

Nomination to change the conservation class of a species under the Queensland *Nature Conservation Act 1992*

Complete this form to nominate a species for assessment of its conservation class under the *Nature Conservation Act 1992* (NC Act). Any subspecies, variety, race, hybrid, mutation or geographically separate population (hereafter 'species') can be nominated. The appropriate conservation class will be selected during an expert assessment process and, following approval processes, reflected in the next suitable update of the NC Act.

A species may be nominated to an appropriate conservation class from any other conservation class. The nomination assessment process may result in a species being recommended to the conservation class as nominated, or to a class better supported by scientific data and expert opinion. Assessments and nominations will be shared with the Commonwealth and other Australian jurisdictions within the species' distribution.

All plant and vertebrate species native to Queensland are protected under the NC Act and classified as Least Concern unless found eligible for a different conservation class. Invertebrate species are only protected under the NC Act if specifically named under a conservation class. A species can be nominated for listing or reassignment from any conservation class to:

A national threat category:

- Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (E) or Vulnerable (V) if it meets at least one of the International Union for Conservation of Nature (IUCN) criteria for species at risk of extinction

A state threat class:

- Near Threatened (NT) if the species meets at least one of the criteria for species at risk of becoming threatened in the future based on concerns relating to population dynamics or threats
- Least Concern (LC) if evidence is provided that no criteria for a higher class have been met, and the species won't become eligible for a higher class in the foreseeable future should conservation actions cease due to reclassification.

The assessment of species against the national threat categories reflected in this form complies with the [Memorandum of Understanding](#) for the Common Assessment Method (CAM) between the Commonwealth and Australian states and territories. The objective of the CAM is for partner jurisdictions to adopt each other's national assessments as appropriate. Information about the CAM can be found at <https://www.qld.gov.au/environment/plants-animals/wildlife-permits/common-assessment>.

To nominate a species with an Australian distribution that is not restricted to Queensland, use the nomination form and guidelines at <http://www.environment.gov.au/biodiversity/threatened/nominations/forms-and-guidelines> and email the completed form to the Australian Government at EPBC.nominations@environment.gov.au.

Important notes for completing this form

- **To enable a species eligibility for listing to be assessed against the criteria, please complete the form as comprehensively as possible by providing a response in each box with an orange border.**
- Completing a nomination is a demanding task. Nominators are encouraged to seek advice from experts where appropriate to assist in completing the nomination form.
- The opinion of scientific experts may be cited as personal communication with their approval. Please provide the experts names, qualifications and contact details (including employment in a government agency if relevant) in the reference list at the end of the form.
- Include any available information and analysis or state when the required information is not available.
- Figures, tables and maps can be included at the end of the form or provided as separate electronic files or hardcopy documents (referenced as appendices or attachments in your nomination).
- Cross-reference relevant areas of the nomination form where needed.
- **Reference all information sources**, both in the text and in a reference list at the end of the form.
- Identify confidential material and the reason it is sensitive. With the exception of information you have identified as confidential, nominations under the CAM process may be made available by a state, territory or the Commonwealth Government to experts or the public for comment.
- If the species is listed nationally, the Australian Government will publish nomination information on its website. Your details as nominator will not be released and will be treated as confidential information.
- Guidance on interpreting this nomination form can be found in the “*Guidelines for Assessing the Conservation Status of Native Species*” developed by the Australian Government under the EPBC Act here <http://www.environment.gov.au/biodiversity/threatened/nominations/forms-and-guidelines>. Although not fully relevant under the NC Act, the guidelines provide assistance on several aspects of this form. Please email SpeciesTechnical.Committee@des.qld.gov for further advice on completing the nomination.

Further information on selected questions

INTRODUCTION

Species native to Queensland may be nominated to any conservation class under the NC Act, including to transfer between classes. If the taxon at risk is a population or hybrid, or if you wish to know if it has been unsuccessfully nominated under the NC Act in the past, please contact the Queensland Department of Environment and Science for advice at SpeciesTechnical.Committee@des.qld.gov.au.

To search for a species' conservation class under the NC Act please refer to the *Nature Conservation (Wildlife) Regulation 2006*: <https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2006-0206>.

You can also search the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) list of threatened species in the Species Profile and Threats Database (SPRAT) at www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

The full lists of threatened fauna and flora under the EPBC Act are available here:
www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna
www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora.

You can find a list of nominated species that did not meet the assessment criteria for listing under the EPBC Act at www.environment.gov.au/biodiversity/threatened/unsuccessful-species.html.

A nomination to transfer a species from a threatened conservation class to Least Concern or Near Threatened under the NC Act need not address sections marked with an asterisk (*).

SCIENTIFIC AND COMMON NAMES OF NOMINATED SPECIES

- Provide the currently accepted scientific and common name(s) for the species (including Indigenous names, where known). Note any other scientific names that have been used recently such as superseded names.

TAXONOMY

- Record the species' authority and the taxonomic group to which it belongs (Family name is sufficient for plants; both Order and Family name are required for fauna).
- Is the species known to hybridise with other species? Describe any cross-breeding with other species in the wild, indicating where and how frequently this occurs.

DISTRIBUTION

- In accordance with the CAM, the Commonwealth is the default assessment 'lead' for species occurring across multiple Australian jurisdictions, and the nomination will be subject to the prioritisation and assessment process under the EPBC Act. Download the nomination form here <http://www.environment.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/nomination-form-species.pdf>, and email it to epbc.nominations@environment.gov.au. Further information on the EPBC Act nomination, prioritisation and assessment process is available at <http://www.environment.gov.au/biodiversity/threatened/nominations>.
Note: where the relevant jurisdictions agree, a State or Territory (rather than the Commonwealth) may take the lead on assessing a cross-jurisdictional species, in consultation with the Commonwealth and other jurisdictions.
- A nomination for a species endemic to Queensland or with its only Australian distribution in Queensland, for example a species only occurring in Queensland and Papua New Guinea, can be assessed under the NC Act. Please submit your completed nomination form to SpeciesTechnical.Committee@des.qld.gov.au.
- Describe the species' current geographic distribution within Queensland, and where applicable, outside Australia.
- Provide a map, if available, indicating latitude, longitude, map datum and location names
 - Indicate the percentage of the global population that occurs in Queensland, and what is its significance?
 - Is the Queensland population distinct, geographically isolated, or does part or all of the population migrate into/out of the Queensland jurisdiction?
 - Explain the relationship between the Queensland population and the global population.
 - Do global threats affect the Queensland population?
- Give locations of other existing or proposed populations such as populations that are captive, propagated, naturalised outside their range, recently re-introduced to the wild, and planned to be re-introduced. Note if these sites have been identified in recovery plans. Provide latitude, longitude, map datum and location name, where available, in an attached table.
- Give details of fauna species' home ranges/territories including any relevant daily and seasonal or irregular movement patterns, such as arrival/departure dates if migratory.
- Does the species occur within an EPBC Act listed ecological community? You will find a list of EPBC Act listed ecological communities here: www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl.

