

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)

Solanum graniticum A.R.Bean

COMMON NAME(S)

Granite nightshade

TAXONOMY

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

Solanum graniticum A.R.Bean in Bean, A.R. (2004) The taxonomy and ecology of *Solanum* subg. *Leptostemonum* (Dunal) Bitter (Solanaceae) in Queensland and far north-eastern New South Wales, Australia. *Austrobaileya* 6(4): 639-816.

*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?

Solanum graniticum is a spindly, prostrate to sprawling, herbaceous resprouter to 0.3 m high (Bean 2004). Stems are armed with prickles to 9 mm long, the branchlets yellow or brown; adult leaves are elliptic to ovate and shallowly to deeply lobed with 2 or 3 lobes on each side, 1.2 – 2.6 cm long, 0.6 – 1.3 cm wide, with prickles present on the upper and lower surfaces. Inflorescence is leaf-opposed or supra-axillary solitary or pseudo-umbellate with 1 or more prickly, 5-merous flowers, the corolla mauve, shallowly lobed, 9 – 14 mm long. Fruits 1 per inflorescence, the calyx armed with prickles, globular to 15 mm and green to yellowish green at maturity with several pale yellow seeds present. *Solanum graniticum* is most closely related to *S. angustum*, which also grows on granitic hills as a small bushy shrub and has similar sized fruit. *S. angustum* differs from *S. graniticum* by having fewer prickles on the calyx, the often longer and less-lobed leaves, and the longer glabrous style (T. Bean pers. comm.). The two species are not known to overlap, with *S. angustum* occurring some 230 km to the north and west of the northernmost location of *S. graniticum* at Mount Zero-Taravale. *Solanum graniticum* is also closely related to *S. pusillum*, differing mostly by its relatively small leaves, wingless petioles and corollas are mauve as opposed to white in *S. pusillum*. The species also differs by the types and size of hairs present (see Bean 2004). Further, *S. graniticum* occurs in different habitat from *S. pusillum*, on soils derived from granite and granodiorite, whereas *S. pusillum* occurs on shallow, yellow soils on low, lateritic plateaux. The ranges of the two species do not overlap, with a distance of approximately 195 km between the closest occurrences.

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.

Solanum graniticum is a Queensland endemic, known from four locations: Gloucester Island: Cape Gloucester on the adjacent mainland north of Proserpine; Eungella Dam (Eungella Dam location) west of Mackay (approx. 120 km SSE of the Gloucester location); and Mount Zero-Taravale Sanctuary (Mt Zero-Taravale location) north west of Townsville (approx. 285 km WNW of the Gloucester location) (see Figure 1). The species is naturally very rare. Of the four locations, the Cape Gloucester location is the most extensive, however numbers of individuals within this location are very low. The Eungella Dam location numbers a few individuals at best. The Gloucester Island location is protected within the reserve system in Gloucester Island National Park, whereas individuals at the Cape Gloucester location occur on unprotected private land. The Eungella Dam location occurs outside of the reserve system, whereas the Mt Zero-Taravale location occurs within the Nature Refuge system. Currently no mining interests exist at any locations where these locations occur, however an historic exploration licence previously existed over the Mt Zero-Taravale location. With large distances between the locations in rugged terrain that has been relatively poorly surveyed for plants, it is likely that further locations occur within the extent of occurrence for *Solanum graniticum*, however the cryptic nature of this species and its inconspicuous form could render discovery of unknown populations by targeted survey effort difficult.



Figure 1. Distribution of *Solanum graniticum* showing the three subpopulations. The shaded area indicates the species extent of occurrence as calculated using the GeoCat mapping tool <http://geocat.kew.org/>. [There are four locations with the Gloucester subpopulation consisting of two locations.](#)

