

# Population and management assessment of the black-footed tree-rat for the Jabiru power station development

March 2021

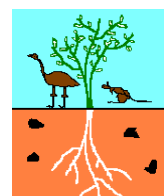


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## DOCUMENT CONTROL

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### Acknowledgements

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## EXECUTIVE SUMMARY

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Low Ecological Services was commissioned by CDM Smith Australia Pty Ltd to undertake a population survey of the threatened black-footed tree-rat, *Mesembriomys gouldii*, at the site of the proposed Jabiru hybrid power station (Lot 2303, Jabiru). In September 2020, the black-footed tree-rat was detected at 14 of 20 camera traps within Lot 2303, but these data could not be used to determine the number of individuals. Feasibly, the number could range from a single active and broad-ranging individual to many animals. This current survey aimed to accurately determine the number of individual tree-rats within Lot 2303 as well as adjacent similar habitat, and test the extent of movement of individuals into and out of the lot.

To ensure appropriate survey design and techniques, the Flora and Fauna Division of the NT Department of Environment, Parks and Water Security were consulted throughout the survey. The Division provided the survey design and supervised the field program. One hundred and ninety-one traps were set for five nights ( $191 \times 5 = 955$  trap nights) within the vegetated area of Lot 2303 and the surrounding woodland. No black-footed tree-rats were trapped. Northern brown bandicoots, *Isodon macrourus*, were captured eight times; seven within Lot 2303 and one outside, with at least one identifiable re-capture.

Given the substantial trapping effort, and the highly trap-able nature of tree-rats, expert opinion is that the zero tree-rat result is a true absence of the species from Lot 2303 and surrounds. The tree-rats that were detected in Lot 2303 in September 2020 (late dry season) now appear to be absent from the site. One explanation is that the tree-rats have dispersed to surrounding areas that have now become more suitable during the above average wet season conditions, for example with fruiting trees, ground cover and hollow-bearing logs.

While the trapping data show no current resident population of black-footed tree-rats, the habitat within Lot 2303 is in good condition and supports a population of northern brown bandicoot among other fauna. We recommend spotters be used to check for animals ahead of the machinery when the vegetation is cleared. The Djurrubu rangers would be well placed to take on this spotter role. Certain staff members of the Djurrubu Rangers also have the skills to care for injured animals and are keen to assist. We also recommend that the bottom of the boundary fence of Lot 2303 be lifted or folded along the entire perimeter to allow fleeing animals to escape. We recommend vegetation be cleared incrementally over a few days so that animals have an opportunity to relocate between clearing efforts, and that the project area is cleared from west to east, in the direction away from the rubbish tip, so that animals might move toward more intact habitat.

# 1 INTRODUCTION

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Low Ecological Services was commissioned by CDM Smith Australia Pty Ltd to undertake a population density survey of the threatened black-footed tree-rat, *Mesembriomys gouldii*, at the site of the proposed Jabiru hybrid power station (Lot 2303, Jabiru). The black-footed tree-rat had recently been detected within Lot 2303, and there is a risk that clearing of the vegetation for the power station development could significantly impact a population of this threatened species. The findings from this population survey will help to assess management options for the black-footed tree-rat.

The black-footed tree-rat is currently listed in Northern Territory and National legislation as Vulnerable (NT *Territory Parks and Wildlife Conservation Act*) and Endangered (*Environmental Protection and Biodiversity Conservation Act* 1999). Across northern Australia and Kakadu National Park, the species has undergone a rapid and severe decline in recent decades along with a suite of other medium-sized mammal species (Woinarski *et al* 2011).

## 1.1 Context

A survey using camera traps within Lot 2303 in September 2020 detected black-footed tree-rat at 14 of 20 camera locations (Connect Environmental 2021). This finding, combined with an absence of tree rats from all but one of 35 camera traps locations in the broader Jabiru area sampled in November/December 2020 (Connect Environmental 2021), suggested that Lot 2303 may provide important habitat for a local subpopulation of this species.

However, the data from the September 2020 sample cannot be used to determine the number of individuals using the habitat within Lot 2303. Feasibly, the number could range from a single active and broad-ranging individual to many animals. This current study aimed to accurately determine the number of individual tree-rats within Lot 2303 as well as adjacent similar habitat, and test the extent of movement of individuals into and out of the lot.

