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 <u>Memorandum of Understanding</u> 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 <u>https://www.qld.gov.au/environment/plants-animals/wildlife-permits/common-assessment</u>.

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 <u>EPBC.nominations@environment.gov.au</u>.



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 <u>personal communication</u> 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

<u>http://www.environment.gov.au/biodiversity/threatened/nominations/forms-and-guidelines</u>. Although not fully relevant under the NC Act, the guidelines provide assistance on several aspects of this form. Please email <u>SpeciesTechnical.Committee@des.gld.gov</u> 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.gld.gov.au.

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

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 <u>www.environment.gov.au/cgi-bin/sprat/public/sprat.pl</u>.

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=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.nomination@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. 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 <u>SpeciesTechnical.Committee@des.gld.gov.au</u>.
- 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: <u>https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2006-0206</u>.
- 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
 <u>SpeciesTechnical.Committee@des.qld.gov.au</u>.
- 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 <u>www.environment.gov.au/cgibin/sprat/public/sprat.pl</u>.
- 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 <u>http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3151/redlistguidelines.pdf</u>.

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)

Phyllurus kabikabi

COMMON NAME(S)

Oakview leaf-tailed gecko, Gympie broad-tailed gecko

TAXONOMY

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

Couper, P.J., Hamley, B. and Hoskin, C.J. (2008) A new species of Phyllurus (Lacertilia: Gekkonidae) from the Kilkivan district of south-eastern Queensland. Memoirs of the Queensland Museum 52(2):139-147.

Family: Carphodactylidate; Order: Squamata.

*CONVENTIONAL ACCEPTANCE OF TAXONOMY

Is the species' taxonomy conventionally accepted?

\times	Y	e	s
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□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?

Phyllurus kabikabi is a small gecko, growing to 15 cm (8 cm snout-vent length) with large tubercles (conical or wart-like projections) covering its body and tail. The species is grey-brown in colour with fine dark mottling or blotches, pale spots and 5-6 pale bands on the narrow cylindrical tail. Regenerated tails lack the pale bands and tubercles of original tails.

The following diagnosis and comparison with similar species has been adapted from the description paper (Couper, P.J., Hamley, B. & Hoskin, C.J. 2008), with additional information added to include the newly described *P. pinnaclensis* (Hoskin, 2019).

Phyllurus kabikabi can only be confused with *P. gulbaru, P. pinnaclensis* and *P. caudiannulatus*, its congeners with cylindrical, non-depressed, tapering original and regenerated tails. It is readily separated from *P. gulbaru* and *P. pinnaclensis* by having a fully divided rostral scale (versus partially divided). *Phyllurus kabikabi* is most similar to *P. caudiannulatus*, which is generally more spinose. It can be readily distinguished from *P. caudiannulatus* by the scalation along the ventral surface of the hindlimb, with uniform granules in *P. kabikabi* versus granules intermixed with pronounced, raised tubercules in *P. caudiannulatus*.

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.

This species is endemic to Queensland, Australia, and occurs in an isolated patch of semi-evergreen vine forest within Oakview National Park and State Forest, near Kilkivan, approximately 40 km WNW of Gympie. Within this area there are several disjunct localities.

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

Phyllurus kabikabi is a nocturnal, arboreal gecko that shelters by day among boulders and in hollows and actively forages over the rocks and low vegetation above the rock throughout the night. Like other members of its genus, *P. kabikabi* likely feeds on small invertebrates such as arthropods (Wilson & Knowles 1988; Couper *et al.* 1993).

Currently, the age at sexual maturity, average life expectancy, natural mortality rates and generation length are unknown. The holotype, QMJ63857, which was a female collected in late September, has two oviducal eggs visible through the body wall (Couper et. al, 2008). This is consistent with other members of the genus that typically lay two eggs in October-November, sometimes communally in crevices (Wilson & Knowles 1998; Greer 1989; Couper *et al.* 1993).

