



Consultation Document on Listing Eligibility and Conservation Actions

Argynnis hyperbius inconstans (Australian fritillary)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Argynnis hyperbius inconstans* (Australian fritillary) for inclusion on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) threatened species list in the Critically Endangered category; and
- 2) the necessary conservation actions for the above species.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the EPBC Act or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Draft information for your consideration of the eligibility of this species for listing as Critically Endangered starts at page 3 and information associated with potential conservation actions for this species starts at page 9. To assist with the Committee's assessment, the Committee has identified a series of specific questions on which it seeks your guidance at page 13.

Responses are to be provided in writing either by email to:
species.consultation@environment.gov.au

or by mail to:

The Director
Terrestrial Species Conservation Section
Wildlife, Heritage and Marine Division
Department of the Environment
PO Box 787
Canberra ACT 2601

Responses are required to be submitted by 8 November 2016.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at:

<http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at:

<http://www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at:

<http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, Conservation Advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation Advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at:

<http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

Argynnis hyperbius inconstans

(Australian fritillary)

Taxonomy

Conventionally accepted as *Argynnis hyperbius inconstans* (Butler, 1873).

Species Information

Description

Argynnis hyperbius inconstans, the Australian fritillary, belongs to the family Nymphalidae. Males and females of this species differ in appearance. The male Australian fritillary has a wingspan of 60 mm. The upperside of the wings are light orange-brown in colour, with numerous rounded black markings (Braby 2004) and a double black subterminal line (line near the edges of the wings). The underside of the forewings are marked the same as the upperside, however they are pinkish-orange in colour, and the apex of the wings (the anterior corners) are light orange. The underside of the hindwings are light orange with black markings edged with silver (QLD DEHP 2010). Females have a wingspan of 66 mm. The colour and markings of the female are similar to the male, however the background wing colour is a slightly paler orange, some black markings are more pronounced, and the apex of the wings are sometimes tinged green (Braby 2004). The species' eggs are dome-shaped, pale yellow in colour and 0.9 mm x 0.7 mm in size. The first instar has a brown body with a lateral white stripe and pairs of white dorsal spots. The second instar has a brownish black body with a short thick scoli (an external spine). The third and fourth instar stages have a black head with two blunt horns, a black body with a broad orange dorsal stripe. The pupa are approximately 26 mm long and are orange-brown in colour with dark brown markings that fade with age (Lambkin & Lambkin 1977).

Distribution

The Australian fritillary has been recorded in scattered locations across south-eastern Queensland and north-eastern New South Wales (Braby 2000; Sands & New 2002). The species appears to have had a core distribution between Gympie in Queensland and Port Macquarie in NSW, although there are historical records which extend beyond this range. The species has been recorded as far north as Mt Bellenden Ker in Queensland, and as far south as the Hunter Valley in NSW (Sands & New 2002).

The Australian fritillary was, at times, considered to have been common at certain locations (Binns 1976; Sands & New 2002). It was reported to be abundant around Gympie at intervals between 1977 and 1994, and around Port Macquarie in 1977, 1985 and 1994 (Sands & New 2002). However, the species experienced declines throughout the 1980s and 1990s. In 1994, Dunn et al. estimated that the species' distribution had contracted by 80 percent (Dunn et al., 1994).

One of the last reliable sightings of the species was in 2001 near Port Macquarie. A sighting was also reported in the vicinity of Bribie Island, Queensland at this time (Sands & New 2002). While a considerable search effort has been made to find populations of the Australian fritillary by interest groups, targeted surveys have repeatedly failed to locate the species. There continues to be sporadic reports of the species, although none have been verified by photographs or specimens or have been able to be repeated by other observers. In 2014, a sighting was reported near the town of Seventeen Seventy in Queensland, and a sighting was reported in 2015 near Port Macquarie. While the Australian fritillary has been successfully bred in captivity in the past, there are no known captive populations of the species (Andren pers. comm., 2016).

