



## **Consultation Document on Listing Eligibility and Conservation Actions**

### ***Fregata andrewsi* (Christmas Island frigatebird)**

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

- 1) the eligibility of *Fregata andrewsi* (Christmas Island frigatebird) for inclusion on the 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 *Environment Protection and Biodiversity Conservation Act 1999* (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.

Responses are to be provided in writing either by email to:  
[species.consultation@environment.gov.au](mailto:species.consultation@environment.gov.au)

or by mail to:

The Director  
Marine and Freshwater 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 20 June 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 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.

# *Fregata andrewsi*

Christmas Island frigatebird

## **Taxonomy**

Conventionally accepted as *Fregata andrewsi* (Mathews 1914).

## **Species/Sub-species Information**

### **Description**

The Christmas Island frigatebird is a very large seabird with a mostly black body, a glossy green sheen to head and back feathers, and varying patches of white on the underbody. It has slender, long wings, a deeply forked tail and a long bill with a hooked tip. Adults weigh 1.4-1.7 kg and have a wing span of 205-230 cm. Adult males have a large, red gular (throat) pouch which is inflated during breeding. Females have no gular pouch, and have more extensive white on the body than males. Juveniles have similar plumage to that of adult females, but have a pale fawn head, a white throat and russet necklace (Marchant & Higgins 1990).

### **Distribution**

The Christmas Island frigatebird breeds on Christmas Island (BirdLife International 2016) but forages widely around south-east Asia and the Indian Ocean, and occasionally occurs in Java, Sumatra, Bali, Borneo, the Andaman Islands, Darwin and the Cocos (Keeling) Islands (Gore 1968; Marchant & Higgins 1990).

Breeding is currently confined to four small colonies on Christmas Island (James & McAllan 2014), these being:

- The 'Golf Course' colony located on the shore terrace of the east coast.
- The 'southern outlier' colony located on the shore terrace of the east coast, south of the 'Golf Course' colony.
- The 'Cemetery' colony located on the first inland terrace of the north coast.
- The 'Margaret Beaches' colony located on the shore terrace of the north coast.

Small clusters of nests have also been observed in the Settlement (near Short Street on the north coast), the inland cliff at the north-western end of Flying Fish Cove (north coast), and on the footslopes of the inland cliff at Smith Point (north-east point of the island) (James & McAllan 2014).

There were formally large colonies on the north coast at Flying Fish Cove and the 'Dryers' site (adjacent to a phosphate mine), however, these sites are no longer suitable for nesting for Christmas Island frigatebirds (James & McAllan 2014).

### **Relevant Biology/Ecology**

The Christmas Island frigatebird undertakes aerial feeding, predominantly scooping up marine organisms, such as flying-fish and squid, and various animal matter from the surface of the water. It also takes eggs, nestlings, grasshoppers and occasionally carrion off beaches. A proportion of food may be stolen from other birds (Gibson-Hill 1947; Hill & Dunn 2004; Marchant & Higgins 1990). Breeding adults tend to forage in the waters around Christmas Island, whereas non-breeding adults and immature individuals forage much more widely (Hill & Dunn 2004).

Christmas Island frigatebirds are barely able to walk (Marchant & Higgins 1990) and experience difficulty becoming airborne, requiring a perch at least 3 m from the ground to take off (Gibson-Hill 1947). Christmas Island frigatebirds predominantly breed and roost on shore terraces that are protected from prevailing south-east trade winds (Hill & Dunn 2004; Woehler 1984). The species is also known to breed and roost on inland terraces close to the shore (James & McAllan 2014).

Christmas Island frigatebirds have a biennial breeding cycle as offspring take 15 months to reach independence (Hill & Dunn 2004). Breeding occurs in pairs (Marchant & Higgins 1990). Christmas Island frigatebirds build loose nests under the top branches of tall trees, usually 10-20 m from the ground, particularly in almond (*Terminalia catappa*), stinkwood (*Celtis timorensis*), strangler fig (*Ficus* species), propeller tree (*Gyrocarpus americanis*) and pongamia (*Pongamia pinnata*) (Hill & Dunn 2004; James 2003; James & McAllan 2014). Multiple pairs will nest in the same tree, sometimes less than 1 m apart (Hill & Dunn 2004; Marchant & Higgins 1990; Nelson 1975). Females lay one egg from mid February to early June. Sexes take turns to incubate the egg over a period of approximately 50 days. Nestlings fledge at six months but remain dependent on parents for an additional nine months (Nelson 1975). Juveniles attain adult plumage in the beginning of their fourth year (Gibson-Hill 1947) and reach breeding age at approximately five to seven years (Nelson 1975).

