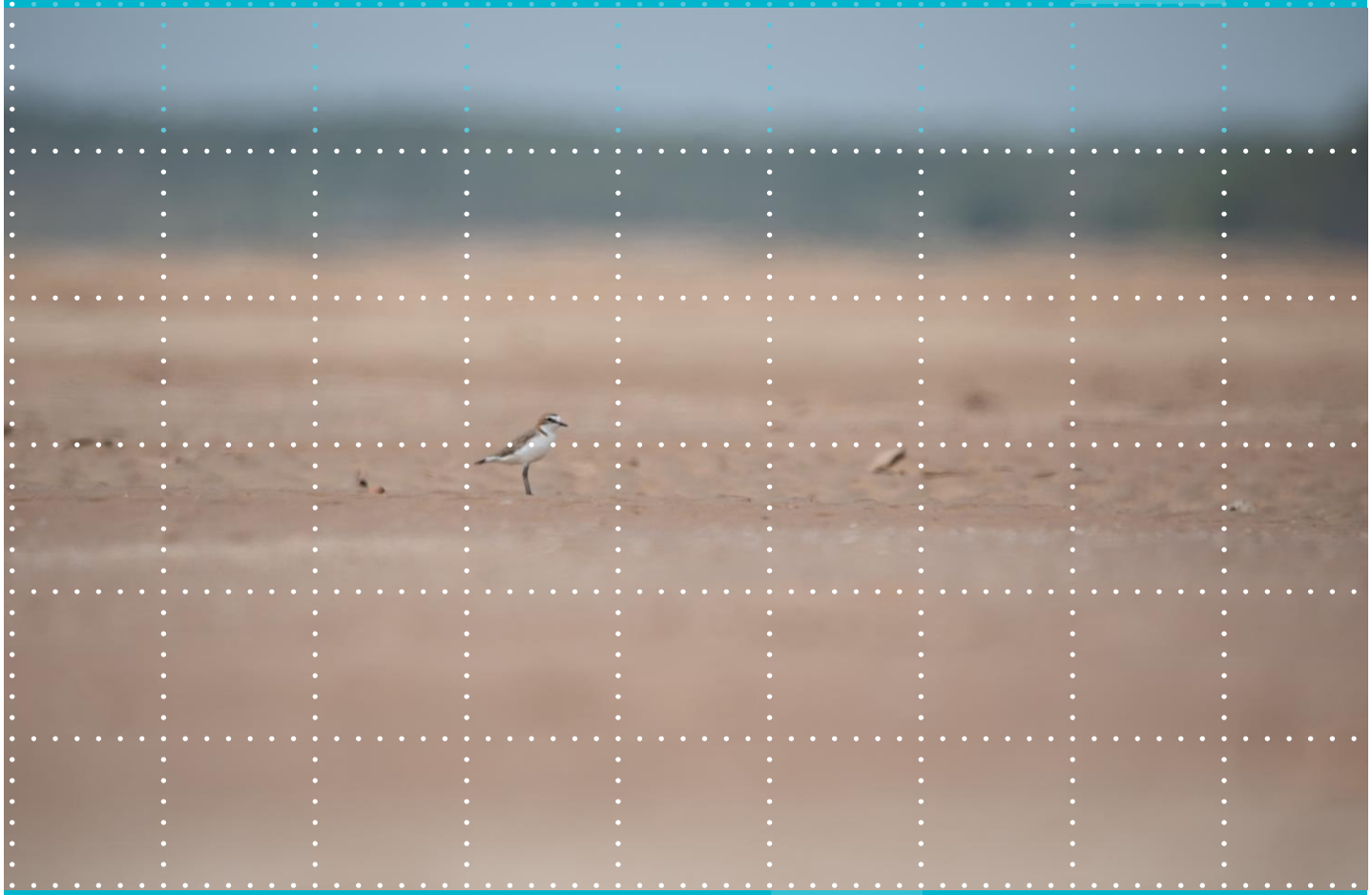
Version 1

# Shorebird Monitoring: Lee Point, Darwin, Northern Territory (Winter 2023)

Prepared for

**Defence Housing Australia**

August 2023



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# Contents

## Document Control

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## Control Version

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Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

# 1 Introduction

Through the environmental approvals' process, it was identified that the Lee Point Master-planned Urban Development project being undertaken by Defence Housing Australia (DHA) has the potential to impact migratory shorebirds through increased anthropogenic disturbance (due to a significant increase in the number of beach users) to the important roosting and feeding site Sandy Creek and Lee Point-Buffalo Creek, on the northern beaches of Darwin, Northern Territory.

