

Supplementary Material

Lost in time and space: re-assessment of conservation status in an arid-zone flora through targeted field survey

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Species nomination form and guidelines for adding or changing the category of a native species listing under the Queensland *Nature Conservation Act 1992 (NCA)*

General notes

The purpose of this document is to nominate a species for assessment under the NCA by the Department of Environment and Resource Management Species Technical Committee (STC) for its consideration and subsequent advice to the Minister for Climate Change and Sustainability.

Please use one nomination form for each species. The form may be submitted electronically, however the original, signed, hard copy must also be lodged. Lodgement instructions are provided at the end of the form. The STC will not consider nominations submitted in any other format.

Each section of the form needs to be completed with as much detail as possible, and indicate when there is no information available. Identify your references/ information sources, document reasons and supportive data. Indicate the quality of facts/information, for example was it based on research or anecdotal data; on observed data or estimated or inferred from data; or suspected to be the case. Identify confidential material and explain the sensitivity

The STC will not consider incomplete nominations or nominations with insufficient information. Your nomination will be returned to you if inadequate information is provided.

Your nomination must be supported with referenced summaries of relevant information from the scientific literature. Full bibliographic details are to be provided. The opinion of appropriate scientific experts may also be cited, provided they authorise you to do so. The names of the expert(s), their qualifications and full contact details must also be provided if they are cited.

The STC assesses nominations against the IUCN Red List Categories and Criteria (version 3.1) for the categories of extinct in the wild, endangered, vulnerable, near threatened and least concern. The IUCN updates its red list guidelines regularly and the STC uses the most recent version (version 8.0). This form will be updated in accord with revisions of IUCN criteria, if necessary. A full description of the IUCN categories and criteria can be found in: IUCN 2001. IUCN Red List Categories: Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

http://www.iucnredlist.org/documents/redlist_cats_crit_en.pdf <http://www.iucnredlist.org/documents/RedListGuidelines.pdf> .

- Species - applies to the entity nominated under the *Nature Conservation Act*
- Population – refers to populations within a species or total population numbers for a species.

Section 1. Summary

1.1 Scientific and common name of species (or subspecies)

***Sclerolaena walkeri* (C.T.White) A.J.Scott**

1.2 If the species is not conventionally accepted, please provide:

- a taxonomic description of the species in a form suitable for publication in conventional scientific literature. State where this description has been submitted for publication; or
- evidence that a scientific institution has a specimen of the species and a written statement signed by a person who is a taxonomist with relevant expertise (has worked, or is a published author, on the class of species nominated) that the species is new. Details of the qualifications and experience of the taxon expert need to be provided. For a specimen lodged at a museum or herbarium, state where the specimen is held, the collector name, collection date and collection/voucher number.

Accepted.

1.3 If a population is being nominated, justify why the population should be considered separately from the species as a whole. This will generally require evidence why the nominated population is considered genetically distinct and/or geographically separate and/or severely threatened in comparison with all other populations of the species.

1.4 Please provide a description of the species or population that is sufficient to distinguish it from other species or populations.

Growth habit: short-lived perennial forb to 30cm high

Leaves: slender, fleshy and sparsely woolly when young, becoming glabrous with maturity

Flowers: tiny, borne singly in the leaf axils, sparsely cottony with five stamens

Fruiting bodies: very distinctive, with numerous small 'spines' emerging from a pumpkin-shaped, conspicuously-ribbed perianth. Each fruit is about 1.5mm high by 2.5mm wide (excluding spines), with the upper third narrowed into a disc-like apex, from which the spines emerge

Does not closely resemble any other species of *Sclerolaena* (or any other species in the Chenopod family). Full description provided in Wilson (1984) and Department of Environment and Water Resources (2007).

