

EAST POINT RESERVE

**Biodiversity Management Plan
2019-2024**

Prepared for:

City of Darwin
GPO Box 84
DARWIN NT 0801

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BASIS OF REPORT

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Reference	Date	Prepared	Checked	Authorised
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EXECUTIVE SUMMARY

The East Point Reserve is a significant public open space in the Darwin urban area (approximately 5 km from the city centre), managed by the City of Darwin. The reserve is subject to range of interacting management concerns influenced by the values and uses of the area.

This Biodiversity Management Plan has been developed to provide management actions to be implemented at the East Point Reserve between 2019 and 2024 to manage, protect, and enhance the biodiversity of the reserve. The plan comprises separate plans of management for:

- Native fauna (including reintroductions)
- Revegetation
- Weed
- Pest animals
- Water
- Planning issues
- Access
- Stakeholders

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ABBREVIATIONS

EPBC Act	<i>Environment Protection and Biodiversity Conservation Act</i>
WM Act	<i>Weeds Management Act</i>
TPWC Act	<i>Territory Parks and Wildlife Conservation Act</i>

1 Introduction

The East Point Reserve (the Reserve) is a significant public open space in the Darwin urban area (approximately 5 km from the city centre), managed by the City of Darwin (**Figure 1**). The Reserve is subject to range of interacting management concerns which are influenced by the values and uses of the area including:

- Recreational use
- Relatively unmanaged land on the 'Fannie Bay Reserve', south east of the Reserve
- Educational values, including the science trail and signage
- Native vegetation
- Native fauna
- Use by community lessees including the Darwin Equestrian club and the Darwin Aero Modellers club
- Commercial lease to Pee Wees at the point
- Pest fauna and biting insects
- Weeds
- Darwin Harbour Site of Conservation Significance
- Neighbouring biodiversity values including mangroves and shorebird habitat
- Commonwealth land, housing the Darwin Military Museum.

The Reserve comprises approximately 190 Ha, divided by City of Darwin into 14 spatial components on the basis of usage and composition (**Table 1, Figure 2**). The Reserve adjoins vacant crown land supporting a mangrove community to the north, and surrounds crown land parcel Lot no. 8158 which hosts the Darwin Military Museum.

SLR has been engaged by the City of Darwin to provide an update to the *East Point Reserve Biodiversity 5 Year management plan 2014-2018* (EcOz, 2015) to allow the City of Darwin to continue to effectively maintain and improve the biodiversity of the Reserve, while minimising threats and working productively with external stakeholders.

Responsibility for management of the Reserve sits with the Manager of Infrastructure Maintenance (City operations) and the Manager for Climate Change and Environment (City futures).



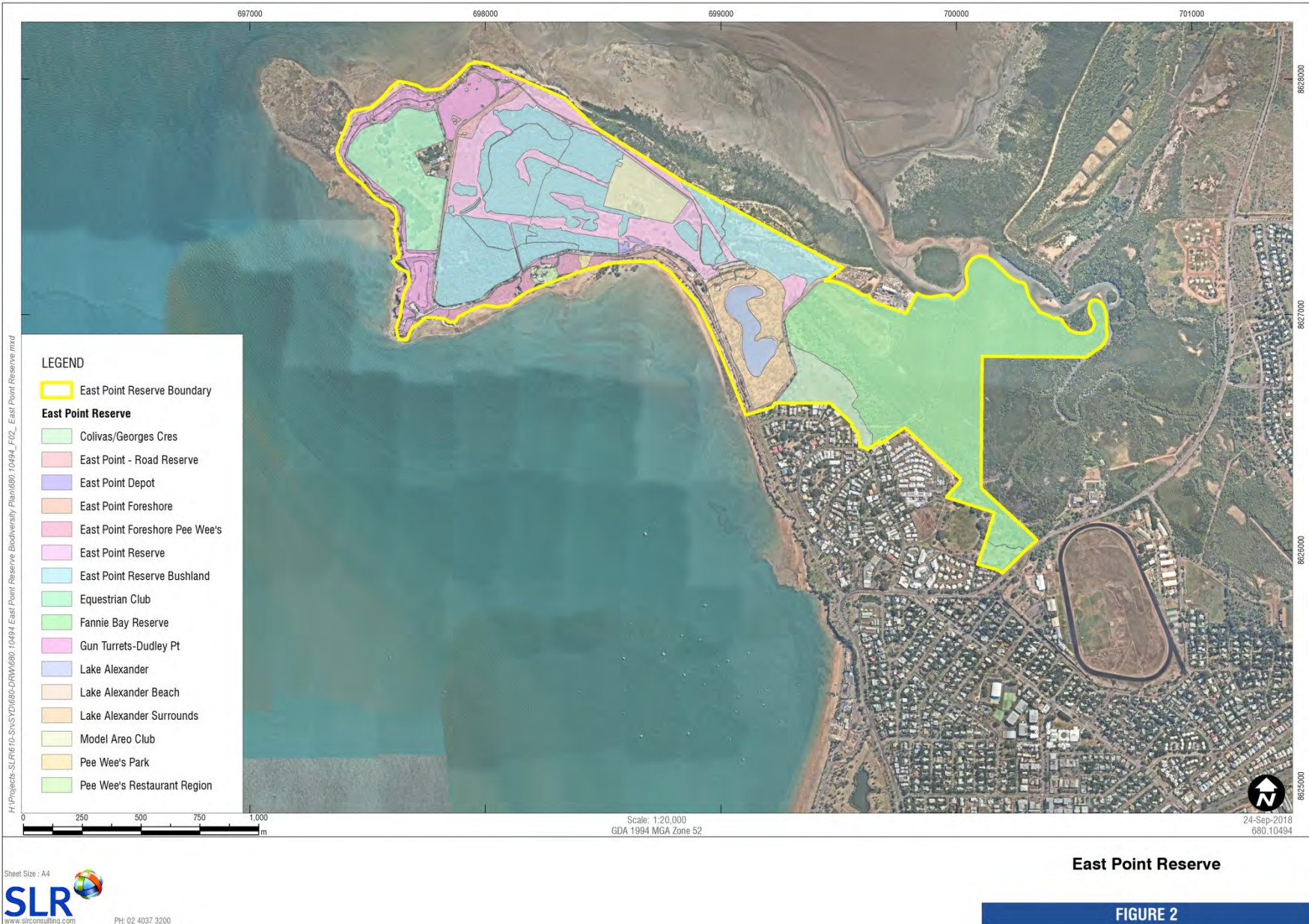
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Location of East Point Reserve

FIGURE 1

Table 1 Composition of the East Point Reserve

City of Darwin ID	Asset type	Area (ha)
East Point Reserve Bushland	Bushland	47.0
Fannie Bay Reserve	Bushland	60.3
Pee Wee's Restaurant Region	Commercial	0.5
Equestrian Club	Community Group	14.1
Model Aero Club	Community Group	5.9
Lake Alexander	Contained	3.9
East Point Foreshore	Foreshore	1.9
East Point Foreshore Pee Wee's	Foreshore	3.5
Gun Turrets-Dudley Pt	Foreshore	12.3
Lake Alexander Beach	Foreshore	0.5
Lake Alexander Surrounds	Foreshore	9.4
Pee Wee's Park	Foreshore	0.2
Colivas/Georges Cres	Park	6.1
East Point - Road Reserve	Park	1.5
East Point Depot	Park	0.4
East Point Reserve	Park	20.9
Fannie Bay Reserve	Park	1.5
Total		189.9



2 Native fauna plan

2.1 Purpose

The native fauna of the Reserve comprise one of its key values, and the potential for introduction / reintroduction of threatened species is an important opportunity for improvement of the biodiversity values of the Reserve. The purpose of this native fauna plan is to provide for management actions that promote the beneficial management of native fauna already on the site as well as to facilitate the reintroduction of threatened fauna species for which suitable habitat is available within the Reserve.

2.2 Objectives

The objectives of implementing the management actions identified below include:

- Continue monitoring fauna diversity
- Ensure that the Agile Wallaby population remains at a suitable size for the resources available in the Reserve
- Support local shorebird populations by running community engagement events
- Maintain the quality of shorebird habitat adjacent to the Reserve
- Action the proposed reintroduction of the Atlas Moth
- Develop the 'breezeway' as a woodland vegetation community rich with foraging and shelter resources for native fauna

2.3 Background and context

2.3.1 Fauna monitoring

The Reserve supports a range of native fauna species including 225 bird species, 3 frog species, 11 mammal species and 31 reptile species (NT Fauna Atlas, Buckley *et al.*, EcOz 2013a). This includes 52 bird species listed as migratory under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act), and 12 species listed as threatened under the EPBC Act and/or the *Territory Parks and Wildlife Conservation Act* (TPWC Act) (**Appendix B**).

Ongoing monitoring of fauna within the Reserve is a key component of biodiversity management. Annual surveys, conducted at the end of the wet season, using consistent methodology, will allow changes in the fauna of the Reserve to be identified and, where required, will allow management responses to be formulated.

2.3.2 Agile Wallabies

There is a resident population of Agile Wallabies at the Reserve which is thought to have persisted since before the original clearing of the peninsula. The wallabies are a popular attraction, and visitors to the Reserve are able to see wallabies feeding in open grassed areas, particularly at dusk and dawn. During the day, and at night, wallabies shelter in the monsoon forest.

The wallaby population has increased considerably from around 300 in the 1970s and early 1980s, to 1500 - 2000 in the mid to late 1980s (Stirrat, 2000). The eruption of the population was attributed to the installation of year-round watering points and drip irrigation throughout the Reserve, so that all wallabies had access to ample drinking water year round. The peak wallaby population size was inappropriate for the area and caused impacts including reducing productivity and diversity of remnant and revegetated monsoon forest, overgrazing of grassed areas leading to decreased amenity, and high rates of vehicle impact (Stirrat, 2000). In the late 1990s, the population had declined and was estimated at approximately 400 individuals (Stirrat, 2000).

EcOz (2013a) subsequently developed a simplified methodology for wallaby surveys which was considered appropriate for assessing changes in the population over time, although strictly it cannot be used to determine the total population size (which may be larger than the numbers counted). Using the simplified methodology, a maximum count of 114 wallabies was made in May 2013. Ongoing population surveys by City of Darwin staff, initially monthly and then quarterly, were recommended in the 2014-2018 Biodiversity Management Plan for the Reserve (EcOz, 2015). Counts have been conducted by City of Darwin staff since 2014, approximately according to the monthly then quarterly schedule. The number of animals recorded varied between 52 and 232 (joeys and adults). The count values do not indicate long term trends of either increase or decrease (**Figure 4**). In their 2016 report, Buckley *et al.* note that 'sampling methods currently employed to monitor the wallaby population at East Point are unlikely to provide reliable estimates of population size or relative change in population size over time' but did not suggest a suitable alternative (Buckley *et al* 2016). In any case, anecdotal evidence suggests that the population is not having a deleterious impact on the vegetation communities of the Reserve (J. Lewis, pers comm), and hence is not considered to be beyond the carrying capacity of the Reserve.

