

Internal use only	
Reference Number	/

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:
 - a. whether it is actual or potential
 - b. how and where it impacts on this species
 - c. what its effect has been so far (is the threat known or suspected?, does it only affect certain populations?) Present supporting information/research).
 - d. 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).
 - e. 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)

Croton mamillatus P.I.Forst.

COMMON NAME(S)

Bahrs Scrub croton

TAXONOMY

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

P.I.Forst. (2003)

Forster, P. I. (2003). A taxonomic revision of *Croton* L. (Euphorbiaceae) in Australia. *Austrobaileya*, 6(3), 349-436.

Malpighiales: Euphorbiaceae

*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.

[Click or tap here to enter text.](#)

*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?

Short description

Perennial, evergreen shrub to 4 metres with a distinctly spindly habit (Forster 2003). Leaves are discolorous and hairy, 30-70 mm long and 10-32 mm wide. Inflorescences to 35 mm with separate male and female flowers to 3 mm and 3.5 mm wide, respectively. Fruits are mammillate, 9-10 mm long and 10 mm wide with dense, star-shaped hairs.

Full description

As in Forster (2003):

"Shrub to 4 m high, monoecious, evergreen, perennial. Indumentum uncoloured to silver. Branchlets ± rounded, with dense peltate trichomes, glabrescent. Stipules shortly lanceolate, c. 0.5 mm long and 0.3 mm wide, entire and with dense peltate trichomes. Leaves alternate, petiolate, discolorous; petioles 3-10 mm long, 1.2-1.5 mm wide, with dense peltate trichomes; lamina elliptic to oblanceolate, 30-70 mm long, 10-32 mm wide, venation penninerved with 12-14 lateral veins per side of midrib, very indistinct, tertiary reticulate veins obscure; upper surface matt dark-green, more glossy when fresh, venation weakly visible, glabrous; lower surface silver-white, lateral veins indistinct, with dense peltate trichomes and peltate scales, neither scabrid nor velutinous; margins ± entire, or very weakly denticulate with barely discernible foliar glands; tip acute to acuminate; base rounded to retuse; extrafloral nectaries absent or if present, then 2, circular, ± sessile, c. 0.3 mm long and 0.2 mm wide, visible above and below. Inflorescence up to 35 mm long, unbranched, androgynous (rarely with male and female flowers mixed in same glomerule), pedunculate up to 12 mm; axis with dense peltate trichomes; bracts shortly lanceolate, 0.5-0.7 mm long, c. 0.3 mm wide, with dense peltate trichomes. Male flowers c. 2 mm long and 3 mm diameter, held singly, spaced up to 1 mm apart, usually

towards top of inflorescence; pedicels 2.5-3 mm long, 0.4-0.5 mm wide, with dense peltate trichomes; sepals valvate, 5, lanceolate-ovate to ovate, 1.8-2.2 mm long, 1.4-1.5 mm wide, with dense peltate trichomes; petals 5, obovate, 1.5-2 mm long, 0.6-0.7 mm wide, lanate in upper half; stamens 9 or 10, filaments filiform, 2-2.2 mm long, c. 0.1 mm wide, with dense simple trichomes at base, anthers oblong, 0.6-0.8 mm long, 0.3-0.4 mm wide. Female flowers 3-3.2 mm long, 2.8-3.5 mm diameter, usually held singly and spaced up to 3 mm apart; pedicels 3-4 mm long, 0.8-1 mm diameter, with dense peltate trichomes; sepals valvate, 5, ovate to obovate, 2.5-3 mm long, 1.8-2 mm wide, with dense peltate trichomes, lanate; petals absent; styles 3, linear, 1.2-1.5 mm long, multifid, twice divided for 1-1.2 mm long, connate at base for c. 0.2 mm, glabrous; ovary 3-locular, 1.8-2 mm long, 2.5-2.7 mm diameter, with dense stalked stellate trichomes. Fruits trilobate, weakly depressed-globose, 9-10 mm long, 10-10.5 mm diameter, with dense stellate trichomes on fleshy mamillate protuberances to 1 mm long and 0.5 mm diameter that are topped by a stellate trichome. Seeds oblong, 6-7 mm long, c. 3.5 mm wide, 2.5-3 mm thick, grey-brown, ventral surface bifacial, dorsal surface rounded, micropylar ridge 4.5-5 mm long; caruncle oblong-rectangular, 1.4-1.5 mm long, 0.8-1 mm wide, cream".

Croton is the most speciose genus in the Euphorbiaceae family and 29 of these species are native to Australia (Forster 2003). *Croton mamillatus* is closely related to *C. lucens*, *C. insularis*, *C. phebaloides* and *C. stigmatosus* in the section *Insulares* (van Ee et al. 2015). *Croton mamillatus* is similar to *C. insularis* and *C. stigmatosus*, but is distinguished by its spindly habit and highly mamillate fruit. *Croton capitatus*-york and *C. stigmatosus* have less-developed mamillate fruit.