Relevant Biology/Ecology

The Australian fritillary usually occurs around river estuaries or open, swampy coastal areas (McCubbin 1971; Sands & New 2002). The species is restricted to areas where the larval food plant, *Viola betonicifolia* (the arrowhead violet), occurs (NSW Scientific Committee 2002). The arrowhead violet is a small perennial herb which usually grows in damp, shaded forest habitats (Australian National Herbarium 2015) and often grows in association with *Lomandra longifolia* (long leaved matrush) and *Imperata cylindrica* (bladey grass) (QLD DEHP 2010). Moderate densities of the arrowhead violet are believed to be necessary to sustain breeding populations of the Australian fritillary (Sands & New 2002; QLD DEHP 2010). Aggregations of the arrowhead violet that would sustain breeding populations have become increasingly rare in areas where the butterfly was formerly known to occur (Andren pers. comm., 2016).

Females lay eggs on, or near, the arrowhead violet. The egg stage lasts five days before the emergence of the first instar. The larval duration lasts approximately 23 days and consists of four instars (QLD DEHP 2010). The caterpillars feed on the leaves of the arrowhead violet (Lambkin & Lambkin 1977). The pupal duration lasts between 4-9 days (QLD DEHP 2010; Lambkin & Lambkin 1977). Adults fly in swampy areas where the arrowhead violet grows, feeding from flowers of various plants and settling on low vegetation or on the ground. Adults are most frequently observed during winter months (Sands & New 2002).

Adults usually occur at low densities, or can be apparently absent from a given site, but on occasions – even at intervals of several years – they can become locally abundant. The predisposing factors for the species' apparent 'boom and bust' cycles, and mechanisms for its persistence at low densities, are not understood. These 'boom and bust' cycles may be related to the ecology of the arrowhead violet. As the arrowhead violet varies in abundance following periods of drought, this may impact on breeding in the Australian fritillary given that moderate densities of the arrowhead violet are necessary to sustain breeding (Sands & New 2002; QLD DEHP 2010). It is also possible that irregular larval diapauses could influence adult apparency (Sands & New 2008).

Threats

Table 1 – Threats impacting upon the Australian fritillary in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type	Threat status	Evidence base
Habitat loss and fragmentation			
Land clearance for rural and urban development	Known	Current	The larval food plant, the arrowhead violet, appears to favour moist and fertile soils in coastal locations - areas which have been severely impacted by urban and agricultural development. As a result of ongoing habitat fragmentation, any remaining populations of the Australian fritillary are susceptible to reduced connectivity and potential inbreeding (NSW Scientific Committee 2002).

Drainage of coastal wetland habitat for rural and urban development	Known	Current	Many freshwater and coastal swamps within the species' range, including areas where the arrowhead violet once occurred, have been degraded or destroyed following drainage for rural and urban use (Dunn et al., 1994; Sands 1999; Braby 2000).
Trampling and grazing of the larval food plant, the arrowhead violet, by a range of herbivores	Suspected	Current	The arrowhead violet is palatable to a range of herbivores (Andren pers. comm., 2016). As moderate densities of the arrowhead violet are necessary to sustain breeding in the Australian fritillary this may impact the species.
Herbicide application to the larval food plant, the arrowhead violet	Suspected	Current	Off-target damage to the arrowhead violet from herbicide spraying is a potential threat to the Australian fritillary (Johnston & Johnston 1984; Andren pers. comm., 2016).
Invasive species			
Weed invasion impacting on the larval food plant, the arrowhead violet	Suspected	Current	The impact of weed invasion, mainly by introduced grass species and groundsel bush (<i>Baccaris halimifolia</i>), on the arrowhead violet has been identified as a threat to the Australian fritillary (Sands & New 2002).
Predation by fire ants (<i>Solenopsis invicta</i>) and the coastal brown ant (<i>Pheidole megacephala</i>)	Suspected	Current	Fire ants (<i>Solenopsis invicta</i>) and the coastal brown ant (<i>Pheidole megacephala</i>) are known to predate upon a variety of invertebrates and their presence in an area affects both species richness and abundance of invertebrates (TSSC 2003; Hoffmann 2008; Commonwealth of Australia 2006). Studies have found fire ants prey on all life stages (eggs, larvae and pupae) in other butterfly species (TSSC 2003). Given their occurrence within the species' historic range, both fire ants and the coastal brown ant are suspected of predated on the Australian fritillary (QLD DEHP 2010) however there are no referenced studies to demonstrate their impact on this species.
Fire			
Too frequent burning	Suspected	Current	While the fire response of the larval food plant, the arrowhead violet, is poorly known, its decline in abundance in coastal areas may be partially the result of altered fire regimes (an increase in fire frequency in particular) (Sands & New 2002; QLD DEHP 2010).

