records at the East Arm Wharf is significant over time with a 39.5% reduction over the 9 years of monthly records to 2018 (Lilleyman *et al.* 2020a). The highest monthly counts occur in February and September (Lilleyman & Garnett, 2019). Nationally significant aggregations (*i.e*. occurrences of ≥ 0.1 % of the total EAAF population) are known to occur in the Darwin Harbour Proper, with particularly important habitat at the East Arm Wharf as a spring high tide roosting site (Garnett 2012, Lilleyman and Garnett 2019).

3.2.4.3 Suitable Habitat in Relation to the Project Area

The intertidal mudflats and sandflats in the Elizabeth River adjacent to Lot 1817 are suitable foraging habitat for *C. mongolus*. The saltpan area within Lot 1817 may be suitable roosting habitat for this species, and it may occasionally use the mangroves for roosting. It does not breed in Australia so there is no suitable breeding habitat.

Habitat in the intertidal mudflats and sandflats in Darwin Harbour Proper are considered to be in pristine condition. The saltpan area within Lot 1817 is intact, and the mangroves adjacent to Lot 1817 are also in Excellent condition, however it is unknown how the condition or suitability of these habitats has been previously impacted by the historic use of Lot 1817 for extractive industries and the unregulated access of humans, dogs, motorbikes and invasive fauna such as cats and pigs. The site hydrology has been altered by the former extractive industry where the upper lateritic aquifer material has been removed and soil bunding has been left in many places which is likely to have altered the natural surface and subsurface hydrological processes on the site.

3.2.4.4 Life History and Migration Patterns

It is assumed that this species can breed from approximately two years of age, and live for nearly 13 years, with these data extrapolated from *C. leschenaultii*. *Charadrius mongolus* usually lays three eggs per clutch, between mid-May and mid-June, with eggs incubated for 22-24 days. Chicks are typically cared for by the males, but occasionally both parents, before they fledge after 30-35 days. The species is gregarious, and is often recorded in flocks, including with other species like *C. leschenaultii*. However, it remains segregated when roosting (TSSC, 2016d).

At the end of the breeding season, *C. mongolus* migrates south along different pathways, depending on the subspecies. Individuals that overwinter in Australia leave the breeding grounds in late-July to early-September, with females the first to depart and juveniles the last. Individuals arrive in Australia between August and September, dispersing around the coast until October or November. Individuals begin the return journey northward around April or May. Some, mostly juvenile individuals, remain in Australia during the breeding season (TSSC, 2016d).

3.2.4.5 Diet and Feeding Behaviour

During the non-breeding season, the diet of *C. mongolus* consists of insects, crustaceans, molluscs, and polycheate worms. It utilises the run, stop, peck technique common for *Charadrius* species, and gleans the surface of moist substrates or probes just below the surface for prey. It is diurnal but is known to forage on moonlit nights (TSSC, 2016d).