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.

Croton mamillatus is known from a restricted and disjunct distribution in the Caboolture, Beenleigh and Boonah localities, near Brisbane in the South Eastern Queensland bioregion (Department of the Environment 2012). The Extent of occurrence (EOO) and Area of occupancy (AOO) are calculated as 2730 km² and 16 km², respectively, using expert verified herbarium specimen records and a 2 km x 2 km grid cell (IUCN 2019; Queensland Herbarium 2020).

Croton mamillatus was first collected from the Mt French area in 1984, with subsequent collections in the Bahrs Scrub area from 2000-2003 (Queensland Herbarium 2020). An additional subpopulation was recorded in 2006 near Caboolture (Campbells Pocket Road; QH 2020) and there are two recent, unvouchered records from Bahrs Hill (P. Forster, G. Leiper, pers. comm. 2020). *Croton mamillatus* is currently known from three subpopulations; at Bahrs Scrub (Bahrs Hill, Belivah and Shenandoah/Ponderosa), Mount French (Moogerah Peaks NP and private tenure) and Caboolture. Subpopulations have been delineated based on the limited dispersal capacity of the species (see Biology and Ecology) and the distance between occurrences. All subpopulations are separated by >60 km.

The number of mature individuals of *C. mamillatus* is estimated to be <150 individuals. Specimen records indicate *C. mamillatus* is very rare where it occurs (QH 2020). All subpopulations have <40 mature individuals, and there are <10 mature individuals at Caboolture (QH 2020). Areas around Mt French and Beenleigh have been extensively surveyed in past 20 years (P. Forster, pers. comm. 2020). While it is unlikely that there are substantially-sized additional subpopulations, two recent records highlight the possibility for small occurrences to be found in vegetation remnants.

At Belivah and Shenandoah/Ponderosa, *C. mamillatus* occurs on freehold tenure, in vegetation mapped as remnant and non-remnant, respectively (Figure 3). At Bahrs Hill, there are two recently located stands of *C. mamillatus* (north of Belivah; Figure 3) that occur in remnant vegetation. This land has been recently acquired by the Logan City Council and proposed as conservation estate (G. Leiper and Paul Forster, pers. comm. 2020). Three of the individuals at this site were only found in March 2020, exemplifying the extremely scattered and rare distribution of the species, while highlighting the potential for additional individuals to be found in the future. At Caboolture, *C. mamillatus* occurs only on freehold tenure and this is mapped as remnant vegetation (Figure 4).

At Mount French, *C. mamillatus* occurs in one subpopulation mapped as remnant vegetation, which is protected in Moogerah Peaks NP. However, these records occur on either side of Mt French Road (Figure 2). The second subpopulation at Mt French occurs on freehold land that is mapped as non-remnant vegetation and is also adjacent to a road (RP158068). The species occurs in regional ecosystems (REs) 12.8.13 and 12.8.3, both of which have undergone extensive clearing for agriculture (QG 2019).

All subpopulations have likely undergone past decline due to land clearing associated with agriculture and urban development (Forster 2003). This is evident in the distribution of the species, which persists in small remnants that are surrounded by cleared land, separated by at least 60 km. Many *Croton* species do have narrow ranges (Forster 2003) and it is possible the species was always naturally restricted in isolated patches. However, the extensive clearing for agricultural and urban development between remnant populations, which continues to encroach on the remaining subpopulations, strongly indicates the species has undergone past decline throughout its distribution.