Six Wallaby watering troughs are currently kept filled throughout the dry season (**Figure 3**). The design of watering points was modified in 2015 to minimise Cane Toad access to water, although Cane Toads still have access to spills (Lippiatt, 2015).

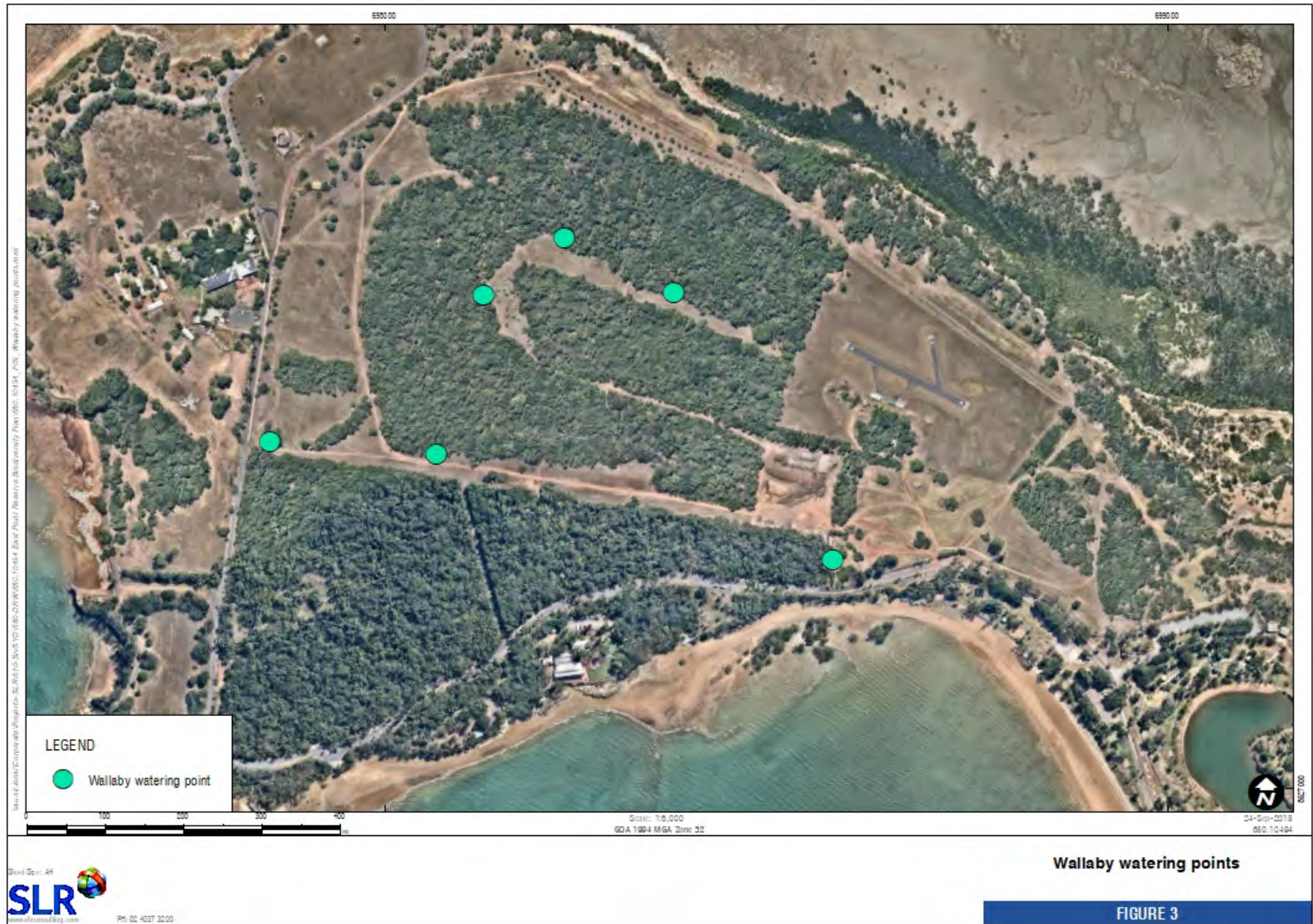
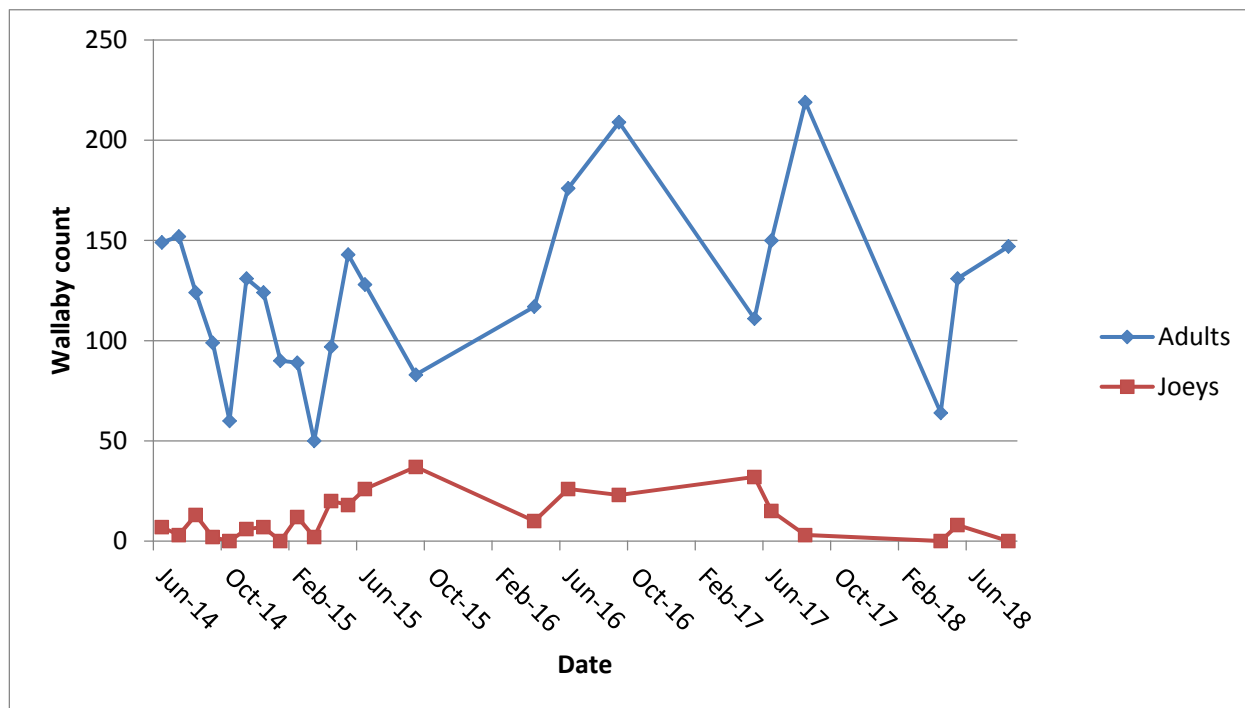


Figure 4 Indicative Wallaby counts

Source: City of Darwin



2.3.3 Shorebirds

Sixteen shorebird species have been recorded at East Point (EcOz, 2013a). The site is potentially a final staging point, where birds build up reserves prior to migratory flight, for at least some species (EcOz, 2013a). Lilleyman *et al* (2015) identified East Point as an area where two subpopulations of shorebirds in Darwin Harbour overlap, and the site meets the EPBC Act criteria for important habitat for migratory birds (EcOz, 2013a).

Migratory shorebird populations are declining globally as a result of interactions between habitat availability and quality in breeding, stopover and non-breeding habitats (Clemens, 2016). While the largest impacts are likely due to habitat destruction in East Asia, Clemens (2016) identified a small but significant effect of declining habitat condition in Australia on reduced shorebird survival. Highly impacted shorebird habitat can be improved by habitat creation (eg. artificial wetlands or saltmarshes), transplantation of vegetation, management of water quality and quantity, and reduction of anthropogenic disturbances. However, the shorebird habitat at East Point is in good condition and management should focus on protecting rather than restoring habitat. The claypan in the Fannie Bay Reserve is under the control of the City of Darwin, while coastal shorebird habitat at East Point is outside the boundary of the Reserve (**Figure 5**).

An osprey nesting platform was installed in the grounds of Fannie Bay Equestrian Club in 2015, however the platform has not been used for nesting to date, and installation of further platforms is not currently warranted. Acquisition of the neighbouring crown land to the north of the Reserve has been suggested as an option for increasing the City of Darwin’s ability to manage shorebirds (EcOz, 2013); while to date no decision has been made, the option should be evaluated further. Control of feral animals, access controls, additional signage, and community engagement could be implemented on City of Darwin controlled land to contribute to shorebird management.

The following additional information has been provided by BirdLife Top End:

Shorebirds that belong to the East Asian-Australasian Flyway migrate between hemispheres and spend most of their time on the non-breeding grounds in the southern hemisphere. Coastal development and disturbance are major threats to shorebirds while they are on the non-breeding grounds. Nature reserves and national parks can provide some refuge to shorebirds through controlled areas and appropriate signage to show recreational users where they can walk dogs or sensitive areas to avoid.