1.5 Current conservation status under Nature Conservation Act 1992 and the EPBC Act

NCA: Vulnerable EPBC: Vulnerable

1.6 Proposed conservation status under the Nature Conservation Act 1992 and the EPBC Act

NCA: Least Concern EPBC: Least Concern

1.7 IUCN Criteria under which the species is eligible for listing. The species should be judged against the criteria described in Attachment B: Categories and criteria used for assessing the status of species. The categories for extinct in the wild, endangered, vulnerable and near threatened use the most recent version of IUCN criteria.

None.

Section 2. Species ecology/biology

2.1 Is this species conventionally accepted? If not, explain why. Is there any controversy on the taxonomy?

Accepted.

2.2 Give a brief description of the species': appearance, including size and/or weight, and sex and age variation if appropriate; social structure and dispersion (e.g. solitary/clumped/flocks)

Short-lived perennial forb to 30cm high; blue-green foliage, densely woolly when young; plants fruit when young and single-stemmed and all plants tend to be laden with small pumpkin-shaped fruits with a crown of tiny non-spiny appendages.

2.3 Describe the species' habitat (e.g. aspect, topography, substrate, climate, forest type, associated species, sympatric species).

Seasonally-inundated floodplains and inter-channel areas, usually in open gidgee/yapunyah woodlands on grey cracking clay on the Paroo and Bulloo Rivers. Seems to prefer slight drainage depressions within this habitat, such as bluebush swamp, tabledrains, tracks etc, and slightly scalded bare areas. Commonly co-occurring species include *Atriplex spongiosa*, *Eragrostis australasica*, *Paspalidium jubiflorum*, *Panicum laevinode*, *Eragrostis parviflora*, *Minuria integerima*, *Alternanthera nodiflora*, *Streptoglossa adscendens*, *Sporobolus mitchellii* and other *Sclerolaena* species. Also occasional in open herbfields with scattered Mitchell grass on Bulloo floodplain. At one site between Thargomindah and Toompine it was abundant on the slope above a creek channel.

On Eyre Creek floodplain, it grows on deeply-cracking grey clay in sparse *Chenopodium auricomum*/*Acacia stenophylla*.*Muehlenbeckia florulenta* shrubland amongst annual flood herbage (including *Ipomoea lonchophylla*, *Echinochloa colona*, *Sesbania cannabina*). On the Diamantina floodplain, it was found in open *Eremophila bignoniflora*/*Chenopodium auricomum* low shrubland on brown cracking clay and an open alluvial plain between the Diamantina River and Lake Billyer. The Cooper population was found on cracking clay herbfield east of Windorah. Lake Mueller north of Aramac is an ephemeral lake, supporting open shrubland dominated by *Eremophila bignoniflora*.

2.4 What is the species' generation length?

Note: Generation length is the average age of parents of the current cohort (i.e. newborn individuals in the population).

Short-lived, but can function as a perennial (perhaps up to 3 years) in good seasons.

2.5 Is there any other information regarding the species ecology or biology relevant to a conservation status assessment?

No.

Section 3. Conservation status

3.1 Describe the species' distribution in Australia and attach a map of known localities. Please include details of which Natural Resource Management and IBRA Bioregions the species occurs in.

South-western Queensland and northern New South Wales. Between 2006 and 2010, it was common on the Paroo River from south of Eulo to just south of the NSW border and the Bulloo River from Toompine to Bulloo Downs, with two records from the Diamantina floodplain (Brighton Downs and Diamantina NP, both south of L.G. Walker's original 1941 record from near the junction of the Diamantina and Mackunda Creek) and isolated records on Eyre Creek south of Bedourie, the Cooper floodplain north-east of Windorah and Lake Mueller north of Aramac. Many other locations along these floodplains were searched and the species not found. Searching in similar habitat on the Warrego and Culgoa floodplains to the east did not find the species. The Paroo and most of the Bulloo records are in the Mulga Lands IBRA and South West NRM regions; the Bulloo records south of Thargomindah, the Cooper, Eyre Creek and Diamantina records are in the Channel Country IBRA and Desert Channels NRM region, and the Lake Mueller record is in the Desert Uplands IBRA and Desert Channels NRM regions. Attached map also shows unsuccessful search effort.