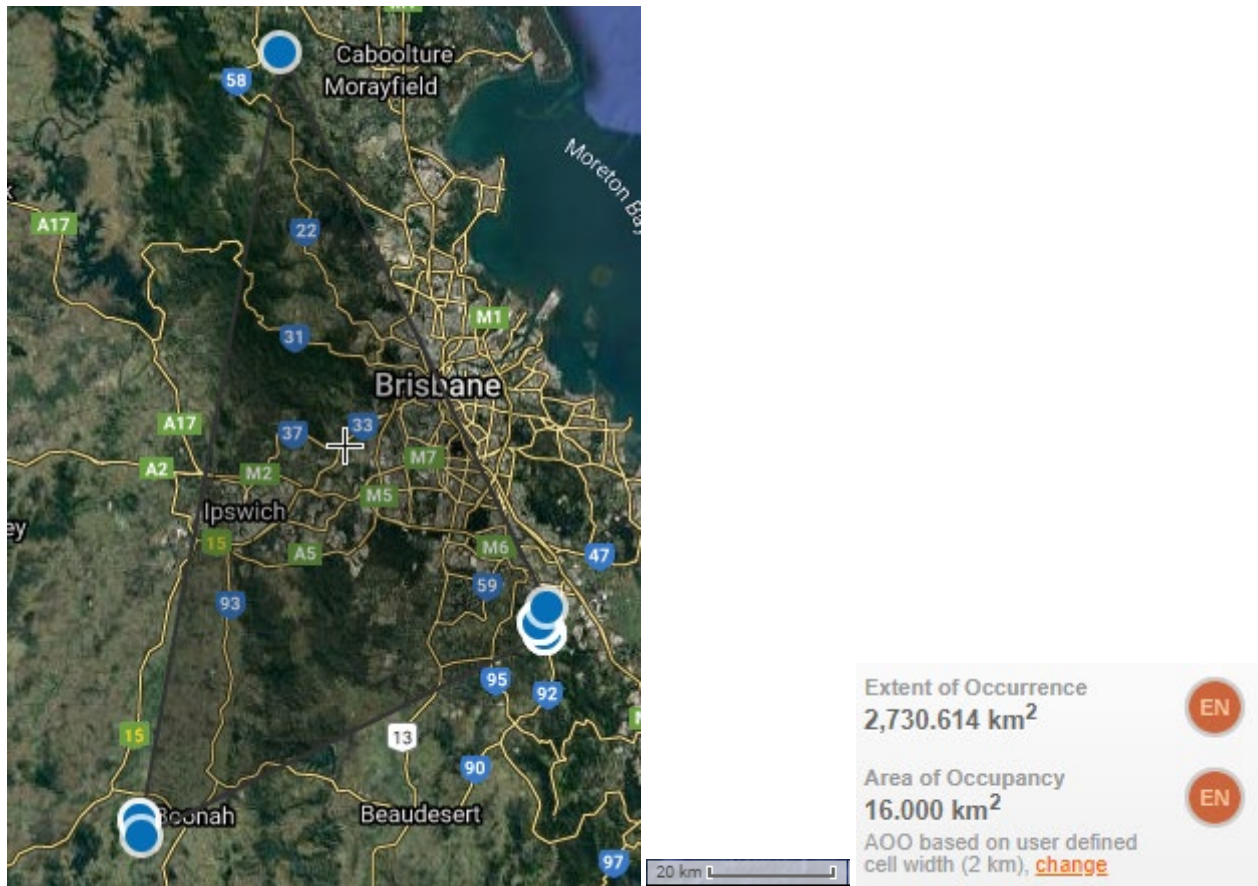


Figure 1. *Croton mamillatus* is known from a restricted and disjunct distribution in the Caboolture, Beenleigh and Boonah localities, near Brisbane in the South Eastern Queensland bioregion (Department of the Environment 2012). The Extent of occurrence (EOO) and Area of occupancy (AOO) are calculated as 2730 km² and 16 km², respectively, using expert verified herbarium specimen records and a 2 km x 2 km grid cell (IUCN 2019; Queensland Herbarium 2020). Map generated on GeoCat (Bachman et al. 2011).



Figure 2. The subpopulation of *Croton mamillatus* at Mt French occurs in National Park that is managed for conservation at the northern site, but on freehold land that is not mapped as remnant vegetation on the southern site (QG 2020).

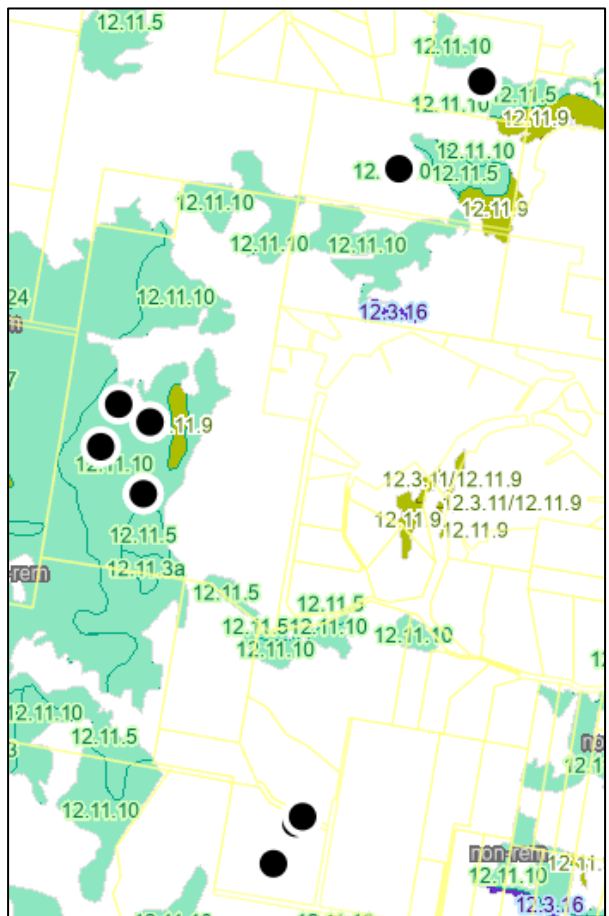


Figure 3. The subpopulation of *Croton mamillatus* at Bahrs Scrub near Beenleigh. At Bahrs Hill (north of Belvah), the species occurs in council land that has been acquired for conservation estate (not yet gazetted). At Belvah (middle), the species occurs in remnant vegetation on freehold tenure. In the south (Shenandoah/Ponderosa), the species occurs in non-remnant vegetation freehold tenure (QG 2020).