In its assessment report for this project, the Northern Territory Environment Protection Agency (NT EPA) provided the following recommendation:

> *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)*

Ecology and Heritage Partners Pty Ltd was commissioned by Defence Housing Australia to undertake the over-wintering Shorebird Monitoring as suggested in this Shorebird Monitoring Program. The primary purpose of the surveys was to obtain information on migratory shorebirds that remain at the survey locations across the study area during the northern hemisphere breeding season.

# 2 Study Area

All survey sites are located north of Darwin CBD. Specifically, Lee Point (Figure 1: Plate 1) and Sandy Creek (Figure 1: Plate 2) are approximately 15 kilometres north, Nightcliff Rocks (Figure 2: Plate 3) is approximately 8.5 kilometres north, and Spot-on-Marine (Figure 2: Plate 4) and East Point (Figure 2: Plate 5 and Plate 6) are approximately 6.5 kilometres north of Darwin CBD. The survey sites at Lee Point are public beaches, Nightcliff Jar and East Point are headlands with exposed intertidal rock flats and Spot-on-Marine is an exposed mangrove mudflat.

**Plate 1.** Lee Point: Shorebird survey location (Ecology and Heritage Partners 27/07/2023).

**Plate 2.** Sandy Creek: Shorebird survey location (Ecology and Heritage Partners 27/07/2023).

**Plate 3.** Nightcliff Rocks: Shorebird monitoring survey location (Ecology and Heritage Partners 27/07/2023).

**Plate 4.** Spot-on-Marine: Shorebird Monitoring survey location (Ecology and Heritage Partners 28/07/2023).

**Plate 5.** East Point: Shorebird monitoring survey location (Ecology and Heritage Partners 28/07/2023).

**Plate 6.** East Point: Shorebird monitoring survey location (Ecology and Heritage Partners 28/07/2023).

# 3 Methods

## 3.1 Field Assessments

Shorebird monitoring was undertaken on 27 and 28 July 2023 by three qualified Zoologists competent in shorebird identification and counting techniques. Field personal recorded species and population abundance of migratory shorebirds at five key feeding and roosting areas in the greater Darwin region (Lee Point, Sandy Creek, East Point, Nightcliff Rocks and Spot-on-Marine) (Figure 1). Human disturbance and interaction with these key roosting locations was also documented.

Shorebird monitoring was conducted in accordance with the methods outlined in *Shorebird Monitoring Program: Lee Point Master-planned Urban Development* (EcOz 2022). Surveys were performed by one person

at each location for a two-hour period during high tide (one hour each side of high tide). On 27 July 2023 surveys were conducted between 10.15 am – 12.15 pm with high tide at 11.15 am. On 28 July 2023 surveys were conducted between 11.07 am and 1.07 pm with high tide at 12.07 pm. Sandy Creek and Lee Point surveys were conducted simultaneously. Surveys were undertaken from a distance of 100 metres or more as to not cause any disturbance to the shorebirds. Each surveyor was equipped with binoculars (10x42) and a spotting scope of 20 – 60 x magnification (Saxon 20-60x80 ED).

The monitoring sought primarily to identify species presence and population abundance at each survey location. Human traffic and any disturbance (e.g. boats, birds of prey) to shorebirds were also recorded at each survey location during the monitoring period.

### 3.2 Assessment Qualifications and Limitations

As stated in the Shorebird Monitoring Program (EcOz 2022) it is recommended that monitoring '*should be performed at high tides of > 6.5 m during the spring tide cycle and during daylight hours*'. However, surveys during the initial winter monitoring surveys were completed when high tide were less than 6.5-metres (Table 1) as the remaining high tides in July did not exceed 6.5-metres.

