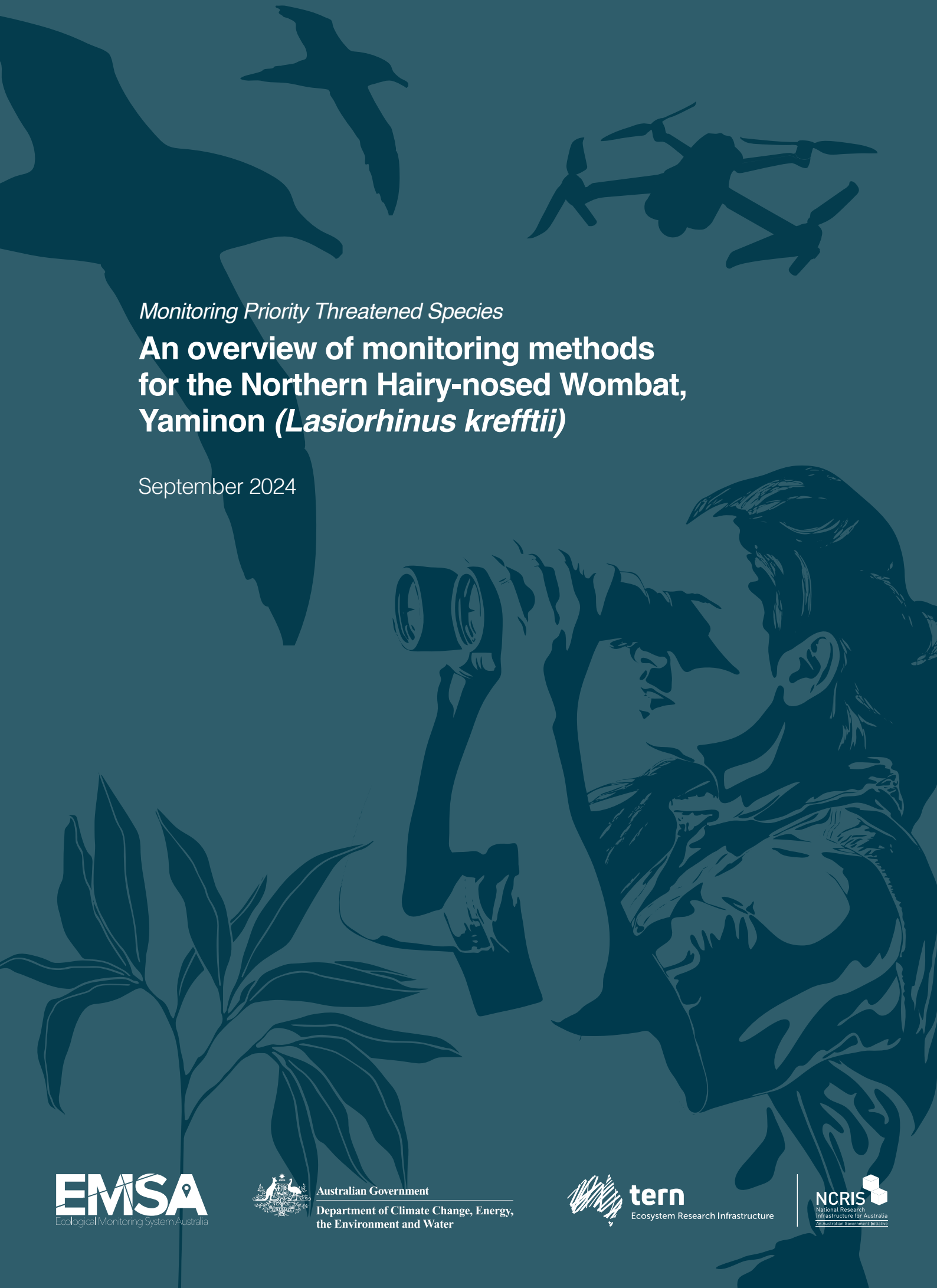

Monitoring Priority Threatened Species

An overview of monitoring methods for the Northern Hairy-nosed Wombat, Yaminon *(Lasiorhinus krefftii)*