Mammologists from the NTG Darwin Flora and Fauna division, Department of Environment, Parks and Water Security, advised that live trapping was the most suitable technique for estimating the population size and spatial use of tree-rats, and provided a survey design and trapping protocol to assess the population. Data from captured and re-captured animals (marked using PIT tags) over sequential nights could then be used to provide a robust estimate of population size. The movement of individual animals would also help determine tree-rat habitat use within and adjacent to the project area, and appropriate management options.

## 1.2 Scope of survey

The scope of this survey was to:

1. Determine the population size and spatial use of black-footed tree-rats within and adjacent to Lot 2303, the development area for the Jabiru hybrid power station.
2. Assess management options for the black-footed tree-rat population occupying the development area.

# 2 METHOD

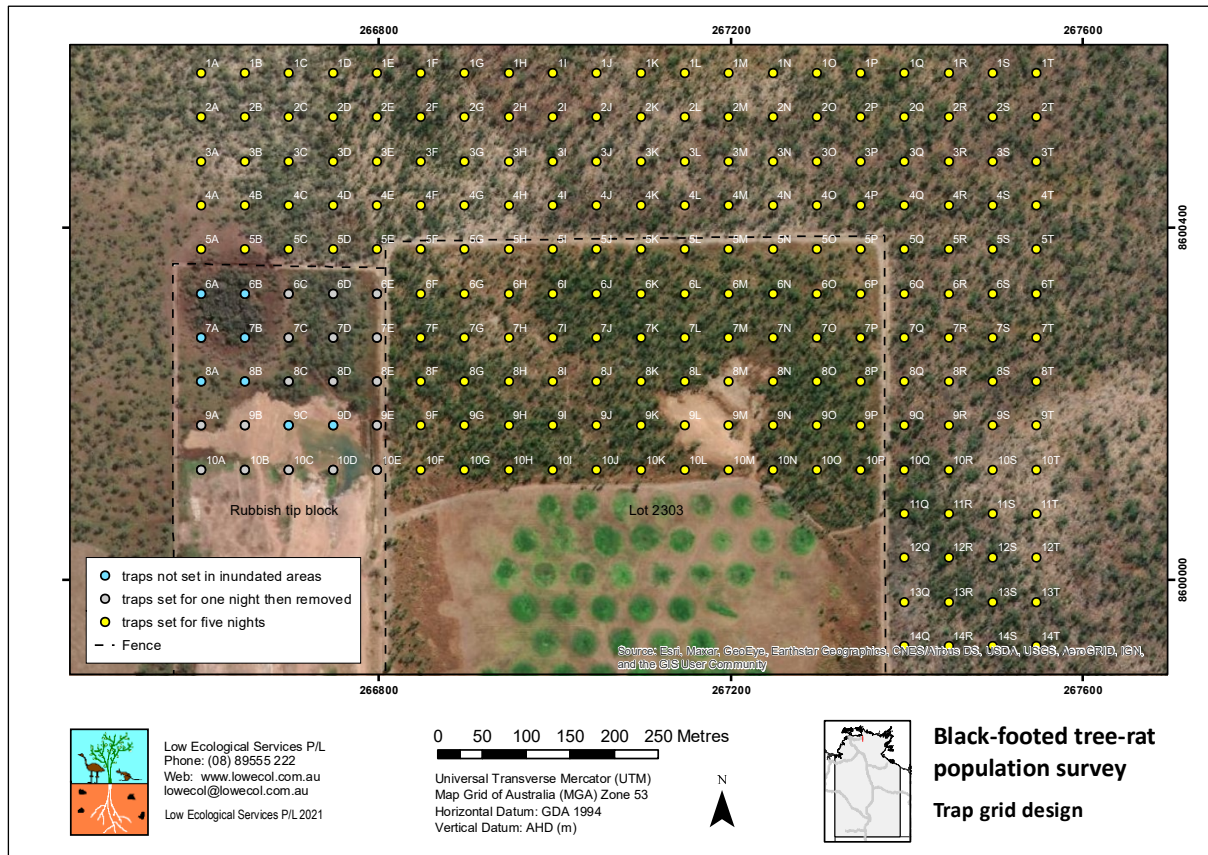
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## 2.1 Survey design

A trapping grid was designed to overlay the vegetated portion within Lot 2303 (n = 66) and a 200 m buffer in the adjacent woodland (n = 150), with traps positioned 50 m apart (Figure 1). However, difficulties laying traps in inundated areas on the western side, and hazardous areas around the landfill



sites, resulted in a decision to remove the 'rubbish tip block' of 25 traps from the survey after the first night (see Figure 1). The remaining 191 traps were set for five nights to ensure the recapture rates would be sufficient for population estimates ( $191 \times 5 = 955$  trap nights).