3.2 What is the species' total extent of occurrence (in km²) (see Attachment A)

Extent of occurrence is 271 360 km².

3.3 What is the species' total area of occupancy (in km²) (see Attachment A)

The area of occupancy is at least 2000 km².

3.4 What is the species' total population size in terms of number of mature individuals?

Total population size fluctuates with prevailing seasonal conditions, so any estimate represents a snapshot in time (as discussed below in section 3.7). The estimates below relate to abundance/population size in 2007, when the species was abundant across large areas of the Bulloo and Paroo floodplains. It ranged from dominant (e.g. along old powerline between Eulo and Hungerford) to scattered/rare at individual sites. A total of 180 000 plants were found on the Paroo from April to September 2007, including >150 000 plants across about 10ha in a bluebush swamp near Caiwarra Waterhole on Currawinya National Park. Total area of habitat (Farnham Plains to Talyealye) = 600 km²; total area searched = 6 km² (1% of potential habitat). So total population is estimated at 18 million plants. 20 000 were found on the Bulloo over this same period. Total area of habitat from Bulloo Downs to Toompine) = 1500 km²; 5 km² searched (0.33% of potential habitat). So total population estimated at 6 million plants. These figures are obviously very rough, but serves to illustrate that there were tens of millions of individuals on these two floodplains in 2007.

The populations recorded on Eyre Creek (500 plants), the Diamantina (200 + 100 plants), Cooper (10 plants) and Lake Mueller (10 000 plants) are very isolated and searching in areas of similar habitat nearby did not find any further populations. Thus total population estimates are not extrapolated from this data, despite the fact that only a tiny fraction of huge expanses of potential habitat along these river systems was searched and it is highly likely that there are numerous other populations.

3.5 How many locations do you consider the species occurs in and why? Where are these located?
 Note: The term 'location' defines a geographically or ecologically distinct area.

The species was recorded at 34 sites: 12 on Paroo River, 17 on Bulloo, two on the Diamantina and one each on Eyre Creek, Cooper Creek and Lake Mueller. Each site was separated from other sites by at least 1 km, but all are probably part of the same populations given they occur on floodplains and seed is transported by floodwaters.

3.6 For flora, and where applicable, for fauna, detail the location, land tenure, survey date, estimated number of individuals and area of occupancy. This is optional for taxa nominated as near threatened or least concern. Summary distribution information such as a map and list of localities should be provided for taxa nominated as near threatened or least concern.

In the table below, where a site has been visited multiple times, abundance and area of occupancy are summarised for each visit, demonstrating the temporal dynamics of the species.

Location	Land tenure	Date of most recent survey	Number of individuals at location and area of occupancy
Near Manda Page's alluvial site on old stock route off northern boundary, Currawinya National Park	National Park	01/10/2013	Abundant from March to August 2007 (average 2 plants/m ² over at least 0.5km ² /500000m ² = 1 000 000 plants), but rare at site in four visits between March 2008 and October 2013
Eulo Town Common, approximately 1.8km west of town on Thargo road	Town common (grazed)	02/10/2013	Locally common (>1000 plants over 0.01km ² in April 2007; has been scattered or absent during five visits between 2008 and 2013
Ourimperee Waterhole, Currawinya National Park	National Park	2/12/2012	Scattered along 60m walked, about 50m from waterhole; about 30 plants seen in April 2011; absent in December 2012
Near Corni Paroo Waterhole campground sign, Currawinya National Park	National Park	24/10/2012	Scattered plants in from April 2007-February 2011 (about 50 seen at site); absent in October 2012
Tarko, Hungerford-Eulo road	Leasehold grazing	1/10/2013	Scattered throughout woodland, but forms dominant groundcover over a wide area to east of the road (particularly where trees cleared for old powerline); >10 000 plants in population; absent during three visits from April 2011 to October 2013
Eulo - Hungerford rd, approx 500m from Springvale turnoff	Leasehold grazing	1/10/2013	Scattered (7 plants seen in 800m ²) in April 2007; absent at site when visited in May 2010, September 2011 and October 2013
Caiwarro Waterhole, Currawinya National Park	National Park	2/10/2013	Abundant across bluebush swamp - estimated 200 000-300 000 plants present between 2006 and December 2010; has been scattered at low densities at site since this time
3 Mile Crossing (Carwarra Creek), Hungerford-Eulo road north of Currawinya homestead	National Park	1/10/2013	Average density 180 plants/m ² , >20 000 plants in population in July 2007; has been scattered or absent from the site in seven visits between 2008 and 2013
6 Mile crossing, southern boundary of CNP, off Hungerford-Thargomindah Road	National Park	4/12/2012	Average density 27 plants/100m ² , totalling >2000 plants in July 2007; has been rare or absent from the site during four visits between March 2008 and December 2012)
Talyalyeae, south of Hungerford; western side of Paroo River	Leasehold grazing	5/07/2007	Locally common - at least 1000 plants over 0.01km ²
Paroo River floodplain, about 5km north of Hungerford, Currawinya NP	National Park	1/04/2011	Rare – two plants seen around perimeter of claypan; only ones seen in 1 hour walking
Farnham Plains, mud spring area near southern boundary	Leasehold grazing	22/10/2012	Patchily abundant, mostly on bare areas; >2000 plants in 0.01km ² area at site
Picarilli; beside main Thargomindah-Bulloo Downs road	Leasehold grazing	05/06/2009	Locally common - 500 plants over 200m x 20m area - stops abruptly on harder-setting scald
Bulloo River road, approx 3.5 km SE of Kiandra Homestead	Leasehold grazing	9/06/2013	Scattered in table drain - 100 plants over 0.005km ²
South of Thargomindah	Town common (grazed)	9/06/2013	Scattered as single plants - 3 found; none found in October 2011 or June 2013