Phyllurus kabikabi is only found in Araucarian vine forest (Regional Ecosystems 12.12.13 and 12.12.16) growing over a deep layer of broken igneous rock (Couper *et al.* 2008; Ferguson unpub. data, 2019). The species does not utilise the rock substrates outside of vine forest, even where it is adjacent to occupied habitat (Ferguson, unpub. data, 2019). It also rarely moves far into vine forest without a rocky ground layer (Ferguson, unpub data, 2019). This strong association with rocky rainforest sites is seen across *Phyllurus* species (Couper *et al.* 1993, Couper *et al.* 2000, Hoskin *et al.* 2003). The extent of vine forest in the Oakview area (National Park, State Forest and surrounding tenures) totals approximately 1800 ha. However, the limiting factor for *P. kabikabi* is the distribution of layered rock underneath the vine forest, which is extremely patchy. Preliminary data indicates a rocky outcrop needs to be in excess of 0.8 ha in size to support the species, with currently known sites ranging in size from approximately 0.8 ha to 6.1 ha (Ferguson, unpub. data 2019). Therefore, the extent of suitable habitat at Oakview is very limited and highly isolated.

Reasonable survey effort has been conducted in areas between Oakview and the nearest *Phyllurus* population, *Phyllurus caudiannulatus*, at Bulburin National Park/State Forest (Eyre et al. 1998; Couper *et al.* 2008). More recent survey efforts have targeted suitable rocky habitat in surrounding protected areas, such as Mudlo and Wrattens National Park/State Forest (Ferguson unpub. data, 2019). These surveys revealed no *Phyllurus* and it is highly likely that *P. kabikabi* is restricted to Oakview (Couper *et al.* 2008).

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	The area of potential vine forest habitat at Oakview has reduced by approximately 17% (Borsboom <i>et al.</i> 2005). Most of the clearing at Oakview was to establish hoop pine (<i>Araucaria cunninghamii</i>) plantations (Borsboom <i>et al.</i> 2005). The level of impact of this clearing is unclear, as it is unknown how much of this cleared vine forest contained suitable rocky ground layer that may have been occupied by the species.

Loss of suitable habitat	There is evidence of wildfire having burnt into the margins of known habitat for the			
due to wildfire	species, reducing the patch size and allowing weed encroachment (Ferguson,			
	unpub data, 2019). The timing of this fire and level of impact on the species is			
	unknown, however, the species does not use the rock substrate that is now			
	outside the semi-evergreen vine forest.			
Current threats	Impact of threat			
Weed encroachment	Coral berry (<i>Rivinia humilis</i>) and Cat's claw creeper (<i>Dolichandra unguis-cati</i>)) are			
reducing habitat quality	currently invading at least one of the disjunct populations at Oakview. Cat's claw			
	creeper is an invasive introduced vine listed as a Weed of National Significance			
	(DAF 2016). This vine can completely smother all hative vegetation from ground			
	even to tree canopy and has a vigorous root and tuber system making it difficult to			
	these invasive weeds is currently unknown. However, their modification of vine			
	forest and rocky ground layer microclimate and the change in ground cover from			
	sparse to dense could severely reduce decko numbers on the rocky outcrops.			
	Giant rats tail grass (Sporobolus spp.) and lantana (Lantana camara), an invasive			
	shrubby weed, are found at Oakview along many tracks and roads cutting through			
	the semi-evergreen vine forest. There is currently significant encroachment of			
	lantana on the margins of over half the leaf-tailed gecko sites at Oakview.			
Catastrophic fire	Uncontrolled fires burning into similar semi-evergreen vine forest habitat during			
	extreme fire weather conditions (typically after prolonged drought) have occurred			
	on many occasions in the Kilkivan region and throughout southern Queensland in			
	the past (Ridley & Gardener, 1961). More recently, the burning of semi-evergreen			
	vine lorest at Mi Eina Caves National Park hear Rocknampton has occurred under			
	extreme file weather conditions (Drock et. al. 2019).			
	Fire of a similar intensity to those reported that results in the destruction of the			
	semi-evergreen vine forest growing over rocky substrate (critical habitat for the			
	species), changing the microclimate, food resources and allowing rampant weed			
	invasion (e.g. Giant rats tail grass, lantana, coral berry and cat's claw creeper will			
	result in the loss of the Oakview leaf-tail gecko from impacted rocky outcrops.			
Illegal collection and/or	This species is desirable in the pet trade but has not yet, as far as we know, been			
disturbance by human	recorded in any collections. Its closest relative <i>P. caudiannulatus</i> is already in			
Interference	overseas collections. Given the likely low numbers of individuals on the small,			
	high However, it is unlikely to be an impact across the entire population			
	night nowever, it is unlikely to be an impact across the entire population.			
	This species is also frequently targeted by reptile twitchers and photographers			
	looking to find the species and tick it off their "lists". As many of these enthusiasts			
	have reptile collections at home the risk of disease introduction (transferred from			
	their private collection) is high. The potential habitat damage to the relatively small			
	rocky outcrops is also high.			
Predation by feral cats	Feral cats and foxes are present on the rocky outcrops where the Oakview leaf-tail			
(<i>Felis catus</i>) & foxes	gecko occurs (Ferguson, unpub. data 2019). Whilst cats and foxes are a predation			
(Vulpes vulpes)	threat, the level of predation is unknown.			
Habitat degradation by	Red deer are currently trampling areas of the rocky habitat where the Oakview			
red deer (<i>Cervus elaphus</i>)	shelters (Forguson, uppub, data 2010). They are also capable of broweing and			
	trampling ground vegetation, ring-barking trees and spreading weeds (DAE 2019)			
	It is unknown how significant this threat is.			
Hoop pine harvesting and	Phyllurus kabikabi is known to occur on the edge of two hoop pine plantations in			
management activities	Oakview State Forest (Ferguson unpub. data 2019) and may occur in further			
	unsurveyed plantations where a suitable rocky ground layer exists. Any harvesting			
	or thinning activities may result in the loss of the species from these areas.			
Future threats – actual	Impact of threat			
Feral pigs (<i>Sus scrofa</i>)	Feral pigs occur at Oakview within the species' extent of occurrence, however are			
	not currently known to be significantly impacting the habitat where the species is			
	known to occur. Feral pigs are opportunistic, omnivorous feeders known to take			
	small reptiles (Mitchell & Dorney 2006) and could potentially modify the rocky			
	ground layer that the species depends upon. Feral pigs may also spread weeds			
Above current threate	and upstasts.			
	impact the population by reducing habitat guality and extent at Oakview.			