**Figure 1** Trapping grid over Lot 2303 and adjacent woodland

Small cage traps were baited with a mixture of peanut butter, oats and honey. Traps were baited and set in the late afternoon and cleared at first light each morning. All traps were cleared by 8:30 am each day to reduce heat stress on animals and were closed during the day to avoid animals entering the traps. Traps were uniquely coded so that movement of uniquely identified individual animals could be tracked.

Upon capture of a trapped tree-rat, LES staff were instructed in the Flora and Fauna Division protocol; tree-rats would be processed immediately at each trap location, and each animal weighed (g), sexed and a unique Passive Implant Transponder (PIT tag) inserted with a sterile applicator beneath the skin on the back of the neck, and the details recorded with date, time and trap location. Once processed, each animal would be released at the point of capture. Where trapped animals are recaptures, the PIT tag ID and trap location would be recorded with a hand held reader and the animal released at the site of capture. Data would be recorded to a suitable proforma and subsequently transferred to Excel in a format that could be easily manipulated for analysis. If species other than black-footed tree-rat were captured, the date, identity and location would be recorded. If other threatened mammal species were captured, it was recommended that these were also PIT-tagged, providing this could be done within the time available and permit conditions allowing. If unexpected adverse events occur, the protocol described in the AEC permit approval were to be enacted.

## 2.2 Data analysis

Experienced members of the Flora and Fauna Division planned to use a closed capture-mark-recapture population model to estimate population size. Capture data would have been summarised to create a



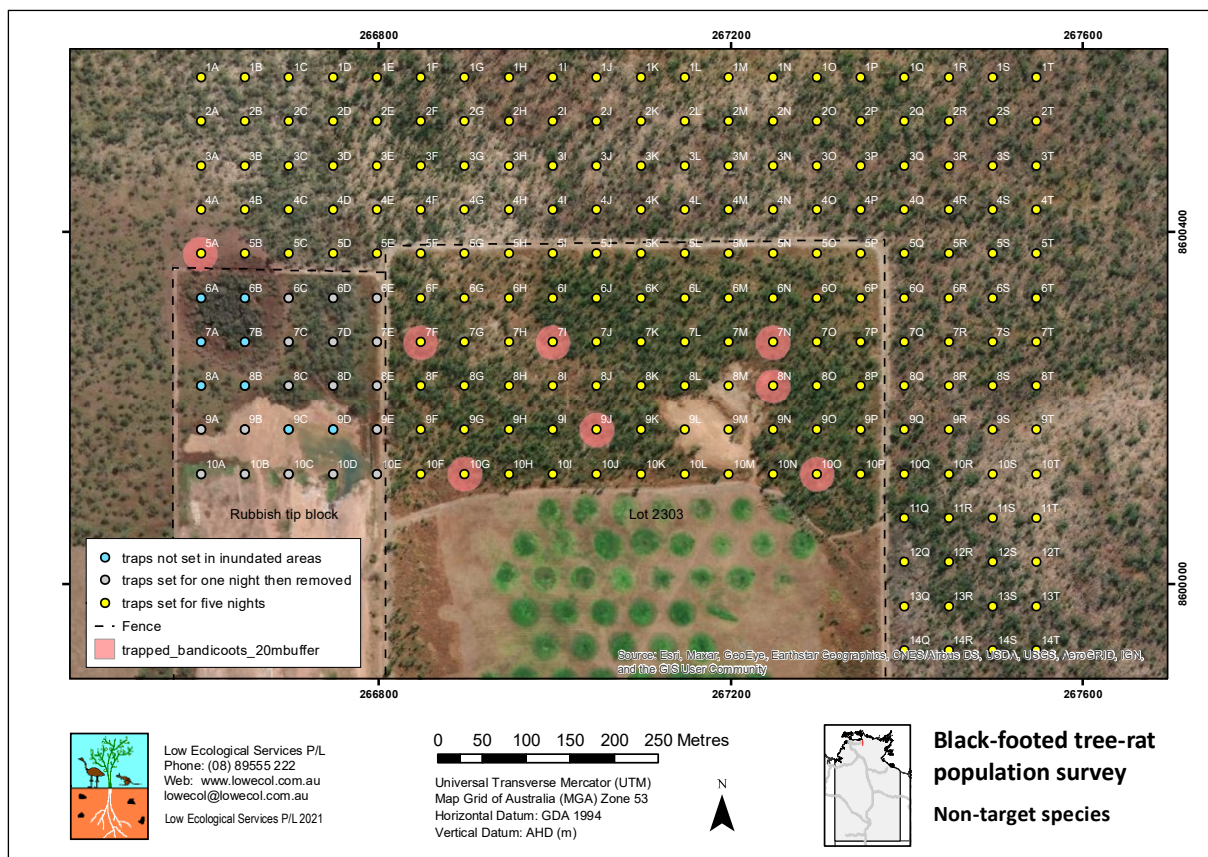
capture history of each individual over the five trap nights. Data would have been analysed in Program MARK v9.0 to estimate capture probability ( $p$ ) and the recapture probability ( $c$ ) to estimate population size ( $N$ ).