September 2024

EMSA
Ecological Monitoring System Australia

Australian Government
Department of Climate Change, Energy, the Environment and Water

tern
Ecosystem Research Infrastructure

NCRIS
National Research Infrastructure for Australia
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Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

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About

This literature overview collates information on one of the 110 priority threatened species identified in the *Threatened Species Action Plan 2022-2032* and has been reviewed by invited practitioners experienced in monitoring the species.

The *Survey Guidelines for Monitoring Threatened Species* project, a collaboration of the Department of Climate Change, Energy, the Environment, and Water (DCCEEW) and the Terrestrial Ecosystem Research Network (TERN), aims to improve our knowledge of threatened species by enhancing accessibility and sharing of quality scientific threatened species data. By developing best practice field survey guidelines and recommendations, practitioners will be better equipped to conduct standardised, repeatable surveys.

By identifying the monitoring methods typically implemented by practitioners, documenting and assessing the techniques known to work, and identifying opportunities to standardise the methods, we can move towards ensuring all monitoring is species-appropriate, comparable between practitioners and populations, and repeatable over time. Further, together with consistent terminology, guidelines, instructions, and data collection, we can refine efforts and resources to measure and share information. Data collected using robust, standardised methods will improve our knowledge of threatened species and underpin threatened species recovery at scale. This project is essential to establishing monitoring protocols and data repositories to enhance the accessibility and sharing of threatened species data.

TERN has prepared the literature overviews for the Department of Climate Change, Energy, the Environment, and Water. For further information, please visit the EMSA Threatened Species Survey Guidelines website. Additional information, particularly monitoring methods and techniques not included that should be considered, can be brought to the author's attention by emailing tern@adelaide.edu.au for consideration for future updates.

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1 Background

1.1 Conservation status and species trajectory

1.1.1 Current EPBC Act status

- Critically endangered

1.1.2 Summary of data held in the Threatened Species Index

The Threatened Species Index (TSX) provides reliable and robust measures of change in the relative abundance of Australia's threatened and near-threatened species at national, state and regional levels. Understanding these changes in species populations is crucial for monitoring Australia's conservation progress and allows users to measure and report on the benefits of conservation investments, and to justify and design targeted management responses. Currently, the index is restricted to birds, plants and mammals, with new groups to be added in the near future.

The table below summarises Northern Hairy-nosed Wombat data held in the TSX. More information on the TSX, including how to contribute threatened species monitoring data to the index, can be found at tsx.org.au

TSX information	Northern Hairy-Nosed Wombat data held in the TSX
Data held in the TSX	Yes
Number of data sources	1
Number of unique sites	1
Average time series length	17
Average number of sampling years	8

1.2 Distribution

- The Northern Hairy-Nosed Wombat currently occurs at only two locations: Epping Forest National Park in central Queensland, and the Richard Underwood Nature Refuge, at Yarran Downs near St George in south-eastern Queensland. .
- Epping Forest National Park is approximately 100 km north-west of Clermont in central Queensland and lies in the Belyando River drainage, one of the upper reaches of the Burdekin River watershed (Johnson 1991).
- The Richard Underwood Nature Refuge colony was established in 2009, with 15 Northern Hairy-Nosed Wombats translocated from Epping Forest National Park between 2009 and 2013.
- The reintroduction site is within the species' historical range (TSSC 2018).
- Historically the northern hairy-nosed wombat's distribution has always been fragmented (Johnson 1991; Woinarski *et al.* 2014; TSSC 2018).
- In addition to the known St George and Epping Forest populations of northern hairy-nosed wombats, there have been several unconfirmed reports of wombats at several locations between these two areas, and one that is further to the north (Crossman *et al.* 1994).