A generation time of 15.5 years (Garnett et al., 2011) is derived from age of first breeding (5.3 years) and maximum longevity (27.6 years) (Shreiber & Burger 2002).

## Threats

Table 1 – Threats

Threat factor	Threat type	Threat status	Evidence base
Habitat loss, disturbance and modifications			
Deforestation	known	past	Loss of habitat, particularly breeding habitat, associated with deforestation for human settlement and phosphate mining has contributed to historical declines in Christmas Island frigatebirds (Hill & Dunn 2004; Garnett et al., 2011; Marchant & Higgins 1990). Approximately 90 ha of breeding habitat was cleared following settlement, including the shore terrace of Flying Fish Cove (Stokes 1988) and the site for the Golf Course (James & McAllan 2014).
Habitat degradation from phosphate dust	known	current	Dust emitted from phosphate mines on Christmas Island is known to cause dieback and death to some trees (Hill & Dunn 2004). Christmas Island frigatebirds do not use habitat affected by phosphate dust (Woehler 1984). In 1967, the 'Dryers' site was considered a major nesting area for the species (Stokes 1988). The 'Dryers' site is located close to a phosphate mine. In the 1970's, large emissions of phosphate dust commenced which is likely to have degraded the breeding habitat. The number of nests significantly reduced in the 1980's and 1990's. In 2003, there were no Christmas Island frigatebirds nesting at the 'Dryers' site (Hill & Dunn 2004). Stokes (1988) suggested that the 'cemetery' colony may have formed from birds displaced from the 'dryers' colony as a result of phosphate dust fallout.

Fishing			
Mortality from bycatch	known	current	Christmas Island frigatebirds have been observed entangled in fishing lines in Jakarta Bay, Indonesia (Tirtaningtyas & Henniecke 2015). Intensive fishing activities in south east Asian waters are likely to pose a significant threat to the species (Tirtaningtyas & Henniecke 2015).
Mortality from poisoning and shooting	known	current	Fishermen in Jakarta Bay, Indonesia, have been observed baiting Christmas Island frigatebirds with poison or sedatives, and also shooting birds (Tirtaningtyas & Henniecke 2015). Christmas Island frigatebirds may be perceived as competition by fishermen which may be the cause for the poisoning and shooting. Christmas Island frigatebirds may also be sedated for easy capture by fishermen for food (Tirtaningtyas & Henniecke 2015). Baiting by fishermen is likely to be a significant threat to Christmas Island frigatebirds and is likely to be occurring across south east Asia within the species' range (Tirtaningtyas & Henniecke 2015).
Invasive species			
Habitat alteration from weeds	known	current	Shore terrace nesting habitat for the Christmas Island frigatebird is threatened by the spread of weeds which compete with tall nesting trees (Director of National Parks 2014; Hill & Dunn 2004). Weeds include coral vine ( <i>Antigonon leptopus</i> ), which is known to smother and kill tall trees, and false curry bush ( <i>Clausena excavata</i> ), coffee bush ( <i>Leucaena leucocephala</i> ) and poinciana ( <i>Delonix regia</i> ), which compete with native species and suppress growth and recruitment of tall tree species (D. Maple pers. comm. 2016).
Habitat alteration and mortality from crazy ant ( <i>Anoplolepis gracilipes</i> )	potential	-	Crazy ants occur at the 'Cemetery' and 'Golf Course' colonies (D. Maple pers. comm. 2016). Crazy ants and mutualistic scale insects are known to cause stress, defoliation and death of tall trees which could have significant impacts on the breeding habitat of Christmas Island frigatebirds (Hill & Dunn 2004). The threat of crazy ants on Christmas Island frigatebirds has not been demonstrated.
Predation by cats ( <i>Felis catus</i> )	potential	-	Predation of grounded birds by domestic cats, particularly in settled areas, may occur (Hill & Dunn 2004). However, the threat of cat predation on Christmas Island frigatebirds has not been demonstrated.

Storms			
Mortality from severe storms	known	current	The breeding success of Christmas Island frigatebirds is affected by severe storms as eggs are known to be destroyed by strong winds (Marchant & Higgins 1990). Severe storms are likely to cause mortality in juveniles and adults (Hill & Dunn 2004).
Fire			
Mortality from wild fire	suspected	current	During the dry season, terrace forests become very dry, making breeding sites vulnerable to wild fire. The 'cemetery' and 'golf course' breeding colonies are located close to human activity, which increases risk of fire occurring (Hill & Dunn 2004).
Climate change			
Increased sea surface temperature	suspected	future	Higher sea surface temperature associated with climate change is likely to reduce food availability for Christmas Island frigatebirds in marine areas adjacent to Christmas Island (Hill & Dunn 2004).

