

Nomination Form

Listing native species

Nomination form and guidelines for listing protected wildlife under the *Nature Conservation Act 1992*

Nomination form for listing, changing the status, or delisting a native species under the Nature Conservation Act 1992.

General notes

The purpose of this document is to bring your nomination to the attention of the EPA Species Technical Committee (STC) for its consideration and subsequent advice to the Minister for Sustainability, Climate Change and Innovation.

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

Each section of the form needs to be completed with as much detail as possible. The Species Technical Committee will not consider incomplete nominations or nominations with insufficient information. Your nomination will be returned to you if inadequate information is provided.

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

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

1. Species details

Scientific name	Common name/s (if any)
<i>Phascolarctos cinereus</i>	Koala

If the species is not conventionally accepted, please provide:

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

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

This nomination is for the Koala Coast koala population. For the purposes of the Nature Conservation Act, a species is defined as “a species, subspecies, hybrid, variant, race, mutation or **geographically separate population** of any animal or plant.”

The Koala Coast koala population is delineated by Manly Road and Lota Creek to the north; the Gateway and Pacific Motorways to the west; Logan River to the south; and Moreton Bay to the east – effectively isolating the resident koala population as a geographically disjunct population (Environmental Protection Agency 2007). Genetic analysis has confirmed koalas from the Koala Coast region are also genetically distinct from all other sampled regions in South East Queensland using Bayesian cluster analysis, which indicates a high degree of reproductive isolation; MtDNA control region haplotype distribution indicates that koalas along the coast were connected historically, were distinct from western koalas and that genetic isolation of the Koala Coast is likely to be a recent event (Seddon et al. 2008; Seddon et al. in prep.).

The Koala Coast koala population is recognised as one of the most significant natural koala populations in Australia, due to the relatively large numbers of koalas and the high density of animals (Environmental Protection Agency 2007). The population is of considerable National significance to the conservation of the species.

The Koala Coast area is, however, also subject to increasingly rapid urbanisation, and the major resulting impacts (habitat loss, roads, dogs and disease) are resulting in drastic declines in koala abundance. Since 1995, there have been 12 pieces of flawed legislation introduced to conserve the koala in the Koala Coast, yet populations continue to display catastrophic declines. Estimates suggest that if the current rate of decline continues, the Koala Coast koala population could be extinct as early as 2010 (Department of Environment and Resource Management 2009).

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

The Koala Coast koala population is delineated by Manly Road and Lota Creek to the north; the Gateway and Pacific Motorways to the west; Logan River to the south; and Moreton Bay to the east.

2 a). **Category nominated** (refer to Attachment 1: *Categories and criteria used for assessing the status of species*).

Tick the relevant box for *one* category only.

- Extinct in the wild
- Endangered
- Vulnerable
- Near Threatened
- Least Concern
- Not listed (or to delete a taxon from the Schedules)

2 b). The species is **currently listed** under the *Nature Conservation Act 1992* as:
(The *Nature Conservation Act 1992* can be viewed online at www.legislation.qld.gov.au)

- Presumed extinct
- Extinct in the wild
- Endangered
- Vulnerable
- Rare
- Near Threatened
- Least Concern
- Common (all indigenous frogs, reptiles, birds and mammals are considered common unless they are listed as another status in the *Nature Conservation (Wildlife) Regulations 1994*)
- Not protected
- Not listed

3. Justification for nomination

The species should be judged against the criteria described in Attachment 1: *Categories and criteria used for assessing the status of species*. The categories for *extinct in the wild*, *endangered*, *vulnerable* and *near threatened* use the most recent version of IUCN criteria.

Answer either 3a, 3b, 3c or 3d.

3 b). Nomination of a species as **endangered, vulnerable or near threatened**

For an *endangered*, *vulnerable* or *near threatened* species nomination, justify how the species meets one or more of the criteria listed in Attachment 1: Categories and Criteria used for assessing the status of species.

