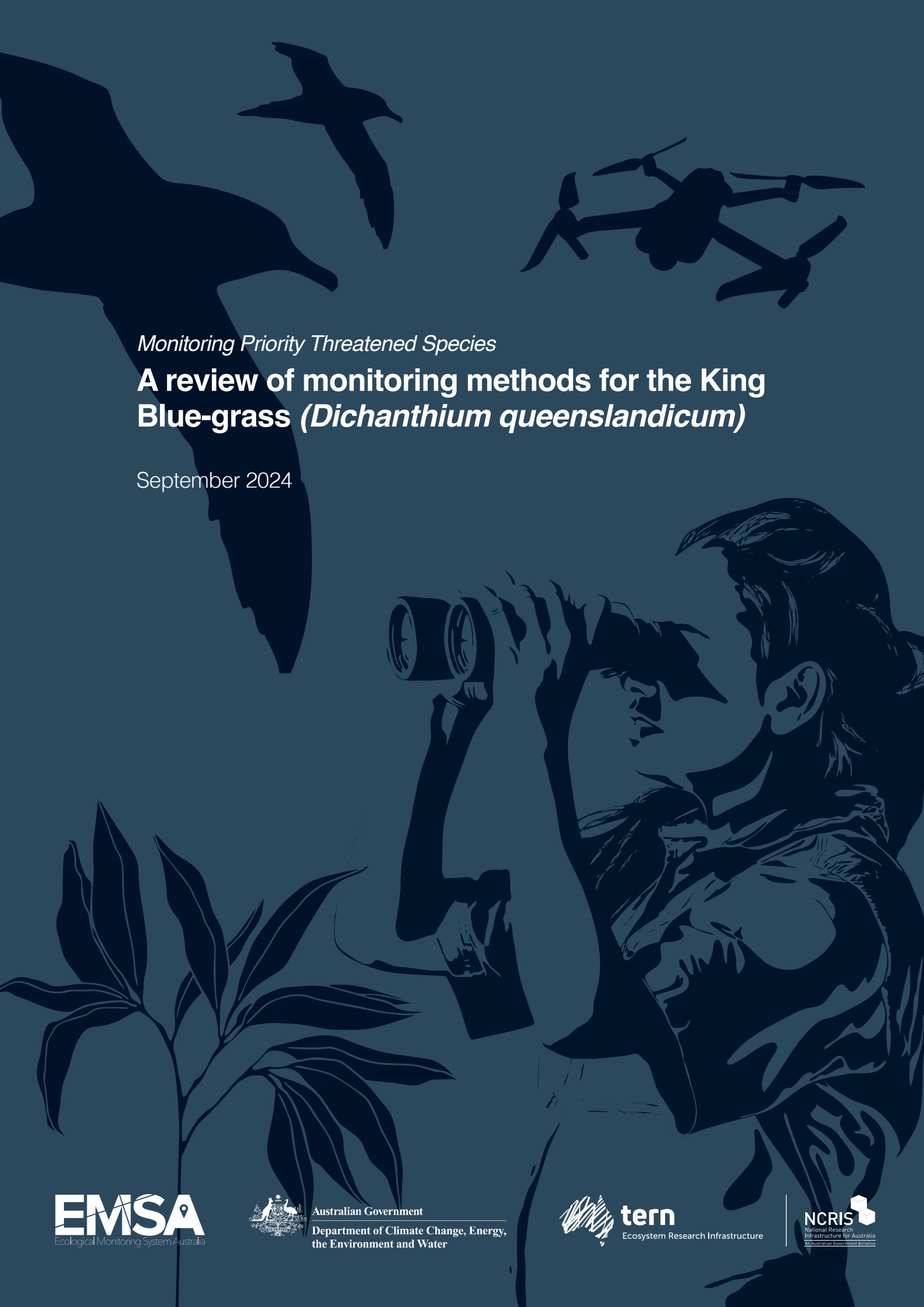




Monitoring Priority Threatened Species

A review of monitoring methods for the King Blue-grass (*Dichanthium queenslandicum*)

September 2024

Citation

TERN Australia (2024) Monitoring Priority Threatened Species: A review of monitoring methods for the King Blue-grass (*Dichanthium queenslandicum*) Version 1 Report to the Department of Climate Change, Energy the Environment and Water. TERN, Adelaide.

Version

Version 1.

Last updated: 2 September 2024

Acknowledgements and contributions

This work was funded by the Australian Government Department of Climate Change, Energy, the Environment and Water.

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 review 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 reviews 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 Species name

King Blue-grass (*Dichanthium queenslandicum*) (Simon 1982).

1.2 Conservation status

King Blue-grass was listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) in 2013. A recovery plan has been deemed as not required for this species (TSSC 2013). The King Blue-grass is one of 30 priority plants listed in the Australian Government *Threatened Species Action Plan 2022-2023* (DCCEEW 2022). The conservation status of the King Blue-grass is outlined in Table 1.