**Table 1.** High tide times and height during the over-wintering surveys (Lee Point)

| 27 July 2023 | | 28 July 2023 | |
|---|---|---|---|
| Time | High Tide (m) | Time | High Tide (m) |
| 11:15 am | 5.33 | 12:07 pm | 5.10 |

Although high tide heights did not exceed 6.5-metres during this round of monitoring, this did no com compromise the results of the surveys as all birds present were observed at the locations and recorded. That is, the surveys fully represented the species demographic and abundance of shorebirds at the five survey locations.

The primary justification for conducting shorebird surveys at high tides of greater than 6.5-metres is to draw birds to roosting sites which provides surveyors a better opportunity to record the species and abundance of shorebirds at the key roosting locations. However, the total number over-wintering shorebirds comprised up to 500 individuals and therefore the field personnel could accurate identify and count the birds. As such, we are confident that all shorebird species and abundance figures were captured correctly.

## 4 Site Results

### 4.1 Lee Point

Lee Point survey location (Figure 1) was surveyed simultaneously with Sandy Creek on 27 July 2023.Seven migratory shorebird species were noted during this survey. These were, Eastern Curlew *Numenius madagascariensis*, Great Knot *Calidris tenuirostris* (Plate 7), Red-capped Plover *haradrius ruficapillus* (Plate 8), Ruddy Turnstone *Arenaria interpres*, Greater Sand Plover *Charadrius leschenaultia* (Plate 9), Sanderling *Calidris alba* (Plate 10) and Pacific Golden Plover *Pluvialis fulva*. Other waterbirds recorded at this location were Gull-

billed Tern *Gelochelidon nilotica*, Great Egret *Ardea alba* and Eastern Reef Egret *Egretta sacra*. The species observations for shorebird monitoring at Lee Point is displayed in Table 2 (Appendix 1).

**Plate 7.** Great Knot recorded at Lee Point (Ecology and Heritage Partners 27/07/2023)

**Plate 8.** Red-capped Plover recorded at Lee Point (Ecology and Heritage Partners 27/07/2023)

**Plate 9.** Greater Sand Plover recorded at Lee Point (Ecology and Heritage Partners 27/07/2023)

**Plate 10.** Sanderling recorded at Lee Point (Ecology and Heritage Partners 27/07/2023)

One disturbance and one potential disturbance was recorded during this survey. One human was noted walking along the beach playing fetch with two dogs, no response by the shorebirds was recorded to this stimulus. A birding group of around 10 people was also noted along the beach observing and taking pictures of shorebirds. On this occasion a flock of Great Knot (approximately 400 individuals) were observed flying west away from the group before landing and continuing to forage about 100 metres away. Both the bird group and the dog walker access the beach via the carpark to the South of the survey location.

Birds of prey (mostly Black Kite *Milvus migrans*) were observed perched in coastal trees fringing the beach and circling the area. However, this activity did not elicit a response from the shorebirds. All disturbance data is shown in Table 6 (Appendix 2).

### 4.2 Sandy Creek

Sand Creek survey location (Figure 1) was surveyed simultaneously with Lee Point on 27 July 2023.

No migratory shorebirds were noted during the survey period. Other waterbirds recorded were Gull-billed Tern *Gelochelidon nilotica*, Silver Gull *Chroicocephalus novaehollandiae*, Eastern Reef Egret *Egretta sacra*, Sacred Kingfisher *Todiramphus sanctus*, and Great Egret *Ardea alba*. The species observations for shorebird monitoring at Sandy Creek is displayed in Table 3 (Appendix 1).

Ongoing potential noise disturbance was noted from boats, jet skis, and planes. A nearby nude beach also had constant patrons during the surveys and a human was observed fishing with a net in Sandy Creek for around 10 minutes. However, no response was noted by any birds to these stimuli. At this location there was a constant presence of birds of prey (approximately 50 Black Kites). At one point, the Gull-billed Terns observed foraging on the water edge were spoked by a circling Black Kite and flew South out of view of the surveyor. All disturbance data is shown in Table 6 (Appendix 2).

### 4.3 Nightcliff Rocks

Nightcliff Rocks survey location (Figure 2) was surveyed on 27 July 2023.