BIOLOGY/ECOLOGY

- **Life cycle:** Provide detail on the age at sexual maturity, average life expectancy, natural mortality rates, and generation length
 - “*Generation length*” is defined as the average age of parents of the current cohort (i.e. newborn individuals in the population), and reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in species that breed only once. Where generation length varies under threat, use the more natural pre-disturbance generation length. It is often calculated as = (longevity + age at maturity)/2. Provide details of the method(s) used to calculate the generation length.
- **Reproduction:** Provide detail on the reproductive requirements of this species.
 - **Flora:** When does the species flower and set fruit? What conditions are needed for this? What are the pollinating and seed dispersal mechanisms? If the species reproduces vegetatively, describe when, how and what conditions are needed. Does the species require a disturbance regime (e.g. fire, cleared ground) to reproduce?
 - **Fauna:** provide an overview of the species' breeding system and breeding success, including: when it breeds; what conditions are needed for breeding; whether there are any breeding behaviours that may make it vulnerable to a threatening process.
- **Habitat**
 - Provide information on aspect, topography, substrate, climate, forest type, associated species, sympatric species and anything else that is relevant to the species' habitat.
 - Explain how habitats are used (e.g. breeding, feeding, roosting, dispersing, basking, etc.).
 - Does the species use refuge habitat (e.g. in times of fire, drought or flood)? Describe this habitat.
- **Feeding (fauna):**

- Summarise the feeding behaviours, diet, and the timing/seasonality associated with these. Include any behaviour that may make the species vulnerable to a threatening process.
- **Movement (fauna):** provide information on daily and seasonal movement patterns.

IDENTIFICATION OF KNOWN THREATS AND IMPACTS OF THE THREATS

- For each threat, describe:
 - whether it is actual or potential
 - how and where it impacts on this species
 - what its effect has been so far (is the threat known or suspected?, does it only affect certain populations?) Present supporting information/research).
 - its expected effect in the future (is the threat known or suspected?, does it only affect certain populations?, is there supporting research/information?) Present supporting information/research).
 - its relative importance or the magnitude of the impact on the species.
- Identify and explain any additional biological characteristics particular to the species that are threatening to its survival (e.g. low genetic diversity).
- If subject to natural catastrophic events, i.e. events with a low predictability that are likely to severely affect the species, identify the type of event, its likely impact, and its likelihood of occurrence (e.g. a drought/cyclone in the area every 100 years). If **climate change** is an important threat to the species, provide referenced information on how climate change might significantly increase the species' vulnerability to extinction. Please refer to the *Guidelines for Assessing the Conservation Status of Native Species*:
<http://www.environment.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2018.pdf>.

*CONSERVATION ADVICE: THREAT ABATEMENT AND RECOVERY ACTIONS

- Describe how threats are or could be abated and/or species recovered.
- Identify who is undertaking these activities and how successful the activities have been to date.
- Describe any mitigation measures or approaches that have been developed specifically for the species at identified locations. Identify who is undertaking these activities and how successful the activities have been to date.
- For species nominated as Extinct in the Wild, provide location details for any naturalised or captive populations and the level of human intervention required to sustain the species.

IMPACT OF TRANSFERRING A THREATENED SPECIES TO NEAR THREATENED OR LEAST CONCERN

- Only complete this section if you are nominating a species for transfer to Near Threatened or Least Concern from a class of nationally threatened wildlife (Extinct, Extinct in the Wild, Critically Endangered, Endangered or Vulnerable).
- Provide details of the expected impact on the species if conservation actions ceased following its transfer out of a threatened wildlife class.

CURRENT LISTING CLASS AND CATEGORY

- Note: The term 'class' under the NC Act is equivalent to the term 'category' under the EPBC Act.
- Select the species' current class under the NC Act where applicable. Search the species' NC Act class here: <https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2006-0206>.
- Select the species' current category under the EPBC Act where applicable. Search the Australian Government SPRAT Database here: www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

NOMINATED LISTING CLASS

- **After completing the section 'Eligibility against the criteria'** sufficient evidence should be available to determine your response to this section. Please select the NC Act class to which the species is being nominated.

REASONS FOR A NOMINATION TO TRANSFER TO ANOTHER CLASS

Please describe why the species is being nominated to transfer to another conservation class in Queensland:

- *Genuine.* The change in class is the result of a genuine status change that has taken place since the previous assessment. For example, the change is due to an increase in the rate of decline, a decrease in population or range size or habitat, or declines in these for the first time (owing to increasing/new threats).
- *Knowledge.* The change in class is the result of new knowledge, e.g. owing to new or newly synthesised information about the status of the taxon (e.g. better estimates for population size, range size or rate of decline).
- *Taxonomy.* The change in class is due to a taxonomic change adopted during the period since the previous assessment. Such changes include:

- *newly split* (the taxon is newly elevated to species level)
- *newly described* (the taxon is newly described as a species)
- *newly lumped* (the taxon is recognised following lumping of two previously recognised taxa)
- *no longer valid/recognised* (either the taxon is no longer valid, e.g. because it is now considered to be a hybrid, variant form or subspecies of another species, or the previously recognised taxon differs from a currently recognised one as a result of a split or lump).
- *Mistake*. The previous class was applied in error.
- *Other*. The change in class is the result of other reasons not easily covered by the above, and/or requires further explanation. Examples include change in assessor's attitude to risk and uncertainty.

INITIAL LISTING

- The reasons for the initial NC Act listing may be available in the original nomination for the species. This can be obtained by emailing the Department of Environment and Science's Species Technical Committee at SpeciesTechnical.Committee@des.qld.gov.au.
- The reasons for EPBC Act listing may also be available. Search for the species' EPBC Act listing and conservation advice for threatened species in the SPRAT Database www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.
- If there is insufficient information to provide details of the reasons for the original listing, please state this.

CHANGES IN SITUATION LEADING TO THE NOMINATION TO TRANSFER TO ANOTHER CLASS

- Describe the changes that have occurred or are likely to occur to the species' population, range or habitat that influence the nomination to change the species' conservation class.

ELIGIBILITY AGAINST CRITERIA

- For a species to be eligible as Near Threatened or a class of threatened wildlife, it must be assessed as meeting **at least one** of the five 'criteria' on this nomination form. For example, for a species listed as Vulnerable to be transferred to the Endangered class, it must meet the threshold/s for at least one of the five criteria for Endangered.
- A species does not have to be found eligible for the same class under all criteria; however, all questions must be answered. If information is not available for a particular criterion, a statement to this effect is required.
- If you hold unpublished data that support assessment of a criterion, you must provide them with the nomination.
- Standards for assessing a species' conservation status in Australia align with the IUCN Red List Criteria and Categories. Please refer to the IUCN guidelines for explanations of how to address the criteria <http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3151/redlistguidelines.pdf>.

DECLARATION

In signing this nomination form, you agree to grant the Queensland Government (as represented by the Department of Environment and Science) a perpetual, non-exclusive, worldwide, royalty-free licence to use, reproduce, publish, communicate and distribute information that you have provided in the nomination form that is not referenced to other sources with the exception of information specifically identified by you as confidential, in websites and publications and to promote those websites and publications in any medium.

As nominator, your details are automatically subject to the provisions of the *Privacy Act 1988* and will not be divulged to third parties. The Commonwealth, State and Territory governments have agreed to collaborate on national threatened species assessments using the CAM. As part of this collaboration, your nomination, including your details as nominator, may be provided to other government jurisdictions, who will also observe these privacy and confidentiality arrangements.