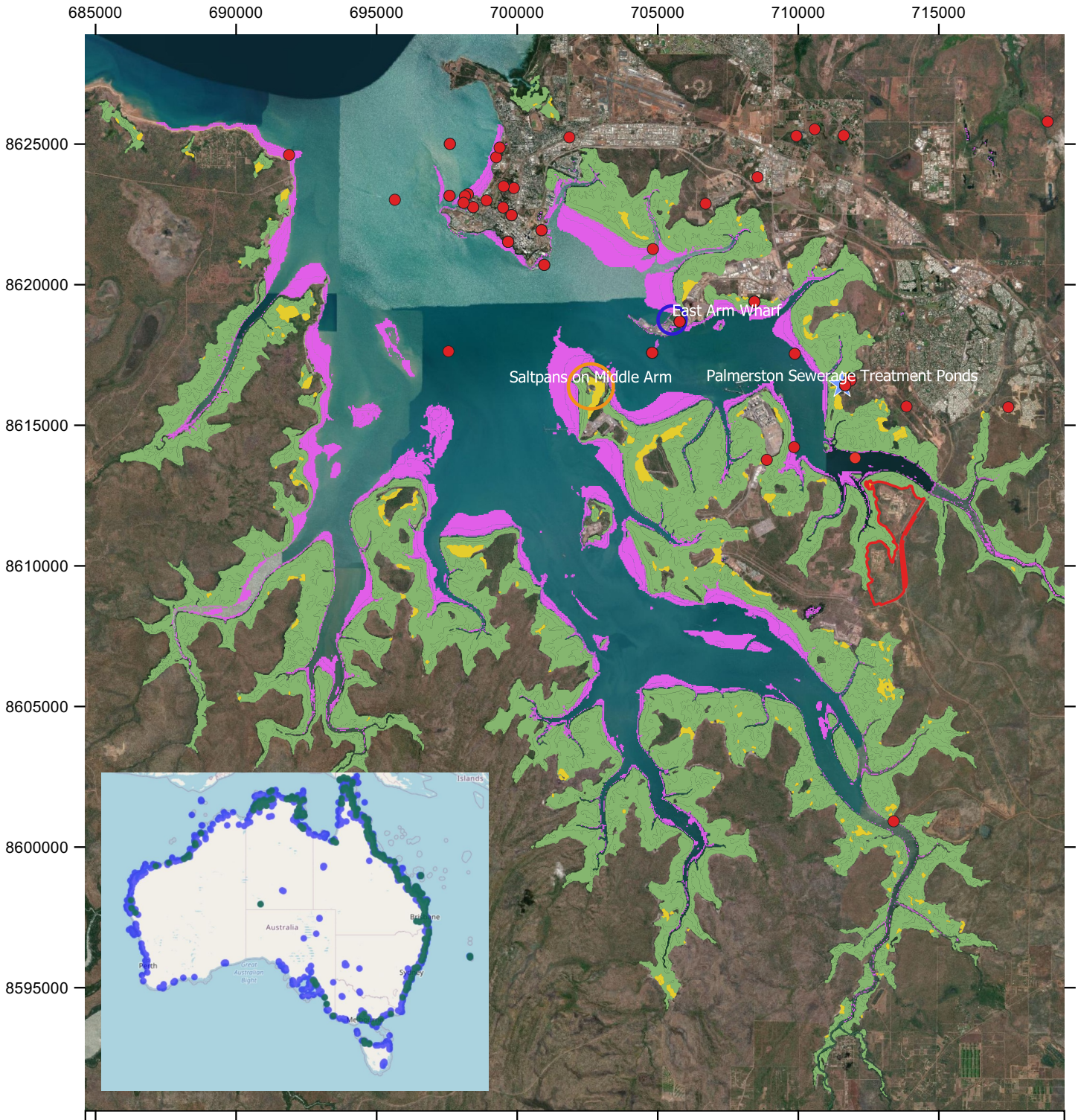

Figure 3-13. Distribution of Charadrius mongolus (Lesser Sand Plover) in Darwin Harbour and (inset) in Australia

Legend

Shorebird habitats
- Mangrove
- Saltpan
- Intertidal layer

DENR Database records
- Lesser Sand Plover
- Lot 1817 boundary

Inset (Source: Atlas of Living Australia)
- All records
- Records 2010-2020

0 2.5 5 km

eleanor@animalplantmineral.com.au
date: 21/07/2020
CRS: GDA94 MGA Zone 52
basemap: ESRI

3.2.4.6 Threatening Processes

As with other migratory shorebirds, *C. mongolus* is sensitive to development due to its high site fidelity, tendency to aggregate, high energy demands, and need for habitat connectivity between roosting and foraging sites. In Australia, major threats to *C. mongolus* include human disturbance, habitat loss and degradation (especially of foraging and roosting sites from land clearing, inundation, infilling, or draining for residential, farming, industrial, and aquaculture/fishing activities), changes to the water regime, and invasive plants (TSSC, 2016d).

Internationally, the species is listed as Least Concern by the IUCN. The key threat facing *C. mongolus* is habitat loss and degradation (e.g. from agricultural development of coastal and inland habitat in Australia) and disturbance from tourism. It is thought that 50% of *C. mongolus* in the EAAF use the Yellow Sea area during the northward migration, an area that has been heavily impacted by habitat loss (BirdLife International, 2016c; TSSSC, 2016d). Other recognised threats include:

- Agriculture and aquaculture (e.g. from annual and perennial non-timber crops)
- Natural system modifications (e.g. dams and water management/use); and
- Human intrusions and disturbance (particularly recreational activities) (BirdLife International, 2016c).

3.2.5 *Limosa lapponica* – Bar-tailed Godwit

3.2.5.1 Description

Limosa lapponica is a large shorebird, reaching lengths of up to 39 cm, a wingspan of 75 cm, and weights of 250-450 g, with females typically larger than males. It has a long neck, and long, slightly upturned bill with dark tip and pinkish base. In non-breeding plumage, it is brown on the upperparts, with dark barring on the lower rump, upper-tail, and underwing, and light/buff on the underparts. The breeding plumage is darker and more rufous, with female plumage duller than males. Juvenile plumage is similar to non-breeding adults (DAWE 2020; TSSC, 2016f, g).

3.2.5.2 Distribution and Habitat

This species breeds in the north of Scandinavia, Russia, and northwest Alaska, before migrating south for the non-breeding season. An estimated 325,000 birds from two subspecies use the EAAF and 175,000 birds overwinter in Australia, combining the nationally VU Western Alaskan subspecies, *L. l. baueri*, and nationally CR Northern Siberian subspecies, *L. l. menzbieri*. Within Australia, *L. lapponica* has been recorded along the coast of every state. Both subspecies are likely migrate to the NT, where an estimated 53,000 birds occur at Darwin and Melville Island, east to Alligator River and Croker Island, as well as the Gulf of Carpentaria, Gove Peninsula, Groote Eylandt, Numbulwar, and Sir Edward Pellew Group. Sites of significance in the NT are Milingimbi coast (population: 7,000) and Elcho Island (population: 5,000) (DAWE 2020).

In non-breeding areas, *L. lapponica* inhabits coastal areas, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. It forages near the edge of water on exposed sandy substrates of intertidal flats, banks, and beaches, and occasionally among mangroves. It roosts on sandy beaches, sandbars, spits, and near-coastal saltmarsh. Like other waders, in hot conditions it seeks moist substrates below roosts, where local temperatures are cooler than surrounding areas (DAWE 2020; TSSC, 2016f, g).

Limosa lapponica is considered likely to occur in the Elizabeth River adjacent to Lot 1817. The NT Fauna Atlas includes 115 records within the Darwin Harbour Proper, shown in **Figure 3-14**, with the closest record being 2.4 km upstream of the Elizabeth River Bridge. The species was not recorded in the Study Area in the 2016, 2018 and 2019 field surveys initiated by TNG. The species is a frequent user of the East Arm Wharf, where a maximum of 60 birds have been counted in one year over the 2013-2018 period. The highest monthly counts occur in September to October (Lilleyman & Garnett, 2019). Lilleyman *et al.* (2020a) modelled the change in visitation by