For a species to be considered *endangered*, *vulnerable* or *near threatened*, its current distribution and/or abundance should be known or estimated with reasonable confidence. Details how this was observed, measured or estimated must be provided. Provide an indication of the reliability of these data. If the data rely on field survey, provide details to show that the methods used were appropriate for detecting the species and the areas searched provided an adequate sample of the species' potential habitat and range.

Please ensure that the justification is as comprehensive as possible and is supported with reference to relevant scientific literature. Provide details of the references cited in your justification. The information in the scientific literature must be summarised. Do not provide just a list of references. Where expert opinion has been provided, give details of the relevant experience and qualifications this taxon expert has.

- i. Justify how the species meets the criteria listed in Attachment 1: Categories and criteria used for assessing the status of species.

Generation Times

Based on data from a free-ranging, Chlamydia-positive population in northeastern New South Wales an estimated generation time of 6.02 years has been calculated for koalas (Phillips 2000). This estimate was determined by taking the mean of the midpoint values of age classes determined for individual animals by the tooth wear criteria of Gordon (1991) and by excluding midpoint values of <4 years in the case of male koalas, and <2 years in the case of females. We have therefore concluded that three generations is equal to 18 years. High mortality among dispersing sub-adults may skew the age-structure of the population; it is possible that this could result in a longer generation time within the Koala Coast. Also, based on the work of Martin and Handasyde (1990), a longer generation time would be conceivable for Chlamydia-negative populations, given the greater longevity and fecundity of females.

Observed Declines

The results of the 2008 Koala Coast koala survey estimates a population of 2279 animals (Department of Environment and Resource Management 2009). Based on the population estimate of 4611 koalas in 2005-2006, this represents a 51% decline in less than three years and a 64% decline in the 10 years since the original 1996-1999 estimate of 6246 koalas (Department of Environment and Resource Management 2009).

Under Criterion A2a, an 'endangered' listing is appropriate if a population shows evidence of a directly observed reduction in abundance of $\geq 50\%$ over the three generations (18 years), where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible. The Koala Coast koala population has undergone a 50% decline in less than three years, and a 64% decline in the last ten years. Declines in the Koala Coast population are primarily attributable to ongoing urban development and excessively high levels of anthropogenic mortality (EPA 2007; Preece 2007); these causes of decline have not ceased, and may not be reversible.

As such, the Koala Coast koala population categorically fulfils the requirements for listing as an 'endangered' population under the Nature Conservation Act 1992.

Any threatening processes observed, suspected or inferred to be acting on the species need to be described. Describe what (if any) measures have been undertaken to reduce these threats and their effectiveness.

- ii. List the threatening processes and the measures taken to reduce these threats.

Threats include:

1. Habitat loss, fragmentation and degradation - Loss of habitat is the major threat to the koala in the Koala Coast and is the primary factor responsible for declining populations in those states. This is a continuing problem, resulting mainly from clearing or fragmentation of forest and woodland associated with urban development. Post-mortem examination of koalas admitted to hospitals within Southeast Queensland reveal high levels of malnutrition (many individuals reported to be 'wasted'). 40% of koalas are not within designated koala habitat under the draft South East Queensland Koala State planning regulatory provisions or the superceded Koala Plan (Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016); any proposed developments in these areas do not require assessment under the provisions of the Koala Plan, and are therefore unprotected. These populations in particular are expected to experience further declines. Additionally, secure bushland areas rely on high immigration rates from these urban areas to maintain population levels (Thompson, 2006).
2. Roads - Injury and death of koalas due to road vehicle collisions is a threat, particularly in urbanised areas where roads intersect koala habitat. The problem of vehicle collisions is usually a result of poor planning and road design (e.g. placing new roads too close to koala habitat).
3. Dogs - Dog attacks occur where koalas use habitat in urban areas, on small rural holdings close to urban centres and in semi-urban and rapidly urbanising areas. The problem is exacerbated when dogs have the opportunity to form pairs or packs (even small dogs can be a threat to koalas), when dogs can roam widely outside their home properties and where large and aggressive breeds are common. Dog attacks commonly result in stress, injury or death to koalas.
4. Disease - Eye or urinary tract infections due to Chlamydia may become apparent as overt diseases when an animal is subject to additional stress such as nutritional deficiency following habitat loss or loss of territory. Infection of the reproductive tract by Chlamydia may lead to

female infertility, which may reach sufficiently high levels to cause a marked depression of the reproductive rate in the population. Koala retrovirus is a retrovirus that is present in many populations of koalas. It has been implicated as the agent of an AIDS-like immunodeficiency and a range of cancers in the native Australian marsupial