If you subsequently agree to be cited as the author of specific, cited information, you will be acknowledged in all publications and websites in which that information appears, in a manner consistent with the *Style Manual for Authors, Editors and Printers* (latest edition).

Nomination form to change the conservation class of a species in Queensland

Details of the nominated species

SCIENTIFIC NAME OF SPECIES (SUBSPECIES, VARIETY, ETC. TO BE SPECIFIED WHERE RELEVANT)

Phebalium distans P.I.Forst.

COMMON NAME(S)

Mt Berryman Phebalium

TAXONOMY

Provide any relevant detail on the species' taxonomy (e.g. authors of taxon or naming authority, year and reference; synonyms; Family and Order).

Forster, P.I. (2003). *Phebalium distans* P.I.Forst. (Rutaceae), a new and endangered species from south-eastern Queensland, and reinstatement of *P. longifolium* S.T.Blake. *Austrobaileya* 6(3): 437–444.

*CONVENTIONAL ACCEPTANCE OF TAXONOMY

Is the species' taxonomy conventionally accepted?

Yes

No

If the species is not conventionally accepted, please provide the following information:

- a taxonomic description of the species in a form suitable for publication in conventional scientific literature

OR

- evidence that a scientific institution has a specimen of the species, and a written statement signed by a person who is a taxonomist and has relevant expertise (has worked with, or is a published author on, the group of species nominated) that the species is considered to be a new species.

Not applicable

*DESCRIPTION

Provide a description of the species. Include where relevant its distinguishing features, size and social structure.

How distinct is this species in its appearance from other species? How likely is it to be misidentified?

Small tree (rarely a shrub) up to 8 m high, up to 15 cm dbh, bark rough-flaky, grey; blaze cream-yellow with strong aromatic scent; wood yellow. Indumentum (unless otherwise stated) on foliage and reproductive parts of overlapping lepidote trichomes that are silver to ferruginous-silver giving the covered surface this colour. Branchlets sparsely glandular-tuberculate, with a dense covering of trichomes, glabrescent. Leaves petiolate, strongly aromatic when crushed; petioles 1.7–3 mm long, 0.5–0.8 mm wide, with a sunken midrib and with dense trichomes; lamina chartaceous, linear, 14–62 mm long, 1.5–4.5 mm wide (length/width ratio 7.7–15.5); margins entire or somewhat sinuate to minutely crenate near apex, recurved; adaxial surface with sunken midrib, glossy dark-green, sparsely glandular, glabrous; abaxial surface with strongly raised midrib, densely covered in trichomes; tip apiculate to shortly acuminate; base attenuate. Inflorescences pedunculate, terminal umbels. Flowers 4–4.5 mm long, 3–4 mm wide; pedicels 4–5 mm long, c. 0.5 mm diameter, with dense trichomes; mature bud shape turbinate; calyx shortly subturbinate, 0.8–1 mm long, 1.7–1.8 mm diameter, adaxially glabrous, abaxially strongly glandular-tuberculate and with sparse trichomes, lobes broadly triangular, c. 0.3 mm long and 0.8 mm wide, irregularly dentate; petals elliptic, 3–3.2 mm long, 1–1.8 mm wide, adaxially glabrous, cream, abaxially with dense trichomes apart from c. 0.2 mm around margin that is devoid of trichomes; stamens 10, filaments 3.5–5 mm long, c. 0.1 mm diameter, filiform, glabrous, anthers oblong, 0.7–0.8 mm long, 0.4–0.5 mm wide; ovary spherical, c. 1 mm high, with dense trichomes; style 3–3.2 mm long, c. 0.3 mm diameter, with scattered multifid stellate trichomes in lower half, stigma capitate, papillate, c. 0.2 mm long and 0.3 mm wide. Cocci erect, 3.5–4 mm long, 2.5–3 mm wide, glandular, truncate at suture. Seed somewhat reniform, longitudinally compressed, 2.2–2.5 mm long, 1.3–1.5 mm wide, longitudinally corrugate, grey-black (Forster 2003).

Not likely to be misidentified. An identification key to *Phebalium* is provided by Wilson (2013).

DISTRIBUTION

Provide a succinct overview of the species' known or estimated current and past distribution, including international/national distribution. Provide a map if available.

Is the species' habitat protected within the reserve system (e.g. national parks, Indigenous Protected Areas, or other conservation estates, private land covenants, etc.)? If so, which populations? Which reserves are actively managed for this species? To your knowledge, which reserves are being actively managed in way that provides incidental benefits for this species? Give details.

Phebalium distans is endemic to south-east Queensland, Australia where it is known from five locations¹ (with sublocations) from Binjour in the north to Mt Berryman in the south (**Map 1**). These five locations are broadly known as Binjour (1), Mt Walla (2), Proston (3), Kingaroy (4) and Mt Berryman (5). It is likely that the species was more widespread in the ancient (before European settlement) past as the five locations are markedly disjunct indicating a species that had already become fragmented into discrete subpopulations². In the recent (last 120 years) past of European land settlement, the habitat for this species has been extensively cleared for agriculture in south-east Queensland. Each of these locations could be impacted on by invasive weed encroachment, and potentially more frequent and intense fires that are a consequence of longer periods of moisture deficit under climate change.

At location 1 (Binjour), the species occurs in a single subpopulation spread over three land tenures (State Forest, road reserve, private freehold land).

At location 2 (Mt Walla), the species occurs in a single subpopulation on private freehold land.

At location 3 (Proston), the species occurs at eight discrete sublocations, mainly near the named localities of Abbeywood and Stalworth; however, these are likely to be all part of the one subpopulation given the former distribution of habitat at the location. All sublocations are in road reserves or fencelines adjacent to the road reserve with adjacent private land completely cleared. Of these eight sublocations, seven comprise singletons or a handful of individuals. It is only the Range Road sublocation (a wide road reserve) that comprises several hundred individuals.

At location 4 (Kingaroy), the species occurs in eight discrete sublocations that are all likely part of the one subpopulation. These occurrences are mainly in road reserves or fencelines adjacent to the road reserve with adjacent private land completely cleared. Of these eight sublocations, six comprise singletons or a handful of individuals. It is only the Tessman's Road sublocation (a closed council road reserve) and the Kingaroy Heights Environmental Park (a council reserve) that comprise several hundred individuals.

At location 5 (Mt Berryman), the species occurs in seven sublocations, mainly in road reserves or on in remnant vegetation on private freehold land. Of these seven sublocations, three probably comprise singletons or a handful of individuals. It is mainly the Dick Scanlon Scrub and the Welk Remnant that comprise several hundred individuals. As several of these sublocations are separated by areas of unsuitable habitat, it is possible that a number of subpopulations may exist at this location; however, this remains to be tested genetically.

The population estimates for the primary stands for this species are as follows:

Location 1 (Binjour): Binjour State Forest. This contains probably up to a thousand individuals with a small number of individuals in adjacent private land and a defunct road reserve.

Location 2 (Mt Walla). This contains perhaps up to 200 individuals.

Location 3 (Proston). The sublocation at Range Road contains several hundred individuals.