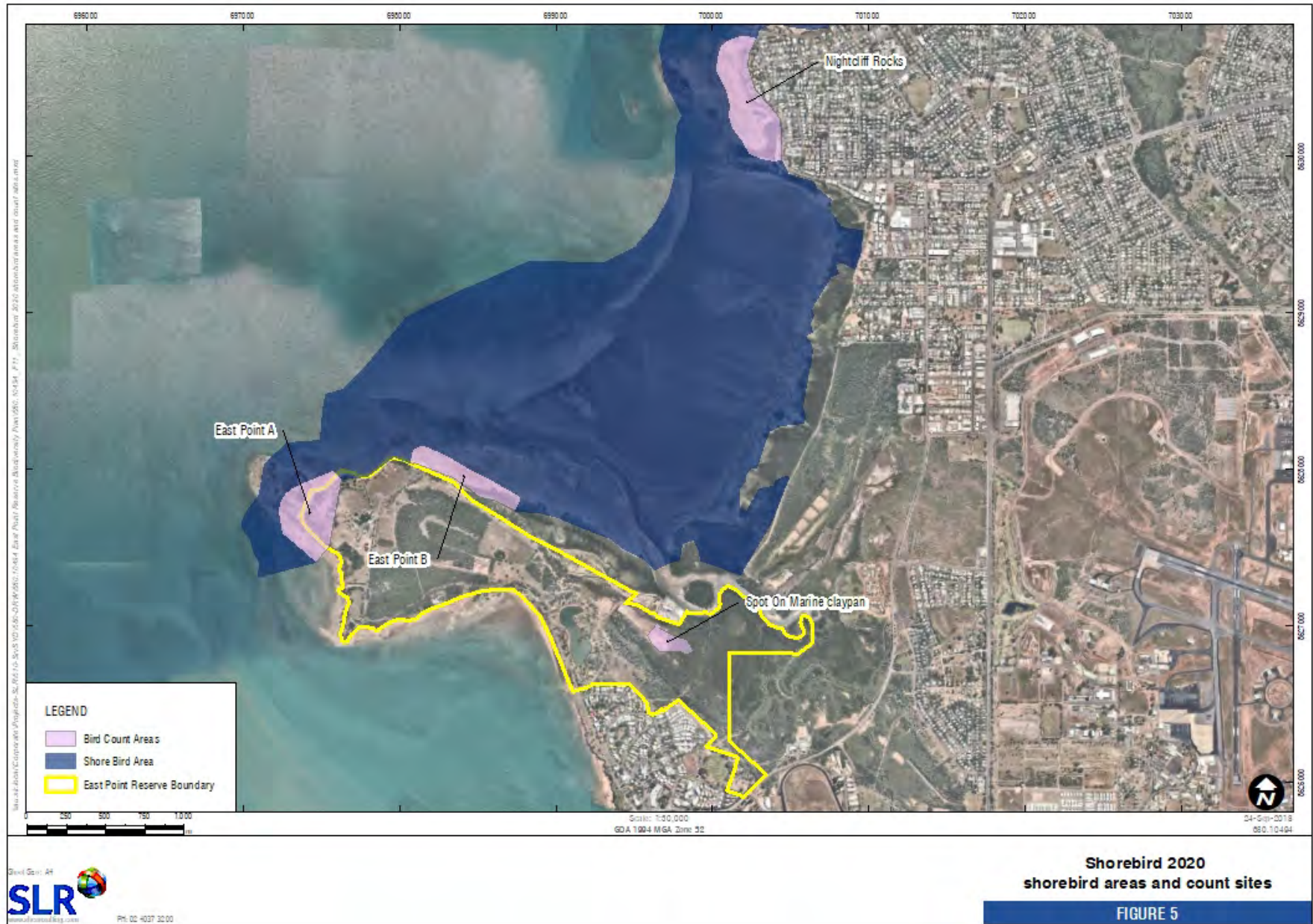
It is crucial that the East Point roost sites remain as part of a network of sites for shorebirds in the Darwin Harbour region. The rocky roost site provides habitat for the Lesser Sand Plover, an endangered species under the EPBC Act 1999. This site supports the largest population of this species within the monitored sites around Darwin. This site also provides habitat for shorebirds that prefer rocky substrates as opposed to sandy beach systems.

East Point is a known roost site for 16 species of migratory shorebird (EcOz, 2013a), with most shorebird present from September through until April each year. The shorebirds roost on the rocky reefs bordering the Reserve, and then feed in the intertidal zone of Ludmilla Bay at low tide. The rocky reef is popular with people fishing, casting bait nets and walking. These activities often disturb shorebirds. The current shorebird signs do not provide enough detail about shorebirds that use the site, where they are from, why they are threatened and how humans can help them.

Shorebirds also use the saltpan known as Spot on Marine, situated along Colivas Road. This area is used predominantly as a roost site and water covers this pan during high tides above 7.5 m. This area has no protection or controlled access and outdated signage regarding shorebirds.

Controlling access to the roost sites will be the biggest challenge in managing safe habitat for shorebirds. It is recommended that a combination of educational signs be installed and regular community engagement events be conducted to engage with the local, but transient population of people in the Darwin region.

To ensure a successful conservation program, it is vital to have the community on board caring about the biodiversity in which the management plan sets out to protect.



2.3.4 Reintroductions of threatened species

2.3.4.1 Atlas Moth

The Atlas Moth (*Attacus wardii*), a monsoon forest endemic which has been lost from much of the Darwin area, has been proposed as a fauna species suitable for reintroduction to the Reserve. A detailed consideration of the logistics of reintroduction of the Atlas Moth to the Reserve was prepared in conjunction with the East Point Biodiversity Assessment Report (EcOz 2013b), the report was prepared with input from an expert on the Atlas Moth in the Darwin Area (Geoff Martin) and the conclusions of the report remain relevant to the planned reintroduction. Part of the report is reproduced in **Box 1**.

In preparation for the proposed introduction, larval food plants including *Litsea glutinosa*, *Pittosporum moluccanum* and *Croton habrophyllus* have been planted as part of the ongoing revegetation of the Reserve with monsoon forest vegetation. These plantings should be assessed for their suitability to support an Atlas Moth population.

Box 1 Logistics of Atlas Moth reintroduction

Proposed reintroduction of the Atlas Moth (EcOz 2013b)

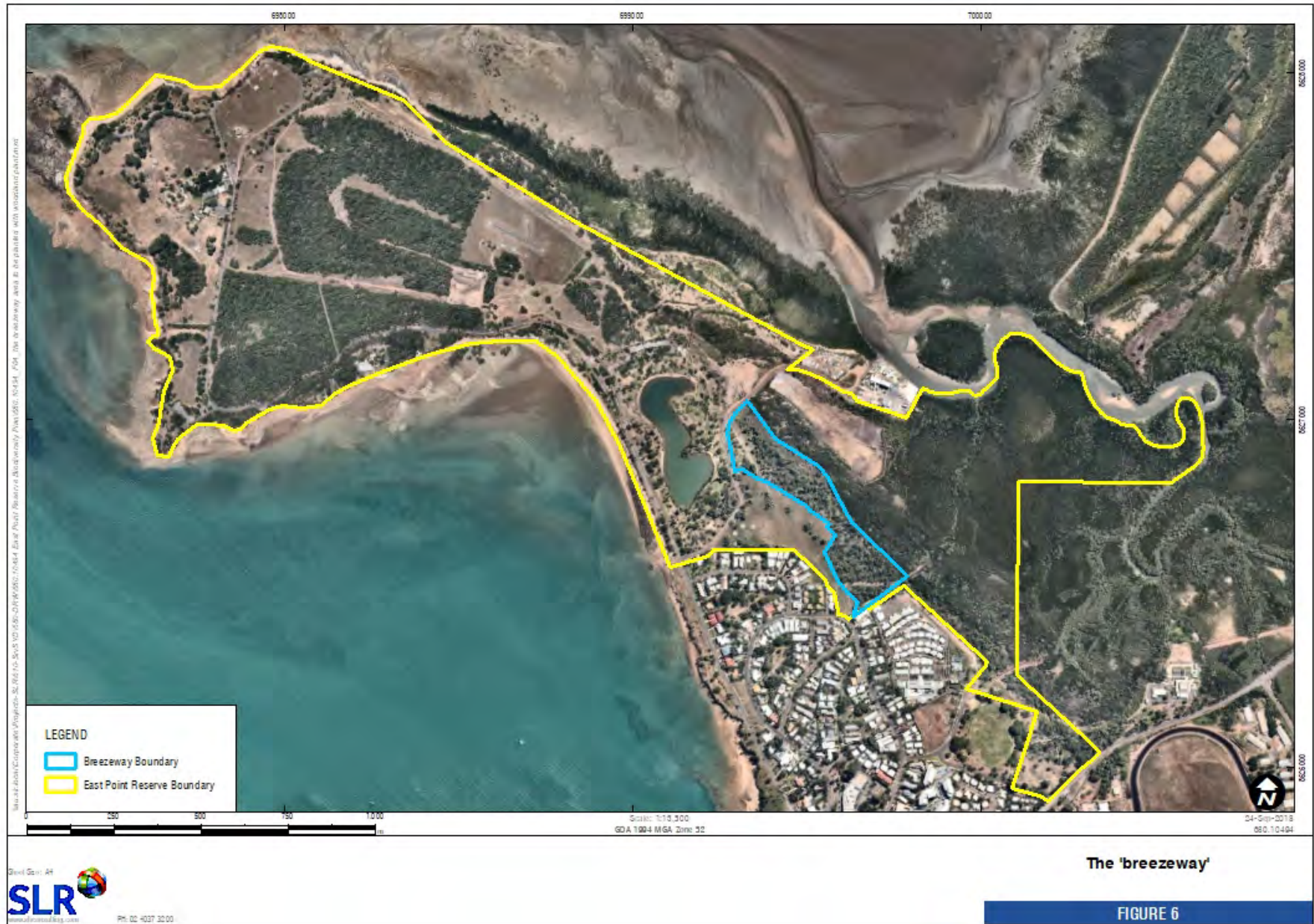
A trial program is currently being investigated by Geoff Martin, an Atlas Moth enthusiast, to raise Atlas Moths in captivity from eggs laid by captured gravid females. This captive breeding program could then provide 15 to 20 captive-raised gravid females for release into East Point Reserve monsoon forest at a later date. Captive rearing of moths is proposed in order to reduce the level of egg mortality experienced in the natural setting, which can be as high as 90% due to predation (pers. comm. Martin 2013).

The collection of gravid females will be undertaken between 11 pm and 5 am after the onset of heavy rains forecast for late November or December. A number of sites including Gunn Point and Dundee Beach will be searched to locate moths for capture; moths have been seen to be locally common in patches of suitable habitat. Females are identified as being larger than males and will not begin flying from the cocoon until after mating with a visiting male. Therefore, females captured on the wing are potentially gravid unless the egg clutch has already been laid (pers. comm. Martin 2013).

Gravid females are taken into captivity and allowed to lay their eggs onto propagated larval host plants within a controlled environment free from egg predators (Figure 2-1). The larvae are raised for 7 weeks until they form the pupa stage with the formation of a cocoon (see Figure 2-2). Emergence from the cocoon is somewhat random so male moths will need to be housed in a large enclosure until a suitable mate has emerged. When a female emerges mating can commence, after which the gravid female could be released at a suitable location within the East Point Reserve monsoon forest to lay her eggs. Pupae remaining dormant over the dry season will be kept in an artificial environment with a climate similar to that found within local monsoon forests to ensure the pupa neither emerges if kept too moist, or desiccates if kept too dry (pers. comm. Martin 2013).

2.3.4.2 Introductions of other species

The potential for reintroduction of other threatened species, particularly the Black-footed Tree-Rat (*Mesembriomys gouldii*) was assessed for the purpose of this Plan. The Black-footed Tree-rat is listed as endangered under the EPBC Act and Vulnerable under the TPWC Act and was present at the Reserve as recently as 2014 (NT Fauna Atlas). The species was not recorded during fauna surveys in 2013 or 2016 (EcOz, 2013a) (Buckley *et al* 2016). Advice received from Dr Leigh-Ann Woolley from Charles Darwin University's Research Institute for the Environment and Livelihood is that a reintroduction of Black-footed Tree-rats into the Reserve would be a long-term project with mature habitat trees required prior to reintroduction, even if nest boxes are installed. Revegetation of parts of the Reserve with woodland vegetation, particularly habitat and food plants, would comprise the very early stages of a Black-footed Tree-rat reintroduction project, and would provide a benefit to a range of declining arboreal mammals including possums and gliders, as well as any naturally occurring Tree-rats. The 'breezeway', an area partially revegetated by the Friends of East Point (Figure 6) (see Section 9.3.5), comprises tussock grassland, monsoon forest and *Corymbia polysciada*/*Corymbia polycarpa* open woodland (EcOz, 2017a). This area is suitable for revegetation as open woodland. A plant species list suitable for developing and enhancing arboreal mammal habitat has been developed by Land for Wildlife (Appendix C).