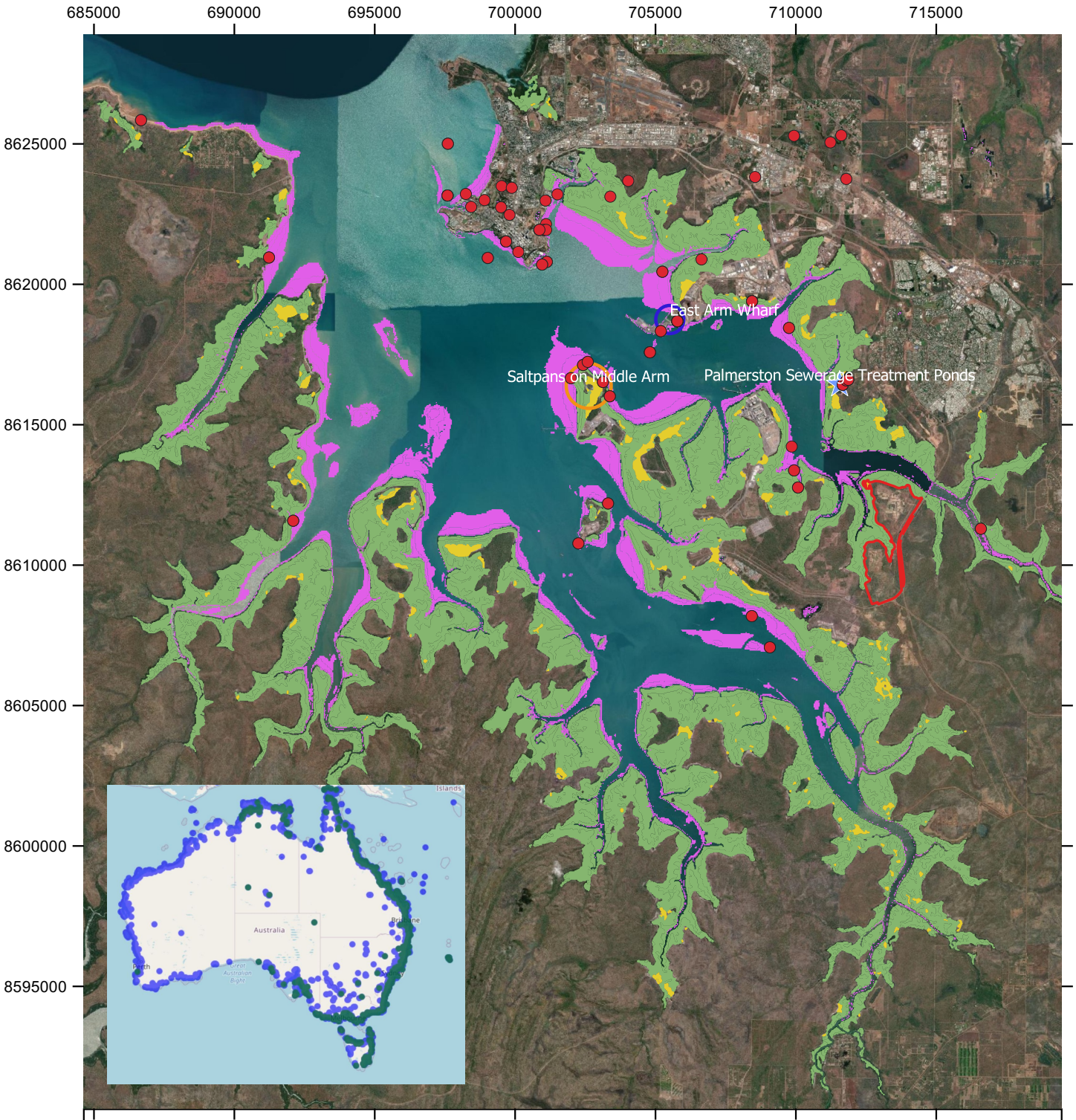

Figure 3-14. Distribution of Limosa lapponica (Bar-tailed Godwit) in Darwin Harbour and (inset) in Australia

Legend

Shorebird habitats
- Mangrove
- Saltpan
- Intertidal layer

Inset (Source: Atlas of Living Australia)
- All records
- Records 2010-2020

DENR Database records
- Bar-tailed Godwit

Lot 1817 boundary

0 2.5 5 km

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date: 21/07/2020
CRS: GDA94 MGA Zone 52
basemap: ESRI

the Bar-tailed Godwit at the East Arm Wharf from data collected monthly over a nine year period to 2018. Whilst not significant at $P < 0.05$, a decline of nearly 25% per year was reported with a significance level of $P < 0.1$. A decline in Bar-tailed Godwit numbers was also observed at the network of sites between East Point and Lee Point/Buffalo Creek in the Greater Darwin area (Lilleyman *et al.* 2020a).

Surveys at Lee Point in the Greater Darwin area have recorded Bar-tailed Godwit in numbers exceeding the benchmark for nationally significant aggregation (*i.e.* occurrences of ≥ 0.1 % of the total EAAF population) on one occasion between 1980 and 2018 (Lilleyman *et al.* 2020a). Nationally significant aggregations are not known to occur in the Darwin Harbour.

3.2.5.3 Suitable Habitat in Relation to the Project Area

The intertidal mudflats and sandflats in the Elizabeth River adjacent to Lot 1817 are suitable foraging habitat for *L. lapponica*. The saltpan area within Lot 1817 may be suitable roosting habitat. This species does not breed in Australia so there is no suitable breeding habitat.

Habitat in the intertidal mudflats and sandflats in Darwin Harbour Proper are considered to be in pristine condition. The saltpan area within Lot 1817 is intact, however it is unknown how the condition or suitability of these habitats has been previously impacted by the historic use of Lot 1817 for extractive industries and the disturbances from unregulated access of humans, dogs, motorbikes and invasive fauna such as cats and pigs. The site hydrology has been altered by the former extractive industry where the upper lateritic aquifer material has been removed and soil bunding has been left in many places which is likely to have altered the natural surface and subsurface hydrological processes on the site.