Three migratory shorebird species were noted during this survey. These were, Sand Plover sp., Bar-tailed Godwit *Limosa lapponica* (Plate 11), and Common Sandpiper *Actitis hypoleucos* (Plate 12). Other waterbirds recorded at this location were Sacred Kingfisher *Todiramphus sanctus* (Plate 13), Masked *Lapwing Vanellus miles*, Silver Gull *Chroicocephalus novaehollandiae*, Beach-stone Curlew *Esacus magnirostris* (Plate 14), Sooty Oystercatcher *Haematopus fuliginosus*, Gull-billed Tern *Gelochelidon nilotica*, and White-faced Heron *Egretta novaehollandiae.* The species observations for shorebird monitoring at Nightcliff Rocks is displayed in Table 4 (Appendix 1).

**Plate 11.** Bar-tailed Godwit recorded at Nightcliff Rocks (Ecology and Heritage Partners 27/07/2023**)**

**Plate 12.** Common Sandpiper recorded at Nightcliff Rocks (Ecology and Heritage Partners 27/07/2023)

**Plate 13.** Sacred Kingfisher recorded at Nightcliff Rocks (Ecology and Heritage Partners 27/07/2023)

**Plate 14.** Beach-stone Curlew recorded at Nightcliff Rocks (Ecology and Heritage Partners 27/07/2023)

One disturbance and one potential disturbance was recorded during this survey. Both occasions were patrons walking onto the headland via Sunset Park. One time did not elicit a response from any shorebirds, however, on the second occasion the patrons walked to the edge of the headland causing the pair of Bar-tailed Godwit to fly West towards a small island just off the headland and beyond the view of the surveyor. All disturbance data is shown in Table 6 (Appendix 2).

### 4.4 Spot-on-Marine

Spot-on-Marine survey location was surveyed on 28 July 2023 (Figure 2).

During the time of surveys this mudflat was extremely dry. As such no migratory shorebirds or other waterbirds were noted interacting with this survey location. The only disturbance that was recorded at this survey location was potential noise disturbance from planes flying overhead. All disturbance data is shown in Table 6 (Appendix 2).

### 4.5 East Point

East Point survey location was surveyed on 28 July 2023 (Figure 2).

Six migratory shorebird species were noted during this survey. These were, Whimbrel *Numenius phaeopus* (Plate 15), Ruddy Turnstone *Arenaria interpres*, Greater Sand Plover *Charadrius leschenaultia,* Red-necked Stint *Calidris ruficollis*, Pacific Golden Plover *Pluvialis fulva* (Plate 16), and Grey-tailed Tatler *Tringa brevipes*. Other waterbirds recorded at this location were Sacred Kingfisher *Todiramphus sanctus*, Silver Gull *Chroicocephalus novaehollandiae*, Straited Heron *Butorides striata*, and White-bellied Sea Eagle *Haliaeetus leucogaster*. The species observations for shorebird monitoring at East Point is displayed in Table 5 (Appendix 1).

**Plate 15.** Whimbrel and Greater Sand Plover recorded at East Point (Ecology and Heritage Partners 28/07/2023)

**Plate 16.** Pacific Golden Plover and other migratory shorebirds at East Point (Ecology and Heritage Partners 28/07/2023)

Only one potential disturbance was recorded during the monitoring period. This was two humans walking along the headland, however, no response from the shorebirds was recorded. All disturbance data is shown in Table 6 (Appendix 2).

## 5 Conclusion

Shorebird monitoring surveys were conducted on 27 and 28 July 2023 to capture information on shorebirds that remain at five key feeding and roosting locations in the Greater Darwin region during the northern hemisphere breeding season. Shorebird species and abundance was recorded as well as disturbance and potential disturbance on migratory shorebirds at each survey location. All surveys were conducted in accordance with *Shorebird Monitoring Program: Lee Point Master-planned Urban Development* (EcOz 2022).

Twelve migratory shorebird species were recorded across the five key feeding and roosting sites with the highest abundance of shorebirds existing at the Lee Point survey location (Figure 1). Only a few instances of disturbance were recorded during the survey period, most of which were caused by patrons walking through the survey locations.