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

Solanum graniticum occurs in eucalypt woodland on hillsides in shallow soils derived from granite and granodiorite. In most cases *Eucalyptus drepanophylla* is present and in many instances a dominant component of the vegetation - often with *Allocasuarina littoralis* and *Lophostemon confertus* at the location of the Gloucester subpopulation (REs 8.12.12d, 8.12.29b, 11.12.16, 8.12.14c, 8.12.6b, 8.12.14a); *Corymbia erythrophloia* at the location of the Eungella Dam subpopulation (RE 11.12.1) and *Corymbia leichhardtii* at the location of the Mt Zero-Taravale subpopulation (RE 9.12.23). The species appears to be naturally rare. It also appears to be somewhat cryptic in terms of presence or absence of above-ground biomass. Repeat visits to the Eungella Dam subpopulation in recent years, in different seasons and in different conditions, failed to result in positive sightings of any individuals (JH pers. obs.). Likewise, the Mount Zero-Taravale subpopulation has not been seen since the initial botanical collection was made, despite repeated survey (R. Jensen pers. comm.). Similar fluctuations in the presence or absence of above ground biomass has also been observed in the closely related species *S. pusillum* and *S. adenophorum* (JH pers. obs.). Such phenomena may suggest a reliance on fire or ground disturbance to invigorate growth and/or a particular climatic trigger. Little is known on the ecological requirements and life history traits of this species however and further research is needed to better understand its requirements and limitations. Furthermore, the species may be difficult to locate when sterile due to its sparse, inconspicuous habit, especially when grasses dominate the ground layer. Dispersal of

fruit is most likely facilitated by birds. Flowers have been recorded in March and mature fruits have been recorded in March, May and July.

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.

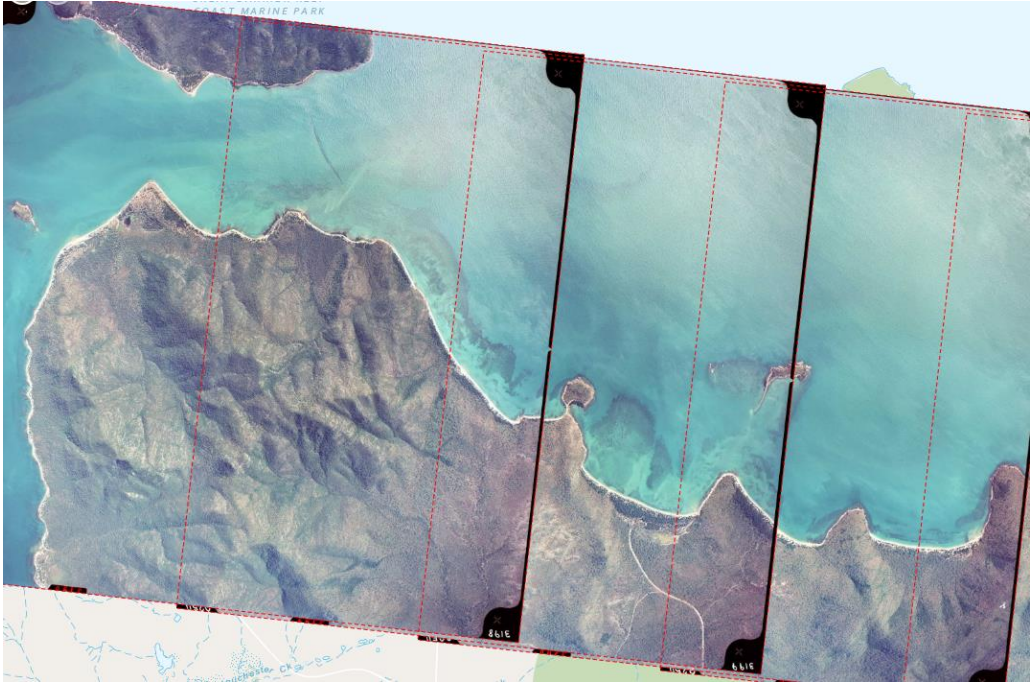

Past threats	Impact of threat
<p>Land clearing: Residential and associated infrastructure development</p>	<p>This threat is valid for the Cape Gloucester locality of the Gloucester subpopulation. The Gloucester subpopulation on the mainland is not afforded protection in the reserve system and coastal development has increased in this area since the 1970s (see Figures 2 and 3 below). The Cape Gloucester subpopulation is the most extensive subpopulation known.</p>  <p>Figure 2. Cape Gloucester in 1972 with very minimal development, taken from QImagery: https://qimagery.information.qld.gov.au/</p> 