2.4 Management actions, timing and responsibilities

Table 2 Native fauna management actions

Action	Timing	Responsibility
Fauna monitoring		
Fauna survey, using methodology established by EcOz (2013a)	As required, during wet season	Climate change and environment / Consultant
Agile wallabies		
Continue quarterly surveys. Review data for rapid increases in population growth (increasing population counts over 6 months).	Quarterly	Climate change and environment
Record evidence of overgrazing of grassed area.	Ongoing	All staff and contractors
Maintain sheltered grassland habitat in close association with monsoon forest by leaving part of the cleared area to the west of the aero modellers club as grassland (see Section 3.4).	Ongoing	City operations
Continue operation of six wallaby troughs unless monitoring or anecdotal evidence of impacts to vegetation indicate that the Wallaby population is undergoing excessive growth	Review bi-annually, mid- and late dry season	City operations, Climate change and environment
Control feral dog populations in the Reserve (see Section 5.4).	As specified in Section 5.4	City operations
Shorebirds (recommendations provided by BirdLife Top End)		
Continue the current zoning of East Point to ensure that dogs are not allowed in the Reserve.	Ongoing	City operations / City planning
Control feral dog populations in the Reserve (see Section 5).	Ongoing	City operations
Support local conservation groups by funding at least two community engagement activities per year, which will aim to educate people and attract volunteers to monitor and protect shorebirds at the Reserve. To be conducted by Birdlife Top End, Greening Australia or other stakeholder groups.	Twice annually	Climate change and environment

Action	Timing	Responsibility
Install educational signage at the northern roost site area (BBQ shelter north of museum), at the rocky roost on the western-facing point of the Reserve (there is currently a sign with a Red Knot on it – this species is not common at this site), and install signage at the Spot on Marine saltpan and beach access points.	Late dry season 2019	City operations in consultation with experts
Investigate the Installation of a bird viewing platform (with appropriate consultation from experts) that overlooks either the western rocky reef, or the rocks at Dudley Point. Install educational signs so that people know what they are looking at and list how they can help in the conservation of shorebirds.	Dry season 2020	City operations in consultation with experts
Conduct feasibility assessment for acquisition of the eastern portion of Lot 5984 (see Section 7.5).	2019	City planning
Atlas Moth		
Conduct a habitat suitability assessment to determine if revegetation has reached appropriate age, height and density to support an Atlas Moth population.	Early wet season 2019, annually if required	Climate change and environment officer / Atlas Moth expert
Liaise with Atlas Moth expert to procure 10 - 20 captive-raised gravid females suitable for release to the Reserve in late December through to February, depending on rainfall conditions.	Late dry season, once suitable vegetation has been established at the Reserve	Climate change and environment
Monitor the success of Atlas Moth reintroduction.	Immediately post introduction, then annually	Climate change and environment
Develop the 'breezeway' as a woodland vegetation community		
Source supply of suitable habitat and food species for arboreal mammals (Appendix C).	Ongoing	City operations
Revegetate the 'breezeway' with plant species that have been identified as suitable for arboreal mammals.	Ongoing	City operations / Friends of East Point

3 Revegetation plan

3.1 Purpose

The purpose of this revegetation plan is to provide for ongoing revegetation at East Point, including nomination of the areas to be revegetated and target vegetation communities.

3.2 Objectives

The objectives of implementing the management actions identified below include:

- Continuing monsoon vine thicket restoration
- Introduce woodland vegetation

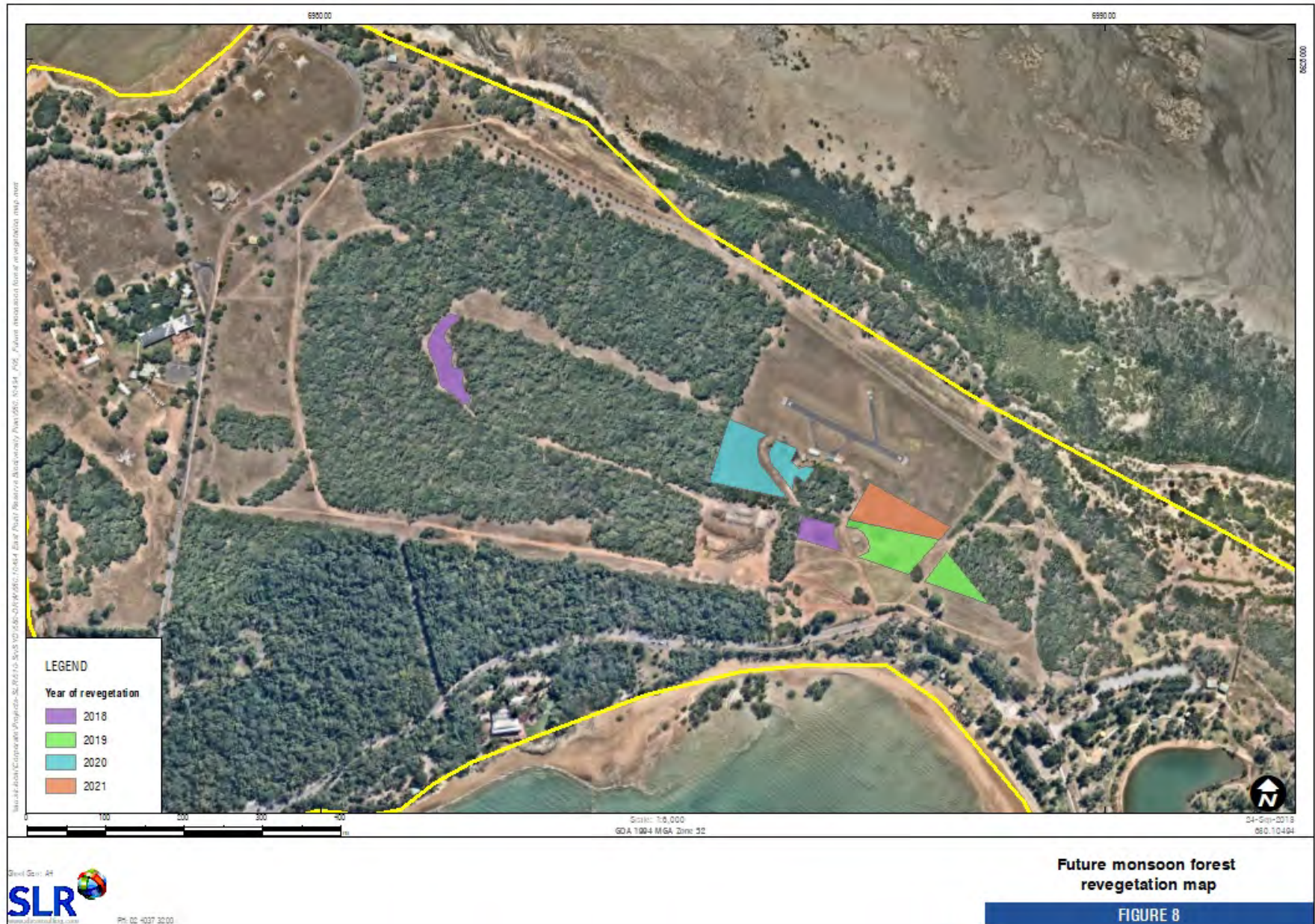
3.3 Background and context

3.3.1 Revegetation monitoring

Ongoing monitoring of revegetation health and condition is a key component of biodiversity management for the reserve. The 2014 – 2018 biodiversity management plan for the reserve included revegetation monitoring under ‘Action 1 – Undertake an annual wet season biodiversity survey’, although the baseline vegetation monitoring carried out in 2014 was not repeated until 2017 (EcOz 2015, EcOz 2017b). Monitoring of vegetation health and condition once every three years, using the established methodology is considered appropriate.

3.3.2 Monsoon forest

Monsoon forest historically covered the East Point Peninsula. It was cleared for military purposes (prior to 1945) followed by construction of a golf course (mostly between 1955 and 1963). The forest remaining was then damaged by Cyclone Tracey (Franklin, Matthews, and Lawes, 2010). Revegetation of the peninsula, focused on restoring monsoon forest, was commenced by the Northern Territory Government in 1974, and continued by the Northern Territory University prior to Darwin City Council taking over the Reserve in 1984. Monsoon forest areas that have been revegetated are shown in **Figure 7**. The City of Darwin intends to continue replanting monsoon forest, balancing this with the need for open grassed for a range of purposes. These include grazing by the Agile Wallaby population, access for maintenance, informal recreation, and open space for leaseholders including the Darwin Aero Modellers Club (who need clear space for visibility and to reduce turbulence) and the Fannie Bay Equestrian Club. The informal future revegetation plan provided by the City of Darwin (**Figure 8**) has been developed to meet these goals, and to continue mitigating potential edge effects resulting from revegetation in patches (EcOz 2013a). The species list which has been used during past successful revegetation activities is provided as **Appendix D**. In addition, continued planting of Atlas Moth food plants including *Litsea glutinosa*, *Pittosporum moluccanum* and *Croton habrophyllus* will increase the value of the Reserve for potential reintroduction of this species.



3.3.3 Woodland

Continuing the Friends of East Points’ revegetation of the ‘breezeway’, using woodland species, particularly those identified by Land for Wildlife as providing habitat and food resources for fauna (Appendix C, see Section 3.3.4.2), will increase the habitat diversity of the Reserve, and provide increased connectivity with the less disturbed areas of the ‘Fannie Bay Reserve’ to the south east of the main Reserve (**Figure 2**). The key challenge to successfully revegetating this area will be the management of fire, as the area currently burns annually, damaging or destroying revegetation. Controlled early dry season burning off and increased weed management would mitigate the fire risk.

3.3.4 Mangrove buffer areas

Control over improving the buffer with the mangrove vegetation community on crown land adjacent to the Reserve is limited, as the City of Darwin owns little of this land. The area that buffers the mangroves contains a shared use path, is used for maintenance access (see **Section 8**), and is directly adjacent to the Darwin Aero Modellers Club. If the City of Darwin is considering acquisition of part or all of the crown land to the north of the Reserve (see **Section 2.3.3** and **Section 7.3**), an integrated revegetation and management plan could be developed for the area.

3.4 Management actions, timing and responsibilities

Table 3 Revegetation management actions

Action	Timing	Responsibility
Revegetation monitoring		
Revegetation health and condition survey (EcOz 2017b) survey	Once every three years, or as appropriate	Climate change and environment / Consultant
Monsoon forest		
Continue planned monsoon thicket restoration, using the existing species list	Ongoing	City operations
Maintain sheltered grassland habitat in close association with monsoon forest by leaving part of the cleared area to the west of the aero	Ongoing	City operations

4 Weed plan

4.1 Purpose

The purpose of this weed management plan is to provide for the control of key weeds of concern for the Reserve. It describes prevention, management and control measures to be implemented by all staff and contractors.

4.2 Objectives

The objectives of implementing the management actions identified below include:

- ensuring that all weed management undertaken at the Reserve complies with applicable legislation, regulations and guidelines
- avoid introducing new weed species into the site
- avoid or control the spread of existing weed species outside of the site
- control weeds currently at the site;
- detail the appropriate monitoring, reporting and incident response procedures for weed management.

