

Survey guidelines and recommendations for priority threatened species

Literature overview documents – note to the reader

About the project

The *Survey guidelines and recommendations for priority threatened species* project aims to develop best practice field survey guidelines and recommendations to assist practitioners working in threatened species conservation and recovery. The intended outcome of the project is to enable targeted efforts and resources to measure, share and achieve tangible outcomes for conservation. Data collected using robust, standardised methods will improve our knowledge of threatened species and drive threatened species recovery at scale. This project is an important step towards establishing monitoring protocols and data repositories to improve accessibility and sharing of threatened species data.

Project deliverables

The first phase of the project involves preparation of literature overviews for 65 of the 110 priority threatened species. The second phase prepares more in-depth literature reviews of selected species, and based on existing best-practice, produces general survey guidelines and recommendations. Phase three of the project produces species-specific survey guidelines and recommendations for selected species. Phase three species were selected on the basis for the most urgent need for standardised surveys.

Literature overviews

The literature overviews are intended to provide a summary of the species under review, identifying known distributions, key resources and ecological requirements, as well as an overview of the known survey techniques used for monitoring.

The literature overviews were compiled in March 2023, and are intended to be updated over time as new information becomes available.

For more information

The literature overviews have been prepared by TERN for the Department of Climate Change, Energy, the Environment, and Water. For further information, please visit: www.tern.org.au/threatened-species-surveys or email tern@adelaide.edu.au



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110 Priority Threatened Species

Literature Overview

Kroombit tinker frog (*Taudactylus pleione*)

Taxa

Plant

Mammal

Frog

Invertebrate

Bird

Reptile

Fish

Current EPBC Act status

Critically Endangered

Endangered

Vulnerable

General background

Distribution

- The Kroombit tinker frog (*Taudactylus pleione*) has an extremely restricted distribution, only found in 12 small and unconnected patches of rainforest above 500 m at Kroombit Tops, south-west of Gladstone, Queensland (Clarke et al. 1999). The frog is endemic to this region (Clarke 2006).
- The total area of known occupancy is 120 ha (Hines and South-east Queensland Threatened Frogs Recovery Team 2002).
- Populations of the Kroombit tinker frog are found in rainforest patches, clumped around drainage lines and seepage areas. The occupied patches are estimated to be scattered within an area of 700 ha (DOE 2022).

Habitat

- The Kroombit tinker frog is highly cryptic and is mainly associated with Piccabeen Palm (*Archontophoenix cunninghamiana*) rainforest and boulder scree gullies (Czechura 1986; Clarke et al. 1999; Meyer et al. 2001).
- The species is found exclusively on rocky shelves and boulders, under rocks or deep rock piles near temporary streamlines, seepage zones, and sheltered rocky scree (DOE 2022).

Ecology

- The Kroombit tinker frog is typically nocturnal but active during the day when conditions are suitable (warm, humid, cloudy) (Clarke 2006).
- As a member of the genus *Taudactylus*, the Kroombit tinker frog has aquatic oviposition and larvae. However, the specifics of their reproduction remain unknown (Clarke 2006) as only three gravid frogs have ever been observed (DOE 2022).
- It is assumed that the Kroombit tinker frog breeds in seepage areas amongst rock piles and that tadpoles remain well hidden (DOE 2022).
- The feeding behaviours of the Kroombit tinker frog are predominately unknown. Males have been observed moving about, possibly searching for prey, after cessation of calling (DOE 2022).
- From April to August, the Kroombit tinker frog retreats into deep cracks and boulder piles, becoming inactive (DOE 2022).

Threats

- Predominant threats have been identified by (DCCEEW) as:
 - domestic stock
 - feral horses
 - feral pigs - direct predation, water fouling, soil disturbance
 - habitat loss
 - invasive weed species
 - chytrid fungus
 - heavy silt loads in streams.

Common survey methods used

Frogs

- Direct observation/direct encounter
- Call surveys (acoustic and/or call-playback)
- Night driving
- Pitfall trapping
- Egg mass surveys
- Larval sampling

Existing survey requirements

- Optimal time of year/season/climate conditions (timing with resource availability etc)
 - During the known calling period between September and March, peaking on warm, wet nights from September to February into early March
 - Weather should be optimal – surveys should not be conducted during heavy rainfall or stream flow and should be one week after heavy rainfall
- Optimal location of surveys
 - Drainage lines and seepages in the rainforest, often moist sites with no free surface water
 - Deep cracks in rocks and boulder piles
 - In leaf litter or among rocks along the edges of temporary pools and soaks
 - Under small stones, palm fronds and debris near permanent and temporary streams
 - Subtropical rainforest and wet sclerophyll forest
 - Rocky scree banks in the riparian zone along first-order streams
- Minimum survey effort
 - Four nights under ideal conditions covering a range of stream structure
 - Stream transects of a minimum 200 m
 - Surveys should be conducted both during the day and night
- Survey personnel
 - Field ecologists that are familiar with the species call and able to distinguish it from other frog species
- Other factors:
 - The known extent of occurrence and area of occupancy is limited
 - Larvae unknown