3.2.5.4 Life History and Migration Patterns

This species can breed from 2 years of age and live for nearly 23 years. Nesting occurs in solitary pairs, with two to five eggs per clutch laid in late-May to June. Eggs are incubated by both parents for 20-21 days. The species is gregarious and may occasionally be seen in large flocks of several hundreds or thousands of individuals (DAWE 2020; TSSC, 2016f, g).

At the end of the breeding season, *L. lapponica* migrates south to overwinter in Europe, Africa, Asia, and Australia. Individuals depart the breeding grounds between July and September and begin to arrive in Australia from late-August. Most arrive between mid-October to mid-December. They show high site fidelity for non-breeding sites. Individuals begin the return northward migration from February, with most departing between March and April. Some individuals remain in Australia during the breeding season, with most, or all, individuals remaining in Australia during their second austral winter (DAWE 2020; TSSC, 2016f, g).

3.2.5.5 Diet and Feeding Behaviour

The diet of *L. lapponica* consists of worms, molluscs, crustaceans, insects, and some plant material. It is diurnal, but will occasionally forage by moonlight. Differences in foraging behaviour and diet exist between the sexes, likely driven by differences in body and bill morphology. It apparently avoids foraging during high tide and will follow the tide edge to forage. Birds wade through shallow water and probe their bills into exposed mud to disrupt prey (DAWE 2020; TSSC, 2016f, g).

3.2.5.6 Threatening Processes

As with other migratory shorebirds, *C. mongolus* is sensitive to development due to its high site fidelity, tendency to aggregate, high energy demands, and need for habitat connectivity between roosting and foraging sites. In Australia, major threats to this species include habitat loss and degradation, and human disturbance, as well as pollution, invasive plants, and changes to water regimes. Sites in the NT are generally considered to be free of threats (DAWE 2020; TSSC, 2016f, g).

Internationally, the species is listed as Near Threatened by the IUCN. At the breeding grounds, key threats include habitat loss from oil and gas exploration and development, legal and illegal hunting, and increased predation. In other areas, keys threats include habitat loss of stopover sites in migration pathways, as well as

land reclamation, shellfisheries, pollution, human disturbance, altered water systems, and modified vegetation in non-breeding areas. As for other shorebirds, habitat loss from the Yellow Sea area is of concern. The Yellow Sea supports approximately 80 % of the EAAF population of *L. lapponica* during the northern migration (BirdLife International, 2017b; DAWE 2020). Other recognised threats include:

- Residential and commercial development
- Agriculture and aquaculture (e.g. annual and perennial non-timber crops)
- Energy production and mining (e.g. oil and gas drilling)
- Biological resource use (e.g. hunting)
- Human intrusions and disturbance (e.g. recreational activities)
- Natural system modifications (e.g. dams and water management/use)
- Invasive and other problematic species, genes, and diseases;
- Pollution; and
- Climate change and severe weather (BirdLife International, 2017b).

3.2.6 *Dasyurus hallucatus* – Northern Quoll

3.2.6.1 Description

Dasyurus hallucatus is the smallest quoll in Australia, reaching maximum weights of 1,100 g. It has dark reddish-brown fur, with prominent white spots on the dorsal surface, and cream fur on the ventral surface. It has a pointy snout and long, sparsely furred tail (TSSC, 2005; Woinarski & Hill, 2012).

3.2.6.2 Distribution and Habitat

This species has undergone a significant range contraction and is now restricted to discontinuous populations across northern Australia, from the southwest Kimberley to southeast QLD, and a disjunct population in the Pilbara region of WA (**Figure 3-15**). In the NT, it is restricted to the Top End, including a number of islands (Hill & Ward, 2010; Woinarski & Hill, 2012) (**Figure 3-15**).

It inhabits a range of environments, with core populations restricted to rocky and/or high rainfall areas. Given it does not exhibit any habitat specificity, habitat considered critical to survival are areas that are least susceptible to future threats. These include rocky areas, which retain water, are biodiverse, are less efficient environments for cat predation, and are less prone to fire impacts, and offshore islands, where mainland threats tend to be absent or less prominent (Hill & Ward, 2010; Woinarski & Hill, 2012).

In the Darwin region it has been recorded from a number of locations (**Figure 3-15**) including Charles Darwin National Park (Woinarski & Hill, 2012). Records in the NT Fauna Atlas on the western extent of Middle Arm are sporadic and infrequent (**Figure 3-15**) despite numerous systematic fauna surveys initiated by proposed developments on Middle Arm. This indicates colonisation of the area west and north of Channel Island Road by quolls is uncommon and long-term persistence of sustainable populations is unlikely.

This species has not been recorded in the Project area over the three systematic fauna surveys initiated by TNG and conducted across three years. NT Fauna Atlas has one record of this species 500 m south of the Project from a systematic fauna survey in 2001 and a juvenile was recorded killed on Jenkins Road two km to the south east of the Project area (Lot 1816 or 1654) in 2018. Both of these records occurred east of the Channel Island Road and Adelaide Darwin railway, which may pose a barrier to accessing Lot 1817 from the more continuous habitat available on Middle Arm to the east.

Due to the lack of records from significant survey effort on Middle Arm west of the Adelaide-Darwin railway line it is considered the likelihood of Northern Quoll being present in Lot 1817 is Low.

3.2.6.3 Suitable Habitat in Relation to the Project Area

Habitat suitability within Lot 1817 is moderate. Potentially suitable habitat in the Project area exists in the Eucalypt Woodland habitat type.