4.3 Background and context

For the purposes of this plan, a weed is defined as:

- a Weed of National significance (WoNS) (these species are agreed by Australian governments based on an assessment process that prioritises these weeds based on their invasiveness, potential for spread and environmental, social and economic impacts) or
- a declared weed (i.e. weeds declared under the Northern Territory *Weeds Management Act* (WM Act)) or
- an environmental weed (weeds that are not declared under the WM Act, but represent a threatening process for conservation values in the local region.

The plan also considers the amenity and landscape values of non-native plants in particular parts of the Reserve where spread can be controlled.

4.3.1 Legislation

Thirty-two listed WoNS have been agreed to by Commonwealth, state and territory governments on the basis of their invasiveness, potential for spread and environmental, social and economic impacts. Land owners and managers are responsible for the control and management of WoNS, and state and territory governments are responsible for the requisite legislation, regulation and administration.

The NT WM Act requires declared weed species to be eradicated (Class A), controlled (Class B) or not introduced in to the NT (Class C). Weeds classified under the Act are to be managed in accordance with the Act and all owners, managers and occupiers of land as well as any other land user within the NT must comply with the Act. It is the requirement and responsibility of the owner and occupier of land to adhere to the following measures under the Act:

- Take all reasonable measures to prevent the land being infested with a declared weed
- Take all reasonable measures to prevent a declared weed or potential weed on the land spreading to other land
- Within 14 days after first becoming aware of a declared weed that has not previously been, or known to have been, present on the land, notify the Weed Management Branch (WMB) of the Department of Environment and Natural Resources (DENR).

There is a legal obligation to manage weeds declared under the WM Act. Environmental weeds are not declared under the WM Act, and so there is no regulatory obligation on the City of Darwin to manage or control these weeds. However, these species can readily colonise disturbed areas and can hinder the success of rehabilitation by outcompeting native species. As such these species will be controlled within the Reserve.

4.3.2 Management plans and guidelines

This WMP has been prepared with reference to:

- East Point Reserve weed management plan (Draft) (Lewis, 2010)
- City of Darwin weed management guide (City of Darwin, 2012)
- East Point Reserve biodiversity 5 year management plan 2014 – 2018 (EcOz, 2015b)
- Australian weeds strategy 2017–2027 (Invasive plants and animals committee, 2016)
- Northern Territory Weed Management Handbook (WMB, 2018).

4.3.3 Current condition

Appendix E lists weed records provided by the City of Darwin and records from the NT Weeds Database. It represents a list of species that have historically been recorded at the Reserve rather than species that are currently known to occur.

During the most recent weed survey of the Reserve, a total of 18 weeds were identified (EcOz 2017c) (**Table 4**). Two of these species are listed WoNS including Gamba Grass (*Andropogon gayanus*) and Lantana (*Lantana camara*). These species are the priority for control, along with species that cause major impacts within the Reserve, including Coffee Bush, Poinciana and Mission Grass. Note however that Poinciana is valued for its aesthetic value: The species is controlled on the northern side of Alec Fong Lim Drive, but is allowed to remain on the southern side of the road.

Table 4 Weeds recorded in the Reserve in 2017 (EcOz 2017c)

Name		Classification				
Common	Scientific	WoNS	Class A	Class B	Class C	Env Weed
Gamba Grass	<i>Andropogon gayanus</i>	✓		✓	✓	
Lantana	<i>Lantana camara</i>	✓		✓	✓	
Chinee apple	<i>Ziziphus mauritiana</i>		✓		✓	
Hyptis	<i>Hyptis suaveolens</i>			✓	✓	
Mission Grass (Perennial)	<i>Cenchrus polystachios</i>			✓	✓	
Neem	<i>Azadirachta indica</i>			✓	✓	

Name		Classification				
Snake Weed	<i>Stachytarpheta sp.</i>			✓	✓	
African Mahogany	<i>Khaya senegalensis</i>					✓
Chloris grass	<i>Chloris sp.</i>					✓
Coffee Bush	<i>Leucaena leucocephala</i>					✓
Coral vine	<i>Antigonon leptopus</i>					✓
Fishtail palm	<i>Caryota mitis</i>					✓
Grewia	<i>Grewia asiatica</i>					✓
Guinea grass	<i>Megathyrsus maximus</i>					✓
Mission grass (Annual)	<i>Cenchrus pedicellatus</i>					✓
Mother-in-laws tongue	<i>Sansevieria trifasciata</i>					✓
Poinciana	<i>Delonix regia</i>					✓
Wild passionfruit	<i>Passiflora foetida</i>					✓

4.3.4 Weed control techniques

There are a number of weed control techniques, each of which has specific advantages and disadvantages. The method of weed control chosen will be dependent on the type of weed, level of infestation and its location, among other factors. The two main treatment methods utilised at the Reserve include physical (i.e. hand pulling, mowing, mulching etc.) and chemical (i.e. foliar spray, direct application).

In general, chemical control will be utilised at the Reserve and supplemented by alternative treatment methods as required. The two methods of herbicide application are application by foliar spraying and direct application. Foliar spraying applies herbicide diluted with water onto targeted foliage, allowing the leaves to directly absorb the active ingredients. Direct application uses a wiper or paintbrush for applying herbicide (usually the cut stump method).

When choosing the method of application, consideration should be given to the species of weed being managed as well as the surrounding environment. Foliar spraying can be carried out in a number of different ways depending on the size of the infestation. Foliar spraying is considered an efficient and cost effective method for weed control; however risks associated with spraying include potential spray drift and damage to native plants (WMB, 2015). It is important to undertake herbicide application in calm or low wind conditions to prevent potential drift. Works must be undertaken by an appropriately qualified person with the ability to accurately distinguish the relevant weed species from native species. It is also important that follow-up treatment is carried out (approximately one month post the initial application) to control seedling recruitment and regrowth after the site has been treated.

A person who uses a chemical product has a duty of care to ensure the use does not result in harm to the health of the general public, animals, the environment or domestic or export trade in agricultural produce. The Australian Pesticides and Veterinary Medicines Authority (APVMA) registers pesticides and herbicides for use in Australian States and Territories according to the provisions of the *Agricultural and Veterinary Chemicals (Northern Territory) Act*. Herbicides must be used according to the directions for use on the APVMA registered label (WMB, 2015).

Weed treatment for each species should be timed according to the growing season, and treatment should generally occur following germination when the plant is actively growing. Treatment should also occur prior to the plant flowering to ensure treatment occurs before the plant has an opportunity to seed, thus preventing seed dispersal. The areas controlled with chemical use must be revisited to assess if further herbicide application is required for complete success. The secondary treatment can occur approximately one month following the initial treatment, to allow the initial effect of the herbicide to take place and assess regrowth and/or missed areas. Plant seeds may remain viable in the ground for a number of years. It is therefore critical that monitoring be undertaken over the long-term. Photo monitoring is a useful form of monitoring.

The weed control techniques being successfully implemented at the Reserve are presented in **Table 5**. Where other controls are required, they should be determined with reference to the weed control option tables provided in the 'Northern Territory Weed Management Handbook' which include prescribed treatment methods, chemical application methods and application rates, and suitable timing for each species (WMB 2015).

In addition to weed management conducted by the City of Darwin, the Reserve incorporates areas managed by lessees (including the Fannie Bay Equestrian Club, the Darwin Aero Modellers Club and Pee Wee's at the Point) and the Commonwealth owned Darwin Military Museum. The managers of these properties are required to manage weeds both by the lease conditions and their obligations under the WM Act.

Table 5 Current weed control methods

Source: City of Darwin (supplied) and Lewis 2010

Weed	Control method
Medium to large trees	
Including - Neem (<i>Azadirachta indica</i>), African mahogany (<i>Khaya senegalensis</i>), Grewia (<i>Grewia asiatica</i>), Siamese cassia (<i>Senna siamea</i>), African tulip (<i>Spathodea campanulata</i>), White Beach (<i>Melia</i> spp.) and Golden shower (<i>Cassia fistula</i>)	Plants occurring in areas where members of the public rarely frequent, and therefore the risk of injury due to falling branches is negligible, will be treated with a basal bark application and be allowed to die in situ. Plants occurring where the risk of falling branches is higher will be treated by the cut stump method.
Herbaceous shrubs	
Barleria (<i>Barleria prionitis</i>), Creeping Sensitive Plant (<i>Mimosa diplotricha</i>), Sicklepod (<i>Senna obtusifolia</i>), Spinyhead Sida (<i>Sida acuta</i>), Snakeweeds <i>Stachytarpheta</i> sp.), Hyptis (<i>Hyptis suaveolens</i>), Lions Tail (<i>Leonotis nepetifolia</i>), Yellow Oleander (<i>Cascabela thevetia</i>), Berrimah Weed (<i>Mitracarpus hirtus</i>), Cobblers peg (<i>Bidens pilosa</i>)	Foliage treated with either Starane or Kamba M, or hand pulled.
Vines	
Calopo (<i>Calopogonium mucunoides</i>), Centro (<i>Centrosema molle</i>), Morning Glory (<i>Ipomoea</i> sp), Phasey Bean (<i>Macroptilium lathyroides</i>), Wild Passion Fruit (<i>Passiflora foetida</i>)	Foliar spray with Starane or hand pulling.
Grassy weeds	
Gamba Grass (<i>Andropogon gayanus</i>), Purple Top Chloris (<i>Chloris inflata</i>), Mission Grass (<i>Cenchrus polystachios</i>), and Mossman River grass (<i>Cenchrus echinatus</i>)	A combination of slashing to prevent seed set and spot spraying with glyphosate will be used to combat these weeds in the grassed areas.

Weed	Control method
Herbaceous weeds in grasslands	
	Herbaceous weeds in grasslands are an emerging issue at the Reserve. Boom spraying using appropriate herbicides will be trialled. Reseeding of grasses may be required.
Species specific controls	
Bellyache Bush (<i>Jatropha gossypifolia</i>)	Periodic hand weeding and foliar spraying with Starane twice annually, once at the beginning of the wet season and once at the end.
Chinee apple (<i>Ziziphus mauritiana</i>)	Cut and poisoning of the stump.
Lantana (<i>Lantana camara</i>)	Periodic hand weeding and foliar spraying with glyphosate 360 twice annually, once at the beginning of the wet season and once at the end.
Coffee Bush (<i>Leucaena leucocephala</i>)	Small plants are hand pulled, adults sprayed with glyphosate, basal bark treatment with diesel and access at a rate of 60:1, or cut and poisoning of the stump.
Poinciana	<p>Plants in open space where the heavy seed poses little or no threat of spreading into remnant vegetation areas will be retained. Poincianas invading the remnant bushland on the northern and eastern sides of Alec Fong Lim Drive will be removed.</p> <p>Trees posing no threat to pedestrians or vehicles will be basal bark treated and left to die in-situ. Trees that cannot be left standing once killed will be removed and the stumps poisoned to prevent regrowth.</p> <p>Trees growing on the western side of Alec Fong Lim drive whose branches are hanging over the road will be pruned to prevent seed falling onto the opposite side of the road and reinfesting the monsoon forest.</p>

4.3.5 Monitoring and recording

Monitoring is important to identify new or re-establishing weed infestations at an early stage, so follow up control can be undertaken quickly. Monitoring is also undertaken to determine the effectiveness of control methods, enabling improvements to future weed management.