	Management of the above threats will limit the extent and severity of the impact, however it is highly unlikely that any of the threats will be completely negated.
Future threats – potential	Impact of threat
Disease	Australian reptiles are at serious at risk from fatal exotic reptile diseases (e.g. Rose <i>et al.</i> 2017; Peterson <i>et. al.</i> 2019). Extinction of the Oakview leaf-tail gecko would be a distinct possibility should any fatal exotic disease reach populations at Oakview.
Changing climate	The Oakview leaf-tail gecko is dependent upon moist semi-evergreen vine forest growing on a deep layer of broken silicic ash-flow tuffs (Couper et al. 2008). Climate change modelling by CSIRO and BOM (2017) predicts significant future changes in the region where the species occurs. The very high confidence predictions include an increase in overall temperatures (i.e. mean, maximum and minimum in all seasons), increased extreme temperatures, increased frequency and duration of hot days and harsher fire weather conditions. Time spent in drought is projected, with medium confidence, to increase (CSIRO & BOM 2017). These changes will result in reductions in the extent and quality of habitat for the Oakview leaf-tail gecko population that is already highly restricted and severely fragmented.
Dieback caused by the plant pathogen <i>Phytophthora</i>	A potential threat is habitat degradation from forest dieback caused by the water mold (<i>Phytophthora</i> spp.). This pathogen has not been recorded from the site but has caused localised dieback in coastal areas of Queensland (Brown 1999). Logging activity may introduce phytophthora to the area and, along with feral pigs and red deer, may increase its spread within the protected area (Brown, 1999; Gadek, 1999).