The availability of tree hollows is limited at Lot 1817. Tree hollows suitable for denning are common in larger, older trees. The NT Land Clearing Guidelines indicate tree hollows are particularly prevalent in trees with a diameter at breast height (DBH) ≥ 50 cm. All trees in Lot 1817 were systematically measured for DBH. Four small pockets of trees totalling 3.7 ha were found to have the required density of trees with DBH ≥ 50 cm to be considered as significant habitat. The remaining remnant Eucalypt woodland contains trees of a smaller size and thus less likely to have developed a significant tree hollow availability.

Disturbances at Lot 1817 that have reduced the quality of habitat are:

- historic extraction industry activity that has disturbed 315 ha or 64.5 % of Lot 1817
- historic extraction industry activity has altered the surface hydrology and large areas of shallow water are available for breeding cane toads in the wet season
- fragmentation of the entire Lot 1817 by the presence of the Channel Island Road, the Adelaide Darwin Railway line, and the Elizabeth River.
- fragmentation within Lot 1817 by the cleared areas and roads.
- frequent human disturbance within Lot 1817 from unregulated access by the general public who use it for recreational purposes, such as off-leash dog walking, motorbike riding, and rally driving, as well as for illegal rubbish dumping, and intentional and accidental fires.
- frequent human disturbance within Lot 1817 for the planned maintenance of existing infrastructure, such as power lines and pipelines, road maintenance, slashing of 28.8 ha of land, and machinery and humans performing maintenance activities.
- poor rehabilitation of 61.5 ha, and no rehabilitation in 106.8 ha, with a high abundance of the weedy Gamba grass, known to exacerbate fire risk and intensity.
- the presence of introduced fauna, such as Cats and Dogs, that compete for prey and pose risks to *D. hallucatus*
- Restricted access to tree hollows leading to high competition for available hollows.

Despite these disturbances and lack of records, it is considered that occasional use of the site for foraging by *D. hallucatus* is possible, but it is unlikely that denning or breeding habitat is present.

Habitat critical to the survival of the northern quoll and populations important for the long-term survival of the northern quoll are defined in CoA (2016). Lot 1817 does not contain critical habitat to, or an important population of, *D. hallucatus*.

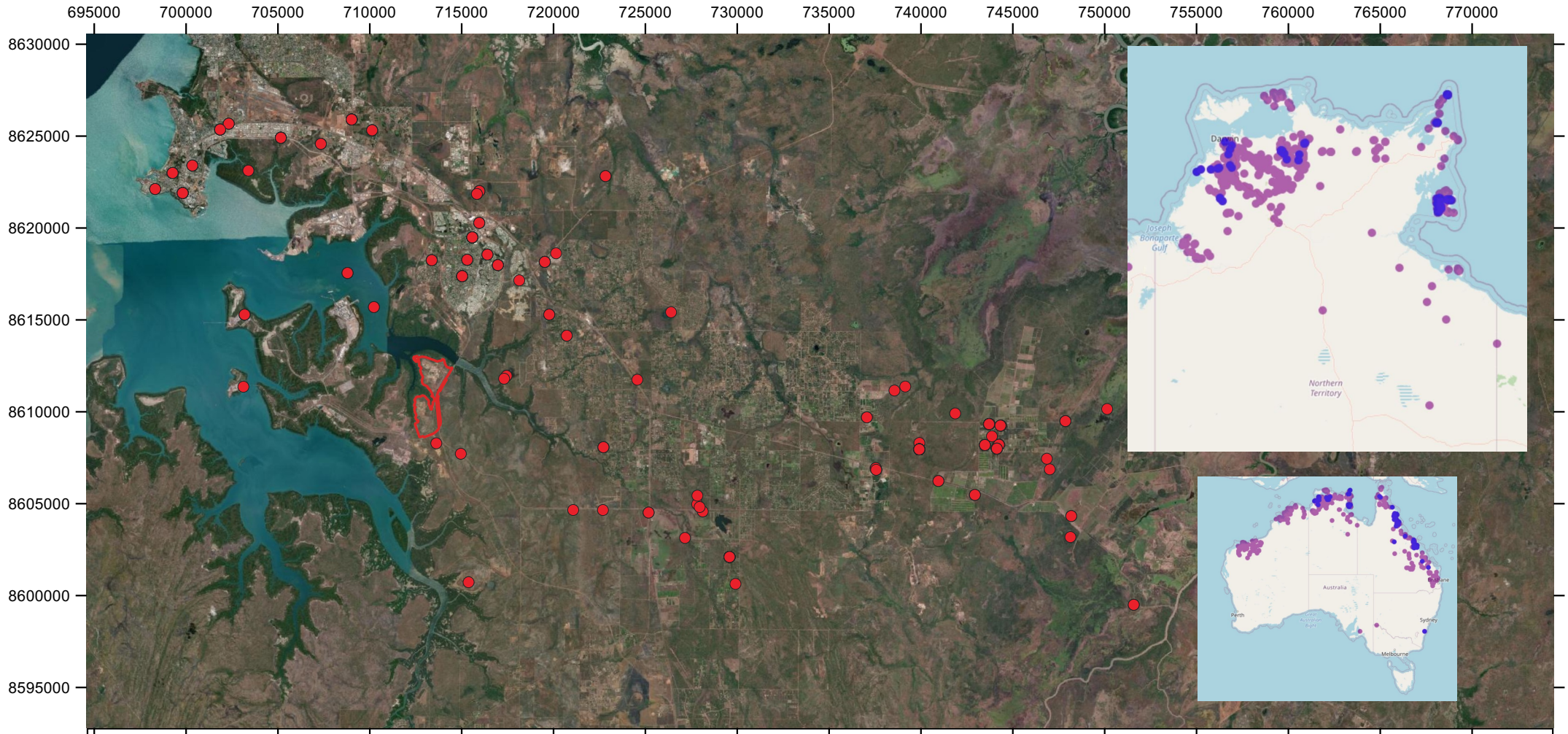

Figure 3-15. Distribution of the Northern Quoll records in the Darwin region and (insets) in the Top End of the NT and in Australia