Collection			
Butterfly collection	Potential	Current	Whilst surveying and accumulation of voucher specimens by hobbyists is important for clarifying the species' range and abundance (New 2011), with so few remaining populations (if any) any collection could have a negative impact upon the Australian fritillary (QLD DEHP 2010).

Assessment of available information in relation to the EPBC Act Criteria and Regulations

Criterion 1. Population size reduction (reduction in total numbers)			
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>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> <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.</p> <p>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]</p> <p>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.</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, hybridization, pathogens, pollutants, competitors or parasites</p> <p><i>based on any of the following</i></p>		

Evidence:

The Australian fritillary was historically widespread, and at some locations including Gympie (Binns 1976; Lambkin & Lambkin 1977) and Port Macquarie (Sands & New 2002), at certain times, it was also considered to be locally common. However, the species experienced declines throughout the 1980s and 1990s. In 1994, Dunn et al. reported the species' distribution had declined by 80 percent (Dunn et al., 1994). Until 2001, the species was known from locations near Port Macquarie and the vicinity of Bribie Island (Sands & New 2002). Populations at these sites declined in 2001, and there have been no confirmed sightings of the species since this time. Sporadic sightings that have not been verified by photographs or specimens are the only indication that the species is not extinct (Andren pers. comm., 2016). As outlined under the threats section, a number of threats are likely to have resulted in this decline. Coastal swamps containing the species' larval food plant, the arrowhead violet, have been largely destroyed by farming and urbanisation (NSW Scientific Committee 2002) and aggregations of the arrowhead violet that are large enough to sustain breeding populations of the Australian fritillary have become increasingly rare in areas where the butterfly was formerly known to occur (Andren pers. comm., 2016).

Based on the above, a very severe population reduction is suspected to have occurred in the past, and the likely causes of this reduction may not have ceased. As such, the data presented above appear to demonstrate that the species is **eligible for listing as Critically Endangered** [A2 (c)] under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions indicating distribution is precarious for survival:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(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			
(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			

Evidence:

The species' past and current area of occupancy is difficult to assess given that the species appears to experience 'boom and bust' cycles, possibly related to patterns in the abundance of its larval food plant (Sands & New 2002). The extent of occurrence of the species' former core distribution, which consisted of coastal areas from Gympie, Qld to Port Macquarie, NSW is estimated to be approximately 33 000 km² (DotEE 2016). However, despite targeted searches across the species' previous range there have been no confirmed sightings of the species' since 2001. There continues to be sporadic sighting of the species, although none of these sightings have been verified by photographs or specimens (Andren pers. comm., 2016).

Given the above, a decline in the species' extent of occurrence and area of occupancy can be inferred and the species' geographic distribution is likely to be very restricted. However, as estimates of the species' current extent of occurrence and area of occupancy are not available, the data presented above appear to be insufficient to demonstrate if the species is eligible for listing under this criterion. As the purpose of this consultation document is to elicit additional information to better understand the species' status this conclusion should be considered to be tentative at this stage.

Criterion 3. Population size and decline			
	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 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 the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

Evidence:

The species' past and current population size is difficult to assess given that the species appears to experience 'boom and bust' cycles, possibly related to patterns in the abundance of its larval food plant (Sands & New 2002). There are no known populations of the Australian fritillary, and there have been no confirmed sightings of the species' since 2001. There continues to be sporadic reports of the species, although none have been verified by photographs or specimens (Andren pers. comm., 2016). Given the above, there are no reliable estimates of population size available.