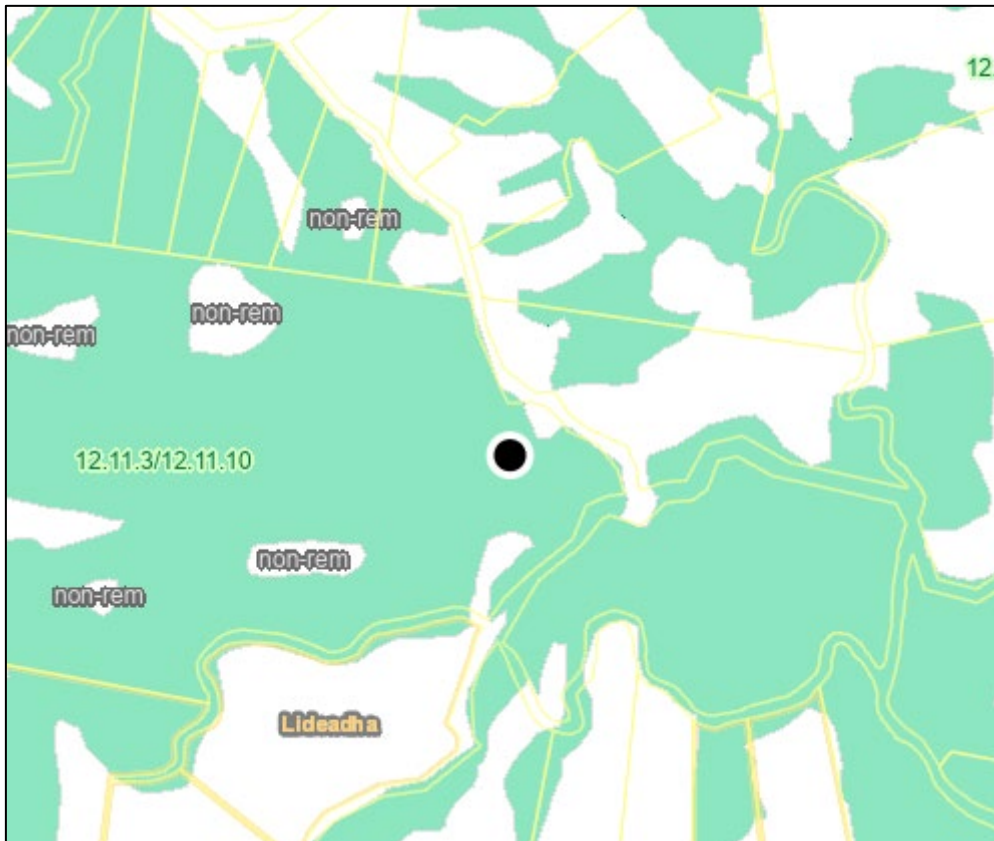


Figure 4. Collection records of *C. mamillatus* at the Caboolture subpopulation only occur on freehold tenure, although in vegetation that is mapped as remnant (green). There is considerable area of 'non-remnant' (white) vegetation in the area, indicating the habitat is fragmented and there is a potential threat of future land clearing associated with urbanisation. Map generated on Queensland Globe.

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

Croton mamillatus grows as an understory shrub in remnants of dry microphyll or notophyll vineforest on red rocky soils derived from chert, often on hillsides near rainforest margins (QH 2020). At Mt French, *C. mamillatus* occurs in regional ecosystems (REs) mapped as 12.8.13 and 12.8.3. At Beenleigh, the species occurs in REs 12.11.10, 12.11.3, 12.11.24 and at Caboolture in REs 12.11.3 and 12.11.10 (QG 2019). Associated species include *Araucaria cunninghamii*, *Acronychia pauciflora*, *Gossia bidwillii*, *Dissiliaria baloghioides* and *Rhodamnia argentea*. Flowers and fruit have been observed throughout the year, particularly Spring and Summer (QH 2020). At the Bahrs Hill site, one stand of *C. mamillatus* (3 individuals) occur in very close proximity to the threatened *Macadamia integrifolia* and *Fontainea venosa* (P. Forster, pers. comm. 2020).

The biology and ecology of *C. mamillatus* and the genus generally, is poorly-documented (Forster 2003). The flowers are probably pollinated by small insects including bees and ants, offering a reward of pollen and nectar (Forster 2003). The fruit of *C. mamillatus* are capsules that dehisce when mature (Forster 2003). The seeds have a fleshy caruncle that may encourage dispersal by ants (Forster 2003). Long-range dispersal is unlikely given the seed falls under the parent plant and that dispersal is by small insects. This (possibly) poor dispersal capacity may be reflected in the patchy distribution of the species across its range.