1.3 Habitat

- The Epping Forest National Park comprises approximately 32 km^2 of *Acacia harpophylla* (brigalow) and *Acacia cambagei* (gidgee) scrubs on heavy non-cracking clay soils (TSSC 2018).
- The Richard Underwood Nature Refuge comprises about 1.3 km^2 of eucalypt woodland on old river levees (TSSC 2018).

1.4 Ecology

- Breeding is closely linked to summer rainfall and the increased availability of grass at that time.
- Females give birth to a single young. Most young are born between November and April.
- The young leave the pouch after eight to nine months and are weaned the following summer when they are around 12 months old.
- Before weaning, the young remain inside the burrows while their mothers forage at night (Horsup 2004).
- The proportion of females breeding in the population correlates to summer rainfall. In periods of good rainfall, females can breed once every two years (Johnson 1991; Woinarski *et al.* 2014).
- Supplementary food and water are provided at Epping Forest National Park and Richard Underwood Nature Refuge to mitigate the effects of drought and wildfire and potentially increase fecundity and survivorship rates (Treby *et al.* 2007).
- While studies have shown that northern hairy-nosed wombats readily take supplementary feed and water, particularly during dry conditions (Treby *et al.* 2007), not all the wombats accept dietary supplements (Johnson 1991; DEHP 2016).
- Northern hairy-nosed wombats eat at least 12 species of grass and sedge, mainly *Aristida* spp., *Enneapogon* spp. and *Fimbristylis dichotoma*. They also consume introduced Buffel Grass (*Cenchrus ciliaris*) (TSSC 2018).
- They conserve energy during unfavourable periods (e.g. when it is too cold, hot or dry), are strictly nocturnal and generally feed over six hectares in two hours a night in summer (wet season) and six hectares in six hours in winter (dry season) (TSSC 2018).
- Northern hairy-nosed wombats are fairly long-lived with wild individuals surviving for 25-30 years (Horsup 2004).

1.5 Threats

- Historically, livestock grazing along with drought and potentially predation by dingoes, are believed to have contributed to the decline of the northern hairy-nosed wombat (TSSC 2018).
- The primary current threat is low population size and limited distribution which makes the species susceptible to inbreeding and loss of genetic diversity, competition, predation, disease and fire (TSSC 2018).
- Predation by dingoes poses another big threat to the species' survival. In 2000 and 2001, 10 wombats (~10% of the population at the time) were killed by dingoes despite baiting being implemented (TSSC 2018). A dingo proof fence has been erected around Epping Forest National Park to prevent predation.
- The introduced Buffel Grass has invaded Epping Forest National Park, rapidly increasing in abundance and outcompeting the native grasses the wombats feed on. Although palatable to the wombats, a reduction in the quality of diet may affect the animals' health (Horsup 2004; TSSC 2018).

- Although generally safe in their burrows, fire can impact the species by removing their food source (DEHP 2016). Additionally, Buffel Grass provides a high fuel load which can increase the intensity of fires overall affecting food supply (TSSC 2018).

2 Existing monitoring methods

2.1 Summary of existing methods used

- Direct observation
- Direct observation: special techniques (specify) (e.g. spotlighting, burrow scopes, drone with camera)
- Signs (tracks, scats, hair-tubes) (includes opportune and sand plots)
- Signs – DNA/eDNA/eRNA
- Camera trapping
- Trapping – pitfall
- Trapping – Elliott/cage/or similar (ground)
- Trapping – Elliott/cage/or similar (in canopy)
- Refuge checks (burrow activity)
- Aerial surveys
- Invertebrate techniques

2.1.1 Existing survey requirements

- Optimal time of year/season/climate conditions (timing with resource availability etc)
  - Most wombats are active above ground at night during late winter and early spring when pasture productivity has been very low for around nine months (Johnson 1991).
- Optimal location of surveys
  - Epping Forest National Park in central Qld – remnant population.
  - Richard Underwood Nature Refuge - translocation reintroduction site.
- Minimum survey effort
  - 5-10 day trap session per burrow (Horsup *et al.* 2021).
  - Each burrow is trapped for at least three sessions in successive months (Crossman *et al.* 1994).
  - Hair tapes checked every morning for 9 days (Banks *et al.* 2003).
- Survey personnel
  - Limited information available
- Other factors:
  - Wombats can be evasive and remain underground (sometimes for seven days) and burrow around or beneath traps to avoid capture (Crossman *et al.* 1994).