Legend

NT Fauna Atlas records

- Northern Quoll

Lot 1817 boundary

Inset: Source Atlas of Living Australia

- All records
- Records 2010-2020

0 2.5 5 km

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date: 21/07/2020
CRS: GDA94 MGA Zone 52
basemap: ESRI

3.2.6.4 Ecology

Dasyurus hallucatus is a generalist omnivore, with a diet consisting of a range of invertebrates and small vertebrates, as well as fruit and nectar. It is an opportunistic forager, switching prey resources with season and availability. It is solitary, predominantly nocturnal, and typically forages on the ground, although it is also an adept climber. It uses a range of dens, including hollow logs or tree hollows, rock crevices, caves, and termite mounds (Hill & Ward, 2010; TSSC, 2005; Woinarski & Hill, 2012).

This species is facultatively male semelparous, meaning many, but not all, males will die after the short, highly synchronised breeding season in late May/early June. Females may live up to three years. Offspring are born in the mid dry season in June and are independent by the early wet season in November. As with all semelparous dasyurids, *D. hallucatus* exhibits sexual size dimorphism, with males larger than females (TSSC, 2005; Woinarski & Hill, 2012.

3.2.6.5 Threatening Processes

Dasyurus hallucatus populations have been declining in the NT for the past few decades, with Feral Cats, disease, and inappropriate fire regimes likely factors contributing to the declines. However, the arrival and spread of Cane Toads across the NT has served as a far more devastating threat. *Dasyurus hallucatus* is highly susceptible to Cane Toad toxin. Refuge populations exist in areas where Cane Toads have invaded and protecting these populations from other threats is considered vital for the survival of the species. In addition to these threats, other threats include habitat loss and degradation, invasion and spread of weeds (including Gamba Grass), and population isolation (Hill & Ward, 2010; Woinarski & Hill, 2012).

3.2.7 *Varanus panoptes* – Yellow-spotted Monitor

3.2.7.1 Description

Varanus panoptes is a large (up to 1.4 m total length), robust monitor. The dorsal surface is dark or blackish brown to reddish-brown, with alternating transverse rows of large spots and smaller dark-edged pale-yellow spots to halfway along the tail. The ventral surface is pale and marked with lines of spots extending from the ventral patterning. The tail is laterally-compressed, and the last quarter is pale with narrow dark bands (Ward *et al.*, 2012; Wilson & Swan, 2010).

3.2.7.2 Distribution and Habitat

This species has a broad range across the north of Australia, from the Kimberley region of WA to Cape York Peninsula, and south through QLD (**Figure 3-16**). In the NT, it has been recorded across most of the Top End and Gulf region, south to Katherine, Judbarra/Gregory National Park, and the Gulf hinterland. A distinct subspecies occurs further south in WA, in the Pilbara and Gascoyne regions (Ward *et al.*, 2012). In the Darwin Region this species has been recorded broadly (**Figure 3-16**) including at Charles Darwin National Park. *Varanus panoptes* inhabits a range of environments, including coastal beaches, floodplains, grasslands, and woodlands (Ward *et al.*, 2012; Wilson & Swan, 2010).

3.2.7.3 Suitable Habitat in Relation to the Project Area

Yellow Spotted Monitor has not been recorded in Lot 1817 in the 3 terrestrial fauna surveys initiated by TNG in 2017, 2018 and 2019, or by the recent unpublished fauna surveys of Middle Arm by the DEPWS Flora and Fauna Division (DEPWS communication). The closest record on the Atlas of Living Australia is 10 km from Lot 1817. The species has a broad habitat suitability and it is likely all habitats within the Survey area are suitable. As the species has not been recorded in recent survey efforts the likelihood of an important population of Yellow Spotted Monitor within Lot 1817 is low. The habitat suitability is moderate.

Disturbances at Lot 1817 that have reduced the quality of habitat are:

- historic extraction industry activity that has disturbed 315 ha or 64.5 % of Lot 1817
- the creation of large areas of suitable Cane Toad breeding habitat