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 (pre-VMA)	There has been extensive land clearing throughout the distribution of the species. Urbanisation has been the dominant driver of land clearing in the vicinity of Brisbane, while agriculture has driven land clearing in the Boonah district. Land clearing for dairy farms was extensive around Ormeau and Beenleigh after 1900 (G. Leiper, pers. comm. 2020). Specific impacts on the species are not known, however, given the extensive scale of development throughout the species habitat, it is very possible additional occurrences of <i>C. mamillatus</i> have been cleared in the past.
Current threats	Impact of threat
Land clearing (post-VMA)	Only two subpopulations are protected in conservation estate (Mt French NP and Bahrs Hill). The remaining five subpopulations occur on freehold land and two of these occur in vegetation mapped as 'non-remnant', probably in uncleared vegetation patches that are too small to be mapped as 'remnant' and therefore not afforded protection under the <i>Vegetation Management Act 1999</i> (see Figure 2, 3, 4, P. Forster, pers. comm. 2020). While several sites occur in 'remnant' vegetation that is protected to some extent under the VMA, clearing can still occur under circumstances such as urban development with approvals. Subdivision for urban development is a pertinent threat to the central subpopulation at Bahrs Scrub, which is likely to be subdivided in the near future (G. Leiper, P. Forster, pers. comm. 2020).
Infrastructure maintenance	The subpopulations at Mt French and Caboolture occur near roadsides (Figure 2, 3) and are therefore vulnerable to road maintenance activities such as road widening, re-alignment, slashing and herbicide application.
Invasive weeds	<i>Croton mamillatus</i> occurs in small, dry rainforest fragments that are often degraded and heavily invaded with weeds (P Forster, G Leiper pers.comm. 2020). The regional ecosystems the species occurs within are documented to be vulnerable to invasion by weeds (Queensland Herbarium 2021). The dominant weeds at Bahrs Scrub are coral berry (<i>Rivina humilis</i>), lantana (<i>Lantana camara</i> and <i>L. montevidensis</i>) and green panic grass (<i>Megathyrsus maximus</i> ; G. Leiper, pers. comm. 2020). Invasive weeds can increase competition and limit recruitment opportunities for native species. Invasion of dry rainforest fragments by lantana can alter fuel loads and allow fire to carry through these fire-sensitive ecosystems, fundamentally altering the structure and composition of vegetation communities (Fensham 1995; Queensland Herbarium 2021).
Inappropriate fire regimes	<i>Croton mamillatus</i> occurs in dry rainforest, which is considered to be a 'fire-sensitive' vegetation type (Fensham 1995; Queensland Herbarium 2021). Although the specific fire ecology of the species has not been documented, the vegetation type is considered to be fire-sensitive and depends on fire exclusion for protection (Queensland Herbarium 2021). Given the subpopulations occur in small, isolated vegetation patches that are surrounded by cleared land, they are increasingly vulnerable to burn incursion due to edge effects (Queensland Herbarium 2021). Invasive weeds are documented to occur in these highly disturbed ecosystems, which are known to increase fuel loads and thus the potential for wildfires. The risk of burn incursion will increase under climate change, as harsher fire weather is predicted in the region with <i>high confidence</i> (Dowdy et al. 2015).
Future threats – actual	Impact of threat
Climate change	Within the species' distribution, the climate is projected to become hotter and drier, with more variable rainfall patterns and an increase in harsh fire weather (Dowdy et al. 2015). This may drive changes in fire regimes, with subsequent impacts on the capacity of the subpopulations to sustain themselves (see Inappropriate Fire Regimes). More variable rainfall and longer periods spend in drought can also impact recruitment.
Future threats – potential	Impact of threat
Genetic effects	The conservation genetics of <i>C. mamillatus</i> remains unstudied. The species exists in small, isolated habitat patches with a limited number of mature individuals.

	A natural progression of past isolation and restricted associated with refugial endemics is the loss of genetic diversity over time (Cartwright 2019; Levin 2000). Further investigation into the magnitude of this potential threat is required.
Stochastic events	<i>Croton mamillatus</i> has a very restricted distribution and is therefore vulnerable to stochastic events such as repeated wildfires and prolonged drought. This is exacerbated by projected climate changes in the species distribution - the climate is predicted to become hotter and drier, with more variable rainfall patterns and an increase in harsh fire weather (Dowdy <i>et al.</i> 2015).