***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
Weed encroachment	QPWS staff are currently initiating actions aimed at preventing the further spread
reducing nabilat quality	species.
Catastrophic fire	Queensland Parks and Wildlife Service (QPWS) staff at Oakview National Park have implemented a fire management strategy, including frequent prescribed burns to reduce fuel loads in forests adjacent to the vine forest to help reduce fire intensity. There remains a high risk of fire burning many of the areas of suitable habitat under extreme or catastrophic fire conditions, combined with the steep terrain found at Oakview. The largest known population is also on the edge of the vine forest at the top of a ridge and has already had wildfire reduce the extent of available habitat.
Illegal collection and/or disturbance by human interference	Vehicle access into areas of Oakview where the species occurs is currently restricted by locked gates.
Habitat degradation by red deer	Oakview National Park management staff currently have a control program aimed at reducing deer numbers within the park (Paul Harris <i>pers. comm.</i> 2019).
Hoop pine harvesting and management activities	Plans to harvest two hoop pine compartments within Oakview State Forest have been abandoned due to the presence of <i>Nangura spinosa</i> (Nangur spiny skink) and the Oakview leaf-tailed gecko. Both compartments are currently in the process of conversion to national park tenure (QPWS 2019). There are however further hoop pine plantations at Oakview that remain unsurveyed for the presence of the species.
	Abatement or recovery action proposed
Illegal collection and/or disturbance by human interference	Road closures, access restrictions and further locked gates are proposed for semi-evergreen vine forest areas of Oakview National Park (QPWS 2019).
Future threats – actual	Abatement or recovery action underway
	Abatement or recovery action proposed
Click or tap here to enter text.	Click or tap here to enter text.

Future threats – potential	Abatement or recovery action underway
Disease and dieback caused by the plant pathogen <i>Phytophthora</i>	Undertake rigorous survey and handling hygiene procedures to ensure the risk of disease and pathogen spread remains minimal into the future. This can be done in accordance with the Australian Government <i>Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi</i> . Prevent access to the known core Oakview leaf-tailed gecko habitat. Continue to expand pest management strategies for Oakview National Park to reduce the risk of pest species spreading pathogens.
	Abatement or recovery action proposed
Click or tap here to enter text.	Click or tap here to enter text.

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
Not Applicable	Not Applicable

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?

□Extinct	□Extinct in the Wild	□Critically Endangered	⊠Endangered			
□Vulnerable	□Near Threatened	□Least Concern	⊡Not listed			
In what category is the	In what category is the species currently listed under the EPBC Act?					
□Extinct	□Extinct in the Wild	□Critically Endangered	□Endangered			
□Vulnerable	□Conservation Dependent		⊠Not listed			
NOMINATED LISTING CLASS To what class under the NC Act is the species being nominated?						
□Extinct	□Extinct in the Wild	⊠Critically Endangered	□Endangered			
□Vulnerable	□Near Threatened	□Least Concern	□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?

\Box Genuine change of status	⊠New knowledge	□Mistake	⊠Other
Taxonomic change - 🗆 'spliť'	□newly described	□'lumped'	□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.

NCA: Endangered B2ab(iii); IUCN: Critically Endangered B1ab(iii)+2ab(iii)

NCA Endangered category B2ab(iii) because its area of occupancy was estimated to be <500 km²; it was known from a single locality and if additional populations were discovered they were likely to be severely fragmented because of the availability of suitable habitat; there was an inferred decline in extent and quality of habitat.

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.

Originally listed as 'Endangered' under the NC Act, with no 'Critically Endangered' category; and was not listed under the EPBC Act due to no nomination. This nomination updates the information to re-determine the conservation status of the species and to align this status under both Acts.

(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.

Eligibility against the criteria

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)	Endan (E	ngered N)		Vulnerable (VU)	Near Threatened (NT)
A1		≥ 90%	≥ 7	0%		≥ 50%	≥ 20%
A2,	A3, A4	≥ 80%	≥ 5	0%		≥ 30%	≥ 20%
A1	Population reduction obs inferred or suspected in causes of the reduction reversible AND understo	served, estimated, the past and the are clearly ood AND ceased.		(a) (b)	direct an inc	t observation [<i>except A</i> dex of abundance appr	.3] ropriate to the taxon
A2	Population reduction obs estimated, inferred or su past where the causes of may not have ceased OI understood OR may not	served, spected in the f the reduction R may not be be reversible	based on any of (a) to (a)	(c)	a dec occur	line in area of occupar rrence and/or quality of	ncy, extent of [:] habitat

- 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.

past and the future (up to ears in future), and where duction may not have

(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.