5. Natural disasters such as fire and drought affect koala populations both directly and indirectly. Hot crown fires can cause high numbers of koala mortalities as well as destroy habitat or reduce it to remnant patches. Droughts can also cause high rates of mortality and may have a greater impact on young koalas, especially in semi-arid and arid regions. If a natural disaster such as a drought occurs over an extended time the impact on the population will be even greater. The impact of natural disasters such as fire and drought is exacerbated by fragmentation of habitat and may also be influenced by climate change.
6. Climate Change - Climate change has the potential to have a significant impact on koala populations. Global climate change is likely to affect koalas and the other eucalypt specialists by changing the species composition within forests and by exacerbating the low ratios of nutrients to anti-nutrients in eucalypt foliage (Hume 2008).

The draft South East Queensland Koala State planning regulatory provisions were recently introduced as the principle legislative tool to protect koalas and koala habitat. Since 1995, there have been 12 flawed legislative instruments introduced to conserve the koala in the Koala Coast, yet populations continue to display catastrophic declines. The most recent legislative instrument, the now superseded *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006 - 2016 (Koala Plan)*, has not been successful in halting loss and fragmentation of habitat. Instead, during the first three years of the Koala Plan, populations declined by a staggering 51%.

4. Summary of criteria used to justify the nomination (using hierarchical, alphanumeric numbering system) for **endangered**, **vulnerable** or **near threatened** species. Refer to Attachment 1 for appropriate category and criteria details. For example, a species may be nominated as *endangered*: A1c; B1ab(iii); C2 a(i).

A2a

5. To support your nomination, provide details of an authority that may be consulted (published reference or an individual). The authority may be either a published reference or an individual. If an individual is nominated as the authority, provide details of his/her experience and qualifications. As the SAC will contact this person for verification of your nomination, please seek their approval before recommending them.

Authority Reports:

Environmental Protection Agency (2007). Report on the Koala Coast surveys 2005-2006 – refer to http://epa.qld.gov.au/nature_conservation/wildlife/koalas/koala_plan/report_on_koala_coast_koala_surveys_20052006/

Department of Environment and Resource Management (2009). Decline of the Koala Coast Koala Population: Population Status in 2008 – refer to http://epa.qld.gov.au/nature_conservation/wildlife/koalas/koala_plan/decline_of_the_koala_coast_koala_population_population_status_in_2008/

Other References:

Gordon, G. (1991). Estimation of the age of the koala, *Phascolarctos cinereus* (Marsupialia: Phascolarctidae) from tooth wear and growth. *Australian Mammology* 14:5-12.

Hume, I. (2008). Comparative animal nutrition: Koalas, eucalypts, and global climate change. New Fellows Seminar delivered to Australian Academy of Science, Science at the Shine Dome 7th May 2008 - refer to <http://www.science.org.au/sats2008/nfs-hume.htm>

Martin, R.W. and Handasyde, K.A. (1990). Population dynamics of the koala (*Phascolarctos cinereus*) in south-eastern Australia. In Lee, A.K., Handasyde, K.A. and Sanson, G.D. (eds) *Biology of the koala*. Surrey Beatty and Sons, Sydney.

Phillips, S.S. (2000). Trends and the koala conservation debate. *Conservation Biology* 14:650-659.

Preece, H.J. (2007). Monitoring and modelling threats to koala populations in rapidly urbanising landscapes: Koala Coast, South East Queensland, Australia. PhD Thesis, The University of Queensland, Brisbane.