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

<b>Criterion 1. Population size reduction (reduction in total numbers)</b>			
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
<b>A1</b>	≥ 90%	≥ 70%	≥ 50%
<b>A2, A3, A4</b>	≥ 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>based on any of the following</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>		

#### **Evidence:**

A historical review of the extent and decline of the four Christmas Island frigatebird sub-colonies suggests that the pre-settlement population was about 6300 breeding pairs per annum, but declined to 4500 by 1910, 3500 by 1945, 2500 by 1967, 1500 by 1978, and 1300 pairs by 1988 (James 2003). James (2003) surveyed frigatebird nests on the Island in 2003 and estimated that there were only 1171 breeding pairs. If the historical and more recent population estimates are

accurate, then it can be inferred that there has been a population decline of about 66 percent in approximately three generations between 1945 and 2003 (James 2003).

The likely causes of decline are habitat clearance, disturbance from phosphate mining, and through mortality across their foraging range (Garnett et al., 2011; Hill & Dunn 2004; Marchant & Higgins 1990; Tirtaningtyas & Hennicke 2015). Although breeding habitat is no longer under threat from clearing, the other pressures remain.

The data presented above appear to demonstrate that the species is **eligible for listing as Endangered (A2)** under this criterion based on an inferred decline of over 50 percent between 1945 and 2003. 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.

<b>Criterion 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy</b>			
	<b>Critically Endangered Very restricted</b>	<b>Endangered Restricted</b>	<b>Vulnerable Limited</b>
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 extent of occurrence is estimated at 9 115 000 km<sup>2</sup>. These figures are based on the mapping of point records from 1996 to 2016, obtained from state governments, museums, Birdlife Australia and CSIRO. The extent of occurrence was calculated using a minimum convex hull (DotE 2016). Garnett et al. (2011) estimate the extent of occurrence of the Christmas Island frigatebird to be 140 000 km<sup>2</sup> based on foraging data within the Australian Fishing Zone, obtained from Birds Australia databases and Atlas data. The extent of occurrence was calculated using a minimum convex polygon. This is an underestimate of the species extent of occurrence as it does not include points across the full foraging range.

The area of occupancy for the Christmas Island frigatebird is based on direct mapping of the four breeding colonies across the island which, combined, are estimated to be only 210 ha in area (0.21 km<sup>2</sup>) (James 2003). For a species with such a restricted nesting area, it is not appropriate to use methods such as 2x2 km grid cells (IUCN 2016) as the species would only utilise a fraction of the grid cell, resulting in substantial overestimate of area used. Using the 2x2 km grid cell method for the frigatebird results in an area of occupancy of approximately 24 km<sup>2</sup> (DotE 2016). Garnett et al. (2011) in the Action Plan for Australian Birds, using 1x1 grid cells, estimate an area of occupancy of 0.5 km<sup>2</sup>.

Given the close proximity of breeding colonies on Christmas Island, the Christmas Island frigatebird is considered to occur in one location, making the breeding distribution of the species very restricted. It is also estimated that the number of mature individuals, area of occupancy, and area and quality of habitat are continuing to decline (Garnett et al., 2011).

The data presented above appear to demonstrate that the species is **eligible for listing as Critically Endangered (B2ab)** under this criterion based on the small estimate an area of occupancy, single breeding location, and declining number of mature individuals, area of

occupancy, and area and quality of habitat (Garnett et al., 2011). 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.

<b>Criterion 3. Population size and decline</b>			
	<b>Critically Endangered Very low</b>	<b>Endangered Low</b>	<b>Vulnerable Limited</b>
Estimated number of mature individuals	<b>&lt; 250</b>	<b>&lt; 2,500</b>	<b>&lt; 10,000</b>
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)	<b>Very high rate 25% in 3 years or 1 generation (whichever is longer)</b>	<b>High rate 20% in 5 years or 2 generation (whichever is longer)</b>	<b>Substantial rate 10% in 10 years or 3 generations (whichever is longer)</b>
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	<b>≤ 50</b>	<b>≤ 250</b>	<b>≤ 1,000</b>
(a) (ii) % of mature individuals in one subpopulation =	<b>90 – 100%</b>	<b>95 – 100%</b>	<b>100%</b>
(b) Extreme fluctuations in the number of mature individuals			

**Evidence:**

Morris-Pocock et al. (2012) estimated the Christmas Island frigatebird population to contain approximately 5000 individuals. Similarly, Garnett et al. (2011) estimated the population to have 4800 mature individuals (based on an estimate of 1200 breeding pairs (Beeton et al., 2010; James 2003)).