## 6 References

EcOz 2022. *Shorebird Monitoring Program Lee Point Master-planned Urban Development.* Defence Housing Australia. September 2022

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

**Figure 1 – Lee Point and Sandy Creek survey locations (EcOz 2022)**

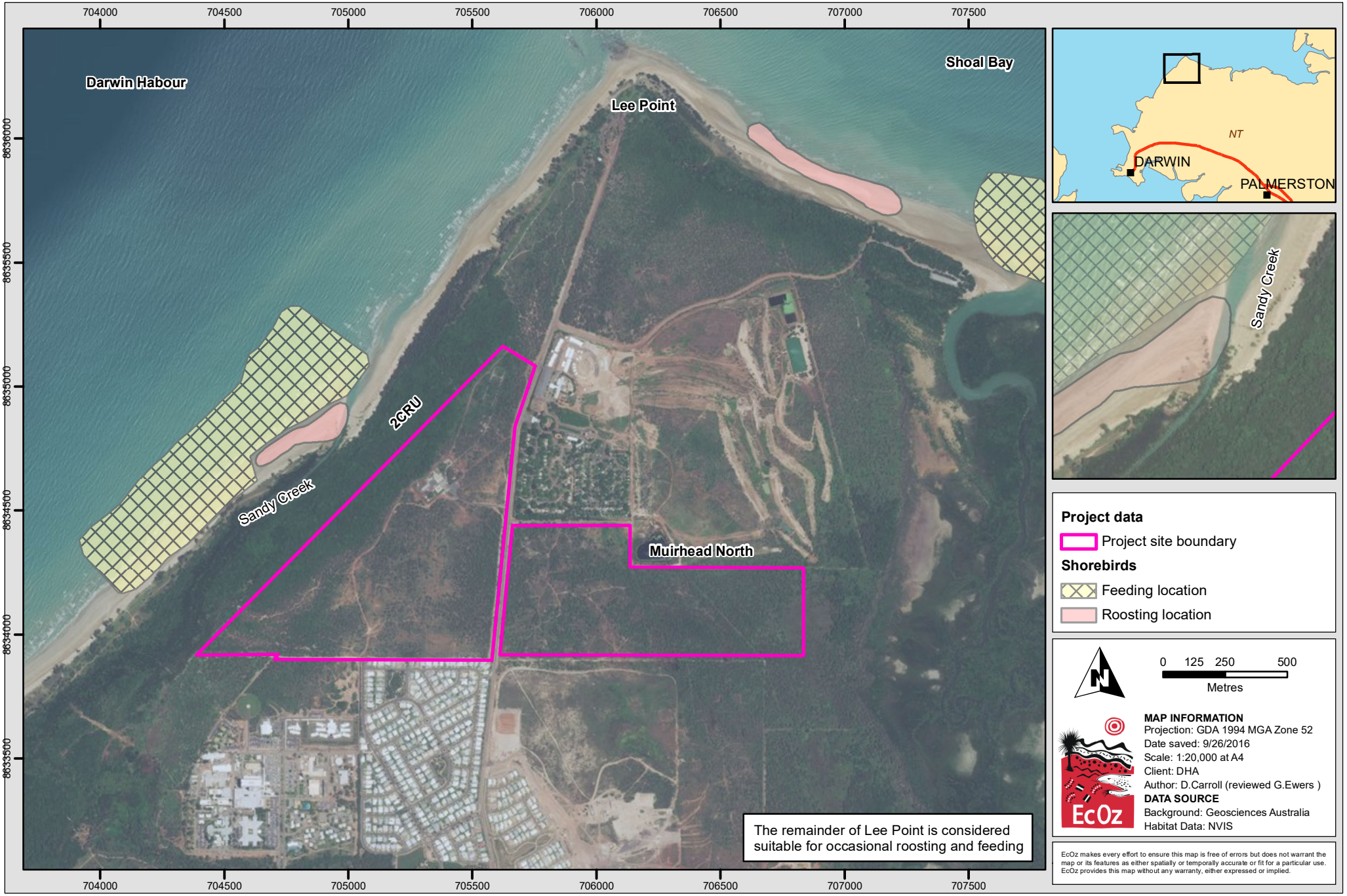


**Figure 1. Map of roosting and feeding areas for migratory shorebirds at