The data presented above appear to be insufficient to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 4. Number of mature individuals			
	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Evidence:

The species' past and current population size is difficult to assess given that the species appears to experience 'boom and bust' cycles possibly related to patterns in the abundance of its larval food plant (Sands & New 2002). There are no known populations of the Australian fritillary, and there have been no confirmed sightings of the species' since 2001. There continues to be sporadic reports of the species, although none have been verified by photographs or specimens (Andren pers. comm., 2016). It is possible that ongoing searching

could result in the discovery of a substantial number of individuals. Given the above, there are no reliable estimates of population size available.

The data presented above appear to be insufficient to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 5. Quantitative Analysis			
	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
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% in 100 years

Evidence:

Population viability analysis appears not to have been undertaken and there are insufficient data to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Conservation Actions

Recovery Plan

A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

Primary Conservation Actions

Undertake surveys to identify breeding populations of the Australian fritillary. If a population is found, protect the larval food plant (the arrowhead violet) in the area, and establish a captive breeding program if feasible.

Conservation and Management Priorities

Habitat loss, disturbance and modifications

- If populations of the Australian fritillary are found, ensure land managers in the area are aware of the species' occurrence and provide protection against key and potential threats.
- Avoid further decline of populations of the larval food plant, the arrowhead violet, in areas where the Australian fritillary has been known to occur by avoiding:
 - the clearance of this plant for rural and urban development;
 - herbicide application to the arrowhead violet; and
 - modification of drainage in the area.

Invasive species (including threats from grazing, trampling, predation)

- If populations are found, identify weeds that could become a threat to the larval food plant, the arrowhead violet, and undertake weed control in the local area using

- appropriate methods such as weed slashing techniques. Avoid using herbicides in the vicinity of the arrowhead violet.
- If populations are found, manage total grazing pressure through exclusion fencing or other barriers. If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and density that does not detrimentally affect the larval food plant, the arrowhead violet.
 - If populations are found, manage sites by identifying and reducing the spread of invasive species including fire ants (*Solenopsis invicta*) and the coastal brown ant (*Pheidole megacephala*).

Fire

- Implement an appropriate fire management regime for protecting key habitat which includes ensuring buffers to prevent wildfire or managed fire from impacting the habitat.
- Where appropriate, employ fuel reduction activities and other protective measures at strategic locations nearby to reduce the potential adverse impacts of wildfire in areas identified as key habitat, but ensure these are well planned and implemented and do not constitute an increased risk (e.g. through escape of planned fires), and are of low intensity. Follow up with appropriate weed control.
- If a population is located, provide maps of known occurrences of the larval food plant to local and state Rural Fire Services in the area and seek inclusion of mitigation measures in bush fire risk management plan/s, risk register and/or operation maps.

Stakeholder Engagement

- Increase awareness of the Australian fritillary amongst private and public land managers, NGOs and butterfly enthusiast/hobbyist groups, with a view to increase the number of people searching for populations of the species, and to encourage participation in the rehabilitation of the larval food plant, the arrowhead violet. This could involve propagating and planting the arrowhead violet at sites where the Australian fritillary was known to occur, and where the arrowhead violet has declined. Awareness could be raised through means such as the development of specific pamphlets or through workshops or newsletters provided by local environment groups and local councils.
- Undertake Indigenous consultation in areas where the species was known to occur to acquire traditional knowledge about the species, for example knowledge of previous breeding sites or knowledge about the species' past 'boom and bust' cycles of abundance.
- Discourage butterfly collectors from over-collecting the species and encourage them to confidentially report sightings to government conservation agencies. This could be achieved through the development of pamphlets, newsletters or workshops with butterfly enthusiast groups/hobbyist groups, local environment groups and local councils.
- If populations are found on private land consider the use of conservation covenants to facilitate ongoing protection for the species and its habitat.

Breeding, propagation and other ex-situ recovery action

- If a population is discovered, investigate the feasibility establishing a captive breeding program and implement if feasible.