The Christmas Island frigatebird currently maintains a viable population size (Morris-Pocock et al., 2012), but is thought to be still declining (Beeton et al., 2010; Garnett et al., 2011; James 2003). There is no information to suggest a projected rate of decline for the species, but James (2003) inferred a rate of decline of approximately 67 percent between 1945 and 2003. There is no information to suggest there have been extreme fluctuations in the number of mature individuals. Given the close proximity of breeding colonies on Christmas Island, the Christmas Island frigatebird is considered to occur in one location.

The data presented above appear to demonstrate that the species is **eligible for listing as Vulnerable (C2a(ii))** under this criterion as there are less than 10 000 mature individuals; there is an inferred ongoing decline; and the population is considered precarious as all mature individuals occur in a single population. 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:**

Garnett et al. (2011) estimate the Christmas Island frigatebird population to have 4800 mature individuals (see Criterion 3).

The data presented above appear to demonstrate the species is not 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:**

No population viability analysis has been undertaken (Garnett et al., 2011).

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 recovery plan is currently in place. The *National recovery plan for the Christmas Island frigatebird Fregata andrewsi* (Hill & Dunn 2004) includes objectives to:

- maximise the extent of occurrence and total population size
- implement threat abatement strategies
- increase community involvement in and awareness of the Christmas Island frigatebird

**Primary Conservation Actions**

- No decrease in population size or area of occupancy.
- No breeding sites degraded or destroyed.

**Conservation and Management Priorities**

Habitat loss, disturbance and modifications

- Undertake habitat restoration within or adjacent to breeding sites by revegetating appropriate areas with native plants, in conjunction with a weed control program.

### Invasive species

- Undertake weed control in breeding colony sites using appropriate methods.
- Continue to control crazy ants through chemical baiting and biological control methods.
- Continue to control cats through baiting, trapping and shooting methods.

### Fire

- Provide maps of breeding colonies to local fire services and seek inclusion of mitigation measures in bush fire risk management plan/s, risk register and/or operation maps.

### Stakeholder Engagement

- Liaise with organisations which have undertaken, or are currently undertaking, research for the Christmas Island frigatebird.
- Engage with construction, mining and tourism companies, including Christmas Island Phosphates and Christmas Island Tourism Association, to provide information about the Christmas Island frigatebird and importance of conserving sites where the species is known to breed.
- Engage with the local community to promote conservation of the Christmas Island frigatebird.
- Engage with countries within the foraging range of the frigatebird to develop strategies to limit direct mortality as a result accidental capture in fishing operations, or through targeted capture.

### **Survey and Monitoring priorities**

- Design and undertake population surveys to more precisely assess population size, breeding success and population trends.
- Monitor the presence of crazy ants, cats and weeds in breeding colony sites to determine the impact of these threats on Christmas Island frigatebirds, and to inform management actions.
- Monitor the progress of conservation actions, including the effectiveness of management actions and adapt them if necessary to contribute to the species' recovery.
- Undertake surveys in suitable habitat to locate any additional occurrences of nesting Christmas Island frigatebirds.
- Undertake surveys of known subpopulations following wildfire or severe storms to determine the impact of stochastic events on the species.

### **Information and Research priorities**

- Undertake research to determine methods for reducing phosphate dust production and fallout, in association with mining companies.
- Assess the relative impact of threats associated with fishing practices (including bycatch, poisoning, targeted capture and hunting) within Australian waters and international waters to inform management actions.
- Investigate the effectiveness and cost-benefits of methods for controlling weeds.
- Investigate the effectiveness and cost-benefits of methods for controlling crazy ants.

## **Collective list of questions – your views**

1. Can you provide any additional or alternative references, information or estimates on longevity and generation length?
2. Can you provide any information regarding the requirements for recruitment?
3. Has the survey effort for this species been adequate to determine its adult population size?
4. Do you accept the estimate provided of the total population size of the species?
5. Can you provide any additional data on the extent of decline in the species' total population size over the last 50 years (approximately three generations)?
6. Does the information consider the entire geographic extent, national extent and international extent of the species?
7. Has the survey effort for this species been adequate to determine its distribution?
8. Is the distribution as described valid? If not, can you please provide an estimate or additional information on the current geographic distribution?
9. Do you agree that the way the current extent of occurrence and/or area of occupancy have been estimated is appropriate?
10. Do you agree that the threats listed are correct and that their effect on the species is significant?
11. To what degree are the identified threats likely to impact on the species in the future?
12. What planning, management and recovery actions are currently in place supporting protection and recovery of the species? To what extent have they been effective?
13. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?
14. Can you provide additional data or information relevant to this assessment?

## **References cited in the advice**

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