Keeping all weed management records up to date will enable an assessment of the previous year's management measures undertaken, effectiveness of controls and expenditure. Weed contractors should keep a record of control works and weed surveys as they are conducted. This information should include:

- Name of weed controller;
- Time and date of control;
- Target weed species;
- Methods of control used;
- Name of the product;
- Rate and amount of herbicide applied;

- Location of application; and
- Reason for control.

A weed treatment record template is provided in **Appendix F**.

4.4 Management actions, timing and responsibilities

Table 6 Weed management actions

Action	Timing	Responsibility
Restricting new weeds		
Comply with the City of Darwin Weed Management Guide (City of Darwin, 2012) recommendations: <ul style="list-style-type: none"> • purchase certified weed free mulch and seed; • restrict movement of vehicle and machinery where seeds are likely to spread; • establish tracks and laneways so vehicle movement is concentrated; • wash down vehicles which have visited infested areas in appropriate wash down bays; • plant appropriately and be aware of WONS and other classed weeds, and • limit disturbed sites. 	Ongoing	All staff and contractors
Restricting spread of existing weeds		
Comply with the City of Darwin Weed Management Guide (City of Darwin, 2012) recommendations: <ul style="list-style-type: none"> • minimise exposure of disturbed areas as weeds readily colonise disturbed areas; • appropriate weed management using controls outlined below; • ensuring clean areas are worked first, followed by infested areas; • work takes place from the outside in; and • equipment including vehicles are cleaned down in appropriate wash down bays. 	Ongoing	All staff and contractors
Inspection of leased properties to ensure lessees are meeting their lease and WM Act obligations (see Section 9.4)	Annually, or more frequently if required	City Operations

Action	Timing	Responsibility
Weed Control		
Weed control as per established methods (Section 4.3.4), or methods in line with those outlined in the 'Northern Territory Weed Management Handbook' (WMS 2015)	Ongoing	City operations / Contractors
Report weed control		
Maintain records of weed control as per Section 4.3.5)	Ongoing, records to be maintained.	Contractors

5 Pest animal plan

5.1 Purpose

The purpose of this plan is to identify pest animals relevant to the Reserve and to identify appropriate control measures.

5.2 Objectives

The objectives of implementing the management actions identified below include:

- Management of biting insects and their habitat
- Reduction of Cane Toad population
- Control of problem cats, dogs and dingos

5.3 Background and context

5.3.1 Biting insects

Biting midges and mosquitos can be an appreciable pest in the Darwin urban area. The City of Darwin is responsible for preventing biting insect breeding within its jurisdiction. The NT Department of Health Medical Entomology Unit is responsible for providing advice, and carries out surveillance, monitoring, and control of insects of medical importance.

At the Reserve, in the adjacent crown land and across the Darwin area more generally, the Medical Entomology unit carries out surveillance and treatment of larvae after every suitable high tide or rainfall event. Surveillance of adult Saltmarsh Mosquitos is carried out in the Reserve during the wet season. During the 2016-2017 wet season, the Medical Entomology Unit and the City of Darwin conducted a joint mosquito engineering control program comprising inspections and upgrading of drains, including those at the Reserve (Medical Entomology Unit, 2017). The Medical Entomology Unit annual report notes that *'the key to the successful mosquito engineering control program is the continued cooperation between Medical Entomology and City of Darwin, as well as assistance from the Power and Water Corporation and Department of Infrastructure, Planning and Logistics in regards to drain maintenance and rectification in their areas'*. Mosquito engineering controls are still required at East Point and Lake Alexander which contain productive salt marsh and breeding sites for the common banded mosquito (Medical Entomology Unit, 2017).

5.3.2 Cane toads

A review of Cane Toads at East point conducted in 2014 (Lippiatt, 2015):

- Assessed options for excluding toads from Agile Wallaby watering points
- Assessed management and potential management of toads on leased properties on the Peninsula (including Fannie Bay Equestrian Club, the Darwin Military Museum and Pee Wees restaurant)
- Conducted a survey of existing toad fencing
- Conducted manual collection of toads
- Trialled toad trapping

The key outcomes of the study are summarised in **Table 7**.

Table 7 Key outcomes of the 2014 review of Cane Toads at East Point (Lippiatt, 2015)

Issue	Outcome
Wallaby water trough inspection	There were seven water troughs in use. Six were suitable to be raised to prevent use by toads No toad tadpoles were observed. The six watering points that were suitable to be raised are still in use.
Camera survey of nocturnal use of water troughs	Wallabies, possums and cane toads were recorded using water points. Cane toads were recorded at all water points.
Features of leased areas favourable to Cane Toads	Horse troughs at the Fannie Bay Equestrian Club are flushed daily and frequently spilt by horses. Lawns adjacent to the property manager’s house are irrigated. Toads feed on invertebrates which are attracted to horse feed and manure. The Darwin Military Museum irrigated lawn throughout the gardens surrounding the property is watered daily. At the time, there were leaks from infrastructure including a septic system, air conditioner and a sump. Lights at the museum run 24 hours, attracting invertebrates that toads feed on. Pee Wees restaurant encompasses an open fresh water drainage and irrigated lawn and gardens. Invertebrates and food scraps potential provide food for Cane Toads.
Toad control on leased areas	At the time of the study, toad busts were conducted regularly at the Fannie Bay Equestrian Club.
Fencing survey	Toad fencing in poor condition ran 110 m on the northern side of Lake Alexander.
Exclusion of toads from a watering point	Modification of a water point by raising to 69 cm above ground level, with provision of a vertical mesh ‘ladder’ resulted in continued use of the trough by adult Agile wallabies and possums.
Manual capture of cane toads	116 cane toads were collected on two nights.

Issue	Outcome
Cane toad trapping	Two cane toad traps were deployed for two nights, two toads and two bandicoots were trapped.
Irrigation survey	<p>Consultation with City of Darwin representatives suggested that a shutdown of all irrigation would have minimal effects on vegetation survival. The impact of this strategy on the Toad population was not discussed.</p> <p><i>See below for a revised assessment of essential irrigation.</i></p>

Management of the Cane Toad population would ideally combine:

- Repair and maintenance of the existing toad exclusion fence (or installation and maintenance of a new toad fence, possibly on the western side of Lake Alexander to reduce the number of water sources to be managed)
- Reduction of non-essential irrigation, while maintaining irrigation for revegetation, for amenity around Lake Alexander, wallaby and horse troughs and showers and taps at Lake Alexander
- Removal of individual toads by trapping and/or manual collection (the Fannie Bay Equestrian Club has held ‘toad busts’ in the past).

A new generation of Cane Toad traps which incorporate UV light to attract insects and a sound lure have been developed by Animal Control Technologies Australia and James Cook University, and may be suitable for deployment at Wallaby and horse troughs at the Reserve.

5.3.3 Cats, dingoes and dogs

Cats were recorded at the Reserve during the 2013 Biodiversity assessment (EcOz, 2013a) but not during 2016 surveys (Buckley et al., 2016). It is likely that they occur at low densities. Even at low densities cats can have significant impacts on native animal populations (Doherty *et al.*, 2015, Frank *et al.* 2014). A permanent cat trap should be operated and the number of animals trapped recorded.

Dogs are not permitted in the Reserve, however reports of dingoes and wild / domestic dogs are commonly sighted, including observations during fauna and Wallaby surveys (EcOz, 2013a, City of Darwin). Control of dog populations is usually not implemented until problem animals are reported and specialist contractors are employed as required.

5.4 Management actions, timing and responsibilities

Table 8 Pest management actions

Acton	Timing	Responsibility
Weed Control		
Weed control as per established methods (Section 4.3.4), or methods in line with those outlined in the 'Northern Territory Weed Management Handbook' (WMS 2015)	Ongoing	City operations / Contractors
Report weed control		
Minimise creation of breeding habitat via vehicle use of unsealed access tracks during the wet season (see Section 8)	Ongoing	All staff and contractors
Cane Toads		
Continue to provide water to Wallabies from raised troughs maintained in good condition	Ongoing	City operations
Survey condition of existing toad exclusion fence	Q1 2019	City operations
Repair or replace toad exclusion fence	Prior to 2019 wet season	City operations
Maintenance of toad exclusion fence	Ongoing post installation	City operations
Support community organisation Toad control activities	Ongoing	Climate change and environment
Trial UV light/acoustic toad traps	2019 wet season	City operations
Install toad trap at each wallaby and horse trough	2020	City operations / Darwin Equestrian Club
Cats, dogs and dingoes		
Monitor reports of dog and dingo activity, respond with contractor pest control as required	Ongoing	City operations / contractor
Maintain records of animal sightings and control activities	Ongoing	City operations

6 Water plan

6.1 Purpose

The purpose of this water management plan is to briefly summarise the current impact of watering at the Reserve on biodiversity, and to identify monitoring or management actions required.

6.2 Objectives and aims

The objectives of water management at the Reserve are to:

- Maintain amenity in key areas
- Ensure the population of Agile Wallabies is not impacted
- Contribute to Cane Toad management by reducing available water where possible
- Ensure the success of revegetation

6.3 Background and context

6.3.1 Lake Alexander

Lake Alexander is filled by pump from Darwin harbour when the tide is at or above 4m (thus the flushing rate varies), and freshwater is added as needed to control jellyfish. To maintain amenity, the grassland to the north and west of Lake Alexander is irrigated during the dry season. An area of grassland to the south-east along Colivas Rd is not irrigated. Removing or reducing irrigation of these grasslands has been suggested as a management measure to reduce the population of Cane Toads, however, water is also available in the Lake Alexander area from showers, taps, bubblers and BBQ areas, and reducing irrigation in the area is therefore likely to cause undesirable browning of grass without reducing the Cane Toad population.

6.3.2 Wallaby water troughs

The history of the Agile Wallaby population at East Point, which boomed in the late 1980s and subsequently declined to sustainable levels, is described in **Section 2.3.2**. Water is currently being provided to Agile Wallabies at the Reserve at six watering troughs, which are kept filled throughout the dry season (**Figure 3**), and the wallaby population is monitored by City of Darwin staff. The design of watering points was modified to minimise Cane Toad access to water in 2015, however Cane Toads still have access to spills (Lippiatt, 2015). An area within the revegetated monsoon forest to the west of the Aero Modellers Club was previously irrigated to provide grass for wallabies, but this has been discontinued.

6.3.3 Revegetation

Revegetation is supported by irrigation through the first dry season after planting.

6.4 Management actions, timing and responsibilities

Table 9 Water management actions

Action	Schedule	Responsibility
Lake Alexander surrounds		
Maintain current irrigation practices	Ongoing	City operations
Wallaby troughs		
Maintain current wallaby watering practices unless ongoing monitoring indicates that the Wallaby population is increasing (see Section 2.4)	Review bi-annually, mid- and late dry season	City operations
Revegetation		
Irrigation of revegetation for the first dry season	Ongoing	City operations

7 Planning issues

7.1 Purpose

The purpose of this plan is to consider suggested alternative zoning and boundaries of the Reserve.