	Figure 3. Cape Gloucester in 2017 with expanding residential development, taken from QImagery: https://qimagery.information.qld.gov.au/
Current threats	Impact of threat
Land clearing: Residential and associated infrastructure development	This threat is valid for the Cape Gloucester locality of the Gloucester subpopulation. The Gloucester subpopulation on the mainland is not afforded protection in the reserve system and coastal development has increased in this area since the 1970s (QImagery 2019) and is ongoing. The Cape Gloucester subpopulation is the most extensive subpopulation known. The level of impact from this threat at this location is high.
Small population size	Small population size and the limited number of subpopulations that are relatively widespread, exposes this species to the effects of stochastic events and genetic inbreeding.
Future threats – actual	Impact of threat
Land clearing: Residential and associated infrastructure development	This threat is valid for the Cape Gloucester locality of the Gloucester subpopulation. The Gloucester subpopulation on the mainland is not afforded protection in the reserve system and coastal development has increased in this area since the 1970s (QImagery 2019) and is likely to continue into the future. The Cape Gloucester subpopulation is the most extensive subpopulation known.
Small population size	See current threats
Future threats – potential	Impact of threat
Disturbance regimes not suitable for sustainable populations	Little is known on the requirements for this species in relation to disturbance, however it occurs in fire-prone habitats and could rely on specific fire regimes to sustain populations. More research needs to be done to understand the life cycle and ecological requirements of this species. This threat is most relevant for the most populous location for this species – the Cape Gloucester locality where residential development has increased over the past few decades. An increase in urban development could lead to changes in fire regimes, negatively impacting fire-dependant species.
Climate change	These small, fluctuating and poorly understood subpopulations are likely to be greatly exposed to the negative effects of future climate change, particularly in relation to an increase in the frequency, intensity and duration of droughts.

***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: Residential and associated infrastructure development	None
Small population size	None
	Abatement or recovery action proposed
Land clearing: Residential and associated infrastructure development	Residential development at Cape Gloucester is ongoing and abatement may prove difficult. While the Flora Survey Trigger Map For Clearing Protected Plants in Queensland identifies much of this location as requiring a threatened species survey as a requirement for development under the NC Act (see Figure 4), the fluctuating nature of this species is likely to result in absence being recorded during a Protected Plant Flora Survey. Despite this, individuals of <i>Solanum graniticum</i> have been located as a result of a Protected Plant Flora Survey at a Cape Gloucester property and the author is aware of a protected plant clearing permit application being submitted to the Department of Environment and Science in relation to this in recent years. As it is difficult to obtain an accurate population estimate for <i>Solanum graniticum</i> it is recommended that an extremely conservative approach be taken in the development of Cape Gloucester until more is known about this species' population extent and life history traits.
Small population size	Further surveys are required in suitable habitat across the extent of occurrence in an attempt to find further subpopulations, however the cryptic nature of this species and the rugged terrain in which it occurs would make targeted survey difficult and expensive.

	Studies in population genetics from the three known subpopulations would provide valuable insight into the genetic relationships within and across each subpopulation to inform on the likelihood of impacts from genetic inbreeding.
Future threats – actual	Abatement or recovery action underway
Land clearing: Residential and associated infrastructure development	None
Small population size	None
	Abatement or recovery action proposed
Land clearing: Residential and associated infrastructure development	See current threats above
Small population size	See current threats above
Future threats – potential	Abatement or recovery action underway
Disturbance regimes not suitable for sustainable populations	None.
	Abatement or recovery action proposed
Disturbance regimes not suitable for sustainable populations	Due to the low population size of <i>Solanum graniticum</i> , deliberate site disturbance or manipulation to better understand disturbance response would be inappropriate for this species due to the potential loss of individuals. Rather, passive observation and documentation of responses proceeding and following natural events may be more appropriate for this species. Experiments involving disturbance regimes may be possible in an ex situ setting using vegetative material (if the taking of this material is deemed unlikely to have an impact on the health of the in situ subpopulations), particularly where ex situ production orcharding can be established, thereby enabling further vegetative division from orchard mother plants to obtain sufficient numbers for experimentation without impacting the wild population.