Table 1. National and state conservation status for the King Blue-grass

Jurisdiction	Conservation status	Legislation
Commonwealth	Endangered	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Queensland	Vulnerable	<i>Nature Conservation Act 1992</i>

1.3 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 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. The index is currently restricted to birds, plants and mammals, with new groups to be added in the near future.

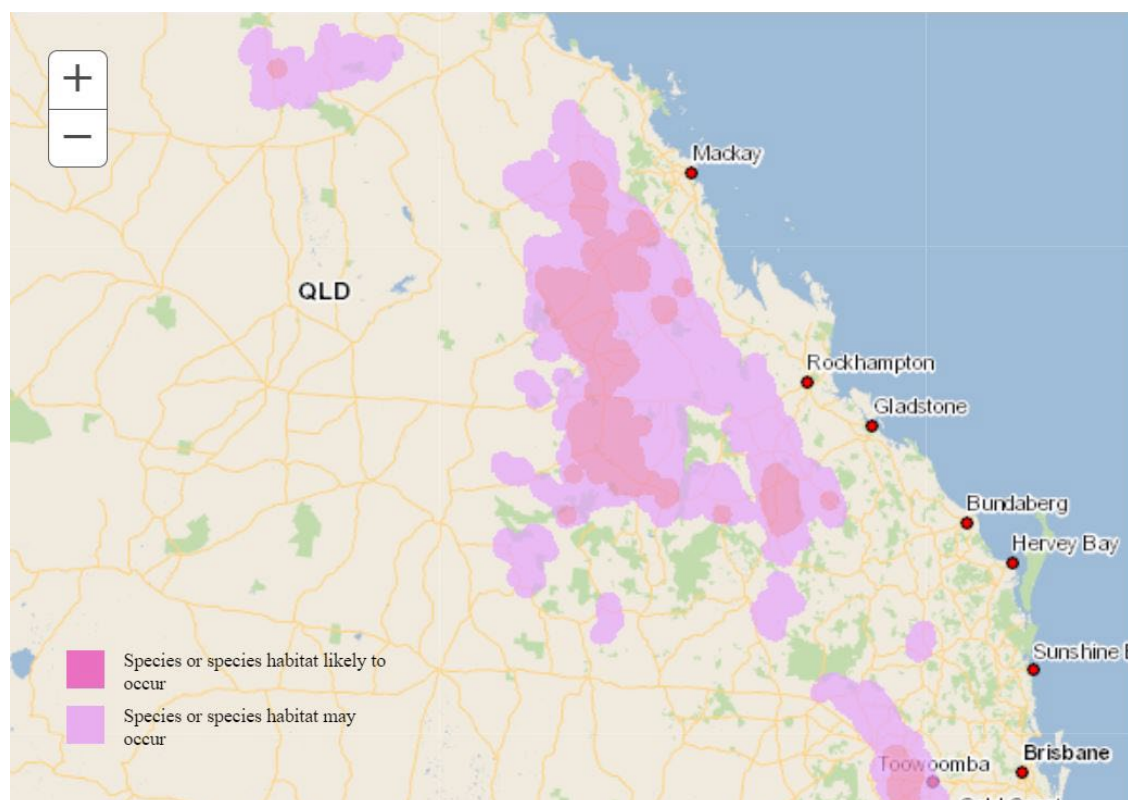
The TSX does not hold data on the King Blue-grass. More information on the TSX, including how to contribute threatened species monitoring data to the index, can be found on the [TSX website](#).

1.4 Distribution and abundance

King Blue-grass is endemic to central and southern Queensland. The species is now extinct in its former range in southern Queensland (Fensham 1998) and has a patchy but widespread distribution in central Queensland. There are historical records of the species occurring in the north near Hughenden and in the south in the Dalby district; however, currently, the main concentration of occurs in central Queensland in the Emerald region between Mackay and Bundaberg (DSEWPC 2013) (see Figure 1.). Albinia National Park is reported to contain the largest protected area of King Blue-grass habitat (Fitzroy Basin Association 2022).

In 2008 the extent of occurrence of King Blue-grass was estimated to have reduced greatly and was only 245 km², a significant decline from the previous estimate of 1100 km² (Accad et al. 2008). The decline in the grasslands has been severe, with the Central Highlands reduced from over 500,000 ha to ~166,000 ha, and the Darling Downs reduced from ~386,000 ha to less than 4,000 ha (Butler 2005). Little is stated about the abundance of King Blue-grass where it occurs, however, it was recently reported to occur on Carnarvon Station Reserve, owned and managed by Bush Heritage Australia, where it can be abundant (Diete 2020).