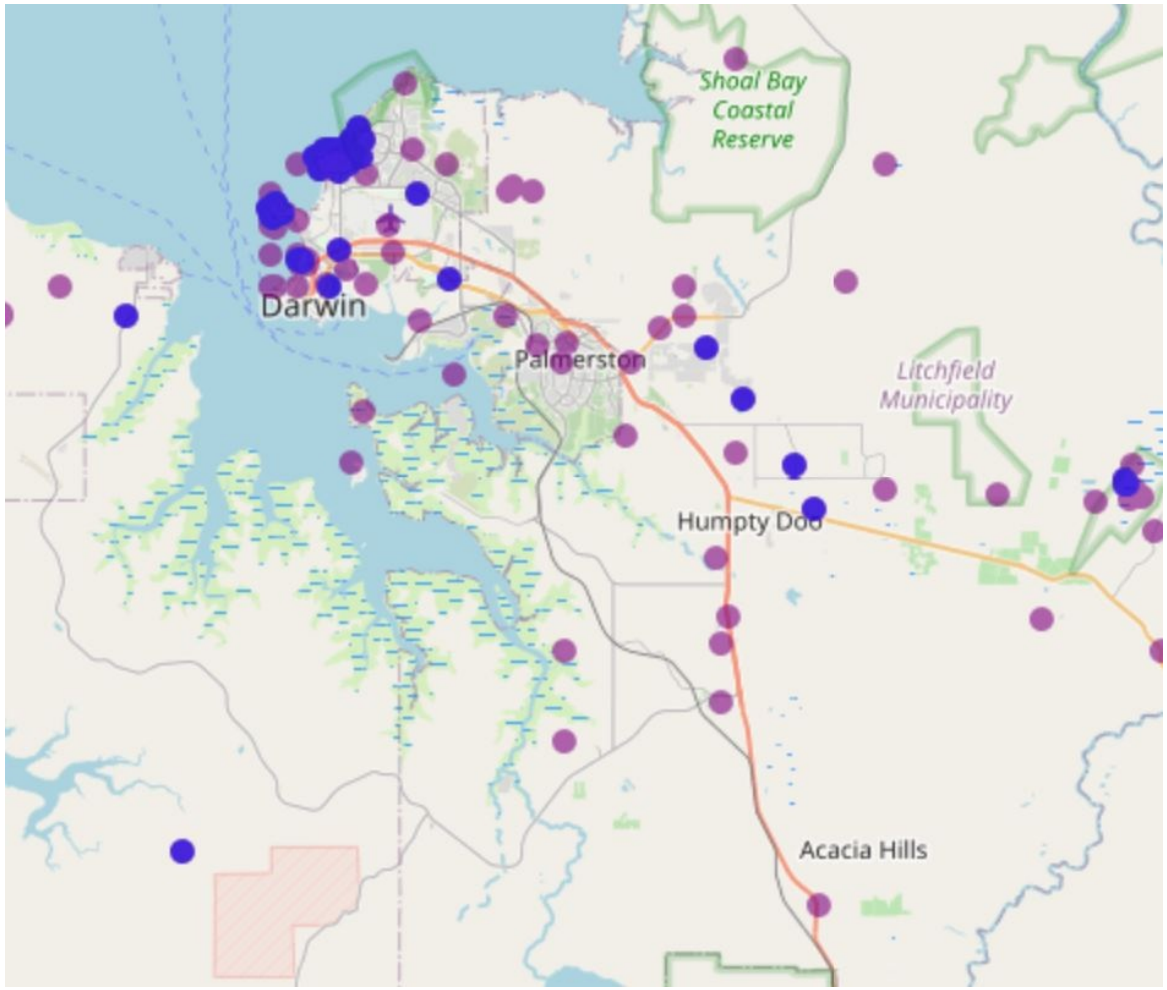
- fragmentation of the entire Lot 1817 by the presence of the Channel Island Road, the Adelaide Darwin Railway line, and the Elizabeth River.
- fragmentation within Lot 1817 by the cleared areas and roads.
- frequent human disturbance within Lot 1817 from unregulated access by the general public who use it for recreational purposes, such as off-leash dog walking, motorbike riding, and rally driving, as well as for illegal rubbish dumping, and intentional and accidental fires.
- frequent human disturbance within Lot 1817 for the planned maintenance of existing infrastructure, such as power lines and pipelines, road maintenance, slashing of 28.8 ha of land, and machinery and humans performing maintenance activities.
- poor rehabilitation of 61.5 ha, and no rehabilitation in 106.8 ha, with a high abundance of the weedy Gamba grass, known to exacerbate fire risk and intensity.
- the presence of introduced fauna, such as cane toads, that compete for prey and pose risks to *Varanus panoptes.*

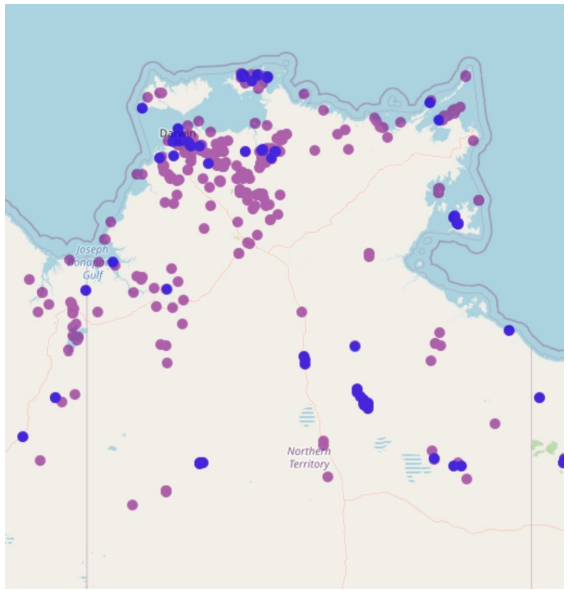
3.2.7.4 Ecology

Varanus panoptes is terrestrial. It preys on small terrestrial vertebrates and insects, as well as marine and freshwater turtle egg located using its strong sense of smell. It lays clutches of eggs in burrows during the wet season (Ward *et al*., 2012).

3.2.7.5 Threatening Processes

As with *Varanus mertensi*, the key threat facing *V. panoptes* is poisoning by Cane Toads. Monitors are easily capable of eating toads large enough to kill them, given they are highly susceptible to Cane Toad toxin (Ward *et al*., 2012).