Survey and Monitoring priorities

- Undertake surveys in potential habitat to identify breeding populations of the Australian fritillary. If populations are found, assess population size and distribution.
- Investigate whether data collected by butterfly enthusiast groups can be used as part of a collective, broad-scale monitoring program.
- If populations are found, monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

Information and Research priorities

- If secure populations are found, carry out studies on the development of immature and adult stages to better understand the 'boom and bust' cycle of abundance in this species and determine how the species is capable of persistence at very low densities in some years e.g. protracted development mechanisms such as diapause, aestivation or over-wintering.
- Identify optimal fire regimes for regeneration of the larval food plant, the arrowhead violet, and response to prevailing fire regimes.
- Investigate to what degree the species' larval food plant, the arrowhead violet, has declined in abundance and geographic range, and identify the causes of this decline.
- Research the potential impact of predation by fire ants (*Solenopsis invicta*) and the coastal brown ant (*Pheidole megacephala*) on the Australian fritillary.

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Collective list of questions – your views

Biological information

1. Can you provide any information or estimates on the species' longevity, average life span and generation length?
2. Can you provide any further information regarding the general requirements for recruitment?
3. Can you provide any information about past or potential changes in the abundance and/or geographic distribution of the larval food plant, the arrowhead violet, across the Australian fritillary's range?
 - If you believe the arrowhead violet has declined in abundance and/or geographic distribution, what do you consider to be the main reasons for this decline?
4. Are you aware of any evidence of the Australian fritillary utilising any other plant species, besides the arrowhead violet, as a larval food plant?

Past Distribution

5. Do you agree with the estimate of the species' former extent of occurrence?

If you disagree with the estimate provided, are you able to provide an alternative estimate?

If, because of uncertainty, you are unable to provide an estimate of past extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of past extent of occurrence, and also choose the level of confidence you have in this estimated range.

Past extent of occurrence is estimated to be in the range of: <input type="checkbox"/> <20 000 km ² <input type="checkbox"/> 20 001 – 30 000 km ² <input type="checkbox"/> 30 001 – 40 000 km ² <input type="checkbox"/> >40 001 km ²
Level of your confidence in this estimated extent of occurrence <input type="checkbox"/> 0–30% - low level of certainty/ a bit of a guess/ not much data to go on <input type="checkbox"/> 31–50% - more than a guess, some level of supporting evidence <input type="checkbox"/> 51–95% - reasonably certain, data suggests this range of decline <input type="checkbox"/> 95–100% -high level of certainty, data indicates a decline within this range <input type="checkbox"/> 99–100% - very high level of certainty, data is accurate within this range

Current distribution/population size

6. Has the survey effort for this species been adequate to determine its national distribution and population size? Please provide justification for your response.

Evidence of change in total population size / geographic distribution

7. How severe do you consider the reduction in the species' population size to have been over the past 10 years?

Very severe reduction in population size	Severe reduction in population size	Substantial reduction in population size
<input type="checkbox"/> ≥ 80%	<input type="checkbox"/> ≥ 50%	<input type="checkbox"/> ≥ 30%
<p>Level of your confidence in this estimated extent of decline:</p> <p><input type="checkbox"/> 0–30% - low level of certainty/ a bit of a guess/ not much data to go on</p> <p><input type="checkbox"/> 31–50% - more than a guess, some level of supporting evidence</p> <p><input type="checkbox"/> 51–95% - reasonably certain, data suggests this range of decline</p> <p><input type="checkbox"/> 95–100% -high level of certainty, data indicates a decline within this range</p> <p><input type="checkbox"/> 99–100% - very high level of certainty, data is accurate within this range</p>		

8. Can you provide any additional information about the extent of decline in the species' population size?
9. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

General

10. Is the information used to identify the nationally threatened status of the species robust? Have all the underlying assumptions been made explicit? Please provide justification for your response.
11. Can you provide additional data or information relevant to this assessment?
12. Have you been involved in developing this nomination? If so, in what capacity?

Threats

13. Do you agree that the threats listed are correct and that their effect on the species is significant?
14. To what degree are the identified threats likely to impact on the species in the future?
15. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this species at any stage of its life cycle?

Management

16. What planning, management and recovery actions are currently in place supporting protection and recovery of the species? To what extent have they been effective?
17. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species?

18. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?