PEST RISK ASSESSMENT

De Brazza's Monkey

Cercopithecus neglectus

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Department of Primary Industries, Parks, Water and Environment
Resource Management and Conservation Division

Tasmania
Explore the possibilities

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About this Pest Risk Assessment

This pest risk assessment is developed in accordance with the *Policy and Procedures for the Import, Movement and Keeping of Vertebrate Wildlife in Tasmania* (DPIPWE 2011). The policy and procedures set out conditions and restrictions for the importation of mammals, birds, reptiles and amphibians pursuant to s32 of the *Nature Conservation Act 2002*. This pest risk assessment is prepared by DPIPWE for the use within the Department.

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1. Summary

De Brazza's Monkey (*Cercopithecus neglectus*) is an African monkey found in tropical riverine forests in north-eastern Angola, Cameroon, Equatorial Guinea, Gabon, Uganda, Kenya and south-western Ethiopia. The species is listed as 'least concern' on the IUCN Red List.

De Brazza's Monkey is not recorded on the Global Invasive Species Database (2011) and no records could be found of any introduced populations other than those reintroduced into areas where the species was previously recorded.

Crop raiding of maize and potatoes has been noted in this species, and it is considered an agricultural pest in Kenya. De Brazza's Monkey is also able to carry various diseases that present a threat to human safety, including herpes B virus.

There is a low likelihood of this species establishing in Tasmania. Climate modelling indicates that Tasmania's climate is dissimilar to the species' natural range.

De Brazza's Monkey is classed as a 'serious' threat under the Vertebrate Pest Committee's list of exotic animals (Vertebrate Pest Committee, 2007). It is not listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

In Tasmania, De Brazza's Monkeys are 'controlled animals' under the Tasmanian *Nature Conservation Act 2002*.

This risk assessment concludes that De Brazza's Monkeys are a serious threat to Tasmania and proposes that imports be restricted to those license holders approved for keeping serious threat species.

2. Introduction

2.1 NAME AND TAXONOMY

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Primates

Family: Cercopithecidae

Genus: *Cercopithecus*

Species: *C. neglectus*

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Common names: De Brazza's Monkey, De Brazza's Guenon, DeBrazza's Monkey, Swamp Monkey (local).

Known hybrids: There are no documented instances of this species hybridising.

Close relatives: The species found in the *Cercopithecus* genus are usually referred to as Guenons. Guenons are thought to be in the active stages of speciation (Gautier-Hion *et al.* 1988). The group is regularly reviewed and there is some disagreement on the taxonomy, which has in the past 30 years been described as containing 1, 2, 4 and 5 genera (Glenn and Cords, 2002).

2.2 DESCRIPTION

The De Brazza's Monkey is an 'Old World Monkey' or 'Guenon' (Nowak, 1991). De Brazza's Monkeys are mostly covered with 'grizzled' grey fur with black extremities and tail. They have a distinct white stripe across their thigh and rump, a white muzzle and long white beard. A conspicuous orange crown is displayed above the eyes. Markings on males are more prominent than those on females (Oregon Zoo, 2011).

Like other Guenons, De Brazza's Monkey shows marked sexual dimorphism in a number of features (Leutenegger and Lubach, 1987). Males typically weigh around 7kg, and are distinctly larger than females, who typically weigh 4kg. Males possess a blue scrotum.

Body length varies from 40 to 63.5cm. De Brazza's monkeys have a round head and a non-prehensile tail. Their feet are considered more robust than those of other Guenons (Oregon Zoo, 2011; Wolfheim, 1983).

2.3 CONSERVATION AND LEGAL STATUS

CONSERVATION STATUS

The De Brazza's Monkey was assessed by the International Union for the Conservation of Nature (IUCN) in 2008 and is listed as 'least concern' on the IUCN Red List (Struhsaker *et al.* 2008).

Although one of the most widespread of African forest monkeys, the De Brazza's Monkey is not found in abundance throughout its range and limited information is available regarding the general population status of this species. This could be due to a lack of surveys undertaken (Decker, 1995) or difficulties associated with detecting the species (King, 2008).

