



**Australian Government**

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**Department of the Environment and Energy**

## **Department Risk Analysis**

**Application to add *Puma concolor* (Puma) to the Environment Protection and Biodiversity Conservation Act 1999 *List of Specimens taken to be Suitable for Live Import***

November 2019

## **INTRODUCTION**

### **Purpose of the proposed import**

Two organisations, Zambi Wildlife Retreat, New South Wales, and Darling Downs Zoo, Queensland, have applied to add Puma (*Puma concolor*) to the Live Import List for public display and education purposes. Zambi Wildlife Retreat also wishes to provide companionship for the one remaining Puma in captivity in Australia. The applicants suggest that other Australian zoos, including Australia Zoo, Mogo Zoo, Shoalhaven Zoo and Wild Animal Encounters, have shown interest in exhibiting Pumas. The animals will be sourced from overseas organisations eligible to export animals from captive-bred populations 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 applying 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 from states and territories).

The Zambi Wildlife Retreat application was received in September 2018 and the Darling Downs Zoo application in February 2019.

The Zambi Wildlife Retreat application and accompanying draft report for the proposed import of Puma was released for public comment between 4 March and 3 May 2019. The application from Darling Downs Zoo was not circulated as it was an application for primarily the same purposes and contained similar information as the Zambi application.

### **Biology and Ecology of *Puma concolor***

#### ***Introduction***

The Puma (*Puma concolor* (Linnaeus, 1771) previously *Felis concolor*) is also known as the cougar, deer tiger, mountain lion, catamount, panther and red tiger. The Puma is a large

slender American cat species that occupies the most extensive range of any New World terrestrial mammal (Nielsen *et al.*, 2015) from Canada to the southern tip of South America.

The taxonomy of the Puma is under review by the International Union for the Conservation of Nature (IUCN) Species Survival Commission Cat Specialist Group. While 32 subspecies of Puma have been classically described, on the basis of genetic analysis Culver *et al.* (2000) suggest six subspecies as follows:

*P. c. cougar*: North America

*P. c. costaricensis*: Central America

*P. c. capricornensis*: eastern South America

*P. c. concolor*: northern South America

*P. c. cabreræ*: central South America

*P. c. puma*: southern South America.

### **Description**

Pumas are large felines standing up to 76cm at the shoulder and up to 2.4m long, nose to end of the tail. Male Pumas are typically larger than females and can weigh up to 100kg but average 62kg. Females grow to 2.05m long and weigh an average of 42kg (applicant). Pumas in Canada and Chile weigh roughly twice as much as those from the tropics with those in the equatorial rainforest weighing only up to 30kg (Sunquist and Sunquist, 2002).

Pumas can live up to 24 years in captivity but only 18 years in the wild (Zambi Wildlife Retreat - Weigl, 2005). Studies of wild Pumas suggest few live past nine years of age (Gay and Best, 1996).

Pumas are typically one colour from reddish brown to grey with lighter underparts and have dark brown markings on the back of the ears, the sides of the nose, and the tip of the tail. Puma kittens are spotted.

### **Habitat/ Special adaptations**

Pumas can survive in a broad range of habitats, including all forest types, as well as lowland and montane desert, grasslands, savanna and shrub lands. Pumas co-occur with Jaguars in much of their Latin American range and may favour more open habitats than their larger competitor, although both may be found in dense forest (Sunquist and Sunquist, 2002).

In the wild Pumas do not migrate, hibernate or aestivate.

### **Diet**

Pumas are an obligate carnivore capable of taking large prey but, when available, small to medium-sized prey are also important. In the wild, Pumas will eat elk, deer, moose and caribou in North America. They will also eat smaller animals such as squirrels, bobcats, coyote, other Pumas, rabbits, possums, birds, rats and fish as well as livestock. In North America, deer make up 60-80 percent of the Puma's diet, and the mean weight of prey taken is 39-48kg. In Florida and Mexico, however, where deer numbers are low, Pumas take smaller prey including feral pigs, raccoons and armadillos, and deer account for only about 1/3 of the diet (Sunquist and Sunquist 2002 and Gómez-Ortiz, 2011). In order to survive Pumas, require 2-7kg of meat a day (in Sunquist and Sunquist 2002).