***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 (post-VMA)	<p>The species is partially protected in conservation estate at Moogerah Peaks NP. Logan City Council has recently acquired the land at Bahrs Hill (north of Belivah), for the purposes of conservation (although not official at time of nomination).</p> <p>The majority of other sites are not protected from land clearing associated with urban development as the individuals occur in very small patches that are not mapped as 'remnant' vegetation.</p>
Invasive weeds	No recovery actions currently address this threat.
Inappropriate fire regimes	No recovery actions currently address this threat.
	Abatement or recovery action proposed
Land clearing (post-VMA)	<p>Protect subpopulations on private land via acquisition for conservation estate, or establishing conservation agreements with the landholders. Formal protection of the subpopulation at Bahrs Hill will have co-benefits for the co-occurring threatened species <i>Macadamia integrifolia</i> and <i>Fontainea venosa</i> (P. Forster, pers. comm. 2020).</p> <p>Undertake additional targeted surveys in suitable habitat to locate additional individuals or subpopulations, so they can be incorporated into conservation planning and protected from development.</p> <p>Undertake extension activities to ensure all landholders are aware of the species' presence and their obligations to protect it.</p>
Infrastructure maintenance	<p>Ensure all contractors undertaking infrastructure maintenance are aware of the species' presence and their obligations to protect it.</p> <p>Incorporate the species into management plans for the roadside subpopulations at Mt French and Caboolture, to protect against incidental or accidental destruction, or indirect impacts of infrastructure maintenance.</p> <p>Establish an <i>ex situ</i> subpopulation of the species that includes genetic representatives from subpopulations vulnerable to infrastructure maintenance activities.</p>
Invasive weeds	<p>Partner with, or support the Traditional Custodians to lead the recovery actions for this species to address the threat of invasive weeds.</p> <p>Implement localised weed control around populations at subpopulations to minimise competition and possibility of burn incursion. [Invasive weed control at Bahrs Hill will have co-benefits for the co-occurring threatened species <i>Macadamia integrifolia</i> and <i>Fontainea venosa</i> (P. Forster, pers. comm. 2020).]</p> <p>Undertake research and time-series monitoring to quantify the impact of invasive weeds on the population demographics of <i>C. mamillatus</i> at all subpopulations. Identify a suitable weed management strategy for this species and determine the viability of implementing this management strategy. Monitor the impacts on the health of the population, including mature individuals and recruitment.</p> <p>Undertake additional targeted surveys in suitable habitat to locate additional individuals or subpopulations, so they can be incorporated into conservation planning.</p>

Inappropriate fire regimes	<p>Partner with, or support the Traditional Custodians to lead the recovery actions for this species to address the threat of inappropriate fire regimes.</p> <p>Undertake research to better understand the fire ecology of the species, including the capacity for the species to resprout and regeneration times. Investigate the interactions of fires regimes with invasive weeds, climate change and land clearing.</p> <p>Incorporate <i>C. mamillatus</i> into the management plans where it occurs in conservation estate.</p> <p>Undertake research and time-series monitoring to quantify the impact of prevailing fire regimes on the population demographics of <i>C. mamillatus</i> at all subpopulations. Identify a suitable fire regime for this species and determine the viability of implementing this management strategy. Undertake management to reduce the frequency and intensity of wildfires within the distribution of the species. Monitor the impacts on the health of the population, including mature individuals and recruitment.</p> <p>Click or tap here to enter text. Undertake additional targeted surveys in suitable habitat to locate additional individuals or subpopulations, so they can be incorporated into conservation planning.</p> <p>Manage the interactions between climate change and increased fire frequency, by adapting fire management approaches as necessary (ecological burns to reduce fuel loads on a semi-regular basis).</p> <p>Establish an <i>ex situ</i> subpopulation of the species that represents the maximum range of genetic diversity possible</p>
Future threats – actual	Abatement or recovery action underway
Climate change	No recovery actions currently address this threat.
Future threats – actual	Abatement or recovery action proposed
Climate change	<p>Partner with, or support the Traditional Custodians to lead the recovery actions for this species to address the threat of climate change.</p> <p>Undertake time-series monitoring to quantify the population demographics of the species (number of mature individuals at each subpopulation) and trends over time.</p> <p>Undertake research to better understand the species biology and ecology, including conservation genetics, fire ecology, reproductive strategies, germination cues and pollinator relationships, with a specific focus on the interactions with climate change.</p> <p>Establish an <i>ex situ</i> population via seed banking or propagation for conservation and research, ensuring the maximum range of genetic diversity possible is represented.</p>
Future threats – potential	Abatement or recovery action underway
Genetic effects	No recovery actions currently address this threat.
Stochastic events	No recovery actions currently address this threat.
	Abatement or recovery action proposed
Genetic effects	<p>Partner with, or support the Traditional Custodians to lead the recovery actions for this species to address the potential threat of genetic effects.</p> <p>Undertake targeted surveys to document additional occurrences of the species. Undertake comprehensive population surveys to precisely quantify population parameters (including number of mature individuals at each site and demographic structure).</p> <p>Undertake research to better understand the biology and ecology of the species to underpin conservation management. This should include conservation genetics, reproductive biology, fire/ disturbance ecology, habitat requirements and threat interactions with climate change.</p>