Seddon, J., Lee, K., Ellis, W., Johnston, S. De Villiers, D., Preece, H., and Carrick, F. (2008) Incorporating spatial data into analysis of koala populations in QLD Australia. Presentation at the Society of Molecular Biology and Evolution 2008 conference, Barcelona, Spain.

Seddon, J., Lee, K., Ellis, W., Johnston, S. De Villiers, D., Preece, H., and Carrick, F. (*in press*). Incorporating spatial data into analysis of koala populations in QLD Australia.

Thompson, J. (2006). The comparative ecology and population dynamics of koalas in the Koala Coast region of south-east Queensland. PhD Thesis, The University of Queensland, Brisbane.

6. Nominee information

Individuals, or individuals acting on behalf of bodies and organisations may submit nominations.

Name (include title, given names and surname):

Ms Deborah Tabart OAM

Position:

Chief Executive Officer

Organisation or company name (if nomination is from an organisation):

Australian Koala Foundation

Postal address:

40 Charlotte Street, Brisbane QLD 4001

Telephone number during business hours:

(07) 3229 7233

Fax number:

(07) 3221 0337

E-mail:

deborah@savethekoala.com

Details of your qualifications are required, including the year and a description of the nature of the qualification. For example, Bachelor of Science (University of Queensland) 1988 with majors in zoology and botany.

Qualifications:

List your experience that may be relevant to this nomination, including a list of publications. A copy of your resume may be attached with the nomination if it contains all of the required details.

Experience (include a list of relevant publications):

7. Declaration

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

Signed: _____

Date: _____

8. Lodgement instructions

Completed nominations should be electronically lodged at:

queensland.herbarium@epa.qld.gov.au

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

Species Technical Committee
C/- The Director
Biodiversity Sciences Branch
Brisbane Botanic Gardens,
Mt. Coot-tha Rd,
Toowong, Qld 4066.

Queries regarding nominations should be directed to:

The Chief Scientist, Ecological Sciences on (07) 3896 9322

Attachment 1: Categories and criteria used for assessing the status of species

Categories	Criteria
Extinct in the wild	<p>A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed as Extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.</p>
Endangered	<p>The best available evidence indicates it meets any one of the following five criteria (A, B, C, D or E):</p> <p>A. Reduction in population size based on any of the following:</p> <ol style="list-style-type: none"> 1. An observed, estimated, inferred or suspected population size reduction of $\geq 70\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following: <ol style="list-style-type: none"> a. direct observation b. an index of abundance appropriate to the taxon c. a decline in area of occupancy, extent of occurrence and/or quality of habitat d. actual or potential levels of exploitation. the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites. 2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of a–e under A1. 3. A population size reduction of $\geq 50\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of b–e under A1. 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 50\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of a–e under A1. <p>B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:</p> <ol style="list-style-type: none"> 1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a–c: <ol style="list-style-type: none"> a. Severely fragmented or known to exist at no more than five locations. b. Continuing decline, observed, inferred or projected, in any of the following: <ol style="list-style-type: none"> (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. c. Extreme fluctuations in any of the following: <ol style="list-style-type: none"> (i) extent of occurrence

Categories	Criteria
	<ul style="list-style-type: none"> (ii) area of occupancy (iii) number of locations or subpopulations (iv) number of mature individuals. <p>2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a–c:</p> <ul style="list-style-type: none"> a. Severely fragmented or known to exist at no more than five locations. b. Continuing decline, observed, inferred or projected, in any of the following: extent of occurrence <ul style="list-style-type: none"> (ii) area of occupancy (iii) area, extent and/or quality of habitat (iv) number of locations or subpopulations (v) number of mature individuals. c. Extreme fluctuations in any of the following: <ul style="list-style-type: none"> (i) extent of occurrence (ii) area of occupancy (iii) number of locations or subpopulations (iv) number of mature individuals. <p>C. Population size estimated to number fewer than 2500 mature individuals and either:</p> <ul style="list-style-type: none"> 1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b): <ul style="list-style-type: none"> a. Population structure in the form of one of the following: <ul style="list-style-type: none"> (i) no subpopulation estimated to contain more than 250 mature individuals, OR (ii) at least 95% of mature individuals in one subpopulation. b. Extreme fluctuations in number of mature individuals. <p>D. Population size estimated to number fewer than 250 mature individuals.</p> <p>E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).</p>
Vulnerable	<p>The best available evidence indicates it meets any one of the following five criteria (A, B, C, D or E) and therefore faces a high risk of extinction in the wild:</p> <ul style="list-style-type: none"> A. Reduction in population size based on any of the following: <ul style="list-style-type: none"> 1. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following: <ul style="list-style-type: none"> a. direct observation b. an index of abundance appropriate to the taxon c. a decline in area of occupancy, extent of occurrence and/or quality of habitat d. actual or potential levels of exploitation. the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