2.1.2 Existing protocols

Existing protocols identified are identified in Table 1.

Table 1. Survey guidelines, protocols, and key resources that identify Northern Hairy-nosed Wombat monitoring methods

Protocol	Comments	Reference

Survey guidelines for Australia's threatened mammals	Recommended survey techniques include, daytime searches for suitable habitat and signs of activity (burrows, tracks, scats), consultation with local community, possibly spotlight surveys or observation surveys conducted at potentially active burrows, hair trapping.	DSEWPC (2011)

2.2 Methods to consider further

The methods listed below have been identified as potential methods and techniques to survey for the species, either to identify presence or absence, or to assist determining population size and status. Further review of the literature and consultation with experts is required, particularly to identify and assess specific techniques for examining population ecology factors.

2.2.1 Available methods

- Camera trapping – cameras placed at burrows (passive infrared) or at supplementary feeding/watering points
- Refuge checks (burrow activity)
- Trapping – commonly used in the literature (e.g. Johnson 1991; Hoyle *et al.* 1995; Banks *et al.* 2003; Martin and Carver 2020; Horsup *et al.* 2021)

2.2.2 Additional methods

- Signs (hair)
- Signs (tracks)
  - The activity of other species, particularly macropods, tended to eliminate all signs of visitation by *L. krefftii*, especially at feed sites (Treby *et al.* 2007)

2.2.3 Methods to rule out

- All survey methods typical for mammals are considered suitable (no specific methods ruled out)
- None have been identified to date.

2.2.4 Relevant Ecological Monitoring Standards Australia (EMSA) modules

The following Ecological Monitoring System Australia (EMSA) modules developed by TERN for the Australian Government should be considered for surveying the Northern Hairy-Nosed Wombat:

- Vertebrate fauna
- Camera traps
- Opportune module

In addition, the Plot description, Floristics, Cover, Soils, Condition and Vegetation mapping modules may be beneficial for assessing the suitability of a location against the species' habitat preferences.

2.2.5 Other 110 priority species with potential links

- None have been identified to date.

3 Considerations for survey guidelines development

Key considerations should a full literature review and/or survey guidelines be developed for the Northen Hairy-Nosed Wombat are highlighted below.

- Special equipment required
  - WomBot – an exploratory robot for monitoring wombat burrows (Ross *et al.* 2021)
- Estimated time and surveyor effort
  - Not determined to date.
- Vegetation communities or landscapes of the species' preferred habitat not suitable for the optimal survey methods
  - None have been identified to date.

3.1 Key documents for further review

The documents listed below have been identified as key documents to review should a full literature review and/or survey guidelines be developed for the northern hairy-nosed wombat.

- Protocols
  - DSEWPC (2011). Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999. Australian Government; Department of Sustainability, Environment, Water, Population and Communities.
- Scientific papers and reports
  - Banks, S.C., Hoyle, S.D., Horsup, A., Sunnucks, P. and Taylor, A.C. (2003). Demographic monitoring of an entire species (the northern hairy-nosed wombat, *Lasiorhinus krefftii*) by genetic analysis of non-invasively collected material. Animal Conservation 6(2): 101-107.
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3.2 Key agencies and organisations involved in the species research and recovery

- The Wombat Foundation: Saving the Northern Hairy-Nosed Wombat https://www.wombatfoundation.com.au/

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