Pumas are opportunistic predators who will kill almost anything that puts itself in a vulnerable position. Pumas can also be idiosyncratic at times focusing their energy on one species. One female Puma is recorded to have killed 72 horses of all ages in a nine and half month period. In another case, one Puma killed 192 sheep in one night (in Sunquist and Sunquist 2002).

### ***Home range and social structure***

Home range sizes for individual Pumas in North America range from 32 to over 500km<sup>2</sup> (Dickson and Beier, 2007), depending on their gender, body mass, season, topography and the availability and distribution of food sources. Male home ranges are larger and may overlap with the home ranges of several females.

Pumas are primarily solitary animals but have been recorded tolerating neighbouring Pumas feeding at their kill which is then reciprocated by that neighbour (Elbroch *et al.*, 2017). Elbroch recorded Pumas of the southern Greater Yellowstone Ecosystem interacting on average every 11-12 days in winter when prey was scarce and 'sharing' was most beneficial. In this area the prey was usually elk - a large herbivore that is much too large for one Puma to consume alone. It is unknown if this behaviour exists in areas where the target prey is only large enough to feed one Puma.

Pumas begin breeding at approximately two years old and give birth every 12 to 22 months to litters of up to six kittens. The mothers keep the kittens in a single nursery or only move them short distances until they are six to eight weeks of age. Kittens are weaned at about three months but will stay with, and learn from, their mother until they are mature at approximately two years old. On average, only one kitten survives until adulthood. When the mother is ready to breed again, she will abandon or aggressively chase off her young. The young adults will then disperse, looking for a new home range. Pumas can disperse up to 500km from their birth place. Young adults will travel until they are either killed or find a home range vacated by the death of another Puma (Pierce and Bleich, 2003).

### ***Environmental tolerances***

Pumas can survive in all climates provided there is a food source. Home ranges overlap with those of other predators such as wolves, coyotes, bears, bobcats and jaguars. Pumas have been recorded killing smaller carnivores as well as being killed by packs of wolves and bears (Pierce and Bleich, 2003).

### ***Distribution and endemism (as regards conservation status)***

#### ***Range Description:***

The Puma is one of the most widely distributed mammals in the Western Hemisphere, existing from western Canada through the mid-western United States south to the southern tip of South America (see Fig 1). There is also a small isolated population in Florida.



**Fig.1:** Distribution map from the International Union for Conservation of Nature (IUCN) 2014. *Puma concolor*. The IUCN Red List of Threatened Species. Version 2019-1

**Reason for import (captive breeding program etc.)**

Pumas would be imported to feature in zoo-based educational displays, serve as ambassadors for their species and facilitate education of zoo visitors.

Initially Zamb Wildlife Retreat proposes to import one male Puma to cohabit with a 17yo female, and Darling Downs Zoo propose to import three breeding pairs.

Importation of Pumas would also be subject to an importation approval under the Commonwealth *Biosecurity Act 2015*.

The following non-indigenous felidae species are recorded as being present (kept in accordance with State/Territory legislation) in Australia. No other felidae species have been kept in Australia (IPAC 2015).

Scientific Name	Common Name (Synonyms)	IPAC Threat Category	Endorsed by IPAC
<i>Acinonyx jubatus</i>	Cheetah; Hunting Leopard	Extreme (P)	No endorsed risk assessment
<i>Caracal caracal</i>	Caracal	Extreme (P)	No endorsed risk assessment
<i>Felis catus</i>	Cat	Extreme (P)	No endorsed risk assessment

<i>Catopuma temminckii</i>	Asian Golden Cat; Asiatic golden cat; Temminck's golden cat	Extreme (P)	No endorsed risk assessment
<i>Leopardus pardalis</i>	Ocelot	Extreme (P)	No endorsed risk assessment
<i>Leptailurus serval</i>	Serval	Extreme (P)	No endorsed risk assessment
<i>Panthera leo</i>	African lion	Extreme (P)	No endorsed risk assessment
<i>Panthera onca</i>	Jaguar	Extreme (P)	No endorsed risk assessment
<i>Panthera pardus</i>	African Leopard	Extreme	21/09/2005
<i>Panthera tigris sumatrae</i>	Tiger; Sumatran tiger	Extreme (P)	No endorsed risk assessment
<i>Prionailurus viverrinus</i>	Fishing Cat	Extreme	10/04/2008
<i>Puma concolor</i>	Cougar; Mountain Lion; Puma	Extreme (P)	No endorsed risk assessment
<i>Uncia uncia</i>	Snow Leopard	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

### Related Live Import List listings

There are 14 felidae on the Live Import List. *Felis catus* (domestic cat) is on Part 1 of the List. The remaining 13 felidae are on Part 2 and listed as 'non-commercial purposes only, excluding household pets', this means they can only be imported for exhibition in zoos.

Felids listed in Part 2 of the Live Import List:

Taxon	Common Name
<i>Acinonyx jubatus</i>	Cheetah
<i>Caracal caracal</i>	Caracal
<i>Catopuma temminckii</i>	Asiatic Golden Cat
<i>Felis manul</i>	Pallas Cat
<i>Leopardus pardalis</i>	Ocelot
<i>Leptailurus serval</i>	Serval
<i>Neofelis nebulosa</i>	Clouded Leopard
<i>Panthera leo</i>	Lion
<i>Panthera onca</i>	Jaguar
<i>Panthera pardus</i>	Leopard
<i>Panthera tigris</i>	Tiger, Sumatran Tiger
<i>Prionailurus viverrinus</i>	Fishing Cat
<i>Uncia uncia</i>	Snow Leopard

There are no reports of any of the species in Part 2 forming feral populations or having any environmental impacts in Australia.

An application to add the Savannah Cat (*Leptailurus serval* X *Felis catus*) as a pet was assessed and, in 2008, the decision was not to include this specimen on the Live Import List

due to the potential risks and/or threats that the Savannah Cat may pose to the Australian environment should they be imported and escape or be released

## Conservation status

All felidae species including *Puma concolor* (except the species included in Appendix I and the domesticated form) are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (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.

*Puma concolor costaricensis* (the Central American subspecies) is listed in Appendix 1. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

Pumas have been given the status of 'Least Concern C1' by the International Union for the Conservation of Nature (IUCN) Red List (Nielsen *et al.*, 2015) however, numbers are decreasing in the wild within some areas of its range.

## 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 Pumas (**Appendix A**). The results indicate that the species has:

- a **serious** risk of establishing a wild population in the Australian environment if released,
- an **extreme** risk of becoming a pest if it were to establish, and
- the potential to be **highly dangerous** to the public from either captive or released individuals.

The Puma has a theoretical Environment and Invasive Committee (formerly Vertebrate Pest Committee) threat category of **EXTREME** (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 Puma has a high climate match to Australia (**Appendix B**). This species has a highest Climatch class of nine indicating that most of the Australian continent is climatically suited to Pumas.

In their native distribution, Pumas can survive in all forest types, as well as lowland and montane desert, grasslands, savanna, shrub lands and wetlands. Pumas will eat anything from the size of a rat to the size of a moose (between 0.5 and 700 kg) so it is likely that they will be able to find food sources in the Australian landscape – both native animals and livestock.

As a big cat Pumas have the capacity to attack and kill people. Big Cat Rescue.org (2019) reports that in the US, where many states allow the keeping of big cats, at least 61 incidents including escapes and mauling of people by captive Puma occurred between 1990 and 2015. If Pumas were to escape or be released, they have the potential to be highly dangerous to the public.

Pumas have been held in zoos worldwide and there have been no reports of them establishing wild populations outside of their natural range (Long 2003). The only successful establishment of wild breeding populations are deliberate reintroductions of Puma for conservation purposes in historic rangelands. Sunquist and Sunquist (2002) describe several attempts to bolster the declining population and improve the genetic diversity of the Florida Puma (*Puma concolor coryi*) with captive bred Florida Pumas and wild caught Pumas from Texas (*Puma concolor stanleyana*). This process was designed to mimic gene flow that historically occurred between the subspecies. Whilst many of the introduced Pumas were shot by poachers, some recaptured after killing domestic livestock or for having an 'overfamiliarity with people' and several hit by cars, the overall result was an increase in panther abundance and genetic variation and a decrease in biomedical abnormalities (Hostetler *et al.* 2012).

Pumas have also hybridised with other felines in captive conditions. Dubost and Royère (1993) report that a captive-living male Ocelot (*Felis pardalis*) and female Puma (*Puma concolor*) produced four litters between 1990 and 1992 although none of the offspring survived more than 12 days. Pumas have also hybridised with Leopards (*Panthera pardus*) (Pendragon and Winkler, 2011 and Grey, 1971) and Jaguars (*Panthera onca*) (Grey, 1971). There is no risk of Pumas hybridising with native Australian animals as there are no felines native to Australia

The Puma is included in the Vertebrate Pests Committee's 2007 "*List of Exotic Vertebrate Animals in Australia*" with a threat rating of '2/extreme'. In total 22 felidae species are listed – all are assigned a threat rating of 'serious' or 'extreme'.

The number '2' in the threat rating is used to denote 'limited to statutory zoos or endorsed special collections'. Four species, the Lion, Jaguar, Leopard and Tiger are listed as '3a' denoting 'Kept under permit for exhibition, education, entertainment or conservation'.

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'.

In line with Environment and Invasives Committee policy, any species that has not undergone a 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 their natural range, Pumas are hunted for taking livestock and as they are considered a danger to humans (Neilson 2015).

As generalist carnivores, Pumas in Australia would feed largely on kangaroos, small mammals, feral deer, feral pigs, feral goats and domestic livestock so would be capable of finding food. Pumas would compete or coexist with foxes, wild dogs and dingoes for potential habitat. In South America studies have shown cases where up to 10 percent of



livestock has been predated by Pumas (Guerisoli, 2017). Pumas would need to take up to forty-eight large and fifty-eight small prey per year to survive (Sunquist and Sunquist 2002).

The domestic cat is the only felidae listed on the Global Invasive Species Database (2018) as being invasive.

### Risk mitigation

The risk assessment indicates that the species has a high potential for establishing in Australia if released. It is for this reason, combined with their CITES Appendix II status, that it recommended that they only be imported by licensed Zoos. 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	major	Only kept in secure cages in zoos	Medium
Release or escape of immature specimens	unlikely	minor	Only kept in secure cages in zoos. If only males or sterilised animals are imported there will be no breeding.	Low/Medium
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 Commonwealth quarantine procedures.	Low/Medium
Theft and deliberate release	unlikely	major	There have been no recorded thefts of big cats in Australia. Deliberate release is unlikely but survival in the wild possible.	Medium

### Concerns raised and responses

The Department undertook consultation with relevant ministers (or their delegates), government agencies and the public between 4 March and 3 May 2019. The Department received six responses – four from the ACT, SA and Victorian governments and the Australian Government Department of Agriculture (DA):

1. The ACT was supportive of the application to allow import Puma for zoo exhibition purposes only.
2. SA was supportive of the application to allow import into high security facilities only and for zoo exhibition purposes. SA indicates that the proponent must undertake adequate breeding control if a breeding program will not be conducted.
3. Victoria opposed the application and noted that in Victoria, the Puma (*Puma concolor*) is a controlled pest animal under the *Catchment and Land Protection Act 1994*. Victoria

also request that there be a restriction to the import of animals to single sex or neutered animals only.

4. DA noted the large number of disease agents that may be introduced and requested more information on these be provided by the proponent.

The applicant stated:

‘The imported animals after undergoing an Official Veterinarian inspection and being issued with a health certification regarding freedom from disease and fitness for travel, would then travel in IATA approved crates via International air services. On arrival the imports would then be transported by road to a secure, approved NSW quarantine facility where it/they will stay for a quarantined period of 30 days, as per Biosecurity regulation.’

*Diseases and consequences for agriculture, livestock, and other exposure groups will be assessed as part of the Department’s Biosecurity Import Risk Assessment process.*

Biosecurity Risk will be assessed under the *Biosecurity Act 2015* and will occur once the species is listed on the Live Import List.

Three issues were raised by non-government organisations:

1. The RSPCA opposed the inclusion of Puma on the Live Import List as Pumas pose a risk in relation to different strains or pathogenicity of zoonotic diseases which may mutate to affect other felid species, including domestic cats. Concerns were also raised about the impact of an escaped Puma on Australian native animals.

*Diseases and consequences for agriculture, livestock, and other exposure groups will be assessed as part of the Department’s Biosecurity Import Risk Assessment process.*

2. A comment was received seeking clarification on the purpose, breeding expectations and future of any imported Puma once the existing Puma dies.

*As the proposed listing is for zoo animals only, specific questions on breeding and the purposes of holding Pumas would be assessed in the application for a permit to import Pumas. This assessment focusses on the environmental risks of importing Pumas into Australia rather than the specific circumstances of each Zoo.*

3. Both raised concerns relating to animal welfare issues of importing Puma’s and the keeping of puma’s together.

*An assessment for listing Pumas is an environmentally based assessment of the environmental consequences if Pumas were allowed into Australia and, although important, animal welfare concerns do not fall within this process. The applications were to list Pumas as suitable for importation into Australia into zoos. If added, Commonwealth and state/territory permits would be required to import any Pumas. It is at this stage of the process that the specific suitability of the premises and animal management protocols would be assessed for each import application.*

No further comments were received in relation to this application.

The Department undertook a second consultation with relevant ministers (or their delegates), and state and territory government agencies between 26 November and 16 December 2019. The Department received two responses from the ACT and SA governments who were supportive of the inclusion of Puma on Part 2 of the Live Import List with the following conditions:

- a. Eligible non-commercial purpose only excluding household pets
- b. Only sterilised animals to be imported.

Following the second consultation round the proposed condition 'only male or sterilised animals to be imported' was reworded to read 'desexed animals only' to prevent breeding. Comments from the Department's Animal Biosecurity Branch noted that sterilised could be interpreted as animals are under hormonal fertility control or have had an operation such as vasectomy which can be reversed. The term desexed means the animal has been permanently sterilised.


### **Conclusion**

Following further consideration of comments received and further review of the literature the Department recommends listing *Puma concolor* (Puma) on Part 2 of the Live Import List with conditions:

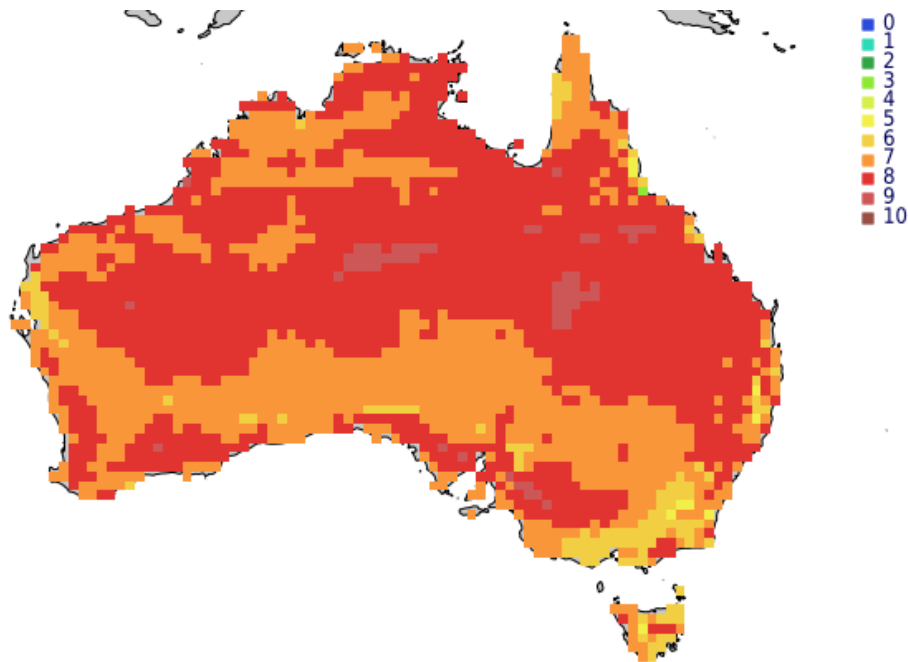
- **Eligible non-commercial purpose only, excluding household pets.**
- **Desexed specimens only.**