South of Thargomindah	Town common (grazed)	9/06/2013	Common on roadside + scattered throughout woodland; 500 plants counted over 0.01km in September 2007; 50 in October 2011; 250 in June 2013
Bullo Downs Road, south of Thargomindah	Leasehold grazing	9/06/2013	Scattered - 50 plants in 2000m2 in September 2007; 12 in October 2011
Bullo Downs Road, south of Thargomindah	Leasehold grazing	1/10/2011	Scattered; commonly associated with yapunyah trees and log patches; 400 plants seen in September 2007 and June 2009 in 1000m2; 20 and 30 in October 2011 and June 2013 respectively
Thargomindah Town Common, just east of town	Town common (grazed)	9/06/2013	Scattered to abundant - >100 000 plants over 2km2 surveyed in September 2007; has remained scattered to patchily abundant since this time
Thargomindah-Toompine River Road	Leasehold grazing	9/06/2013	Common but patchy throughout swampy area, mostly occurring in patches of small/young plants in September 2007; absent in October 2011; patchily abundant seedlings in June 2013
Thargomindah-Toompine River Road	Leasehold grazing	11/09/2007	Only occasional walkeri in 2007 and 2011
Bulloo River rd approx 8.2 km NNW Autumn Vale HS	Leasehold grazing	9/06/2013	Locally common in April 2007 - 200 seen in 400m2; still scattered in October 2011 and June 2013 (50/400m2)
Thargomindah-Toompine River Road	Leasehold grazing	9/06/2013	Dominant or co-dominant over quite a large area, including downstream side of crossing and bare areas leading down to channel - >10 000 plants over 0.02km2 in September 2007; only scattered plants in June 2013 (35 seen in 2400m2)
Thargomindah-Toompine River Road	Leasehold grazing	2/10/2011	Scattered - average density of 5 plants/100m2 over 0.01km2; only one live plant seen at site in October 2011
Thargomindah-Toompine River Road	Leasehold grazing	2/10/2011	Common (200 plants/800m2 in Sept 2007); scattered (9 plants found in 1000m2) in October 2011
Bulloo River rd approx 6 km NE of Karwalke HS	Leasehold grazing	9/06/2013	Locally very common - 1000 plants seen in 0.01km2 in April 2007; occasional plants only in October 2011 and June 2013
Thargomindah-Toompine River Road	Leasehold grazing	2/10/2011	Locally very common - 1000 plants seen in 0.01km2 in Sept 2007; scattered (total of 40 plants seen) in Oct 2011
Thargomindah-Toompine River Road	Leasehold grazing	2/10/2011	Scattered - average density of 5 plants/100m2 over 0.01km2; none seen in October 2011
Thargomindah-Toompine River Road	Leasehold grazing	2/10/2011	Common at point; mostly scattered throughout swamp in Sept 2007 (average density 30 plants/m2; 200 plants total); none seen in Oct 2011
Northern end of Lake Mueller, Edgbaston	Private conservation (Bush Heritage Australia)	11/04/2012	Abundant - mass regeneration with 6 inches of rainfall 5 weeks ago; 130 plants along 50m transect - would be >5000 of plants over lake, but patchy; has fluctuated in abundance since first observed in 2009
Cluny, about 2km south of Glengyle homestead along Eyre Creek	Leasehold grazing	06/04/2008	Abundant over small area (100 plants) but uncommon (12 plants found in 15 minutes searching) in July 2010
Diamantina National Park, about 1km south of homestead	National Park	16/05/2009	Locally common over small area - 200 plants in 0,005km2
Lake Billyer area, Brighton Downs	Leasehold grazing	22/04/2009	Scattered over small area; not found in other areas searched
Coniston, Hammond Downs road	Leasehold grazing	15/07/2010	Uncommon - only 10 plants seen; not found elsewhere
3.7 Is the species' distribution severely fragmented? If so, what is the cause of this fragmentation? Note: Severely fragmented refers to the situation in which increased extinction risk to the taxon results from most individuals being found in small and relatively isolated populations (in certain circumstances this may be inferred from habitat information). These small populations may go extinct, with a reduced probability of recolonisation			
No – occurs on floodplains and fruiting bodies float so are transported by floodwaters, in effect connecting populations occurring across the same river system.			
3.8 Does the species undergo extreme natural fluctuations in population numbers, extent of occurrence or area of occupancy? To what extent and why?			

Note: Extreme fluctuations can be said to occur in a number of taxa when population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e. a tenfold increase or decrease).
<i>Sclerolaena walkeri</i> undergoes extreme natural fluctuations in response to rainfall and flooding, as documented in the table in section 3.6 above. The species was first collected on the Diamantina River in 1941, and was collected on the Bulloo River in 1964. In the mid-1990s, it was grown from a soil seedbank sample by Manda Page on Currawinya National Park, but was not recorded in the standing vegetation at this site between 1992 and 1997.
From October 2006 to December 2008 (when all sites went under water in a flood event), <i>Sclerolaena walkeri</i> was abundant across large areas of the Paroo floodplain, including at this site. Inundation killed all existing plants in December 2008, but seedlings germinated at most sites, however in very low densities compared to pre-flooding. Through 2009, it persisted at low densities at all Paroo sites, and was only abundant at Caiwarro bluebush swamp on Currawinya, where there had been two major germination events. Sites were revisited again in February 2011, and the species was scattered in low densities at most sites but still quite common at Caiwarro, and by September 2011 was in low densities and almost unrecognizable at Caiwarro swamp. From October to December 2012, only one plant was found across six Paroo River sites revisited, and no plants found in an hour searching at Caiwarro swamp. In October 2013, it was again scattered in very low densities at most sites, including Caiwarro.
<i>Sclerolaena walkeri</i> was abundant on the Bulloo floodplain between Toompine and Thargomindah in 2007-2008. By October 2011, its abundance and vigour were drastically reduced at all sites, although it was still present at 15 of 21 sites revisited. However, only at three was it sufficiently common and recognizable to have been detected by a botanist who was not specifically searching for the species (most plants were dead stems with fruits lying on the ground). In June 2013, it was abundant at sites near Thargomindah but rare or absent at sites further north where there had not been late autumn/early winter rainfall.
Ongoing monitoring will provide further information on the population dynamics of this enigmatic burr. However, its apparent rarity until 2006 is probably due to a combination of its 'boom-bust' life history and low collection effort, which mean that the chances of a collector's visit coinciding with a rare boom event are low (Silcock et al. 2011).
3.9 What data are there to indicate past trends in the species' population size, distribution, extent or quality of habitat? (if available, include data that indicates the percentage decline over the past 10 years or 3 generations whichever is longer)?
There is no data to indicate declines or changes in the species' population size, distribution, extent or quality of habitat in Queensland.
3.10 What data are there to indicate future changes in the species' population size, distribution, extent or quality of habitat? (if available, include data that indicates the percentage decline over 10 years or 3 generations whichever is longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past?)
There is no indication of future long-term changes in these parameters, despite natural fluctuations discussed in Section 3.8.
3.11 Has the species been reasonably well surveyed? Is the species' current known distribution and/or population size likely to be its actual distribution and/or population size?
The species has been well surveyed between 2007 and 2010; the current known distribution is thus likely to be its actual distribution, although population size will fluctuate substantially as discussed above. The floodplains of the Paroo/Cuttaborra systems were not searched during good seasons/after flooding, and it is possible that the species' distribution extends further into NSW.
3.12 For species considered eligible for listing as extinct or extinct in the wild, please provide details of the most recent known collection, or authenticated sighting of the species in the wild and whether additional populations are likely to exist.