Expert elicitation conducted by Legge et al. (2021) suggested that 13% of the distribution of *P. kabikabi* was burnt in a wildfire during the 2019-2020 fire season, which equated to a population decline of between approximately 4% and 19% (lower 80% bound) over 10 years, considered through the elicitation process to be an appropriate timeframe for measuring rates of population size reduction for the species. *P. kabikabi* does not meet the population decline thresholds for Near Threatened under Criterion A and is considered **Least Concern**.

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 km²	< 5,000 km²	< 20,000 km²	< 40,000 km²	
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²	< 4,000 km²	
AND at least 2 of the following 3 cond	ditions for CR, EN or V	U:		AND (b) for NT	
(a) Severely fragmented OR Number of locations	Not applicable				
 (b) Continuing decline observed, es occurrence; (ii) area of occupancy; (ii locations or subpopulations; (v) numb 	≥ 10% within the longer of 10 years or 3 generations				
(c) Extreme fluctuations in any of: (locations or subpopulations; (iv) num	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.

The Oakview leaf-tail gecko is eligible for listing as **Critically Endangered under Criterion B1+2ab(i,ii,iii,iv,v)**.

The extent of occurrence is calculated as 2.73 km² using the minimum convex polygon method but enlarged to 8 km² to match the area of occupancy (AOO), calculated based on 2 x 2 km grid as recommended by IUCN. Note that by moving the starting point of the 2 km x 2 km grid, as allowed by the IUCN, changes the AOO from 12 km² (shown in attached map) to 8 km². Consequently, the geographic distribution is very restricted. **B1 & B2**

The species is deemed to be found in one location due to the small AOO, EOO and its occurrence within one connected patch of vine forest in a single small, protected area. The most serious plausible event is a catastrophic fire, exacerbated by regional climate change predictions, that has the potential to severely impact all six subpopulations simultaneously. There is also a serious threat to the location from the introduction of a reptile pathogen (e.g. *Nannizziopsis* spp.) that would likely, in a short period of time, infect all subpopulations by being transferred by feral animals and other more mobile native reptile species.

Within the single location, the population is known to exist at a limited number of disjunct sites (Ferguson, unpub. data 2019). Six very small subpopulations are known within its highly restricted distribution, which are separated by large tracts of unsuitable habitat that appear to be a barrier to genetic exchange as the species does not traverse areas of vine forest that lack a ground layer of broken rock (Ferguson unpub data, 2019; see Biology/Ecology for further details). There is an increased extinction risk to this species because of the small size (see Criterion C) and highly isolated nature of each of the subpopulations and the inability for the species to recolonise suitable habitat areas where they have become locally extinct. This means the species is severely fragmented. **B1a & B2a – severely fragmented & 1 location**

It can be inferred that the area, extent and quality of habitat, subpopulations and number of individuals are expected to further decline as a result of threats. The quality of habitat has continued to decline due to the effects of pest species (red deer, pigs, cats and foxes), weed encroachment and unmanaged fire (Ferguson unpub. data 2019). There is also projected continuing decline from potential catastrophic fire, exacerbated by regional climate change effects, collecting for the pet trade and introduced reptile pathogens. Given the

observed decline in habitat quality at many of the isolated sites for this species it can also be inferred declines in the EOO, AOO, number of subpopulations and number of mature individuals has and will continue to occur without intervention.

There is no evidence to indicate the species undergoes extreme fluctuations.

B1+2ab(i,ii,iii,iv,v)

CRITERION C

Sm	Small population size and decline					
		Critically Endangered Endangered (CR) (EN)		Vulnerable (VU)	Near Threatened (NT)	
Esti indi	mated number of mature /iduals	< 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 pred	An observed, estimated, projected arious for its survival based on at l	l or inferred continuing east 1 of (a) or (b):	decline AND its geo	graphic distribution is		
	(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	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.

The Oakview leaf-tail gecko is eligible for listing as **Endangered under C2a(i)**, and possibly Critically Endangered under C1+2a(i) with additional quantitative population data to ascertain subpopulation numbers and severity of decline.