Particularly within Kenya, the species was considered to be threatened with extinction and subject to considerable pressure through deforestation, hunting for a food source and for crop protection. As a result of these pressures, the De Brazza's Monkey has been identified as facing reproductive isolation (Brennan, 1985). The Kenyan population remains threatened, despite a new population of approximately 300 individuals being discovered in 2007 (Mugambi *et al.* 1997; Mwenja, 2007).

LEGAL STATUS

The species is classed as a 'serious' threat under the Vertebrate Pest Committee's list of exotic animals (Vertebrate Pest Committee, 2007). It is not listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

In Tasmania, De Brazza's Monkeys are 'controlled animals' under the Tasmanian *Nature Conservation Act 2002*.

De Brazza's Monkey is listed on Appendix II of the Convention on International Trade in Endangered Species (CITES).

3. Biology and Ecology

3.1 LIFE HISTORY

De Brazza's Monkeys are diurnal mammals that typically live in relatively small groups of about six individuals. They are sometimes observed in larger groups of 16-35 individuals, and solitary males are often sighted (King, 2008; Mugambi *et al*. 1997). Groups often comprise one resident male, at least three adult females and some juveniles (Muriuki, 1989).

C. neglectus are generally considered to be monogamous although there are suggestions that they exhibit some variation in their mating system which may include polygyny (Leutenegger and Lubach, 1987).

In captivity *C. neglectus* can live up to 31 years of age (Weigl, 2005); however longevity of the species in the wild is not documented. Hakeem *et al*. 1996 (cited in Institute of Primate Research, 2008), state that:

"We have very little information on the longevity of primates in the wild, because this requires sustained observations of wild populations for many decades. The few very long-term studies of primates living under natural conditions indicate, however, that some individuals do live into extreme old age in the wild. Long-term observational data suggest that the maximum life spans for zoo-living and wild primates may be about the same".

Females reach reproductive maturity at around four and half years, while males reach sexual maturity at around 7 years of age. Females give birth to only one offspring per year and have a gestation period of 6 months. When born, young weigh 260g and are weaned after approximately 395 days by which time they weigh 1.6kg (de Magalhaes and Costa, 2009). Young are born with fur and with their eyes open. Newborns are able to cling to their mother's fur and are completely dependent on the mother for the provision of food, grooming and protection. Females tend to stay with the mother once independent, but leave once they become sexually mature.

In areas with marked seasonal food availability, such as Gabon and some areas of Kenya, the breeding and birthing season is often fixed to coincide with maximum food levels.

3.2 HABITAT REQUIREMENTS AND PREFERENCES

The natural distribution of the species is closely linked to tropical riverine forests and swamps in central Africa, with areas of flooded forest being heavily utilised by the species (Wahome *et al*. 1993; King, 2008). De Brazza's Monkeys are generally restricted to dense swamp, bamboo and dry mountain forests associated with streams, rivers and dense vegetation, and occur from lowland areas to submontane forests at an elevation of up to 2100m (Institute of Primate Research Kenya, 2008).

C. neglectus are occasionally found in dense vegetation away from water. However groups found in such areas may have a water source within one day's travel (Decker, 1995). This suggests that they

may be attracted to the dense vegetation that is often present near watercourses rather than the water itself.

3.3 NATURAL GEOGRAPHIC RANGE

One of the most widespread of African forest monkeys, although never found at high densities, De Brazza's Monkey can be found from north-eastern Angola, through Cameroon, Equatorial Guinea and Gabon to Uganda, Kenya and south-western Ethiopia. The known range of the species continues to expand with the discovery of new populations in Kenya, Gabon and Congo (Maisles *et al.* 2007; Mwenja, 2007). The estimated of De Brazza's Monkey range is approximately 173,000 km^2.

