



*Monitoring Priority Threatened Species*

# **An overview of monitoring methods for the Gilbert's Potoroo, Ngilkat (*Potorous gilbertii*)**

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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](mailto: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 TSX does not hold data on the Gilbert's Potoroo. More information on the TSX, including how to contribute threatened species monitoring data to the index, can be found at [tsx.org.au](https://tsx.org.au)

## 1.2 Distribution

- Historical reports indicate that Gilbert's Potoroo was abundant in the vicinity of King George Sound in the 19th century (Gould 1863).
- The species was thought to be extinct since its last official record in 1870 (Courtenay and Friend 2004) until it was rediscovered in 1994 at the Mt Gardner headland of Two Peoples Bay Nature Reserve, near Albany (Sinclair et al. 1996).
- Gilbert's Potoroo currently occurs in the south-west of Western Australia in Mt Gardener headland, Two Peoples Bay Nature Reserve near Albany (TSSC 2016). In 2012 there was estimated to be a total of 100 individuals (Woinarski et al. 2014). This had declined to an estimate of 60 in 2015 (TSSC 2016).
- Translocated populations also occur on Bald Island Nature Reserve (translocated in 2005) within a fenced enclosure in Waychinicup National Park (translocated in 2010) and Middle Island in the Recherche Archipelago, east of Esperance (translocated in 2018) (TSSC 2016).
- Twelve Gilbert's Potoroos were released onto Bald Island Nature Reserve between 2005–2007 (Friend 2009; Finlayson et al. 2010). This population was estimated to exceed 65 individuals in 2012 but is currently estimated to be around 40 individuals (DPaW pers comm. 2016).
- It has been estimated that Mount Gardener had the capacity to support 30-40 individuals (Friend 2008, 2009), but this capacity has been reduced significantly due to a fire in 2015 (TSSC 2016). Post-fire surveys confirmed the presence of at least five adults and the significant loss of habitat (TSSC 2016).
- Since 2009, Bald Island and Mount Gardener animals have been used to establish a new wild population in a 380 ha introduced predator-free fenced area in Waychinicup National Park. However, despite regular supplements from Bald Island, this population has failed to thrive and now comprises less than 20 individuals (TSSC 2016).

## 1.3 Habitat

- A small area within Two Peoples Bay Nature Reserve (1000 ha) (Mt Gardner headland) is considered to be representative of the species' natural habitat. In 2012 the species occurred in

at least four separate patches of long-unburnt, dense shrubland on the valley slopes (TSSC 2016).

- The habitat consists of *Melaleuca striata* (a shrub) and *M. uncinata* (broom honey-myrtle) shrubland between 1.5–2 m tall with 70–100 percent canopy cover, with a dense understorey of sedges including *Lepidosperma* sp. and *Anarthria scabra* (a herb) (DEC 2009).
- Gilbert's Potoroo uses a network of tunnels through the heathland to move around quickly under cover. It also uses *Gastrolobium* spp. thickets and sometimes shelters under deep accumulations of 'needles' in *Allocasuarina fraseriana* (Western Sheoak) clumps.

## 1.4 Ecology

- Gilbert's Potoroo is the only potoroid in the high rainfall area of far south Western Australia (TSSC 2016).
- They live in small groups, that are unevenly dispersed across their habitat (TSSC 2016).
- These colonies are isolated from each other for the most part, but dispersing subadult animals, and some older males move between them on occasion (Friend 2000).
- Males have home ranges of 15–25 ha, whereas females, juveniles and sub-adult animals of both sexes move within only 3–6 ha (Friend 2000).
- Breeding occurs throughout the year (TSSC 2016). One joey is produced at a time and females can give birth every four months (Courtenay and Friend 2004).
- Young females become sexually mature at about one year of age and males a little later (Courtenay and Friend 2004). Juveniles remain in the mother's home range after weaning, leaving between seven and 18 months of age (Courtenay and Friend 2004). Between 60–80 per cent of pouch young do not attain maturity (Friend 2008).
- Gilbert's Potoroos can live for up to ten years, but longevity in the wild would usually be less (TSSC 2016). The generation length is estimated to be 3–4 years (TSSC 2016).
- This species is almost entirely fungivorous (Nguyen 2000) with more than 90 % of their dietary composition coming from fungi. The species supplements its diet by consuming invertebrates and occasionally seeds from fleshy fruits (TSSC 2016).
- Vegetation that forms potoroo habitat at Two Peoples Bay had not been burnt for at least fifty years until 2015 and it is likely that long-unburnt areas are necessary to support the species, at least in the presence of introduced predators (TSSC 2016).

## 1.5 Threats

Primary threatening processes are (DPaW 2016):

- Fire
- Predation
- Inadequate gene flow
- Climate change
- Lack of knowledge



## 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 (burrows, dens, nests, caves, etc)
- Aerial surveys
- Invertebrate techniques

### 2.2 Existing survey requirements

- Optimal time of year/season/climate conditions (timing with resource availability etc)
  - Standard trap line monitoring occurs throughout the year, excluding only the summer months (Courtenay and Friend 2004; DPaW 2014).
- Optimal location of surveys
  - Depends on survey aim. DBCA have established survey trap lines in three of the four sub-populations (and probably also on Middle Island).
- Minimum survey effort
  - At least 4 consecutive nights cage trapping is the methodology for Bald Island (DPaW 2016). To detect presence of the species the survey area should not be greater than 5 ha (DSEWPC 2011).
- Survey personnel
  - 2-4 people per site.
- Other factors:

### 2.3 Existing protocols

- DPaW (2016) have established a method for surveying Gilbert's Potoroo using camera traps and cage trapping although specific detail is not provided.
- DESWPC (2011) 'Survey guidelines for Australia's threatened mammals' is inclusive of Gilbert's Potoroo.

### 2.4 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.

#### **2.4.1 Available methods**

- None have been identified to date.

#### **2.4.2 Additional methods**

- Taking soil samples from known and unknown habitats and analysing for eDNA.

#### **2.4.3 Methods to rule out**

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

#### **2.4.4 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 Gilbert's Potoroo:

- Vertebrate fauna
- Camera traps

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.

#### **2.4.5 Other 110 priority species with potential links**

- Occur in the same region:
- Western Quoll
- Western Ringtail Possum
- Western Ground Parrot
- Australasian Bittern
- Malleefowl

## 3 Considerations for survey guidelines development

Key considerations should a full literature review and/or survey guidelines be developed for the Gilbert's Potoroo are highlighted below.

- Special equipment required
  - Boat or helicopter hire if surveying Bald and/or Middle Island populations.
- Estimated time and surveyor effort
  - Minimum of 4 days
- 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 Gilbert's Potoroo.

- Protocols
  - 'Camera trapping' and 'Cage trapping' requires DBCA to provide detailed protocols.
- Scientific papers and reports
  - Department of Parks and Wildlife (DPaW) (2016). Gilbert's potoroo (*Potorous gilbertii*) Recovery Plan. Wildlife Management Program No. 62. Prepared by J.A. Friend, S. Comer, M.J. Page, A. Thomas, Department of Parks and Wildlife, Perth, WA.

### 3.2 Key agencies and organisations involved in the species research and recovery

- Department of Biodiversity, Conservation and Attractions, WA;
- South Coast Natural Resource Management Inc.
- Dr Tony Friend
- Gilbert's Potoroo Action Group (<https://www.potoroo.org/>)

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