Sandy Creek and Lee Point-Buffalo Creek**

**Figure 2 – Nightcliff Rocks, Spot-on-Marine and East Point survey locations (EcOz 2022)**

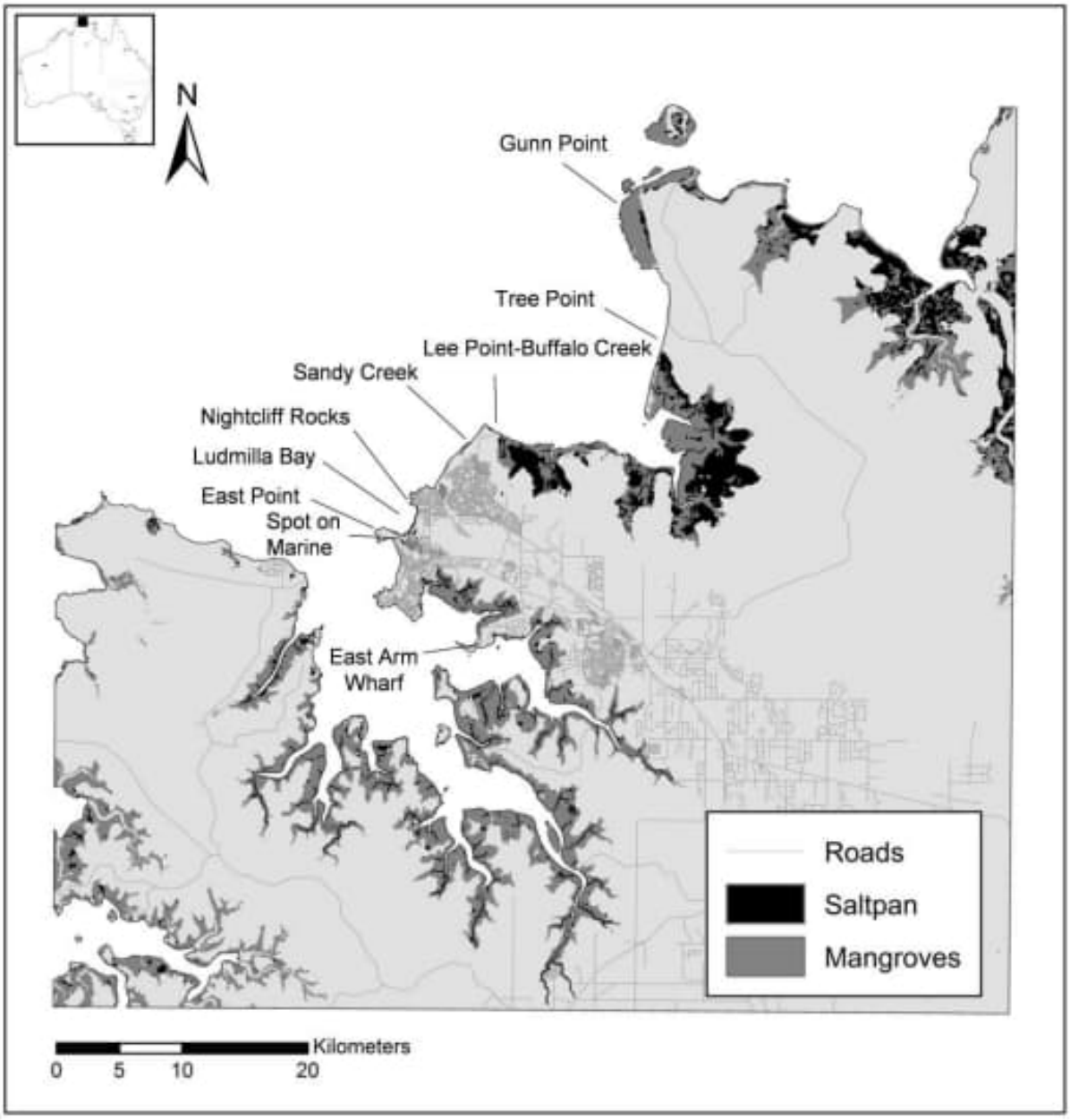


**Figure 2. Map displaying the monitored shorebird roosting and feeding sites in the Darwin Harbour region**

*(including the three broader monitoring sites; East Point, Nightcliff Rocks and Spot on Marine)*