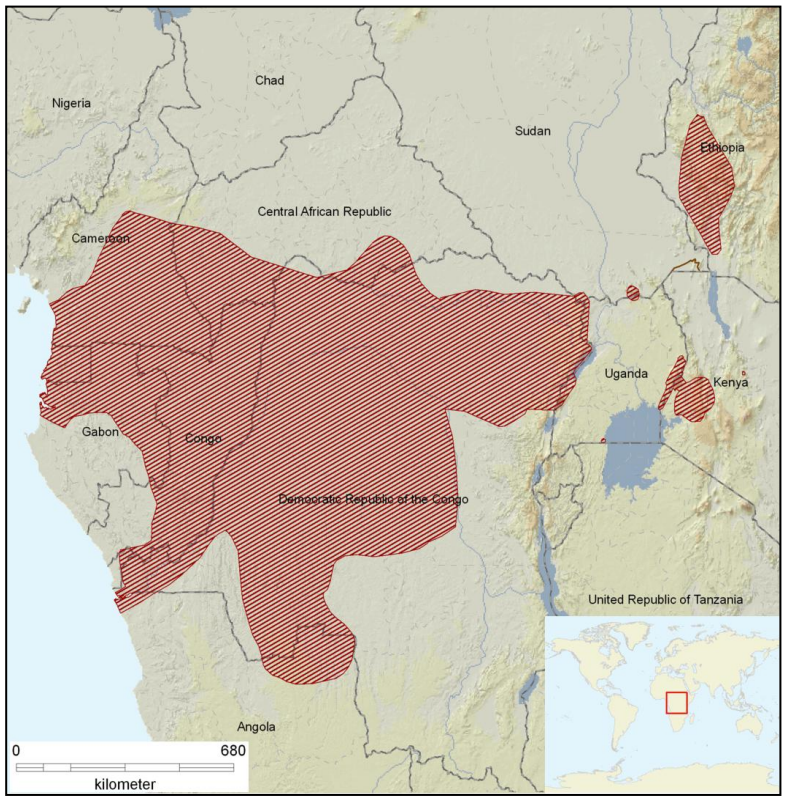

Figure 1. Native range of De Brazza's Monkey (*C. neglectus*) (Source: Struhsaker *et al.* 2008).

3.4 INTRODUCED GEOGRAPHIC RANGE

The De Brazza's Monkey is not recorded on the Global Invasive Species Database (2011) and no records could be found of any introduced populations other than those reintroduced into areas where the species was previously recorded.

3.5 POTENTIAL DISTRIBUTION IN TASMANIA

Using modelling by the Bureau of Rural Science, a climate comparison between the species' current distribution in Africa and potential Australian distribution is shown in Figure 2. Modelling suggests that Australia has few areas of similar climate that may support introduced populations of De Brazza's Monkey, with far northern, and potentially south west mainland Australia showing significant areas with moderately similar climates. Modelling suggests that Tasmania's climate is dissimilar, with climate match scores of between 0 and 6.