7.2 Objectives

The objectives of implementing the management actions identified below include resolving the outstanding proposed changes to zoning and boundaries of the Reserve.

7.3 Rezoning

The Reserve comprises Lot 5775 Town of Darwin, and is mostly zoned as ‘public open space’ (173.7 ha), with the Equestrian Club zoned as ‘organised recreation’ (9.4 ha) and the north eastern part of the Fannie Bay Reserve zoned as ‘conservation’ (21.2 ha). The purpose of these zones, and the activities and uses permitted under the Northern Territory Planning Scheme are described in **Figure 9**.

There has been some consideration of rezoning all of Lot 5775 to conservation (partly in response to the proposal to develop the area between Fannie Bay and Coconut Grove as the ‘Arafura Harbour’ development in 2009). However, the primary purpose of most of the Reserve, existing infrastructure and the management of the Reserve align more closely with the intention of the ‘public open space’ zone. Rezoning only the monsoon forest as conservation would increase the complexity of zoning without achieving any practical outcome.

7.4 Acquisition of crown land

Acquisition of the neighbouring crown land to the north of the Reserve has been suggested as an option for increasing the City of Darwin’s ability to enhance conservation of shorebirds (EcOz, 2013) (**Section 2.3.3**); while to date no decision has been made, the option should be evaluated further.

7.5 Management actions, timing and responsibilities

Table 10 Planning management actions

Action	Schedule	Responsibility
Acquisition of crown land		
Conduct feasibility assessment for acquisition of the eastern portion of Lot 5984.	2019	City planning

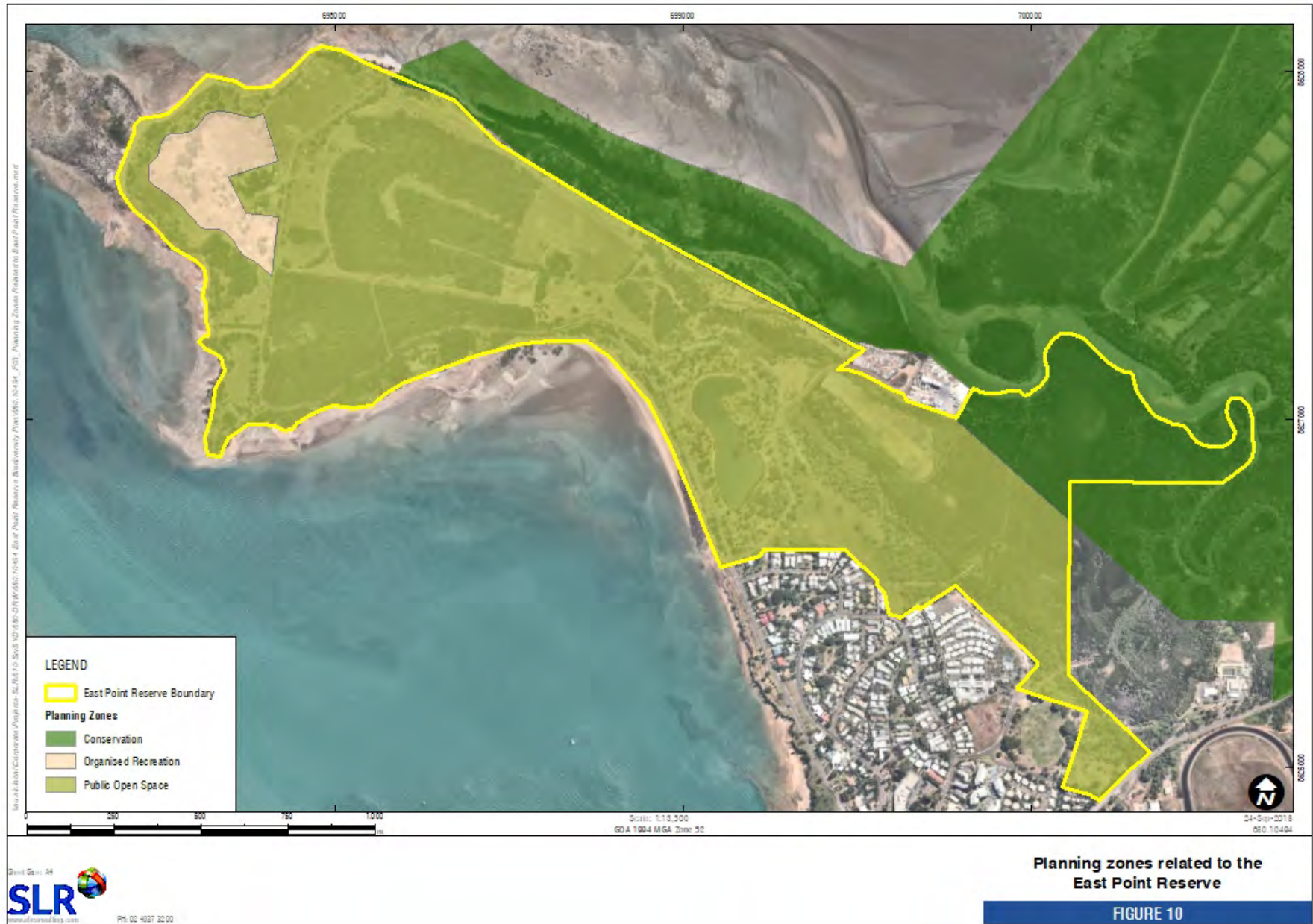


Table 11 Planning zones at East Point Reserve

Zone	Purpose	Permitted and discretionary activities
Conservation	<p>The primary purpose of conservation is to conserve and protect the flora, fauna and character of natural areas.</p> <p>Development is to be sensitive to the natural features and habitats of the zone and be so sited and operated as to have minimal impact on the environment.</p>	<p>Permitted</p> <ul style="list-style-type: none"> • business sign • home occupation <p>Discretionary</p> <ul style="list-style-type: none"> • caretaker’s residence • restaurant • shop
Organised recreation	<p>The primary purpose of organised recreation is to provide areas for organised recreational activities.</p> <p>Development is to be limited to that which is consistent with the recreational opportunities of the land.</p>	<p>Permitted</p> <ul style="list-style-type: none"> • business sign • community centre • home occupation • promotion sign <p>Discretionary</p> <ul style="list-style-type: none"> • caretaker’s residence • car park • child care centre • home based child care centre • leisure and recreation • licenced club • restaurant • stables
Public open space	<p>The primary purpose of public open space is to provide public areas for recreational activity.</p> <p>Development should be limited to that which is for public use and enjoyment consistent with the recreational opportunities of the land and which has minimal adverse impact (if any) on adjoining or nearby property.</p>	<p>Permitted</p> <ul style="list-style-type: none"> • business sign • home occupation <p>Discretionary</p> <ul style="list-style-type: none"> • caretaker’s residence • community centre • leisure and recreation • promotion sign • restaurant

8 Access plan

8.1 Purpose

The purpose of this access plan is to ensure that the biodiversity values of the park are protected, while allowing reasonable recreational use and sufficient accessibility for maintenance.

8.2 Objectives

The objectives of implementing the management actions identified below include:

- Maintaining public safety by restricting access to the City of Darwin’s East Point works depot
- Maintaining the network of public access to the Reserve
- Reducing inappropriate use of the Reserve by restricting night-time access
- Rationalising maintenance access through use of a shared site map
- Ongoing monitoring and management of impacts to the reserve from public and management access

8.3 Background and context

8.3.1 Public access

The Reserve is serviced by a network of roads, walking paths, shared bicycle/ walking/ horse trails and the 5 km ‘Science trail’ with interpretive signage explaining some of the biodiversity values of the site. The vehicle access gate located on Alex Fong Lim drive west of Pee Wee’s at the Point is locked between 11 pm and 5 am daily. Feedback from stakeholder group representatives (including some who are local residents) is that late night use of the park is associated with ‘hooning’, noise and littering. While the Reserve is a popular evening recreation location, sunset in Darwin is between approximately 6.30 and 7.30 pm, and other similar facilities in the Darwin area close between 6 and 7 pm (**Table 12**). Changing the closing time of the Reserve from 11 pm to 9 pm is not expected to have significant impact on legitimate recreational users.

The City of Darwin’s East Point depot and green waste recycling facility is currently open to the public when the shared gate with the Darwin Aero Modellers Club is open.

Table 12 Opening hours of Darwin region recreation areas

Facility	Opening hours
Berry Springs Nature Park	8 am to 6.30 pm
Charles Darwin National Park	8 am to 7pm
George Brown Darwin Botanic Gardens	7 am to 7 pm
Homes Jungle Nature Park	8 am to 6 pm
Howard Springs Nature Park	7.30 am to 7 pm



8.3.2 Maintenance and emergency access

Vehicle access is required to allow weed spraying, tree maintenance, track maintenance, revegetation planting and management, irrigation infrastructure maintenance, mosquito surveillance, maintenance of unlined stormwater drainage systems and emergency responses. In addition, the grassed area to the north west of Lake Alexander is used for overflow car parking for large events. The potential impacts of vehicle access into the Reserve include erosion, generation of dust, damage to vegetation, weed spread, disturbance or injury of wildlife, creation of mosquito breeding habitat and loss of amenity. In some cases these effects can be avoided by use of existing sealed bicycle/shared use tracks. Where access via sealed tracks is not possible, alternative access should be identified and used by all staff and contractors, the condition of informal access routes should be monitored and consideration given to surfacing such tracks. A draft map of sealed and commonly used unsealed site access track is provided in **Figure 11**.



8.4 Management actions, timing and responsibilities

Table 13 Access management actions

Action	Schedule	Responsibility
Public access		
Community consultation on a change closing time of the Reserve to 9pm	After sufficient public consultation/notice	City operations
Install access control to City of Darwin’s East Point depot and green waste recycling facility	Q1 2019	City operations
Maintenance and emergency access		
Formalise site access plan (Figure 11)	Q1 2019	All staff and contractors
Monitor condition of unsealed access tracks	Ongoing	City operations

9 Stakeholder plan

9.1 Purpose

The purpose of this stakeholder plan is to identify the key external stakeholders in the East Point Reserve, and to outline their use of the Reserve, any obligations they bear, and any concerns raised about the management or condition of the Reserve.

9.2 Objectives

The objectives of the management actions outlined in this plan are:

- To ensure that stakeholders have a chance to review and comment on the 2019-2024 Biodiversity Management Plan for the Reserve
- To encourage ongoing engagement of stakeholders in the management of the Reserve
- To ensure that lease holders within the Reserve are meeting their obligations under their leases and relevant legislation (i.e., the NT *Weed Management Act*).

9.3 Background and context

External stakeholders in the Reserve include leaseholders (the East Point Aero Modellers Club Inc., Fannie Bay Equestrian Club Inc. and Pee Wee’s at the Point) (**Figure 12**), the Darwin Military Museum (which sits on Commonwealth land within the Reserve), recreational user groups (including the Northern Territory Naturalist’s Club and Darwin Runners and Walkers Inc.), and issue specific groups (including the Top End Native Plant Society and Birdlife Top End).