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.

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 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.

Solanum graniticum was initially listed as Endangered on the basis of criteria **B1ab(ii-v),2ab(ii-v);C12a(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.

While currently listed as Endangered under the NC Act a nomination has never been put forward for listing under the EPBC Act

(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 for 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.		<p><i>based on any of (a) to (e)</i></p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites</p>	
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.			

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.

Insufficient information to assess. Difficult to demonstrate population size reduction due to extreme fluctuations of the population

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.

Solanum graniticum meets the Endangered criterion **B2ab(iii,v)c(i,ii,iii,iv)** The Extent of Occurrence was 17,215 km² and Area of Occupancy (AOO) of *Solanum graniticum* is 28 km². This figure was derived from a convex hull polygon generated to the extremity of species location data extracted from the Queensland Herbarium database Herbrecks, with coordinates plotted using the GeoCAT IUCN assessment tool developed by Kew (see Figure 1). This very low AOO is spread across a large area with considerable distance between each of the three subpopulations. This distance, in concert with numerous areas of unsuitable natural habitat and highly modified landscapes create barriers to genetic crossflow throughout the population. The number of locations has been determined to be four, based on the Eungella Dam and Mount Zero-Taravale subpopulations being considered one location each; and the Gloucester subpopulation being separated into two locations: Gloucester Island and Cape Gloucester. This separation is based on the different levels of threat faced by individuals at each of these two locations. Decline has been determined based on ongoing development of the Cape Gloucester location, affecting habitat and number of mature individuals. Extreme fluctuations occur in the population of *Solanum graniticum*, in which all individuals have been observed as absent at the subpopulation level (see Biology/Ecology section above) at two of the three subpopulations.

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
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.

Solanum graniticum meets the Endangered criterion **C2a(i)b**. It is conservatively estimated that less than 1000 mature individuals occur in total, based on observation and specimen data in the Queensland Herbarium collection. This figure is difficult to accurately determine because of extreme fluctuations in the number of individuals observable as standing plants. It is therefore likely that the number of individuals is considerably

less than 1000. Very few individuals exist in both the Eungella Dam and Mount Zero-Taravale locations (where fluctuations in population size has reduced both these locations to nil), and the species is described as being rare in the remaining few sites where it occurs at the Gloucester locations. At each location at any time, the number of mature individuals is likely to be less than 250.

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.

Fluctuations in individuals, observable as standing plants, from site to location level make estimating the number of mature individuals at a given time very difficult. Conservatively the population meets the Vulnerable criteria D1, however Endangered D1 is not unrealistic. An in-depth monitoring of population size, both temporally and spatially, is essential to obtaining a sound estimate of population size.

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 has been undertaken to determine probability of extinction in the wild

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 type="checkbox"/> Criterion A	<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 type="checkbox"/> B1 (specify at least two of the following) <input type="checkbox"/> a) <input 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 checked="" type="checkbox"/> c)
<input type="checkbox"/> Criterion C Endangered	<input checked="" 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

C2 b)

Criterion D

D1 **OR** D2

Vulnerable

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.

None 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.).

Urgent investigations are required in the areas of population dynamics, reproductive biology, capacity and recruitment to better understand the overall population size and the requirements for subpopulation subsistence. Genetic studies would also be helpful to understand the relationship between the subpopulations and the genetic health within each. Targeted field survey in suitable habitat is also required in an attempt to find further subpopulations.

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.

No further comments. Maps are imbedded in the report

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.

None available

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.

Queensland Herbarium, Department of Environment and Science.

REFERENCE LIST

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

Bean, A.R. (2004) The taxonomy and ecology of *Solanum* subg. *Leptostemonum* (Dunal) Bitter (Solanaceae) in Queensland and far north-eastern New South Wales, Australia. ***Austrobaileya* 6(4): 639-816.**

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.)

Mr

FULL NAME

Jason James Halford

ORGANISATION OR COMPANY NAME (IF APPLICABLE)

Queensland Herbarium

CONTACT DETAILS

DECLARATION

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

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

Date: 13/09/2019

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: