Australian Government

Department of the Environment and Energy

Department Risk Analysis

Application to add *Mico argentatus* (Silvery Marmoset) to the Environment Protection and Biodiversity Conservation Act 1999 *List of Specimens taken to be Suitable for Live Import*

September 2019

INTRODUCTION

Purpose of the proposed import

Darling Downs Zoo seeks to import an unspecified number of Silvery Marmosets (*Mico argentatus*) into Australia for public exhibition.

The proposed import would initially be of six individuals, three male and three female to be kept in three zoos. Darling Downs Zoo intend to hold one pair while the remaining pairs will be held by another two facilities. Importing three pairs of Silvery Marmosets, each individual from separate bloodlines, will help achieve and maintain genetic diversity for the species in the Australasian region. Further imports may be undertaken to provide additional genetic stock.

The imported animals will all have been captive-bred in licenced overseas zoos eligible to export animals to Australia.

Background

Under s303EC of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the responsible Minister may amend the *List of Specimens taken to be suitable for live import* (Live Import List) by including a specimen on the list. There are two parts to the List:

- Part 1 comprises specimens that can be imported without a permit under the EPBC Act and
- Part 2 comprises specimens that require a permit under the EPBC Act to be imported. Import restrictions generally apply to the species listed on Part 2, such as 'Eligible non-commercial purpose only, excluding household pets'. Additional conditions may also be applied when the permit for import is issued.

Before amending the Live Import List, the Minister must consult with appropriate Ministers and other persons, and consider a report assessing the potential environmental impacts of the proposed amendment. When submitting an application to the Department to amend the Live Import List, all applicants are required to provide an accompanying report that addresses specific terms of reference.

The Department undertakes a risk assessment using the information in the applicant's report and any other sources of relevant information. The Department also considers comments and information received through the public consultation process (including states and territories). The application and accompanying draft report for the proposed import of Silvery Marmoset was released for public comment between August and September 2018.

Biology and Ecology of *Mico argentatus*

Introduction

The Silvery Marmoset, *Mico argentatus,* is a small monkey native to the Amazon Basin in South America.

The species was formerly in the genus Callithrix (along with all other marmosets, now divided between three or four distinct genera), but is now almost-universally placed in the genus *Mico*, which was previously treated as a subgenus of Callithrix. The IUCN considers the species to be in the genus *Mico* while CITES still lists it as *Callithrix argentata* (with *Mico argentatus* as a synonym) (Garbano, 2015 and 2018).

Description

Silvery Marmosets are relatively small primates. The average head-to-body length, excluding the tail is 21cm; the tail adds another 30-32cm (Petter and Desbordes, 2010). Adults weigh between 273–435g and the reported lifespan is about 16 years both in the wild and in captivity (Hakeem, 1996).

The Silvery Marmoset is the only marmoset with a body that is silver-gray in color and a tail that is dark brown. They have bare, yellow to pink faces and ears, a trait shared with several other marmoset species. Their hands end in sharp claws which gouge tree bark to access and consume the sticky sap inside.

Habitat/ Special adaptations

Silvery Marmosets inhabit a range of forest types, including primary forest, secondary forest, open forest, and remnant forest patches in savannah and appear to avoid risk of predation and higher temperatures to travel by not crossing open grassland in the absence of tree cover (Albernaz and Magnusson, 1999). There may be interspecific competition in areas where they live sympatrically with other callitrichid species such as the Black-handed Tamarin (*Saguinus niger*) (Ferrari and Lopes Ferrari, 1990).

In the wild the species does not migrate, hibernate or aestivate. They are distributed in the lowland tropics of north eastern Brazil, less than 100 metres above sea-level. In this monsoonal climate the annual average temperatures are above 26 degrees Celsius, and the annual rainfall is 2800-3100mm. Silvery Marmosets are not dependent on waterways and, as an arboreal species, occur in many different forest types sited away from water bodies.

Diet

Silvery Marmosets are omnivorous and eat fruits, flowers, nectar, plant exudates (gums, saps, latex) and animal prey (including frogs, snails, lizards, spiders and insects). Silvery Marmosets have morphological and behavioural adaptation for gouging trees trunks, branches and vines of certain species to stimulate the flow of gum, which forms a notable component of the diet (Coimbra-Filho and Mittermeier, 1976; Rylands, 1984).

Home range and social structure

Home ranges for individual groups of Silvery Marmosets are between 4 and 35 hectares, (Digby et al, 2007), the size depending on availability and distribution of foods and secondary-growth patches. Home ranges of several groups may sometimes overlap.

In the wild Silvery Marmosets live in extended family groups of between four and 15 individuals. All members of the group are involved in infant care including infant carrying and food sharing. Silvery Marmosets have a high reproductive potential compared with other primates however their reproductive output is limited by high infant mortality rates and suppression of reproduction in socially subordinate individuals (Digby et al, 2007). Silvery Marmosets have two breeding seasons per year however only the dominant female of the group successfully produces one to four offspring per breeding season in both the wild and in captivity however only one to two will survive to adulthood.

Both male and female non dominant adults have been observed leaving their family group to join neighbouring family groups or to breed with members of adjoining groups. This breeding is only successful if individuals become the dominant pair of the new group (Digby et al, 2007).

Environmental tolerances

Whilst Silvery Marmosets are only found in a small part of the monsoonal lowland tropics of Brazil, less than 100m above sea level, they can survive in captivity in all climates including cold and snowy conditions provided they have a dry, warm retreat (Mallinson, 1971). In temperate climates the survival of Silvery Marmosets is expected to be limited by a lack of invertebrate prey rather than by cold.

In the wild Silvery Marmosets are preyed upon by birds of prey, snakes, and predatory mammals (Felidae, Mustelidae, Procyonidae) (Digby et al, 2007). In Australia escaped Silvery Marmosets would potentially be prey to birds of prey and large snakes. Terrestrial predators such as quolls, feral cats and foxes would have little impact on tree-dwelling marmosets.

Distribution and endemism (as regards conservation status)

Range Description:

The Silvery Marmoset has a fairly restricted range in north eastern Brazil. Gonçalves et al (2003) describe the species' distribution as being bounded by the Amazon River to the north, the Tapajos River to the west, and the Toncantins River to the east. The species was found to be common near the mouth of the Rio Tapajós (Mittermeier and Coimbra-Filho 1977) in terra firma primary forests and in extensive areas of secondary growth forest, dense lowland forests and montane and submontane forests of the Brazilian Shield (Ferrari and Lopes Ferrari 1990). Further south the species inhabits mixed open forest. It has been observed in forest patches in Amazonian white-sand savanna at Alter do Chão, south of Santarém, Rio Tapajós (Albernaz and Magnusson 1999).

Fig.1:
Distribution map from IUCN (International Union for Conservation of Nature) 2008. Mico argentatus. The IUCN Red List of Threatened Species. Version 2019-1

Reason for import (captive breeding program etc.)

There have never been Silvery Marmosets in Australia although closely related species of tamarin and marmoset have been held and bred in Australia in zoos and laboratories over the last 100 years (applicant – and IPAC list below).

Below is a list of non-indigenous marmoset and tamarin species currently recorded as being present (kept in accordance with State/Territory legislation) in Australia. No other marmoset or tamarin species have ever been kept in Australia (IPAC 2015).

Class	Scientific Name	Common Name (Synonyms)	IPAC Threat Category*	Endorsed by IPAC
Mammalia	*Callithrix jacchus*	Common Marmoset; White-tufted-ear Marmoset	Extreme	16/08/2004

Mammalia	*Callithrix pygmaea*	Pygmy Marmoset	Extreme (P)	No endorsed risk assessment
Mammalia	*Leontopithecus rosalia*	Golden Lion Tamarin	Moderate	22/06/2009
Mammalia	*Saguinus imperator*	Emperor Tamarin	Extreme (P)	No endorsed risk assessment
Mammalia	*Saguinus oedipus*	Cotton-top Tamarin	Extreme (P)	No endorsed risk assessment

* If a species has not been assessed by IPAC or if there is too little information to be able to properly adopt a risk analysis approach, the precautionary approach will be adopted, that is the species will be assigned to an Extreme (P) IPAC Threat Category

There are currently approximately 300 animals of six species of callitrichids held in Australian zoos as (contained) breeding populations (applicant – based on Australian zoo census data from Zoo and Aquarium Association (ZAA)). Despite this long history and the population figures, no species of callitrichid has ever formed a wild population in Australia via escaped or released animals.

Silvery Marmosets will feature in zoo-based educational displays, will serve as ambassadors for their species and facilitate education of zoo visitors.

Initially three female and three male Silvery Marmosets would be imported with a pair going to each of three zoos. A captive breeding program will be undertaken to further conservation of the species in captivity and to maintain genetic diversity of the species in the Australasian region.

Planned breeding will be undertaken to preserve genetic diversity and in order to avoid producing surplus stock. Individual animals will be contracepted to avoid unwanted breeding.

Importation of Silvery Marmosets would also be subject to an importation approval by the Commonwealth Department of Agriculture.

Related Live Import List listings

There are currently seven callitrichids on the Live Import List. All are on Part 2 and listed as ‘non-commercial purposes only, excluding household pets’, namely:

Taxon	**Common Name**
Callithrix jacchus	Common Marmoset
Callithrix pygmaea	Pygmy Marmoset
Leontopithecus chrysopygus	Black Lion Tamarin
Leontopithecus rosalia	Golden Lion Tamarin
Saguinus imperator	Emperor Tamarin
Saguinus midas	Red Handed Tamarin
Saguinus oedipus	Cotton-headed Tamarin, Cotton-top Tamarin

There are no reports of any of these species forming feral populations or having any environmental impacts in Australia.

Conservation status

Mico argentatus:

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listing: Appendix II (CITES, 2018).
Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. All Primates are listed in Appendix II 'with the exception of those species listed in Appendix I'. There are three marmoset species listed in Appendix I – *Callimico goeldii*, *Callithrix aurita* and *Callithrix flaviceps*. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

International Union for the Conservation of Nature (IUCN) Red list status: Least Concern C1 (Rylands and Silva, 2018).

The IUCN Red List has listed the Silvery Marmoset as Least Concern as this species is relatively wide ranging and adaptable, and although habitat loss is taking place within its range, there is no reason to believe that it is declining at a rate that would warrant listing in a threatened category (Rylands and Silva, 2018).

Risk assessment

The Department used the Australian Bird and Mammal Risk Assessment Model developed by Mary Bomford (2008) to assess the risks posed by the importation of Silvery Marmosets (**Appendix A**). The results indicate that the species has:

- a low risk of establishing a wild population in the Australian environment if released.
- a low risk of becoming a pest if it were to establish.
- poses no danger to the public from either captive or released individuals.
- a theoretical Environment and Invasive Committee (formerly Vertebrate Pest Committee) threat category of **LOW** (using Australian Bird and Mammal Risk Assessment Model and Table 2.3 in Bomford, 2008).

The climate match, comparing the native range of the species to Australian climates, indicates that the Silvery Marmoset has a low climate match to Australia **(Appendix B**). This species has a highest Climatch class of six indicating that most of Australia is climatically quite different to their natural habitat. All of these matches correspond to coastal regions in central and northern Queensland and the far north of the Northern Territory.

In their native distribution Silvery Marmosets are able to survive in disturbed forest and forest fragments however these isolated populations appear to suffer from inbreeding and genetic drift (Gonçalves 2003). Some of the areas identified in the Climatch data would contain suitable habitat for this species to survive, however due to the predicted low numbers of

animals likely to escape, their low reproductive rate and the lack of genetic diversity it would be relatively unlikely to establish a self-sustaining feral population.

The application states that Silvery Marmosets have been held in zoos worldwide and there has been no reports of them establishing wild populations in any of these countries to date. In Brazil, the species has a restricted range and is reliant on a good supply of insects within a forested habitat being available.

The Silvery Marmoset has never established wild breeding populations outside of its natural range (Long 2003). The only successful establishments of wild breeding populations are deliberate reintroductions of marmoset and tamarin species for conservation purposes (e.g. Golden Lion Tamarin *Leontopithecus rosalia*)). Wild populations of the Common Marmoset *Callithrix jacchus* and Black-tufted Marmoset *Callithrix penicillata* have established in non-native parts of Brazil via a large scale pet trade in these species (Long, 2003). Reintroduction success from captive bred populations of tamarins and marmosets is very low unless animals are taught survival techniques prior to reintroduction (Long, 2003).

There is no risk of Silvery Marmosets hybridising with native Australian animals as there are no primates native to Australia.

Hybridisation in callitrichids, especially in marmosets, is known to occur in the wild where the distributions of two related species meet, creating "hybrid zones". (Arnold and Meyer 2006) Ciombra-Filho et al, (1993) suggest that all marmoset hybrids would be fertile as many hybrids have been successfully bred in captive trials. Silvery Marmosets have been recorded as hybridising with the Common Marmoset *Callithrix jacchus* in captivity (English (1932) and Hill (1961).

As noted above under ‘reason for import’ the Silvery Marmoset is not included in the Vertebrate Pests Committee’s 2007 “*List of Exotic Vertebrate Animals in Australia*”. Of the callitrichid species listed in the document, the Common Marmoset *Callithrix jacchus* is assigned a threat rating of "2/extreme", while six other listed marmoset and tamarin species are assigned a threat rating of “2/Serious”.

The number “2” in the threat rating is used to denote “limited to statutory zoos or endorsed special collections”.

The rating of "serious" is qualified as "These animals may be introduced and/or should be kept only in collections approved by the relevant State/Territory authority as being primarily kept for (1) public display and education purposes, and/or for (2) genuine scientific research approved by the relevant State/Territory authority, and as meeting Best Practice for the purposes of keeping the species concerned".

The rating of "extreme" is qualified as "These animals should not be allowed to enter, nor be kept in any State or Territory. (Special consideration may be given to scientific institutions on a case by case basis.) Any species that has not been assessed previously should be considered to be in the Extreme Threat Category and should be treated accordingly, until a risk assessment is conducted."

In line with their policy any species that has not undergone an Environment and Invasives Committee approved Risk Assessment is designated “extreme” as part of their precautionary

procedures as a result almost every species of exotic mammal listed in the document has been categorised as either "extreme" or "serious".

Potential impacts of established feral populations

Within its natural range Silvery marmosets are not considered a pest in any economic way (IUCN 2019). The Global Invasive Species Database (2018) does not list any member of the callitrichid genus as being invasive.

Silvery Marmosets feed largely on exudates, reptiles and insects so would find some food in most forested habitats in Australia. Their exudativory is also directly comparable to the feeding habits of Australian possums of the family Petauridae. Marsupials whose home ranges overlap with potential habitat for Silvery Marmoset and are also listed as being obligate exudativores (gum eaters) by Cabana *et al* (2017) include the Sugar Glider (*Petaurus breviceps)*, Yellow-bellied Glider (*Petaurus australis)*, Squirrel Glider (*Petaurus norfolcensis*), Striped Possum (*Dactylopsila trivirgata*) and the endangered Mahogany Glider (*Petaurus gracilis)* which is listed as being an opportunistic gum-feeder, with the foraging-time spent on exudates being only "minor".

The low reproductive rate of Silvery Marmosets together with the need for the support of a family group to care for offspring and rapid vulnerability to inbreeding as a result of genetic isolation reduces the probability that Silvery Marmosets would be able to establish feral populations in Australia.

Risk mitigation

The risk assessment indicates that the species has a low potential for establishing in Australia if it were released. However due to their IUCN Least Concern and CITES Appendix II status, and for the welfare of those animals that are to be imported, it will be a requirement that they be contained in secure facilities at an approved Zoo. This containment will assist in preventing the escape of this species into suitable habitat.

Table 1: Summary of risks and mitigation measures

Risk	Likelihood	Impact	Mitigation measures	Overall risk
Release or escape of adult specimens	unlikely	minor	Only kept in secure cages in zoos	Low
Release or escape of immature specimens	unlikely	minor	Only kept in secure cages in zoos	Low
Disease transmission to native species populations	unlikely	minor	Only kept in secure cages in zoos. Individuals will be vet checked prior to arrival and will be subject to Department of Agriculture quarantine procedures.	Low

Theft and deliberate release	possible	minor	Previous thefts of marmosets in Australia were for the pet trade – deliberate release is unlikely and survival in the wild unlikely.	Low

The Department considers that any risks posed by this species would be adequately mitigated by listing the species under Part 2 of the Live Import List with standard conditions relating to the import of live animals for zoo exhibitions.

Concerns raised and responses

The Department undertook consultation with relevant ministers (or their delegates), government agencies and the public in July – September 2018. The Department received responses from the ACT and Queensland governments with both supportive of the application:

1. The ACT was supportive of the application to allow import for zoo exhibition purposes only.

2. Queensland is supportive of the application to allow import for zoo exhibition purposes only.

No further comments were received in relation to this application.

The Department undertook a second consultation with relevant ministers (or their delegates), government agencies between 24 August and 11 October 2019.

One response was received from the ACT government supporting the listing of Silvery Marmosets.

Conclusion

Having undertaken an analysis and reviewed the available information, the Department recommends listing *Mico argentatus* (Silvery Marmoset) on Part 2 of the Live Import List with conditions: **Eligible non-commercial purpose only excluding household pets**.

Permits would be required for each import, the security of the facilities would be assessed and further conditions can be placed on individual imports as required.

Appendix A: Australian Bird and Mammal Risk Assessment Model

Insert Risk Assessment

Species identification and sources

Common name	Silvery Marmoset
Scientific name	*Mico argentatus*
Date assessed	20-Jun-19
Literature Search Type And Date:	IUCN Red List of Threatened Species, Google,

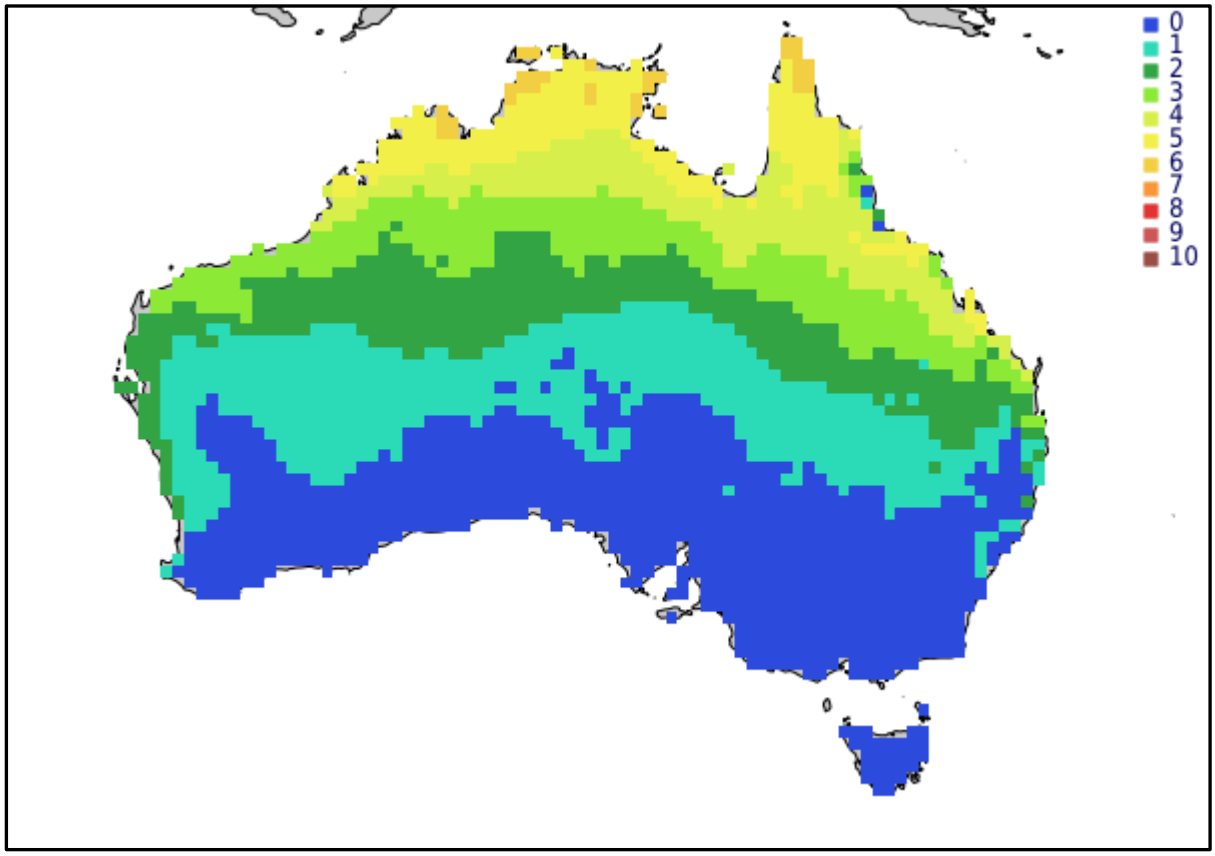
Risks posed by captive or released individuals	Value	Comment
A1. Risk to people from individual escapees (0–2)	0	Callitrichids have small sharp claws and sharp teeth, and are capable of inflicting minor wounds on humans. However the very small size of the animals prevents serious injuries.
A2. Risk to public safety from individual captive animals (0–2)	0	no risk to humans
A. Risk posed by captive or released individuals (= Sum of A 1 to 2).	**0**	**Not dangerous**