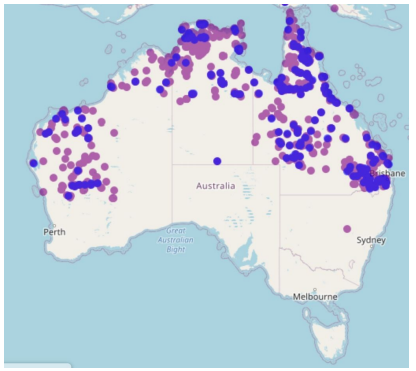


Figure 3-16. Distribution of Yellow Spotted Monitor records in the Darwin Region, in the Top End of the NT and in Australia

Legend

Source Atlas of Living Australia

All records

Records 2010-2020

eleanor@animalplantmineral.com.au
date: 21/07/2020
CRS: GDA94 MGA Zone 52

3.2.8 *Saccolaimus saccolaimus nudicluniatus* – Bare-rumped Sheathtail Bat

3.2.8.1 Description

Saccolaimus saccolaimus remains taxonomically uncertain in Australia. While the northeast QLD and NT populations are geographically isolated, and individuals from these population show inter-population variation, the EPBC Act currently lists the two populations under the *S. s. nudicluniatus* umbrella (TSSC, 2016). As such, this document considers the NT population to be *S. s. nudicluniatus*.

Saccolaimus saccolaimus nudicluniatus is a large bat, weighing between 48 and 55 g and reaching head-body lengths of 81 – 97 mm. It is reddish brown to dark brown above, paler below, and irregularly flecked with white fur. Not all individuals have naked rumps; however, it is conspicuous when present. Males have a throat pouch, which exists in a rudimentary form in females. It is likely that individuals inhabiting the NT are slightly larger and darker in colour than those from northeast QLD (TSSC, 2016; Van Dyck & Strahan, 2008).

3.2.8.2 Distribution and Habitat

Saccolaimus saccolaimus nudicluniatus is the only taxon from the broader *S. saccolaimus* species to occur in Australia, with its range extending into southeast Asia. In Australia, this species occurs in near-coastal areas of northeast QLD and the monsoonal tropics of the NT (**Figure 3-17**). It is likely to also occur in the Kimberley region of WA. There are few records of the species across Australia, including fewer than five records in the NT since the first record in Kakadu National Park in 1979, suggesting that the species is either rare, has a very fragmented distribution, or detection rates are low due to confused identification with the morphologically similar congener *S. flaviventris* (TSSC, 2016).

This species is poorly known. In QLD, it has been recorded inhabiting coastal Eucalypt woodlands, in a zone that receives high rainfall. Generally, it is thought to inhabit lowland areas, within woodland, forest, and open environments. During the day, it roosts in tree hollows, but may also use geological formations, such as caves, as it does in other countries. At night, it forages for flying insects above the canopy. It has been suggested that it forages over ecotones, such as the edge of rainforests, or in forest clearings (DAWE 2020; TSSC, 2016; Van Dyck & Strahan, 2008).

There are no records in the NT Fauna atlas of this species for the Darwin region. DAWE (2020) and TSSC (2016) report no recent records of this species from the Top End, however Atlas of Living Australia has some scattered historic records in the Darwin region and a recent record south of Darwin.

3.2.8.3 Suitable Habitat in Relation to the Project Area

This species was not recorded in the Project area in the terrestrial biological surveys initiated by TNG in 2016, 2018 and 2019 but has been recorded on Middle Arm by the DEPWS Flora and Fauna Division in recent unpublished surveys (DEPWS communication). Suitable habitat exists in the Project area in the Eucalypt Woodland and Melaleuca woodland habitat types. The proportion of these habitat types within the development envelope is insignificant compared to what is available regionally (**Figure 3-17**).

Habitat suitability within Lot 1817 is moderate. Potentially suitable habitat in the Project area exists in the Eucalypt Woodland and Melaleuca woodland habitat types. The availability of tree hollows is likely limited at Lot 1817. Tree hollows suitable for roosting are common in larger, older trees. The NT Land Clearing Guidelines indicate tree hollows are particularly prevalent in trees with a diameter at breast height (DBH) ≥ 50 cm. All trees in Lot 1817 were systematically measured for DBH. Four small pockets of trees totalling 3.7 ha were found to have the required density of trees with DBH ≥ 50 cm to be considered as significant habitat. The remaining remnant Eucalypt woodland contains trees of a smaller size and thus less likely to have developed a significant tree hollow availability.

Disturbances at Lot 1817 that have reduced the quality of habitat are:

- historic extraction industry activity that has disturbed 315 ha or 64.5 % of Lot 1817
- fragmentation of the entire Lot 1817 by the presence of the Channel Island Road, the Adelaide Darwin Railway line, and the Elizabeth River.
- fragmentation within Lot 1817 by the cleared areas and roads.
- frequent human disturbance within Lot 1817 from unregulated access by the general public who use it for recreational purposes, such as off-leash dog walking, motorbike riding, and rally driving, as well as for illegal rubbish dumping, and intentional and accidental fires.
- The small amount of large remnant trees may provide high competition for tree hollows
- poor rehabilitation of 61.5 ha, and no rehabilitation in 106.8 ha, with a high abundance of the weedy Gamba grass, known to exacerbate fire risk and intensity.

3.2.8.4 Ecology

Saccolaimus saccolaimus nudicluniatus is a gregarious species, typically occurring in flocks of three or four individuals, and occurring in flocks of up to 40 individuals. This species is insectivorous, although specific species included in the diet are unknown. It hunts in high, straight flight paths, and is known to be fast.

Females give birth to a single young and have been recorded with young in the NT from December to April. Individuals reach sexual maturity at one to two years, and live for five to eight years (TSSC, 2016; Van Dyck & Strahan, 2008).

3.2.8.5 Threatening Processes

The key threat thought to be facing this species is habitat loss and fragmentation, particularly the continued removal of suitable roosts by land clearing. Other threats may include interspecies competition for tree hollows, disease, and inappropriate fire regimes (too frequent fire). Globally, the species is considered adaptable, tolerating some level of disturbance (TSSC, 2016; Van Dyck & Strahan, 2008).