4. Threats and threat abatement

4.1 Identify past, current and future threats indicating whether they are actual or potential. For each threat describe: <ul style="list-style-type: none"> a. how and where it impacts on this species b. what its effect has been so far (indicate whether it is known or suspected; does it only affect certain populations) c. what is its expected effect in the future (is the threat only suspected; does it only affect certain populations)
<i>Sclerolaena walkeri</i> is listed as Vulnerable, as was only known from L.G. Walker's type collection in the early 1940s, and a single record from the Bulloo River in 1964. However, surveys have shown it to be abundant across large areas of floodplain, at least in certain seasons, with no threats to its persistence. It is only grazed in areas with very high total grazing pressure, and then sparingly, although does appear to be more palatable than other co-occurring Chenopod species such as <i>Atriplex spongiosa</i> and <i>S. muricata</i> . However, given that plants produce fruits when very young, and that most populations were completely ungrazed, grazing is not regarded as a threat to <i>Sclerolaena walkeri</i> .
4.2 Where possible, provide information on threats for each occurrence/location. This is optional for taxa nominated as near threatened or least concern. Summary information should be provided for taxa nominated as near threatened or least concern.
Not applicable (see section 4.1 above).
4.3 Identify and explain any additional biological characteristics particular to the species that are threatening to its survival.
None (see section 4.1 above).

4.4 Give an overview of how threats are being abated/could be abated and other recovery actions underway/proposed. Identify who is undertaking these activities and how successful the activities have been to date.
Not applicable (see section 4.1 above). However, continued monitoring of the established sites on the Paroo and Bulloo floodplains (and other populations opportunistically) will shed further light on the dynamics of this mysterious species which remained unrecorded for almost half a century.
4.5 Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.
Currawinya National Park management plan.
4.6 Are there any management or research recommendations from the documents mentioned in 4.5 or otherwise, that will assist in the conservation of the species?
No.