Location 4 (Kingaroy). The sublocations at Tessman's Road and Kingaroy Heights Environmental Park contain probably less than 400 individuals between them.

Location 5 (Mt Berryman). The sublocation at the Welk Remnant contains c. 200 individuals. Forster (2003) estimated c. 200 individuals at the Dick Scanlon scrub; however, it is not known what is still there after an intervening 28 years from the original observations.

This means a total population of less than 3000 individuals.

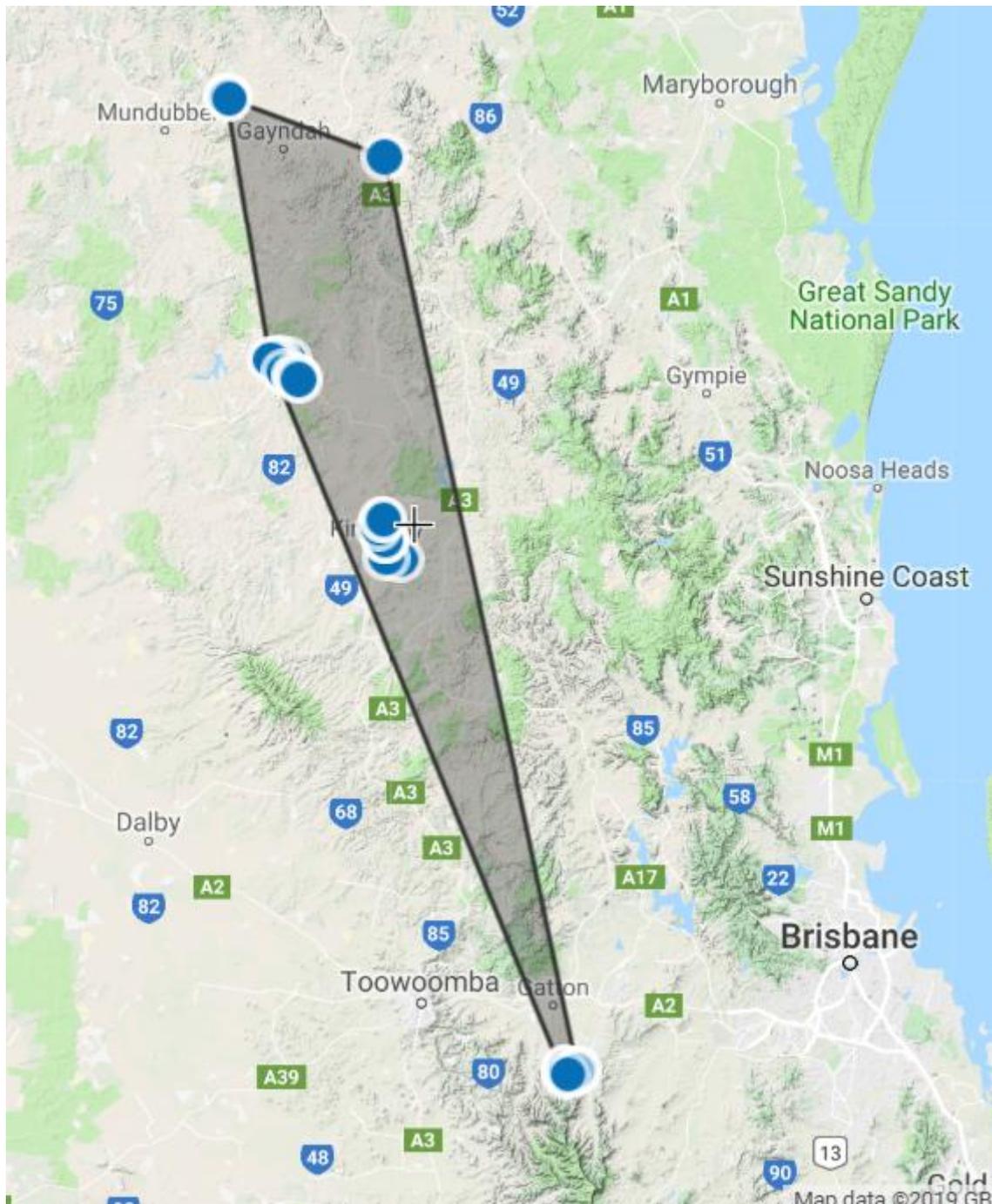
Locations 1 and 2 are within the North Burnett Regional Council jurisdiction. Locations 3 and 4 are within the South Burnett Regional Council jurisdiction. Location 5 is within the Lockyer Valley Regional Council jurisdiction.

Conservation Reserves: The species is present in Binjour State Forest and the Kingaroy Heights Environmental Park; all other locations (or sublocations thereof) are in road reserves (3, 4, 5) managed by regional councils or on private land (1, 2, 3, 5).

No reserves are being actively managed for this species, apart from a cessation of broadscale vegetation clearing. Within the South Burnett Regional Council area (3, 4), council is well aware of the species presence and is attempting to avoid damage to the existing subpopulations from incidental road maintenance.

¹For a definition of location and sublocation see next box

²For a definition of population and subpopulation see next box



Map 1. Distribution of *Phebalium distans* showing five locations. The shaded area indicates the species area of occurrence as calculated using the GeoCat mapping tool <http://geocat.kew.org/>

BIOLOGY/ECOLOGY

Provide a summary of biological and ecological information.

Include information on:

- life cycle including age at sexual maturity, life expectancy and natural mortality rates
- specific biological characteristics
- the species' habitat requirements
- for fauna: feeding behaviour and food preference and daily/seasonal movement patterns
- for flora: pollination and seed dispersal patterns

Life cycle

Habitat. *Phebalium distans* occurs only in semi-evergreen vine-thicket (softwood scrub), araucarian microphyll vineforest (hoop pine scrub) or allied communities on red soils derived mainly from basalt or lateritic substrates. In some localities (e.g. Binjour locality), individuals occur in the ecotone between semi-evergreen vine-thicket and adjacent eucalypt woodland, usually on substrates derived from a mixture of duricrust (a heavily laterised crust) and basalt. In the Mt Berryman locality, some stands at some sublocations are recorded from laterised

sedimentary substrates. At the Mt Walla locality, individuals occur in the ecotone between semi-evergreen vine thicket and adjacent eucalypt woodland, on a substrate derived from rhyolitic ignimbrite.

Phebalium distans is a long lived perennial shrub. It is sexually mature under ideal conditions at approximately five years from seed germination. Life expectancy and natural mortality rates are unknown. The species suckers and it is likely that in many instances 'multiple' individuals or ramets represent a single clone.

Reproductive biology. *Phebalium distans* has bisexual flowers and is most probably obligately outbreeding. The small regular flowers are not morphologically specialised and fit the syndrome for pollination by small invertebrates such as bees and flies; however, pollination remains unstudied. The capsular fruit release the seed locally and it is assumed that most fall close to the parent plant. Dispersal remains unstudied; however, long range dispersal (i.e. beyond 100m from the parent tree as defined by Cain *et al.* 2000) is thought unlikely with the species unable to cross large habitat gaps in short periods of time.

Definition of Critical Terms

The context of species and the listing process

"Species can be defined as populations that are diagnosably distinct, reproductively isolated, cohesive, or exclusive groups of organisms" (Harrison & Larson 2014).