## Appendix 1 – Species observations

migratory shorebird species*

**Table 2.** Species observations of all migratory shorebirds and waterbirds at Lee Point

| Time | Species | Number of Individuals | Direction from Surveyor | Distance from Observer | Direction of Bird Movement | Vertical Height | Behaviour |
|---|---|---|---|---|---|---|---|
| 10:15 | Beach Stone-curlew | 1 | W | 50 | W | 0 | Walking |
| 10:15 | Eastern Curlew* | 13 | NE | 100 | E | 0 | Roosting |
| 10:15 | Red-capped Plover* | 4 | E | 20 | W | 0 | Walking and foraging |
| 10:41 | Black Kite | 1 | NE | 80 | E | 5 | Circling |
| 10:15 | Greater Sand Plover* | 100 | N | 100 | - | 0 | Roosting |
| 10:15 | Great Knot* | 7 | N | 100 | - | 0 | Roosting |
| 10:37 | Ruddy Turnstone* | 1 | N | 100 | - | 0 | Roosting |
| 10:40 | Sanderling* | 3 | N | 100 | W | 0 | Roosting, foraging |
| 10:43 | Gull-billed Tern | 1 | N | 100 | - | 0 | Roosting |
| 10:52 | Pacific Golden Plover* | 1 | N | 100 | - | 0 | Roosting |
| 11:08 | Great Knot* | 180 | N | 100 | - | 0 | Roosting |
| 11:21 | Eastern Reef Egret | 1 | N | 120 | W | 5 | Flying |
| 11:24 | Gull-billed Tern | 1 | N | 120 | W | 10 | Flying |
| 11:48 | Great Knot* | 400+ | N | 100 | - | 3 | Flying |
| 11:59 | Great Egret | 1 | N | 120 | W | 5 | Flying |

**Table 3.** Species observations of all migratory shorebirds and waterbirds at Sandy Creek

| Time | Species | Number of Individuals | Direction from Surveyor | Distance from Observer | Direction of Bird Movement | Vertical Height | Behaviour |
|---|---|---|---|---|---|---|---|
| 10:15 | Black Kite | 45+ | N | 100 | - | 50 | Flying, circling and perched |
| 10:15 | Gull-billed Tern | 6 | N | 150 | S | 0 | Standing on water edge |
| 10:15 | Silver Gull | 1 | N | 150 | N | 0 | Standing on water edge |
| 10:37 | Eastern Reef Egret | 1 | N | 150 | - | 0 | Foraging |
| 11:04 | Silver Gull | 1 | S | 250 | N | 4 | Flying |
| 11:14 | Sacred Kingfisher | 2 | S | 250 | - | 0 | Perched |
| 11:29 | Rainbow Bee-eater | 1 | N | as close as 5m | - | 3 | Foraging |
| 11:53 | Eastern Reef Egret | 1 | N | 50 | - | 0 | Walking along Sandy Creek |
| 12:12 | Magpie Lark | 2 | N | 25 | - | 0 | Walking along Sandy Creek |
| 12:41 | Great Egret | 1 | N | 100 | - | 0 | Foraging |

**Table 4.** Species observations of all migratory shorebirds and waterbirds at Nightcliff Rocks

| Time | Species | Number of Individuals | Direction from Surveyor | Distance from Observer | Direction of Bird Movement | Vertical Height | Behaviour |
|---|---|---|---|---|---|---|---|
| 10:15 | Sacred Kingfisher | 3 | W | 100 | - | 0 | Perched on rocks |
| 10:16 | Sand Plover sp.* | 1 | W | 100 | - | 0 | Perched on rocks |
| 10:16 | Masked Lapwing | 3 | NE | 20 | N | 5 | Flying |
| 10:26 | Sacred Kingfisher | 1 | E | 50 | - | 2 | Flying |
| 10:27 | Magpie Lark | 3 | S | 5 | N | 0 | Walking along rocks |
| 10:47 | Welcome Swallow | 3 | W | 10 | - | 10 | Circling around the headland |
| 10:48 | Silver Gull | 1 | W | 30 | N | 15 | Flying |
| 10:49 | Silver Gull | 1 | W | 30 | N | 15 | Flying |
| 10:55 | Beach Stone-curlew | 1 | W | 40 | N | 0 | Walking along the headland |
| 11:10 | Bar-tailed Godwit* | 2 | W | 100 | - | 0 | Perched on rocks that abut waterline |
| 11:17 | Sooty Oystercatcher | 1 | N | 120 | N | 0 | Walking along the headland |
| 11:26 | Common Sandpiper* | 1 | W | 50 | N | 8 | Flying |
| 11:31 | Masked Lapwing | 3 | W | 40 | W | 20 | Flying |
| 11:35 | Gull-billed Tern | 3 | W | 40 | N | 20 | Flying |
| 11:44 | White-faced Heron | 1 | SE | 100 | W | 0 | Walking along the headland |
| 12:20 | Common Sandpiper* | 1 | W | 100 | - | 0 | Walking along the headland |