Risk of establishment	Value	Comment
B1. Climate Match Score (1–6)	1	confined to far northern Australia (primarily Cape York and northern
B2. Exotic Population Established Overseas Score (0–4)	0	No exotic populations ever established.
B3. Overseas Range Size Score (0–2)	0	Over seas range in the Amazon Basin, Brazil. The extent of occurrence is more than 20,000 km² and the area of occupation is more than 2,000 km². It is found in the in the lowland tropics of northeastern Brazil, less than 100 metres above sea-level, in a monsoonal climate.
B4. Taxonomic Class Score (0–1)	1	Mammal
B5. Diet Score (0–1)	1	Mico argentatus eats fruits, flowers, nectar, plant exudates (gums, saps, latex) and animal prey (including frogs, snails, lizards, spiders and insects).
B6. Habitat Score (0–1)	1	Mico argentatus found in a range of forest types, including primary forest, secondary forest, open forest, and remnant forest patches in savannah.
B7. Migratory Score (0–1)	1	Not migratory.
Model		
B. Risk of Establishment (Model 1 = Sum of B1 to B4; Model 2 = Sum of B1 to B7).	**5**	**Low**

Risk of becoming a pest	Value	Comment
C1. Taxonomic group (0–4)	0	Mico argentatus is not a member of any of the identified taxonomic groups.
C2. Overseas range size including current and past 1000 years, natural and introduced range (0–2)	0	The extent of occurrence is more than 20,000 km² and the area of occupation is more than 2,000 km²
C3. Diet and feeding (0–3)	1	Mico argentatus eats fruits, flowers, nectar, plant exudates (gums, saps, latex) and animal prey (including frogs, snails, lizards, spiders and insects).
C4. Competition with native fauna for tree hollows (0–2)	0	In captivity nest-boxes are routinely provided for callitrichids, but animals in the wild do not normally use cavities for either sleeping or breeding.
C5. Overseas environmental pest status (0–3)	0	the only wild-introduced populations of any species are either deliberate re-introductions to their former range for conservation purposes
C6. Climate match to areas with susceptible native species or communities (0–5)	1	The species has no grid squares within the highest four climate match classes (ie in classes 10, 9, 8 and 7) that overlap the distribution of any susceptible native species or communities, and has 1–50 grid squares within the highest six climate match classes that overlap the distribution of any susceptible native species or ecological communities.
C7. Overseas primary production pest status (0–3)	0	Mico argentatus has not been identified in the literature as a primary production pest.nt
C8. Climate match to susceptible primary production (0–5) **Hint: Use the "commodity" sheet created when a CLIMATCH grid is opened.**	1	Low (species has attributes making it capable of damaging this or similar commodities and has had the opportunity but no reports or other evidence that it has caused damage in any country or region
C9. Spread disease (1–2)	2	Species is mammalian. Score of 2 is predetermined.
C10. Harm to property (0–3)	1	Callitrichids have small sharp claws and sharp teeth, and are capable of digging holes in wooden structures in search of sap. However the very small size of the animals restricts the amount of damage to property or ecosystems. The limited potential range of this species within Australia, according to the Climatch modelling, indicates limited interraction between this species and the environment or property. Hence the score of 1.
C11. Harm to people (0–5)	2	Callitrichids have small sharp claws and sharp teeth, and are capable of inflicting minor wounds on humans. However the very small size of the animals prevents serious injuries.
C. Pest Risk Score (= Sum of C 1 to 11).	**8**	**Low**

Summary	Value	
A. Risk to public safety posed by captive or released individuals	**0**	**Not dangerous**
B. Risk of establishing a wild population	**5**	**Low**
C. Risk of becoming a pest following establishment	**8**	**Low**

APPENDIX B: CLIMATCH PREDICTED RANGE.



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