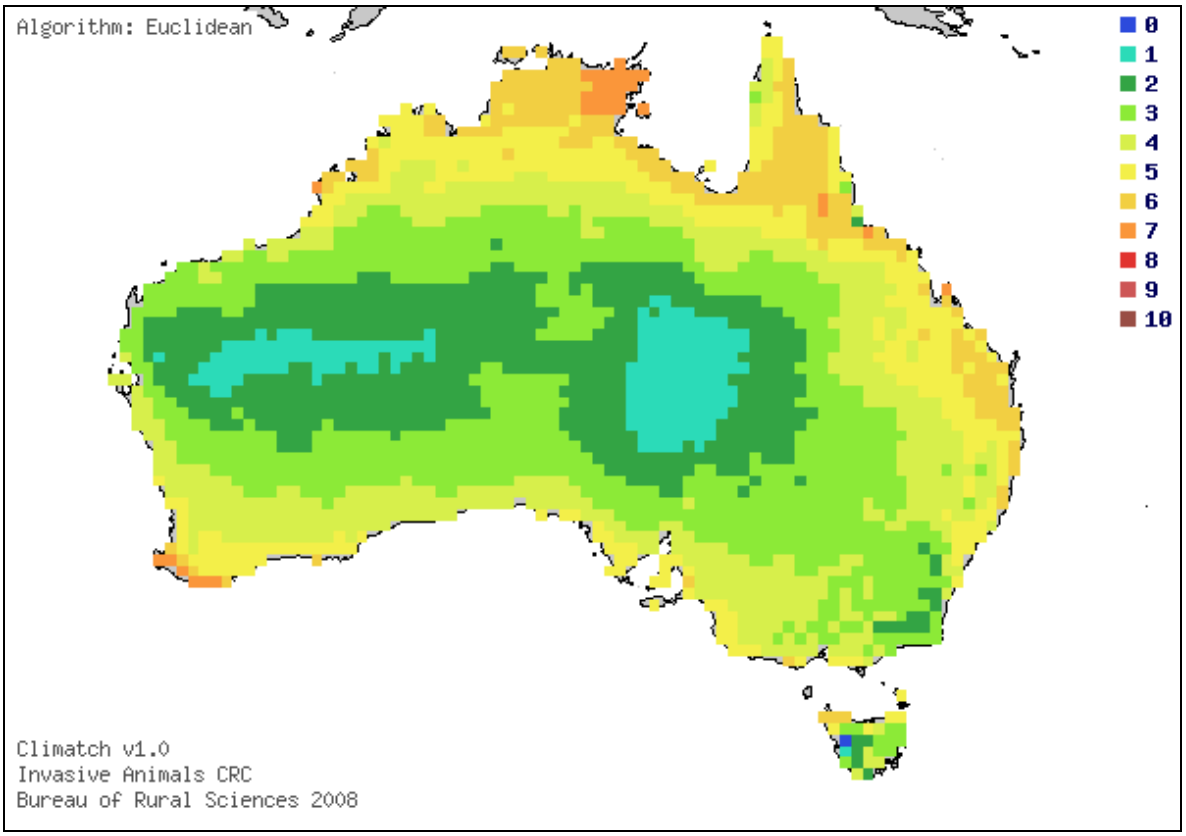

Figure 2. Climate comparison between the natural range of *C. neglectus* and Australia, where 10 is a 'perfect' climate match and 0 represents a dissimilar climate. Tasmania shows a match between 0 and 6.

A limited number of captive *C. neglectus* is maintained at Tasmania Zoo, where they are provisioned and housed in exhibition enclosures with heated sleeping quarters.

3.6 DIET AND FEEDING BEHAVIOUR

De Brazza's Monkeys are mainly frugivorous, however a substantial proportion of their diet comes from leaves and invertebrates such as ants, termites and resting moths (Wahome *et al.* 1993). One study observed that the species spends about 47% of its time feeding on fruit and 32% feeding on leaves (Karere, 2000). De Brazza's Monkeys are also known to eat mushrooms and lizards.

There is potential for this species to feed on agricultural fruits and vegetables. The species is an agricultural pest in Kenya, where it is noted for raiding crops of maize and potatoes (Mugambi *et al.* 1997).

3.7 SOCIAL BEHAVIOUR AND GROUPINGS

De Brazza's Monkeys are diurnal mammals that typically live in small groups of about six individuals. Larger groups of 16-35 individuals may be observed, and solitary males are often sighted (King,

2008: Maisels *et al.* 2007; Mugambi *et al.* 1997). Lone males of the species are often sighted outside the territories of local troops (Muriuki, 1989). Observations of captive *C. neglectus* show that social structure is based on small groups that maintain some distance from other groups to avoid confrontation (Oswald and Lockard, 1980).

Generally monthly home ranges of *C. neglectus* in small, isolated and unprotected areas of forest in Kenya range from 0.20 to 0.85ha (Karere, 2000). Where suitable habitat is more readily available, home range may vary from 4.1 to 6ha. Flooded areas of the forest are heavily used and a group may spend more than 50% of its time less than 5m above the forest floor, with daily path length ranging from 330 to 1001 meters (Wahome, 1993). Karere (2000) noted that the time spent at various heights within the canopy was not influenced by the time of day.

De Brazza's Monkey is considerably less conspicuous than other Guenons. The species rarely uses group calls and generally avoids living in multi-species troops (Gautier-Hion and Gautier, 1978), although they have been sighted in the company of Red-tailed Monkeys (*Cercopithecus ascanius schmidti*) and Black and White Colobus monkeys (Decker, 1995).

3.8 NATURAL PREDATORS AND DISEASE

In their natural African habitat, species that prey on De Brazza's Monkeys include Rock Pythons, Crown Eagles (*Stephanoetus coronatus*), Leopards (*Panthera pardus*), Golden Cats (*Felis aurata*), other primates and humans (Wahome *et al.* 1993; King, 2008).

In Tasmania, potential predators include the Tasmanian devil (Sarcophilus harrissii), spotted-tailed quoll (*Dasyurus maculatus*), large raptors such as Wedge-tailed Eagles (*Aquila audax fleayi*) and, should it become established, the introduced European Red Fox (*Vulpes vulpes*).