**Table 5.** Species observations of all migratory shorebirds and waterbirds at East Point

| Time | Species | Number of Individuals | Direction from Surveyor | Distance from Observer | Direction of Bird Movement | Vertical Height | Behaviour |
|---|---|---|---|---|---|---|---|
| 11:27 | Sacred Kingfisher | 1 | W | 80 | - | 0 | Perched |
| 11:30 | Silver Gull | 1 | W | 50 | E | 20 | Flying |
| 11:33 | Whimbrel* | 1 | W | 100 | - | 0 | Roosting |
| 11:43 | Pacific Golden Plover* | 4 | W | 100 | - | 0 | Roosting |
| 11:50 | Red-necked Stint* | 9 | W | 100 | - | 0 | Roosting |
| 12:08 | Sand Plover Sp.* | 17 | W | 100 | - | 0 | Roosting |
| 12:10 | Ruddy Turnstone* | 3 | W | 100 | - | 0 | Roosting |
| 12:13 | Grey-tailed Tatler* | 18 | W | 100 | - | 0 | Roosting |
| 12:50 | Striated Heron | 1 | N | 20 | W | 0 | Flying and perched |
| 13:08 | White-bellied Sea Eagle | 1 | N | 50 | N | 20 | Flying |

## Appendix 2 – Disturbance data

**Table 6.** Disturbances recorded at each survey location during monitoring

| Date | Time of disturbance | Site Location | Duration of disturbance (min) | Disturbance Type | Shorebird Response | Shorebird Species | Number Affected | Did the affected birds leave the site? | Entry and Exit Points | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 27.7.23 | 10:15 | Sandy Creek | ongoing | Human (nude beach) | - | - | - | No | South | Multiple patrons at nude beach limited beach survey extent to the south |
| 27.7.23 | 10:20 | Sandy Creek | 5 | One human | - | - | - | No | North | Throwing a net into Sandy Creek – with a dog |
| 27.7.23 | 10:45 | Sandy Creek | ongoing | Black Kite | Flew south | Gull-billed Tern | - | Yes | North | - |
| 27.7.23 | 10:18 | Lee Point | 10 | One human with two dogs | - | - | - | No | Entry/exit likely near Lee Point | Throwing ball away from roosting area, not walking along beach near birds |
| 27.7.23 | 11:48 | Lee Point | 15 | 10 humans (birding group) | Flew West | Great Knot | 400+ | No | Buffalo Creek Rd, accessed from car park. | Flew 100m to the West (joined other roosting flock) |
| 27.7.23 | 10:17 | Nightcliff Rocks | 15 | Human (walking onto the headland) | - | - | - | No | Access via Sunset Park | - |
| 27.7.23 | 12:15 | Nightcliff Rocks | 10 | Human (walking onto the headland) | Flew West | Bar-tailed Godwit | 2 | Yes | Access via Sunset Park | Flew West away from the headland off the coastline and out of surveyor's view. |
| 28.7.23 | 11:05 | Spot-on-Marine | Ongoing | Human (Planes, jets, boats, jet skis) | - | - | - | No | All directions | All disturbance was noted at the boat ramp – none on the mudflat. |
| 28.7.23 | 11:33 | East Point | Ongoing | Human (walking onto the headland) | - | - | - | No | Access via East Point carpark | 30 patrons accessed the headland North of survey location - five were fishing. |