9.3.1 East Point Aero Modellers Club Inc.

The East Point Aero Modellers Club has been active at East Point since the early 1970s, and has occupied several positions in the Reserve. The current lease of 6.16 ha extends to 29 June 2020. Model aircraft 500 g to 20 kg are flown by a small number of users throughout the week. Other visitors to the site enter by foot while watching Agile Wallabies.

Under both their lease conditions and the *Weed Management Act* the club is responsible for weed control. Current management of the Aero Modellers Club area primarily consists of mowing of grassed areas, irrigation of a small area adjacent to the 'pit' area (for dust control), occasional tree pruning when required, and infrastructure repairs and maintenance. Some introduced trees have been planted for amenity and shade adjacent to the 'pit' area. Topsoil has historically been used to level the area and promote establishment of lawn.

Flight paths and the location of infrastructure including the 'pit' building are determined by safety and operational constraint. There was some concern that plantings by the City of Darwin at the eastern end of the runway would cause problematic turbulence, however the availability of aircraft stabilisers has mitigated the impact of these plantings on aircraft operation. In the future, it may be desirable to trim the canopy of revegetation to the east of the runway to create a height gradient at the edge of the patch.

The Club has noted the success of City of Darwin revegetation (ground prep and species selection). However, the club remains concerned about additional plantings affecting turbulence and crossflow of the airstrip.

9.3.2 Fannie Bay Equestrian Club Inc.

The current lease of 15.05 ha extends to 9 October 2020. The Club has implemented a number of environmental actions including excluding horses from part of the remnant monsoon forest on the lease and planting Atlas Moth food plants with help from Greening Australia, changing the horse herding practices to reduce grazing pressure and trampling in the paddocks where horses are held overnight, and aggressive weed spraying and removal of Coffee bush (in conjunction with the Coffee bush management conducted at the Darwin Military Museum). Horses are supplemented fed during the dry season to prevent overgrazing, although a reseeding project implemented in 2017 was not successful. The main riding area is irrigated to provide a suitable surface, and water is provided in troughs which are cleared daily. Frogwatch North monitor goannas at the site, and conducts 'toad busts' in collaboration with the Club.

9.3.3 Pee Wee's at the Point

The current lease of 0.98 ha extends to 30 September 2027. Pee Wee's at the Point conducts weed management on their lease and the neighbouring cliffs, and a pest eradication program including spraying for spiders, ants, mosquitos and cockroaches is conducted by contractors monthly during the build-up and wet season. Wallabies, Northern Brown Bandicoots, Dingos, Brush-tailed Possums, and a large variety of bird and snake species visit the site. Cats have been recorded and reported to the City of Darwin who responded by deploying cat traps. The lease holders support reduced opening hours for the Reserve, citing 'hooning', rubbish dumping and disturbance of wildlife, noting that use of the Reserve for jogging and cycling is available via the unlocked pedestrian gate. The lease holders report a very good relationship with the City of Darwin with prompt responses to reports of problems with power or water supply, or the presence of cats. The lease holders are concerned with the prevalence of large Cane Toads (which may be due to the availability of water at the sewerage drain neighbouring the property) and would like to see traps in place.

9.3.4 Darwin Military Museum

The Darwin Military Museum has occupied Commonwealth land at East Point for 49 years. Maintenance includes weekly mowing and removal of large and dangerous trees, and weed management through weed removal, planting grass and gardens, mowing and mulching. A joint project with City of Darwin to remove Coffee Bush (*Leucaena leucocephala*) from the site has been successful; however ongoing management of the species is required due to uncontrolled Coffee Bush in the neighbouring Fannie Bay Equestrian Club lease.

9.3.5 Friends of East Point

The Friends of East Point currently comprises three 'core' members and three 'casual' members. The group primarily conducts revegetation, watering and weed control (conducted by a contractor using grant funding) within the 'breezeway', and the area directly north adjacent to the claypan. The core concerns of the group include fire control, recognition of their work area via signage, and unauthorised access associated with recent fly-tipping. The group has obtained funding from the City of Darwin for a planting day to be held in December 2018, using local provenance seedlings.

9.3.6 Northern Territory Naturalist's Club

The club holds field excursions to the Reserve twice a year – the last event held on 16 September 2018 saw 25-30 people visit the mangrove boardwalk. The club would like to 'complement the City of Darwin for the apparent management of serious invading weeds in the Reserve and adjacent crown land'.

9.3.7 Top End Native Plant Society

The Top End Native Plant Society has provided comment on the Reserve revegetation species list.

9.3.8 Research organisations

The City of Darwin supports a wide range of environmental research projects; the Darwin Municipality Environmental Research Database includes 45 projects related to the Reserve (**Appendix G**). These studies have been conducted by several universities, Northern Territory and Queensland museums, interest groups, Northern Territory government departments, and private corporations. Projects vary from short intern studies on specific issues, to long term monitoring projects, and cover a range of environmental issues from flora and fauna to water quality. Collaboration between the City of Darwin and research organisations allows the City to identify environmental issues and develop management strategies based on appropriate scientific data. Including key research organisations in stakeholder meetings will facilitate information sharing between research organisations, the City of Darwin, lease holders and other stakeholders.

The City of Darwin should continue to facilitate research addressing key management issues including:

- Long term viability of the Agile Wallaby population, including robust methods for assessing the population size, and assessment of genetic variability
- Suitability of the Reserve for Atlas Moth introduction, and the outcomes of any introduction
- Success of Cane Toad control and the recovery of fauna populations (particularly goannas)
- Success of revegetation projects, including development of the existing monsoon forest, and of the breezeway woodland

9.4 Management actions, timing and responsibilities

Table 14 Stakeholder management actions

Action	Timing	Responsibility
Obtain stakeholder feedback on the East Point Reserve Biodiversity Management Plan 2019 – 2024	Q1 2019	Climate change and environment
Inspections of leased properties to ensure that biodiversity issues, particularly weeds, are being managed appropriately	Annual, more frequently if particular issues requiring management are identified	City operations
Hold stakeholder group meetings, at the start of the wet and the dry season to review outcomes and highlight seasonal issues	Twice annually	Climate change and environment / city operations
Continue to support a diversity of research projects	Ongoing	Climate change and environment
Initiate and promote research on key management issues	Minimum of one project annually	Climate change and environment
Include research organisations in at least one stakeholder meeting annually	Annually	Climate change and environment / city operations

10 Monitoring, reporting and review

In addition to particular monitoring and reporting activities outlined under specific parts of the plan (above), an annual ‘report card’ style report, recording progress against each of the action identified in this plan, should be prepared by the City of Darwin Climate change and environment department. The plan as a whole should be reviewed after the 2019 -2024 implementation period.

11 Implementation schedule

The recommendations of each plan above have been compiled into an overall schedule provided in **Table 15**.

Table 15 Management implementation schedule

Action	2019			2020			2021			2021			2023			2024		
Native fauna																		
Fauna monitoring																		
Fauna survey, using established methodology																		
Agile wallabies																		
Continue monthly surveys. Review data for rapid increases in population growth (increasing population counts over 6 months).																		
Record evidence of overgrazing of grassed area.																		
Maintain sheltered grassland habitat in close association with monsoon forest by leaving part of the cleared area to the west of the aero modellers club as grassland																		
Continue operation of six wallaby troughs unless monitoring or anecdotal evidence of impacts to vegetation indicate that the Wallaby population is undergoing excessive growth																		
Native Fauna																		
Shorebirds																		
Continue the current zoning of East Point																		

Action	2019				2020				2021				2021				2023				2024			
to ensure that dogs are not allowed in the Reserve.																								
Monitor reports of dog and dingo activity, respond with contractor pest control as required																								
Support local conservation groups by funding at least two community engagement activities per year																								
Install educational signage																								
Install a bird viewing platform																								
Atlas Moth																								
Conduct a habitat suitability assessment to determine if revegetation has reached appropriate age, height and density to support an Atlas Moth population.																								
Liaise with Atlas Moth expert to procure 10 - 20 captive-raised gravid females suitable for release to the Reserve																								
Monitor the success of Atlas Moth reintroduction.																								
Source supply of suitable habitat and food species for arboreal mammals																								
Revegetate the 'breezeway' with plant species that have been identified as suitable for arboreal mammals.																								

Action	2019				2020				2021				2021				2023				2024							
Revegetation																												
Monsoon forest																												
Continue planned monsoon thicket restoration, using the existing species list																												
Maintain sheltered grassland habitat in close association with monsoon forest																												
Woodland																												
Source supply of suitable habitat and food plant species for the Black-footed Tree-rat in the Darwin area, as identified by Land for Wildlife (Appendix B).																												
Revegetate the 'breezeway' with plant species that provide habitat and food resources suitable for a range of arboreal mammals.																												
Revegetation monitoring																												
Revegetation health and condition survey (EcOz 2017b) survey																												

Action	2019	2020	2021	2021	2023	2024
Weed management						
Restricting new weeds						
Comply with the City of Darwin Weed Management Guide (City of Darwin, 2012) recommendations.						
Restricting spread of existing weeds						
Comply with the City of Darwin Weed Management Guide (City of Darwin, 2012) recommendations.						
Inspection of leased properties to ensure lessees are meeting their lease and WM Act obligations.						
Weed Control						
Weed control as per established methods (Section 4.3.4), or methods in line with those outlined in the 'Northern Territory Weed Management Handbook' (WMS 2015)						
Report weed control						
Maintain records of weed control as per Section 4.3.5)						

Action	2019		2020		2021		2021		2023		2024	
Pest animals												
Cane Toads												
Continue to provide water to Wallabies from raised troughs maintained in good condition												
Survey condition of existing toad exclusion fence												
Repair or replace toad exclusion fence												
Maintenance of toad exclusion fence												
Support community organisation Toad control activities												
Trial UV light/acoustic toad traps												
Install toad trap at each wallaby and horse troughs												
Cats, dogs and dingoes												
Monitor reports of dog and dingo activity, respond with contractor pest control as required												
Maintain records of animal sightings and control activities												

Action	2019	2020	2021	2021	2023	2024
Water management						
Lake Alexander surrounds						
Maintain current irrigation practices						
Wallaby troughs						
Maintain current wallaby watering practices unless ongoing monitoring indicates that the Wallaby population is increasing (see Section 2.4)						
Revegetation						
Irrigation of revegetation for the first dry season						
Access management						
Public access						
Change closing time of the Reserve to 9pm						
Install access control to City of Darwin's East Point depot and green waste recycling facility						
Maintenance and emergency access						
Formalise site access plan (Figure 11)						
Monitor condition of unsealed access tracks						

Action	2019		2020		2021		2021		2023		2024	
Stakeholder management												
Obtain stakeholder feedback on the East Point Reserve Biodiversity Management Plan 2019 – 2024												
Inspections of leased properties to ensure that biodiversity issues, particularly weeds, are being managed appropriately												
Hold stakeholder group meetings, at the start of the wet and the dry season												
Continue to support a diversity of research projects												
Initiate and promote research on key management issues												
Include research organisations in at least one stakeholder meeting annually												

12 References

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