All species (or lesser taxonomic categories of biological classification) have an evolutionary origin and existence in terms of time and space. All species have periods of range expansion, followed by fragmentation, reduction and eventual extinction (Levin 2000). Many of the species that are dealt with in respect to the listing process are already well advanced towards the final stage where the different subpopulations have become fragmented and are now restricted to small areas of suitable habitat. This may contrast to species where the primary threatening process has been habitat destruction.

Individual: A genetically discrete organism (within the genetic and morphological confines of a species, subspecies or variety: collectively taxon) that has arisen from sexual reproduction, *viz.* a seed. Individuals may spatially comprise singletons (i.e. a tree by itself) or may comprise many ramets that lack physical connection (i.e. clonal disintegration). It should be noted that for plants, many 'individuals' are genetically essentially indistinguishable due to inbreeding and the accumulation of similar genes or the mode of seed reproduction (e.g. apomixis).

Location: The IUCN clearly defines a location in terms of conservation status listing, *viz.* "The term 'location' defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat" (IUCN 2012). A 'sublocation' is part of a greater 'location' and often comprises discrete collection spots (e.g. along a road reserve at discontinuous intervals).

Population: The IUCN clearly defines a population, *viz.* "The term 'population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life forms, population size is measured as numbers of mature individuals only" (IUCN 2012). In the absence of genetic data, disjunct locality/location records (those that are separated by gaps of different ecological habitat, i.e. Regional Ecosystems where the taxon is absent and unable to easily disperse across the gap) are considered to represent subpopulations. A population or subpopulation may consist of one to many individuals (this by definition means that a taxon can be a single individual). Greatly disjunct subpopulations or groups of subpopulations are inferred (in the absence of genetic analysis) to harbour significant genetic variation due to historical patterns of genetic drift, and may equate to metapopulations (see next).

Metapopulation: One or many subpopulations (geographically contiguous or disjunct) that share genetic connectivity (i.e. unique gene combinations as often quantified by the distribution of haplotypes⁴). A taxon that has population groups in e.g. the Wet Tropics and Border Ranges, would be inferred to comprise several metapopulations unless genetic analysis proved otherwise. The ultimate aim of species conservation biology is to conserve the different subpopulations and genetic variation (total taxon variation and subpopulation variation). The greater the genetic variation within a taxon or subpopulation, then the greater potential exists for 'adaptation' in response to stochastic events (e.g. climate change). A taxon may comprise one to many metapopulations. The number of metapopulations may or may not be equivalent to the number of subpopulations and it should be noted that the two concepts are not the same in biology.

Genetic Variation: Total variation (100%) for a taxon is the variation that was present prior to the impact of the threatening processes (e.g. post European settlement in Australia and resultant land clearing/alteration; climate

variation causing death of individuals, subpopulations etc., e.g. widespread eucalypt deaths in droughts). This does not take into account ongoing genetic diversification that may result from factors such as mutation or introgression. Genetic variation can be measured in various ways (allozymes, discrete DNA regions of the genome) and the variation numerically quantified thus enabling comparison of individuals, subpopulations and metapopulations. Taxa that have been highly fragmented and severely impacted from recent human mediated actions may retain significant levels of variation, despite small population sizes (e.g. *Gossia gonoclada*), with the inference being that due to the slow mode of reproduction; incipient inbreeding and the accumulation of deleterious gene combinations has not yet had a chance to occur. In general, higher levels of fragmentation and destruction of subpopulations and individuals results in reduced genetic variation, especially in the longer term through attrition of unique individuals and gene combinations. It should also be noted that natural threatening processes (e.g. drought; or incipient inbreeding due to isolation and small population size) will result in the loss of genetic variation.

⁴A haplotype is a set of DNA variations, or polymorphisms, that tend to be inherited together. A haplotype can refer to a combination of alleles or to a set of single nucleotide polymorphisms (SNPs) found on the same chromosome (<https://www.genome.gov/genetics-glossary/haplotype>).

Threats

IDENTIFICATION OF KNOWN THREATS AND IMPACT OF THE THREATS

Identify any known threats to the species in the table below. Describe **past, current or future** threats, whether the threats are **actual or potential**, and the **type and level of impact** you believe each threat is having on the species.

Past threats	Impact of threat
Land clearing for agriculture	This has been the primary past threat to the species, with the majority of the potential habitat long cleared at all locations.
Land clearing for housing development	At the Kingaroy location, the two sublocalities that are immediately adjacent to areas of housing within the confines of the town of Kingaroy, are on similar substrates to the areas now covered in housing. It is likely that the sublocality at Kingaroy Heights would have been impacted by clearing for housing development prior to 2000.
Fragmentation into sublocations within each subpopulation	The species is known from five highly disjunct locations that are considered as discrete subpopulations or group of subpopulations. Each subpopulation may equate to a genetic metapopulation, although conservation genetic analysis remains to be undertaken for this species. These five locations are likely to be the result of natural processes of dispersal and fragmentation prior to European settlement. The process of disjunct metapopulation formation is considered to represent a natural process by which species journey towards eventual extinction (Levin 2000). Within each of the five locations, the species has a highly fragmented distribution with multiple sublocalities. This is due in part to natural factors where not all vinehicket/vineforest species are distributed continuously due to habitat variation and historical factors, in which case a greater number of subpopulations would need to be recognised. However, in the case of <i>Phebalium distans</i> , the habitat at each location has been highly fragmented due to land clearing (see above).
Current threats	Impact of threat
Land clearing for agriculture	At three of the five locations (Binjour and Mt Walla are the probable exceptions), small scale land clearing continues as part of fence-line maintenance or 'tidy up' clearing of small vegetation patches that may be classed as non-remnant under the Queensland <i>Vegetation Management Act</i> .
Land clearing for housing development	At the Kingaroy location, housing expansion is ongoing. It is unknown if this will directly affect the two sublocations of concern (Tessman's Road; Kingaroy Heights) as the South Burnett Regional Council is well aware of the presence of the species. In any instances where the species has not been specifically documented within the confines of the town of Kingaroy or any current adjacent housing estates, individuals could be cleared unknowingly.
Land clearing for infrastructure	The majority of sublocations at the Kingaroy, Mt Berryman and Proston locations are in road reserves. In the case of singletons or handfuls of individuals, these remain under direct threat from accidental road maintenance clearing.
Fire frequency and intensity	In the case of singletons or handfuls of individuals in road reserves or along fence lines, these remain under direct threat from fires, particularly where the natural habitat has been replaced by an anthropogenic grassland of introduced pastures