	Establish an <i>ex situ</i> population via seed banking or propagation for conservation and research, ensuring the maximum range of genetic diversity possible is represented.
Stochastic events	<p>Partner with, or support the Traditional Custodians to lead the recovery actions for this species to address the potential threat of stochastic events.</p> <p>Undertake targeted surveys to document additional occurrences of the species. Undertake comprehensive population surveys to precisely quantify population parameters (including number of mature individuals at each site and demographic structure).</p> <p>Undertake research to better understand the biology and ecology of the species to underpin conservation management. This should include conservation genetics, reproductive biology, fire/ disturbance ecology, habitat requirements and threat interactions with climate change.</p> <p>Establish an <i>ex situ</i> population via seed banking or propagation for conservation and research, ensuring the maximum range of genetic diversity possible is represented.</p>

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 type="checkbox"/> Critically Endangered | <input type="checkbox"/> Endangered |
| <input type="checkbox"/> Vulnerable | <input type="checkbox"/> Conservation Dependent | | <input checked="" 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 checked="" type="checkbox"/> Critically Endangered | <input 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.

The species was nominated as Endangered under the NC Act in 2009 due to its narrow distribution, restricted habitat type and small local populations. It was found to be eligible under criteria A1c, B2ab(ii-v) and C2a(i).

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 meets the IUCN criteria for listing as CE.

(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.

Click or tap here to enter text.

(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 for the species in the wild and captivity.

Click or tap here to enter text.

STANDARD OF SCIENTIFIC EVIDENCE AND ADEQUACY OF SURVEY

Please complete as appropriate to the nomination

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

Eligibility against the criteria

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.

***Croton mamillatus* is Data Deficient under Criterion A.**

Past decline has probably occurred due to land clearing, although the magnitude of this decline is not known.

Future decline is projected given the range of threats, especially land clearing on private land.

The generation of the species is not known.

Population decline relative to generation length cannot be estimated.

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.

***Croton mamillatus* meets the threshold for Endangered under the criteria B1+2ab(i-v).**

The EOO of *C. mamillatus* is 2730 km², and the AOO is 16 km². These parameters are unlikely to increase substantially (and not beyond the thresholds for Endangered) with additional survey given the species' distribution has been relatively well botanised.

The species is considered to be **severely fragmented** given its limited dispersal capacity and that all subpopulations occur in small, isolated patches of remnant vegetation that are surrounded by land use change, predominantly urbanisation.

Continuing decline has been **projected** for the species based on the threat of current land management (land clearing risk), and habitat degradation associated with invasive weeds and inappropriate fire regimes. When assessed against these threats, the species occurs at **5 locations**. These locations were delineated based on the scale of subpopulations and land tenure. The Caboolture subpopulation is comprised of a one location, given there is only one occurrence of the species in this area, and the threats of land clearing, invasive weeds and fire management will impact all individuals simultaneously. The Mt French subpopulation comprises two locations, as some plants occur on National Park, while others occur on freehold land. Regulation of land clearing, and management of invasive weeds and fire will occur at the land tenure scale for this subpopulation (NP/freehold). Similarly, at Bahrs Scrub, there are two locations. Some individuals occur on land gazetted as a council reserve (for conservation), while others occur on freehold land (in a mixture of remnant and non-remnant vegetation), equating to two locations.

Croton mamillatus is a perennial shrub and extreme fluctuations are unlikely.

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				
(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**.

***Croton mamillatus* meets the threshold for Critically Endangered under the criteria C2a(i).**

The population size of *C. mamillatus* is estimated as <150 mature individuals.

Continuing decline has been **projected** for the species based on the threat of current land management (land clearing risk), and habitat degradation associated with invasive weeds and inappropriate fire regimes.

All known subpopulations of *C. mamillatus* have <40 mature individuals (QH 2020). The proportion of individuals in each subpopulation is not precisely known.

Croton mammilatus is a perennial shrub and extreme fluctuations are unlikely.

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.

***Croton mamillatus* meets the threshold for Vulnerable under Criteria D1.**

The population of *C. mamillatus* is estimated at <150 mature individuals.

The AOO of the species is 16.0 km² and is threatened by land clearing, inappropriate fire regimes and invasive weeds. When assessed against these threats, the species occurs at **5 locations**. These locations were delineated based on the scale of subpopulations and land tenure. The Caboolture subpopulation is comprised of a one location, given there is only one occurrence of the species in this area, and the threats of land clearing, invasive weeds and fire management will impact all individuals simultaneously. The Mt French subpopulation comprises two locations, as some plants occur on National Park, while others occur on freehold land. Regulation of land clearing, and management of invasive weeds and fire will occur at the land tenure scale for this subpopulation (NP/freehold). Similarly, at Bahrs Scrub, there are two locations. Some individuals occur on land gazetted as a council reserve (for conservation), while others occur on freehold land (in a mixture of remnant and non-remnant vegetation), equating to two locations.

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.

Data Deficient.

No quantitative analysis has been 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.