Figure 1. Distribution range of King Blue-grass in Queensland



Source: SPRAT (DCCEEW 2023)

1.5 Habitat requirements

King Blue-grass is part of the blue-grass dominant grassland of central Queensland, occurring primarily on undulating plains composed of black cracking clay soils (basalt downs, basalt cracking clay, open downs). The species can be found in endangered ecological communities (EPBC Act 1999), natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin and natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (TSSC 2013). King Blue-grass is often associated with other species of blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.) and other species restricted to these soil types (Fletcher 2001; Simon 1982). It also occurs in *Acacia salicina* thickets in grassland and eucalypt woodlands (Fensham 1999). Rainfall varies across its distribution, but near the primary population of this grass around Emerald it varies from 536 mm to 762 mm (Fensham 1999). The species is highly sensitive to grazing (Fensham et al. 1999) but persists with high levels of cover on roadsides and when only lightly grazed (Fensham 1999).

1.6 Biology and ecology

King Blue-grass is a perennial tufted, erect grass that can grow up to 80 cm in height. It is distinguishable from other *Dichanthium* species by exhibiting a flowering raceme length greater than 6 cm, glumes that are glabrous or sparsely hairy, a lower glume of sessile spikelet without a ciliate sub-apical arch and sessile spikelets 6 to 8 mm long (Simon 1982).

It is reported to flower throughout the year, particularly from March (Queensland Herbarium 2011). It occurs with numerous other tussock grasses, including *D. sericeum*, legumes, herbs forbs, and daisies, and becomes more dominant with years of above-average rainfall (Butler 2005).

1.7 Threats

Primary threats to King Blue-grass include vegetation clearance, over-grazing and invasive weeds. Vast regions of blue-grass dominated tussock grasslands have been cleared and converted to agricultural production or cleared for mining or Liquid Natural Gas (LNG) exploration or production. These threats continue to impact these grasslands significantly. King Blue-grass is a very palatable grass susceptible to overgrazing (Butler 2005; Fensham et al. 1999). Where these grasses occur on grazing properties, their retention or recovery depends on light and managed grazing (Butler 2005). The Carnarvon Station Reserve, owned and managed by Bush Heritage Australia, shows that where grazing is removed, it can take decades, but King Blue-grass can again become abundant (Diete 2020). Another primary threat to King Blue-grass is competition from invasive perennial weeds such as parthenium weed (*Parthenium hysterophorus*) (Nguyen et al. 2017), *Parkinsonia* (*Parkinsonia aculeata*) (DSEWPC 2013), and exotic grasses (Butler 2005).

2 Existing monitoring

2.1 Overview of monitoring methods

The presence of King Blue-grass can only be ascertained by direct observation, whether that be observation of seed, roots or the whole plant. The presence of species associated with King Blue-grass, such as Queensland Bluegrass (*Dichanthium sericeum*), may indicate suitable habitat and, subsequently, a survey could be undertaken. Areas of optimal habitat may also be used to infer the likelihood of encountering the species within an area.

Key population monitoring measures for King Blue-grass include:

- population abundance (estimated)
- area of occupancy
- habitat condition (degree of weed invasion).

2.2 Monitoring resources

At this stage, no existing monitoring resources are specifically identified or tailored to King Blue-grass. Large-scale (1:100 000) mapping of vegetation change has been undertaken, and though this will detect clearance of the bluegrass tussock grasslands (Accad et al. 2008), it cannot monitor change at the species level.

Key resources with information for monitoring King Blue-grass are listed below.

- Approved Conservation Advice for *Dichanthium queenslandium* (King Blue-grass) (DSEWPC 2013)
 - outlines the current status of King Blue-grass and its conservation.
lists research priorities that include:
 - designing and implementing a monitoring program
 - assessing population size, distribution, ecological requirements and the relative impacts of threatening processes
 - undertake survey work in suitable habitats and potential habitat to locate any additional populations/occurrences/remnants.
- Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (Neldner et al. 2022)
 - specific procedures for regional ecosystem and vegetation survey and mapping for herbarium staff and other organisations
 - follows traditional approaches to survey and mapping based on floristic survey and aerial photo-pattern interpretation, also incorporates satellite imagery and other computer-aided technologies
 - describes methods for:
 - classification of vegetation and regional ecosystems
 - mapping vegetation and regional ecosystems
 - collection of site data.

2.3 Survey methods

There are currently no accepted survey methods that explicitly outline King Blue-grass monitoring. Large-scale (1:100 000) vegetation community/habitat level surveys have been conducted using remotely sensed imagery (Accad et al. 2008), however, the methodology to establish the landscape level recovery and 25 km distribution on Carnarvon Station reserve was not specified (Diete 2020)

3 Key agencies and organisation involved in the species research and recovery

Key agencies, organisations or individuals identified as having been previously or currently actively involved in monitoring Adamson's Blown Grass include:

- Bidjara People and the Karingbal First Nations People
- Rebecca Diete, Bush Heritage Australia
- Chris Wilson, Bush Heritage, Australia
- Catherine Pohlman, Fitzroy Basin Association Inc
- Hayley Young, Fitzroy Basin Association Inc.
- Queensland Herbarium

4 Survey guideline recommendations gathered from the literature

The literature review of monitoring methods relating to the King blue-grass did not identify any key points that must be addressed when developing species-specific guidelines.

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