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

## Appendix A: Australian Bird and Mammal Risk Assessment Model

Australian Bird and Mammal Risk Assessment Model		
 <b>Australian Government</b> Department of the Environment, Water, Heritage and the Arts		
<b>Instructions:</b> Complete the risk assessment by typing values in the pale green cells. The numerical result of the assessment is then calculated automatically. Context-sensitive help will appear when cells with a red triangle are selected.		
<b>Species identification and sources</b>		
Common name	Puma	
Scientific name	<i>Puma concolor</i>	
Date assessed	18-Sep-19	
Literature Search Type And Date:	IUCN Red List of Threatened Species, Google,	
<b>Risks posed by captive or released individuals</b>		
A1. Risk to people from individual escapees (0-2)	2	Pumas are capable of aggressive behaviour, have sharp teeth and claws and a known history of attacking, injuring or killing people. It is an animal that sometimes attacks when unprovoked and is capable of causing serious injury (requiring hospitalisation) or
A2. Risk to public safety from individual captive animals (0-2)	0	No risk to humans provided they don't enter the cage.
A. Risk posed by captive or released individuals (= Sum of A 1 to 2).	2	<b>Highly dangerous</b>
<b>Risk of establishment</b>		
B1. Climate Match Score (1-6)	6	The majority of the Australian continent.
B2. Exotic Population Established Overseas Score (0-4)	0	No exotic populations ever established.
B3. Overseas Range Size Score (0-2)	2	The range of the puma is from Canada to the southern end of Chile.
B4. Taxonomic Class Score (0-1)	1	Mammal
B5. Diet Score (0-1)	1	Pumas are a highly generalist Predator and obligate carnivores and feed on any animals from rabbits to moose, including domestic animals.
B6. Habitat Score (0-1)	1	Pumas are found in any habitat that provides adequate cover and prey - from dense forest to dry desert.
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).	12	<b>Serious.</b>
<b>Risk of becoming a pest</b>		
C1. Taxonomic group (0-4)	2	Puma concolor is in the Order Carnivora.
C2. Overseas range size including current and past 1000 years, natural and introduced range (0-2)	2	The extent of occurrence is more than 20,000 km <sup>2</sup> and the area of occupation is more than 30 million km <sup>2</sup>
C3. Diet and feeding (0-3)	3	Puma concolor is a ground living carnivore that can climb trees.
C4. Competition with native fauna for tree hollows (0-2)	0	Puma concolor does not use tree hollows.
C5. Overseas environmental pest status (0-3)	0	Never reported as an environmental pest in any country or
C6. Climate match to areas with susceptible native species or communities (0-5)	5	The species has more than 20 grid squares within the highest two climate match classes (ie in classes 10, 9, 8 and 7) and has more than 100 grid squares within the highest four climate match classes that overlap the distribution of any susceptible native species or ecological communities.
C7. Overseas primary production pest status (0-3)	1	Pumas will take livestock in their home range.
C8. Climate match to susceptible primary production (0-5) <b>Hint: Use the "commodity" sheet created when a CLIMATCH grid is opened.</b>	2	Moderate-serious (reports of damage to primary production (livestock) exist but damage levels have never been high in any country or regions and no major control programs against the species has been conducted.
C9. Spread disease (1-2)	2	Species is mammalian. Score of 2 is predetermined.
C10. Harm to property (0-3)	1	Pumas if escaped will most likely hide and avoid humans and development. Hence the score of 1.
C11. Harm to people (0-5)	4	Pumas pose a serious risk to people - causing severe injury or death however but few people at risk due to the highest level of containment needed to keep them.
C. Pest Risk Score (= Sum of C 1 to 11).	22	<b>Extreme</b>

## Appendix B: Climatch predicted range for Puma.



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