### 3 RESULTS AND DISCUSSION

No black-footed tree-rats were trapped over the 955 trap nights. Northern brown bandicoot, *Isodon macrourus*, were trapped in eight instances (examples Figure 2); seven within Lot 2303 and one outside (trap 5A, see Figure 2). At least one bandicoot was re-captured, identified as the same individual from an old eye injury and a missing tail, at traps 7N and 8N.



**Figure 2** Examples of northern brown bandicoots captured at 7I (left) and 8N (right)



**Figure 3** Trap locations of captured northern brown bandicoots in Lot 2303 and adjacent woodland

Given the substantial trapping effort, and the highly trap-able nature of tree-rats, there is a high degree of confidence that the zero tree-rat result is a true absence of the species from Lot 2303 and surrounds (T. Griffiths pers. comm. March 2021). The tree-rats detected in Lot 2303 in September 2020 (late dry season) now appear to be absent from the site. One explanation is that the tree-rats have dispersed to surrounding areas that have now become more suitable during the above average wet season conditions, for example with fruiting trees, ground vegetation and hollow-bearing logs.

## 4 CONCLUSION AND RECOMMENDATIONS

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While the trapping data show no current resident population of black-footed tree-rats, the habitat within Lot 2303 is in good condition and supports a population of northern brown bandicoot among other fauna. We strongly recommend spotters be used to check for animals ahead of the machinery when the vegetation is cleared. The Djurrubu rangers would be well placed to take on this spotter role. Certain staff members of the Djurrubu Rangers also have the skills to care for injured animals and are keen to assist (Shay Wrigglesworth has a Wildlife caring permit). We also recommend that the bottom of the boundary fence of Lot 2303 be lifted or folded along the entire perimeter to allow fleeing animals to escape. We recommend vegetation be cleared incrementally over a few days so that animals have an opportunity to relocate between clearing efforts, and that the project area is cleared from west to east, in the direction away from the rubbish tip, so that animals might move toward more intact habitat.

## 5 REFERENCES

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Connect Environmental. (2021). *Biodiversity assessment report*, Lot 2302, Jabiru, NT. Darwin.

Woinarski, J.C.Z., Legge, S., Fitzsimons, J.A., Traill, B.J., Burbidge, A.A., Fisher, A., Firth, R.S.C., Gordon, I.J., Griffiths, A.D., Johnson, C.N., McKenzie, N.L., Palmer, C., Radford, I., Rankmore, B., Ritchie, E.G., Ward, S. and Ziemnicki, M. (2011), The disappearing mammal fauna of northern Australia: context, cause, and response. *Conservation Letters*, 4: 192-201. <https://doi.org/10.1111/j.1755-263X.2011.00164.x>