Categories	Criteria
	<p>2. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of a–e under A1.</p> <p>3. A population size reduction of $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of b–e under A1.</p> <p>4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of a–e under A1.</p> <p>B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:</p> <p>1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a–c:</p> <ul style="list-style-type: none"> a. Severely fragmented or known to exist at no more than ten locations. b. Continuing decline, observed, inferred or projected, in any of the following: <ul style="list-style-type: none"> (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. c. Extreme fluctuations in any of the following:(i) extent of occurrence(ii) area of occupancy(iii) number of locations or subpopulations(iv) number of mature individuals. <p>2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a–c:Severely fragmented or known to exist at no more than ten locations.b. Continuing decline, observed, inferred or projected, in any of the following:(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.</p> <ul style="list-style-type: none"> c. Extreme fluctuations in any of the following:(i) extent of occurrence(ii) area of occupancy(iii) number of locations or subpopulations(iv) number of mature individuals. <p>C. Population size estimated to number fewer than 10,000 mature individuals and either:</p> <p>1. An estimated continuing decline of at least 10% within ten years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR</p> <p>2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):a.</p>

Categories	Criteria
	<p>Population structure in the form of one of the following:</p> <ul style="list-style-type: none"> (i) no subpopulation estimated to contain more than 1000 mature individuals, OR (ii) all mature individuals are in one subpopulation. <p>b. Extreme fluctuations in number of mature individuals.</p> <p>D. Population very small or restricted in the form of either of the following:</p> <ul style="list-style-type: none"> 1. Population size estimated to number fewer than 1000 mature individuals. 2. Population with a very restricted area of occupancy (typically less than 20km²) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming endangered or extinct in a very short time period. <p>E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.</p>
<p>Near Threatened</p>	<p>Please provide evidence that the species meets the following two criteria as set out below:</p> <p>A taxon is near threatened when it has been evaluated against the criteria [for threatened] and does not qualify for Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.</p> <p>And</p> <p>The best available evidence indicates that the species meets any one of the following five criteria A, B, C, D or E.</p> <p>A. Population size reduction of $\geq 20\%$ over 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased. Time period must include the current time, or the immediate preceding period, or the immediate future period. This assessment must be based on (and specifying) any of the following:</p> <ul style="list-style-type: none"> a. direct observation b. an index of abundance appropriate to the taxon c. a decline in area of occupancy, extent of occurrence and/or quality habitat d. actual or potential levels of exploitation e. the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites. <p>B. Geographic range in the form of either Extent of occurrence $\leq 40000\text{km}^2$ or Area of occupancy $\leq 4000\text{km}^2$ AND a continuing decline of at least 10% within 10 years or 3 generations, whichever is longer, is observed, projected or inferred in any of the following:</p> <ul style="list-style-type: none"> (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 <p>C. Population size estimated to be less than 20000 mature individuals, AND,</p>

Categories	Criteria
	<p>there is continuing decline of at least 10% within 10 years or 3 generations, whichever is longer (See Vulnerable criterion C.)</p> <p>D. Population size \leq 3000 mature individuals, OR, Area of occupancy \leq 40km², or very small number of locations, 10 or fewer. (See Vulnerable criterion D and also refer to “rare fauna and flora” categories).</p> <p>E. Quantitative analysis showing probability of extinction in the wild \geq 5% within 100 years.</p>