Section 5. Compilers, referees and references

5.1 Compiler(s) details	
Name(s)	Jenny Silcock
Organisation(s)	University of Queensland
Contact details	
Postal address	133 King Street, Charleville, 4470
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Phone	(07) 46542389
Date	7 January 2014
5.2 Has this document been refereed? If so, indicate by whom	
5.3 Reference List	
Australian Virtual Herbarium records online, accessed 5 October 2013.	
Department of the Environment and Water Resources (2007). <i>Sclerolaena walkeri</i> in Species Profile and Threats Database, Department of the Environment and Water Resources, Canberra. Available from: http://www.environment.gov.au/sprat . Accessed 2007-04-17 @08:48:50.	
Silcock, J.L., Fensham, R.J. & Martin, T.G. (2011). Assessing rarity and threat in an arid-zone flora. <i>Australian Journal of Botany</i> 59 : 336–350.	
Wilson, P.G. 1984, 'Chenopodiaceae', in <i>Flora of Australia, Volume 4: Phytolaccaceae to Chenopodiaceae</i> , Australian Government Publishing Service, Canberra.	

Section 6. Declaration

I declare that the information in this nomination and its attachments is true and correct to the best of my knowledge.

Signed:

Date:

Section 7. Lodgement instructions

Completed nominations should be electronically lodged at:

Derm_species_tc@derm.qld.gov.au

The original, signed hard copy of the nomination must be posted to:

Species Technical Committee

C/- The Director

Biodiversity and Ecosystem Sciences

Queensland Herbarium

Department of Environment and Resource Management

Brisbane Botanic Gardens,

Mt. Coot-tha Rd,

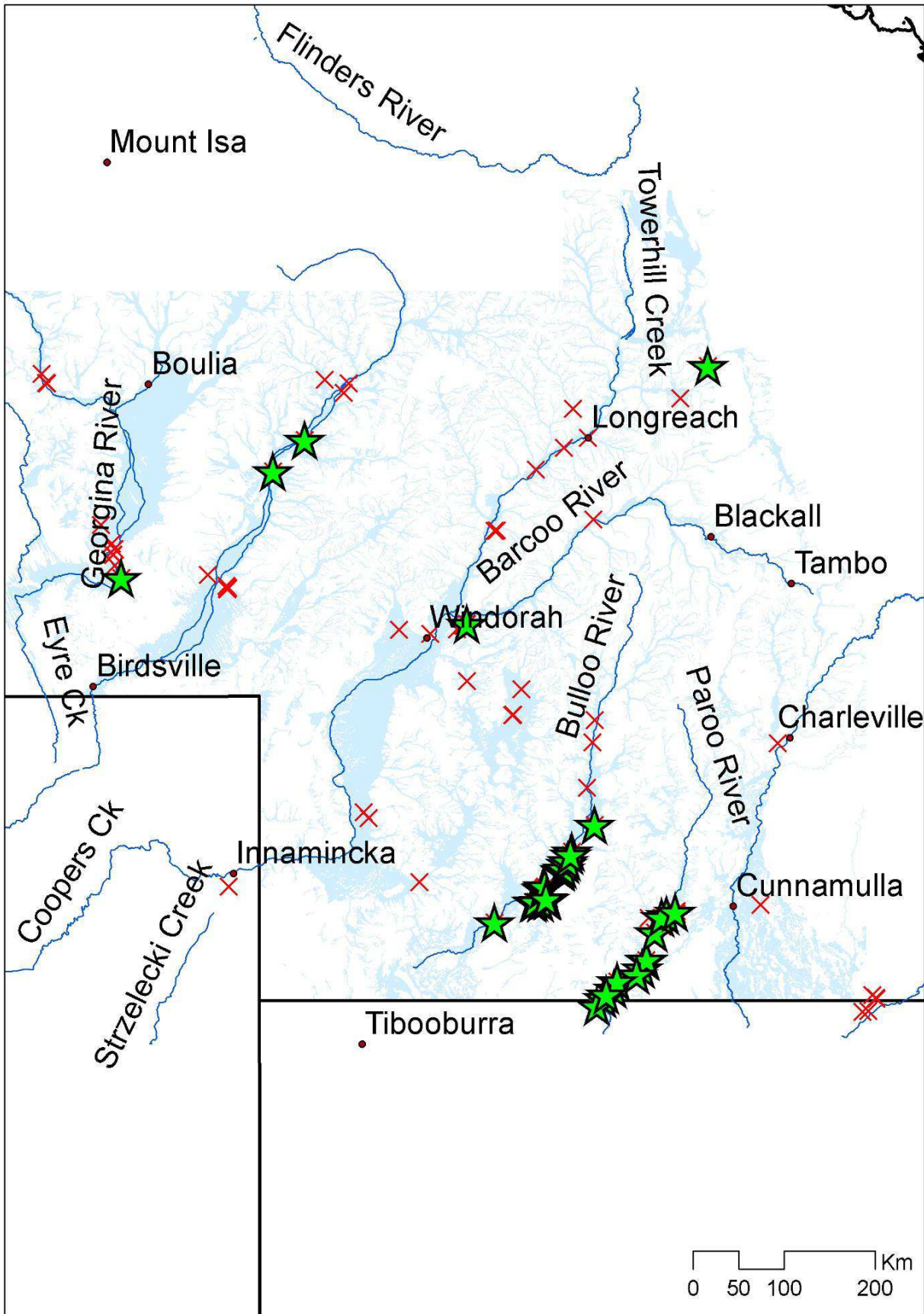
TOOWONG, Qld 4066



Growth habit and fruiting bodies of *Sclerolaena walkeri*, Paroo River floodplain, July 2007



S. walkeri abundant in disturbed habitats, including (a) Thargomindah motorcycle jump, (b) graded road verge near Thargomindah, and (c) old stock route track, Currawinya NP



Distribution of *Sclerolaena walkeri*, showing main rivers, towns and alluvial habitat (shaded light blue). Green stars show records between 2006 and 2010, red stars show survey sites where the species was not found during this period.

Threatening Processes¹ for *Sclerolaena walkeri*

Threatening Process	Risk Level ² (not applicable, unknown, none, low, medium, high, extreme)	Ability to Ameliorate ³ (not applicable, unknown, none, low, medium, high, excellent)
Land clearing (historical pre VMA)	Low	not applicable
Land clearing (current post VMA), includes urbanization	Low	High
Current land management practises (e.g. fire regimes, physical disturbance)	Low	Medium
Invasive plants	Low	Not applicable
Impacts of feral/introduced animals (eg grazing)	Low	Medium
Impacts of native animals (vertebrates or invertebrates)	Low	Medium
Accidental destruction (e.g. roadworks, recreation)	Low	High
Small populations (e.g. demographic, genetic effects)	Low	Low
Climate variation (e.g. drought, flood, climate change)	Low	None
Pathogen induced dieback (e.g. <i>Phytophthora</i> fungal rootrot; Citrus canker)	Unknown	None
Deliberate harvesting (commercial, cultural, hobbyist)	not applicable	Not applicable
Alteration of hydroecology (e.g. salinity, water table)	Low	None
Mining activities (including quarries)	Low	High

Footnotes

¹ based in part on those proposed by Coates & Atkins (2001).

² definitions for Risk Level

not applicable: doesn't apply to this species

unknown: we have no idea based on current data/knowledge

none: there is good data/knowledge on the species and this threatening process does not apply

low: the threatening process is likely to impact on less than 10% of populations and genetic variation

medium: the threatening process is likely to impact on between 10 and 50% of populations and genetic variation

high: the threatening process is likely to impact on between 50 and 90% of populations and genetic variation

extreme: the threatening process is likely to impact on 100% of populations and genetic variation leading to *in situ* extinction

³ definitions for Ability to Ameliorate, i.e. through human intervention *viz.* government policies, land tenure security, community participation

not applicable: doesn't apply to this species

unknown: we have no idea based on current data/knowledge

none: we can't do anything that will enable conservation of the species *in situ*

low: it is possible to conserve *in situ* less than 10% of populations and genetic variation

medium: it is possible to conserve *in situ* between 10 and 50% of populations and genetic variation

high: it is possible to conserve *in situ* between 50 and 90% of populations and genetic variation

excellent: it is possible to conserve *in situ* 100% of populations and genetic variation