Existing protocols

Protocol	Comments	Reference
Survey guidelines for Australia's threatened frogs	Guidelines for visual encounter surveys, call surveys, night driving, pitfall trapping, egg mass and larval sampling surveys and combined approaches that can be applied to a variety of frog species.	DEWHA (2010)
Survey Standards for Australian Frogs	Unpublished guidelines	University of Canberra Applied Ecology Research Group (2003)

Methods to consider (for further literature review)

Available methods

- Visual encounter surveys
- Call surveys
- Acoustic monitoring

Additional methods

- eDNA

Methods to rule out

- All survey methods typical for frogs are considered suitable (no specific methods ruled out)

Relevant TERN ecological monitoring modules

The following TERN ecological monitoring modules should be considered for surveying the Kroombit tinker frog:

- Targeted surveys module
- Opportune module
- Vertebrate fauna 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.

Other 110 priority species with potential links

- Similar species and methods:
 - Growling grass frog (*Litoria raniformis*)
 - Southern corroboree frog (*Pseudophryne corroboree*)

Considerations for survey guidelines and/or protocols development

Special equipment required

- Acoustic recorder

Estimated time and surveyor effort

- Minimum four nights per location within the species' known distribution to detect presence. Locations should be surveyed during the optimal time of year (September and March, avoiding April-August).

- Surveys longer than four nights, and repeated occurrences should be undertaken prior to declaring absence.

Vegetation communities or landscapes of the species' preferred habitat not suitable for the optimal survey methods

- None have been identified to date

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 Kroombit tinker frog.

Protocols

- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2010). Survey guidelines for Australia's threatened frogs Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

Scientific papers and reports

- Xie, J., Zhu, M., Hu, K., Zhang, J., Hines, H. and Guo, Y. (2022). Frog calling activity detection using lightweight CNN with multi-view spectrogram: A case study on Kroombit tinker frog. *Machine Learning with Applications* 7: 100202.
- Clarke, J. (2006). Habitat, microhabitat and calling behaviour of *Taudactylus pleione* Czechura (Anura: Myobatrachidae), a critically endangered frog from central Queensland, Australia. Master of Applied Science thesis, Central Queensland University.

Key agencies and organisations involved in the species research and recovery

- Currumbin Wildlife Sanctuary
- Bundaberg Zoo
- Rockhampton Zoo
- Queensland Parks and Wildlife Service

Projects funded by the Australian Government

An interrogation of MERIT found that at least two projects have received Australian Government funding to actively manage or deliver conservation gains for the Kroombit Tinkerfrog (ERF-WRR2-006 Kroombit Tinkerfrog Conservation Breeding Program; ERFIP000152 Saving the Critically Endangered Kroombit Tinkerfrog from Extinction).

References

- Clarke, J (2006) Habitat, microhabitat and calling behaviour of *Taudactylus pleione* Czechura (Anura: Myobatrachidae), a critically endangered frog from central Queensland, Australia. Master of Applied Science thesis, Central Queensland University.
- Clarke, JM, Borsboom, AC, Cunningham, M, Hines, H (1999) The recovery process for the Kroombit tinkerfrog, *Taudactylus pleione*. In 'Rainforest Recovery for the New Millennium. WWF 1998 SE Qld Rainforest Recovery Conference.' (Ed. BR Boyes.) pp. 109-123. (WWF: Sydney)
- Czechura, GV (1986) A new species of *Taudactylus* (Myobatrachidae) from southeastern Queensland, Australia. *Memoirs of the Queensland Museum* **22**, 299-307.
- DCCEEW 'Taudactylus pleione – Kroombit Tinker Frog, Pleione's Torrent Frog.' Available at [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1889#:~:text=\(1998\)%20list%20domestic%20cattle%2C,of%20water%20\(Clark%20et%20al](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1889#:~:text=(1998)%20list%20domestic%20cattle%2C,of%20water%20(Clark%20et%20al).
- DEWHA (2010) Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999. Department of the Environment, Water, Heritage and the Arts, Canberra, ACT.
- DOE (2022) 'Taudactylus pleione in Species Profile and Threats Database.' Available at http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1889 [Accessed 1 June].

- Hines, HB, South-east Queensland Threatened Frogs Recovery Team (2002) Recovery plan for stream frogs of south-east Queensland 2001-2005. Report to Environment Australia, Canberra. Queensland Parks and Wildlife Service.
- Meyer, E, Hines, H, Hero, J-M (2001) Kroombit Tinker-Frog, *Taudactylus pleione*. In 'Wet Forest Frogs of South-east Queensland.' pp. 38-39. (Griffith University: Gold Coast)
- University of Canberra Applied Ecology Research Group (2003) Survey Standards for Australian Frogs (unpublished). Canberra, Australia.
- Xie, J, Zhu, M, Hu, K, Zhang, J, Hines, H, Guo, Y (2022) Frog calling activity detection using lightweight CNN with multi-view spectrogram: A case study on Kroombit tinker frog. *Machine Learning with Applications* **7**, 100202.