Estimates from time-lapse camera trapping and occupancy modelling across known suitable habitat indicates a population size of approximately 112 adult individuals (95% CI of 65 to 193) spread across the six subpopulations (Ferguson unpub data 2019). At approximately 14 adults per hectare this is likely to be an over-estimate and it is likely that the largest subpopulation, based on the largest suitable habitat patch size of approximately 6.1 ha, is less than 85 animals (< 250). This estimate is based on density data from four of the six known subpopulations and may not fully capture the variation in density found at all sites. The area, extent and quality of habitat is expected to continue to decline as a result of threats (weed encroachment, pest species and unmanaged fire) and future/potential threats (climate change and illegal collection). This decline in habitat quality is suspected to be driving a decline in the number of mature individuals at all sites. Further work is required to increase the confidence in this density estimate and to determine the rate the species is declining. **Endangered C2a(i)**.

Extreme fluctuations in the number of mature individuals is unlikely to be applicable, although prolonged periods of drought are likely to temporarily impact recruitment, survivorship and number of animals within the rocky vine forest habitat sites.

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 km² or number of locations ≤ 5	D2. Typically: AOO < 40 km² 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.

Eligible for listing as **Endangered under Criterion D1** with an estimated population size of less than 250 mature individuals. See Criterion C for further details.

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.

Population viability analyses have not been undertaken as there is insufficient information on generation length, reproductive potential and survivorship on which to base modelling. Therefore, the species cannot be assessed for listing under Criterion E.

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

Please mark the criteria and sub-criteria that apply.

□Criterion A	□A1 (specify at least one of the following) □a) □b) □c) □ d) □e); AND/OR □A2 (specify at least one of the following) □a) □b) □c) □d) □e); AND/OR □A3 (specify at least one of the following) □a) □b) □c) □d) □e); AND/OR □A4 (specify at least one of the following) □a) □b) □c) □d) □e)
 ☑ Criterion B Critically Endangered □ Criterion C Endangered 	 B1 (specify at least two of the following) ⊠a) ⊠b) □c); AND/OR B2 (specify at least two of the following, other than NT) ⊠a) ⊠b) □c) □estimated number of mature individuals AND □C1 OR ⊠C2 ⊠a (i) OR □a (ii) OR □C2 □b)
□Criterion D Endangered	⊠D1 OR □ D2

□Criterion E	
□EX	
□EW	
□LC	Species nominated to change from a higher conservation class to Least Concern. No above boxes apply.

Other Considerations

***INDIGENOUS CULTURAL SIGNIFICANCE**

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

It is unknown whether the species has cultural significance for indigenous groups within Australia. The species epithet 'kabikabi' is derived from Kabi Kabi to recognise the language group of the traditional owners of Oakview National Park (Hoskin et al. 2008). The name Kabi is derived from the traditional name Kav'ai or Kab'ai being the name for the native light grey bee (Hoskin et al. 2008).

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.).

Department of Environment and Science is continuing to survey and monitor for the species both at Oakview and other potentially suitable habitat areas.

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.

N/A

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.

Can be supplied if required.

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 Michael Mathieson Senior Scientist Queensland Herbarium, Department of Environment and Science

REFERENCE LIST

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

- Borsboom A., Smyth G. and Rider E. (2005) *The rare Queensland skink* Nangura spinosa: *Surveys, distribution, habitat, threats, management and conservation status*. Internal report. Environmental Protection Agency, Brisbane.
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Commonwealth Scientific and Industrial Research Organisation and Bureau of Meteorology (CSIRO & BoM) (2017) *East Cost North Projection Summaries*. Commonwealth Government.

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- Hoskin, C.J, Bertola, L.V. and Higgie, M. (2019) A new species of *Phyllurus* leaf-tailed gecko (Lacertilia: Carphodactylidae) from The Pinnacles, north-east Australia. Zootaxa 4576 (1): 127-139.
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Nominator's Details

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

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

Mr

FULL NAME

Daniel Ferguson

ORGANISATION OR COMPANY NAME (IF APPLICABLE)

Department of Environment and Science

CONTACT DETAILS

DECLARATION

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

Signed: Click here to enter text.	Date: 4/09/2019				
* 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.

Ferguson, D (2019). Nomination to change the conservation class of *Phyllurus kabikabi* under the Queensland *Nature Conservation Act 1992*. Queensland Department of Environment and Science. Updates for research post 2019 in criterion A provided by the Commonwealth government.