	species that can carry a heavy fuel load. More intense drought periods because of climate change could cause more intense and/ or frequent fires.
Reduction or degradation of habitat due to weed invasion	The habitat is currently under invasion from alien weeds, especially <i>Anredera cordifolia</i> (Madeira vine), <i>Asparagus africanus</i> (asparagus fern), <i>Lantana camara</i> (lantana) and <i>Megathyrsus maximus</i> (green panic). <i>Anredera cordifolia</i> and <i>Asparagus africanus</i> directly displace <i>Phebalium distans</i> in its habitat. <i>Lantana camara</i> and <i>Megathyrsus maximus</i> increase fuel loads around the habitat margins potentially causing hotter fires when they do occur.
Future threats – actual	Impact of threat
Land clearing for agriculture	At three of the five locations (Binjour and Mt Walla are the probable exceptions), small scale land clearing will continue as part of fence-line maintenance or 'tidy up' clearing of small vegetation patches that may be classed as non-remnant.
Land clearing for housing development	The town of Kingaroy continues to expand, so it is likely that the sublocations of <i>Phebalium distans</i> at the Kingaroy location will continue to be impacted.
Land clearing for infrastructure	All sublocations in road reserves at the Kingaroy, Mt Berryman and Proston locations will continue to be impacted by maintenance or expansion of infrastructure (roads, power lines, telecommunication lines).
Reduction or degradation of habitat due to weed invasion	Without control measures being undertaken (i.e. patch remnant weed maintenance), habitat quality and individual patch size will likely decrease for the entire population.
Future threats – potential	Impact of threat
Allee effects resulting from reduced genetic structure	It remains to be determined by a conservation genetics study as to whether <i>Phebalium distans</i> is already existing as a species with five subpopulations that are equivalent to the five locations and operate as discrete metapopulations. However, the degree of past and current subpopulation fragmentation due to land clearing is likely to result in long term genetic loss, although this may not be evident for decades or even centuries.
Extractive mining	Bauxite deposits at the Binjour location are proposed to be developed by Australian Bauxite (ABx) Limited http://australianbauxite.com.au/

*CONSERVATION ADVICE: THREAT ABATEMENT AND RECOVERY ACTIONS

Give an overview of recovery and threat abatement/mitigation actions that are underway, have been formally proposed or that you would like to recommend. Address all threats listed or state threats that lack conservation advice.

Current threats	Abatement or recovery action underway
Land clearing for agriculture	Apart from general regulations under the Queensland <i>Vegetation Management Act</i> (VMA), there are no specific actions or conservation advice available for clearing of land where <i>Phebalium distans</i> may occur. In many instances this species occurs on land that is non-remnant and/or exempt from land clearing under the VMA.
Land clearing for housing development	Nothing specifically known. This is dependent on competent survey for threatened species being undertaken.
Land clearing for infrastructure	South Burnett Regional Council is aware of the Kingaroy and Proston locations and has been consultative about management of the locations.
Fire frequency and intensity	There are currently no fire management actions specifically designed to avoid loss of <i>Phebalium distans</i> habitat or individuals.
Allee effects resulting from reduced genetic structure	Nothing underway.
Reduction or degradation of habitat due to weed invasion	Develop a weed management plan for each location, especially for the major stands (sublocations) for the species. Implement the weed management plan.
	Abatement or recovery action proposed
Land clearing for agriculture	Increase documentation of subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect.
Land clearing for housing development	Increase documentation of subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect.

Land clearing for infrastructure	Increase documentation of subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect.
Fire frequency and intensity	Increase documentation subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect. Develop a fire management action plan for the primary sublocations at each location.
Allee effects resulting from reduced genetic structure	A conservation genetics study is required for <i>Phebalium distans</i> to determine if the species occurs in subpopulations that equate to the five overall locations and are operating as metapopulations; whether genetic substructuring occurs within subpopulations; what is an effective population size based on genetic variation; and whether some genetic variation is already infrequent or at threat of extinction.
Future threats – actual	Abatement or recovery action underway
Land clearing for agriculture	Nothing underway that is specific to <i>Phebalium distans</i> .
Land clearing for housing development	Nothing underway that is specific to <i>Phebalium distans</i> .
Land clearing for infrastructure	Nothing underway that is specific to <i>Phebalium distans</i> .
Reduction or degradation of habitat due to weed invasion	Nothing underway that is specific to <i>Phebalium distans</i> overall. The Kingaroy Heights Environmental Park does have some ongoing weed management.
	Abatement or recovery action proposed
Land clearing for agriculture	Increase documentation of subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect.
Land clearing for housing development.	Increase documentation of subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect.
Land clearing for infrastructure	Increase documentation of subpopulation occurrence within each overall location. Raise local awareness with councils and landowners about this species. This can have a negative effect.
Reduction or degradation of habitat due to weed invasion	Develop a weed management plan for each location, especially for the major stands (sublocations) for the species. Implement the weed management plan.
Future threats – potential	Abatement or recovery action underway
Allee effects resulting from reduced genetic structure	Nothing underway that is specific to <i>Phebalium distans</i> .
Extractive mining	Nothing underway that is specific to <i>Phebalium distans</i> .
	Abatement or recovery action proposed
Genetic structure	A conservation genetics study is required for <i>Phebalium distans</i> to determine if the species occurs in subpopulations that equate to the five overall locations and are operating as metapopulations; whether genetic substructuring occurs within subpopulations; what is an effective population size based on genetic variation; and whether some genetic variation is already infrequent or at threat of extinction
Extractive mining	It needs to be determined if adequate survey for this species has been undertaken in the area where the proposed bauxite mining is to be undertaken.

IMPACT OF TRANSFERRING A THREATENED SPECIES TO NEAR THREATENED OR LEAST CONCERN

Omit this section and proceed to 'Listing class/category' if the nomination does not involve transferring a species from a threatened class to Least Concern or Near Threatened.

If the threatened species (Extinct, Extinct in the Wild, Critically Endangered, Endangered or Vulnerable) were moved to Least Concern or Near Threatened, what would be the impact if conservation actions for the species were reduced or ceased? Would the species decline at such a rate that it would be eligible for listing under a threatened class again in the foreseeable future? Provide evidence, expert advice and appropriate references to support your response.

Conservation action	Impact on the species if abatement/recovery action is reduced or ceases
Click or tap here to enter text.	Click or tap here to enter text.

Listing class/category

CURRENT LISTING CLASS/CATEGORY

[Please mark the boxes that apply by double clicking them with your mouse.]

In what class is the species currently listed under the **NC Act**?

<input type="checkbox"/> Extinct	<input type="checkbox"/> Extinct in the Wild	<input type="checkbox"/> Critically Endangered	<input checked="" type="checkbox"/> Endangered
<input type="checkbox"/> Vulnerable	<input type="checkbox"/> Near Threatened	<input type="checkbox"/> Least Concern	<input type="checkbox"/> Not listed

In what category is the species currently listed under the **EPBC Act**?

<input type="checkbox"/> Extinct	<input type="checkbox"/> Extinct in the Wild	<input checked="" type="checkbox"/> Critically Endangered	<input type="checkbox"/> Endangered
<input type="checkbox"/> Vulnerable	<input type="checkbox"/> Conservation Dependent		<input type="checkbox"/> Not listed

NOMINATED LISTING CLASS

To what class under the **NC Act** is the species being nominated?

<input type="checkbox"/> Extinct	<input type="checkbox"/> Extinct in the Wild	<input type="checkbox"/> Critically Endangered	<input checked="" type="checkbox"/> Endangered
<input type="checkbox"/> Vulnerable	<input type="checkbox"/> Near Threatened	<input type="checkbox"/> Least Concern	<input type="checkbox"/> Not listed

Nominating a species to transfer to another class

REASON FOR A NOMINATION TO TRANSFER TO ANOTHER CLASS

What is the reason for the nomination?

<input type="checkbox"/> Genuine change of status	<input type="checkbox"/> New knowledge	<input type="checkbox"/> Mistake	<input checked="" type="checkbox"/> Other
Taxonomic change - <input type="checkbox"/> 'split'	<input type="checkbox"/> newly described	<input type="checkbox"/> 'lumped'	<input type="checkbox"/> no longer valid

INITIAL LISTING

Describe the reasons for the species' initial listing under the NC Act and/or the EPBC Act and, if available, the criteria under which it was formerly considered eligible.

Phebalium distans was listed as Endangered under the NC Act as the category of Critically Endangered was not legislated in Queensland at the time of the last assessment. The criteria used at the time were **B1a,b(i-v),B2b(i-v),C2a(i)**.

It was listed as Critically Endangered under the EPBC Act on 24 December 2008 based on the available data at that time.

CHANGES IN SITUATION LEADING TO THE NOMINATION TO TRANSFER TO ANOTHER CLASS

Please complete (a), (b) OR (c) as appropriate to the nomination.

(a) Critically Endangered, Endangered, Vulnerable or Near Threatened

Describe the change in circumstances that make the species eligible for listing in a class other than Extinct and Extinct in the Wild.

The species has now been documented from an additional location and sublocations.

(b) Extinct in the Wild

A native species is eligible to be included in the Extinct in the Wild class if: (a) thorough searches have been conducted for the species; and (b) the species has not been seen in the wild over a period appropriate for its life cycle or form. The species may still survive in cultivation, captivity or as a naturalised population (or populations) well outside the historic range.

Describe how circumstances have changed that now make the species eligible for listing as Extinct in the Wild. Provide details of the last valid record or observation of the species in the wild.

n/a

(c) Extinct

A native species is eligible to be included in the Extinct class if there is no reasonable doubt that the last member of the species has died. A taxon is presumed Extinct when exhaustive surveys in the known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.

Describe how circumstances have changed that now make the species eligible for listing as Extinct. Provide details of the last valid record or observation of the species in the wild and captivity.

n/a

Eligibility against the criteria

Standard of scientific evidence and adequacy of survey

For this assessment is it considered that the survey of the species has been adequate and there is sufficient scientific evidence to support the listing outcome.

CRITERION A

Population size reduction (reduction in total numbers) measured over the longer of 10 years or 3 generations based on any of A1 to A4

	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)
A1	≥ 90%	≥ 70%	≥ 50%	≥ 20%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%	≥ 20%
A1	Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.			
A2	Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.			
A3	Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]			
A4	An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.			
		based on any of (a) to (e)		
			(a) direct observation [except A3]	
			(b) an index of abundance appropriate to the taxon	
			(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat	
			(d) actual or potential levels of exploitation	
			(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites	

Please identify whether the species meets A1, A2, A3 or A4. Include an explanation, supported by data and information, on how the species meets the criterion (A1 – A4). If available include information on:

- whether the population trend is increasing, decreasing or static
- estimated generation length and method used to estimate the generation length

You must provide a response. If there is no evidence to demonstrate a population size reduction, this **must be** stated.

The species probably meets Endangered A1c on the basis of the widespread reduction in available habitat over the last 120 years throughout the area of occupancy; however, this cannot be proven. Exact data are not available as it is not known how much of the cleared habitat was occupied by the species. *Phebalium distans* is not present in the majority of extant habitat patches (semi-evergreen vine thickets, araucarian microphyll vineforest) within the area of occurrence (cf. Forster *et al.* 1991), so was probably never extensively distributed in modern times. Where the species is extant, the stands are minute remnants surrounded by areas of cleared land that would have supported the suitable habitat; however, there are no precise estimates available on the percentage loss due to the naturally patchy distribution of the species. At most of the locations (1, 2, 4, 5), survey of other extant remnants (cf. sublocations) of this habitat type have not revealed additional stands of *P. distans*.

The species has a generation time of approximately 5 years, based on observation of cultivated individuals in gardens, although this may be much longer in wild subpopulations. Any large scale population reduction has occurred in the period before the last 15 years (three generations) (Bradshaw 2012; Reside *et al.* 2017), so there is insufficient information to apply this criterion.

CRITERION B:

Geographic distribution is precarious for either extent of occurrence AND/OR area of occupancy				
	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²	< 40,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²	< 4,000 km ²
AND at least 2 of the following 3 conditions for CR, EN or VU:				AND (b) for NT
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10	Not applicable
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals				≥ 10% within the longer of 10 years or 3 generations
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals				Not applicable

Please refer to the '[Guidelines for Using the IUCN Red List Categories and Criteria](#)' for assistance with interpreting the criterion particularly in relation to calculating 'extent of occurrence', 'area of occupancy' and understanding of the definition and use of 'severely fragmented', 'locations', 'continuing decline' and 'extreme fluctuations'.

Please identify whether the species meets B1 or B2. Except for Near Threatened species, include an explanation, supported by data and information, on how the species meets at least 2 of (a), (b) or (c). For Near Threatened species, include an explanation, supported by data and information, on how the species meets (b).

Please note that locations must be defined by a threat. A location is a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the species present.

If available, include information on:

- Whether there are smaller populations of the species within the total population and, if so, the degree of geographic separation between the smaller populations within the total population
- Any biological, geographic, human induced or other barriers enforcing separation

You must provide a response. If there is no evidence to demonstrate that the geographic distribution is precarious for either extent of occurrence AND/OR area of occupancy, this **must be** stated.

Phebalium distans meets the Endangered criterion **B2ab(i,ii,iii,iv,v)**. It has an estimated extent of occurrence of 6,094 km² and an area of occupancy of 68 km², and is known from five locations.

The locations are markedly disjunct, geographically. There is a continuing decline inferred and predicted because of the ongoing threats of small area land clearing and fence line maintenance, invasive weed encroachment, potentially more frequent and intense fires and potential loss of allee effects resulting from reduced genetic structure.

CRITERION C

Small population size and decline				
	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)
Estimated number of mature individuals	< 250	< 2,500	< 10,000	< 20,000
AND either (C1) or (C2) is true				AND (C1) is true
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in the future	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of (a) or (b):				
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000	Not applicable
(a) OR				
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%	Not applicable
(b) Extreme fluctuations in the number of mature individuals	Applicable	Applicable	Applicable	Not applicable

Please identify the estimated total number of mature individuals and either an answer to C1 or C2. Include an explanation, supported by data and information, on how the species meets the criteria. **Note:** If the estimated total number of mature individuals is unknown but presumed to be likely to be >10 000, you are not required to provide evidence in support of C1 or C2, just state that the number is likely to be >10 000.

You must provide a response. If there is no evidence to demonstrate small population size and decline this **must be stated**.

There are no accurate data available on the overall number of mature individuals within the population; however, it is easily in the multiple thousands. C1 does not apply, although some sublocations (these are not equivalent to a subpopulation as they are the result of fragmentation by land clearing) only consist of singletons or a handful of individuals in altered habitat (i.e. regrowth or isolated individuals or copses) and may not be still extant in 2019.

The primary stands or sublocations for this species are as follows:

Location 1 (Binjour): Binjour State Forest. This contains probably up to a thousand individuals with a small number of individuals in adjacent private land and a defunct road reserve.

Location 2 (Mt Walla). This contains perhaps up to 200 individuals.

Location 3 (Proston). The sublocation at Range Road contains several hundred individuals.

Location 4 (Kingaroy). The sublocations at Tessman's Road and Kingaroy Heights Environmental Park contain probably less than 400 individuals between them.

Location 5 (Mt Berryman). The sublocation at the Welk Remnant contains c. 100 individuals. Forster (2003) estimated c. 200 individuals at the Dick Scanlon scrub; however, it is not known what is still there after an intervening 28 years from the original observations.

An optimistic estimate of an overall number would be no more than 3000 mature individuals; however, this is not based on rigorous field survey data at most localities and there are potentially more. At sublocations that are not singletons or a handful of individuals, the only site with a reasonably accurate count is at Tessman's Road (Location 4) where 230–250 adult individuals have been recorded (surveys in 2007 and subsequent). As the species suckers, it is difficult to derive a definitive number of genetically discrete individuals.

Phelipium distans meets the Vulnerable category under criterion **C2a(i)** because of <1000 individuals in each subpopulation and the continuing decline inferred and predicted because of the ongoing threats of small area land clearing and fence line maintenance, invasive weed encroachment, potentially more frequent and intense fires and potential loss of allee effects resulting from reduced genetic structure.

CRITERION D:

Very small population				
	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)
D1. Number of mature individuals	< 50	< 250	D1. < 1,000	D1. < 3,000
OR				
D2. [Only applies to the VU and NT categories] Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	Not applicable	Not applicable	D2. Typically: AOO < 20 km ² or number of locations ≤ 5	D2. Typically: AOO < 40 km ² or number of locations ≤ 10

Please identify the estimated total number of mature individuals and evidence of how the figure was derived.

For Criterion D2, please provide information on the species' area of occupancy, number of locations and plausible threats.

You must provide a response. If there is no evidence to demonstrate eligibility, this **must be** stated.

Phebalium distans meets the category of Vulnerable under criterion D2. An optimistic estimate of an overall number would be no more than 3000 mature individuals (D1); however, this is not based on rigorous field survey data at most localities. At sublocations that are not singletons or a handful of individuals, the only site with a reasonably accurate count is at Tessman's Road (Location 4) where 230–250 adult individuals have been recorded (surveys in 2007 and subsequent; Forster & Fechner 2007). As the species suckers, it is difficult to derive a definitive number of genetically discrete individuals. The species is known from five locations and has an area of occupancy of 68 km² (D2).

CRITERION E:

Quantitative Analysis				
	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% within 100 years	≥ 5% within 100 years

Please identify the probability of extinction and evidence of how the analysis was undertaken.

You must provide a response. If there has been no quantitative analysis undertaken this **must be** stated.

No quantitative analysis undertaken.

SUMMARY OF CRITERIA UNDER WHICH THE SPECIES IS ELIGIBLE FOR LISTING AS: CR, EN, V, NT, EW or EX

Please mark the criteria and sub-criteria that apply.

- Criterion A
- A1 (specify at least one of the following) a) b) c) d) e); **AND/OR**
- A2 (specify at least one of the following) a) b) c) d) e); **AND/OR**
- A3 (specify at least one of the following) a) b) c) d) e); **AND/OR**
- A4 (specify at least one of the following) a) b) c) d) e)
- Criterion B
Endangered
- B1 (specify at least two of the following) a) b) c); **AND/OR**
- B2 (specify at least two of the following, other than NT) a) b) c)
- Criterion C
Vulnerable
- estimated number of mature individuals **AND**
- C1 **OR**

C2 a (i) **OR** a (ii) **OR**
C2 b)

Criterion D
Vulnerable

D1 **OR** D2

Criterion E

EX

EW

LC

Species nominated to change from a higher conservation class to Least Concern.

No above boxes apply.

Other Considerations

*INDIGENOUS CULTURAL SIGNIFICANCE

Is the species known to have cultural significance for Indigenous groups within Australia? If so, to which groups? Provide information on the nature of this significance if publicly available.

Not known

FURTHER STUDIES

Identify relevant studies or management documentation that might relate to the species (e.g. research projects, national park management plans, recovery plans, conservation plans, threat abatement plans, etc.).

The species is being included in a PhD project on *Phebalium* systematics being undertaken at the University of Armidale. This project will be on *Phebalium* phylogenetics, but is unlikely to inform on the conservation genetics of the species.

ADDITIONAL COMMENTS/INFORMATION

Please include any additional comments or information on the species such as survey or monitoring information, and maps that would assist with the consideration of the nomination.

Phebalium distans has been grown from seed in cultivation by amateur native plant enthusiasts. It does not require any specialist treatment for seed germination or for growth of the plant.

IMAGES OF THE SPECIES

Please include or attach images of the species if available, and indicate if you are in a position to authorise their use.

Google *Phebalium distans*. There are numerous online images available of the species.

Reviewers and references

REVIEWER(S)

Has this nomination been peer-reviewed? Have relevant experts been consulted on this nomination? If so, please include their names, current professional positions and contact details.

Dr Gordon Guymer, Director Queensland Herbarium.

REFERENCE LIST

Please list key references/documentation you have referred to in your nomination.

Bradshaw, C.J.A. (2012). Little left to lose: deforestation and forest degradation in Australia since European colonization. *Journal of Plant Ecology* 5: 109–120.

Cain, M.L., Milligan, B.G. & Strand, A.E. (2000). Long-distance dispersal in plant populations. *American Journal of Botany* 87: 1217–1227.

Forster, P.I. (2003). *Phebalium distans* P.I.Forst. (Rutaceae), a new and endangered species from south-eastern Queensland, and reinstatement of *P. longifolium* S.T.Blake. *Austrobaileya* 6: 437–444.

Forster, P.I. & Fechner, N. (2007). *Survey of Tessman's Road, Kingaroy Shire for Threatened Flora and Vegetation*. Unpublished report to Kingaroy Shire Council. Queensland Herbarium, Environmental Protection Agency: Brisbane.

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Nominator's Details

Note: Your details are subject to the provisions of the *Privacy Act 1988* and will not be divulged to third parties, except for state and territory governments and scientific committees that have agreed to collaborate on national threatened species assessments using a CAM. If there are multiple nominators please include details below for all nominators.

TITLE (e.g. Mr/Mrs/Dr/Professor/etc.)

Dr

FULL NAME

Paul Forster

ORGANISATION OR COMPANY NAME (IF APPLICABLE)

Queensland Herbarium, Department of Environment and Science

CONTACT DETAILS

DECLARATION

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

Signed: [Click here to enter text.](#)

Date: [Click or tap to enter a date.](#)

** If submitting by email, please attach an electronic signature*

Lodging your nomination

Completed nominations may be lodged either:

1. by email in Microsoft Word format to: SpeciesTechnical.Committee@des.qld.gov.au
2. by mail to: The Chair
Species Technical Committee
Queensland Herbarium
Mount Coot-tha Rd
Toowong QLD 4066

*** If submitting by mail, you must include an electronic copy on a memory stick.**

Recommended citation:

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