<input checked="" type="checkbox"/> Criterion A Data deficient	<input type="checkbox"/> A1 (specify at least one of the following) <input type="checkbox"/> a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/> d) <input type="checkbox"/> e); AND/OR <input type="checkbox"/> A2 (specify at least one of the following) <input type="checkbox"/> a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/> d) <input type="checkbox"/> e); AND/OR <input type="checkbox"/> A3 (specify at least one of the following) <input type="checkbox"/> a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/> d) <input type="checkbox"/> e); AND/OR <input type="checkbox"/> A4 (specify at least one of the following) <input type="checkbox"/> a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/> d) <input type="checkbox"/> e)
<input checked="" type="checkbox"/> Criterion B Endangered	<input checked="" type="checkbox"/> B1 (specify at least two of the following) <input checked="" type="checkbox"/> a) <input checked="" type="checkbox"/> b) <input type="checkbox"/> c); AND/OR <input checked="" type="checkbox"/> B2 (specify at least two of the following, other than NT) <input checked="" type="checkbox"/> a) <input checked="" type="checkbox"/> b) <input type="checkbox"/> c)
<input checked="" type="checkbox"/> Criterion C Critically Endangered	<input type="checkbox"/> estimated number of mature individuals AND <input type="checkbox"/> C1 OR <input checked="" type="checkbox"/> C2 <input checked="" type="checkbox"/> a (i) OR <input type="checkbox"/> a (ii) OR <input type="checkbox"/> C2 <input type="checkbox"/> b)
<input checked="" type="checkbox"/> Criterion D Vulnerable	<input type="checkbox"/> D OR <input checked="" type="checkbox"/> D1 OR <input type="checkbox"/> D2
<input type="checkbox"/> Criterion E Data Deficient	
<input type="checkbox"/> EX	
<input type="checkbox"/> EW	
<input type="checkbox"/> 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.

The cultural, customary and spiritual significance of species and the ecological communities they form are diverse and varied for Indigenous Australians and their stewardship of Country. This section describes some examples of this significance but is not intended to be comprehensive or applicable to, or speak for, Indigenous Australians. Such knowledge may be held by Indigenous Australians who are the custodians of this knowledge and have the rights to decide how this knowledge is shared and used.

Croton mamillatus is known from occurrences on the lands of the Yugara/Ugarapul People (whilst acknowledging that other peoples may have a connection to the Country). There is little published information on how the Yugara/Ugarapul People relate to Country in this region and what that may mean for the cultural significance of *C. mamillatus*.

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.).

Click or tap here to enter text.

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.

Click or tap here to enter text.

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.

Click or tap here to enter text.

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. Paul Forster, Principal Botanist, Queensland Herbarium, Department of Environment and Science.
Glenn Leiper, Amateur Botanist, Naturalist, co-author of *Mangroves to Mountains*.

REFERENCE LIST

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

- Bachman S, Moat J, Hill AW, de la Torre J, Scott B (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. In 'e-Infrastructures for data publishing in biodiversity science. *ZooKeys* 150: 117-126. (Version BETA). (Eds V Smith and L Penev).
- Cartwright, J. (2019). Ecological islands: conserving biodiversity hotspots in a changing climate. *Frontiers in Ecology and the Environment* 17: 331–340.
- Forster, P. I. (2003). A taxonomic revision of *Croton* L. (Euphorbiaceae) in Australia. *Austrobaileya* 6(3), 349-436.
- Department of the Environment (2012). *Interim biogeographic regionalisation for Australia (regions – states and territories) v. 7 (IBRA)*. Commonwealth of Australia. Canberra. Available at <https://www.environment.gov.au/land/nrs/science/ibra#ibra>.
- IUCN Standards and Petitions Committee (2019). Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Committee. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>.
- Levin, D.A. (2000). *The origin, expansion, and demise of plant species*. Oxford University Press: New York/Oxford.
- Queensland Government (2019). *Regional ecosystem descriptions*, The State of Queensland, viewed 31 January 2020, <https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions>.
- Queensland Herbarium (2020) Herbarium records for *Croton mamillatus*, Department of Environment and Science, Queensland, viewed 21 January 2020.
- Queensland Herbarium (2021). *Regional Ecosystem Description Database (REDD)*. Version 12.1 (December 2021). (DES: Brisbane). Accessed 26 May 2022.
- Queensland Government (2020). *Queensland Globe*. The State of Queensland, viewed 14 February 2020, <https://qldglobe.information.qld.gov.au/>
- Van Ee, B. W., Forster, P. I., and Berry, P. E. (2015). Phylogenetic relationships and a new sectional classification of *Croton* (Euphorbiaceae) in Australia. *Australian Systematic Botany* 28(4), 219-233.

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.)

Ms

FULL NAME

Teghan D. Collingwood

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.

Date: 14/02/2020

[Signed]

** 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.**

Suggested citation:

Collingwood, T. D. (2020). Nomination to change the conservation class of *Croton mamillatus* under the Queensland Nature Conservation Act 1992. Department of Environment and Science, Brisbane.