Wild populations of De Brazza's Monkey are vulnerable to a variety of diseases, including simian immunodeficiency viruses (SIVs), herpes B virus, and multiple gastrointestinal parasites (Bibollet-Ruche *et al.* 2004; Thompson *et al.* 2000; Karere and Munene, 2002). Individuals may also be prone to ectoparasites such as ticks and mites. It is likely that some symptoms of pre-existing infectious diseases may only appear when the species is subject to stress in captivity or experimental manipulations.

3.9 THREAT TO HUMAN SAFETY

De Brazza's Monkeys are not considered a direct threat to human safety and the species is not noted for attacking humans without provocation. Individuals have the potential to cause moderate physical injury by biting and scratching, which may require medical attention. The associated consequences from a bite or scratch may be serious and require hospitalisation.

The Cercopithecus genus has been noted for its ability to harbour a wide variety of zoonoses[1]. The diseases carried by this genus that pose a threat to human safety include herpes B, Marburg virus, Yellow fever virus, monkeypox virus, leptospirosis, and tuberculosis (Pavlin *et al.* 2009).

Humans can become infected with herpes B virus (*Herpesvirus simiae*) through bites, scratches, and contact with body fluid or tissue. Infection can be severe and result in ascending paralysis and has a high fatality rate, or neurological impairment (Williams & Barker, 2001). The prevalence of human infection with herpes B virus is low, as is secondary transmission of the virus.

3.10 HISTORY AS A PEST

Although De Brazza's Monkey has not established feral populations outside its natural range, the species is noted as an agricultural pest. De Brazza's Monkeys are notorious crop raiders in Kenya and commonly raid crops of maize. Raiding is particularly problematic in areas of high deforestation, where natural food sources are depleted. Local villagers may chase and kill De Brazza's Monkeys to prevent them from crop raiding. Villagers may also provide alternative food sources such as potatoes for the species to feed on in place of maize, or may clear nearby forest patches to remove suitable habitat (Karere, 1995, cited in Mugambi *et al.* 1997).

3.11 POTENTIAL IMPACT IN TASMANIA

C. neglectus is likely to compete with Tasmanian possum species for leaves and shoots, fruits, insects and flowers. Possums that would compete for these resources include the Common Brushtail Possum (*Trichosurus vulpecula*), Common Ringtail Possum (*Pseudocheirus peregrinus*), Eastern Pygmy Possum (*Cercartetus nanus*) and Little Pygmy Possum (*Cercartetus lepidus*) (Strahan, 1995).

Other species that may experience competition with the De Brazza's Monkey include the Eastern Quoll (*Dasyurus viverrinus*), Southern Brown Bandicoot (*Isoodon obesulus*) and Eastern Barred Bandicoot (*Perameles gunnii*). These three species are largely insectivorous, but the Eastern Quoll also opportunistically eats fruit and small vertebrates (Bryant and Squires, 2009; Menkhorst and Knight, 2001). Macropods such as Bennetts Wallaby (*Macropus rufogriseus*) and Tasmanian Pademelon (*Thylogale billardierii*) could also experience very limited competition.

Introduced De Brazza's Monkeys could affect several agricultural industries. At-risk agricultural industries in Tasmania include those producing vegetables, fruit, cereal, other crops and horticulture, oil seeds and grain legumes.

[1] Infectious animal diseases that can be transferred to humans.

4. Risk Assessment

4.1 PREVIOUS RISK ASSESSMENTS

The species is classed as a 'serious' threat under the Vertebrate Pest Committee's list of exotic animals (Vertebrate Pest Committee, 2007). A formal risk assessment has not been carried out for this species previously.

4.2 RISK ASSESSMENT

The following risk assessment determines the risk of De Brazza's Monkey to Tasmania using the Bomford model (2008) and proposes assigned threat categories and import classifications for the species.

Species:	**De Brazza's Monkey (*Cercopithecus neglectus*)**	
Date of Assessment:	June 2011	
Literature search type and date:	See references	
Factor	**Score**	
A1. Risk posed from individual escapees (0-2)	2	*Animal that sometimes attacks when unprovoked and/or is capable of causing serious injury (requiring hospitalisation) or fatality.* De Brazza's Monkeys are capable of spreading diseases such as herpes B which can be fatal to humans.
A2. Risk to public safety from individual captive animals (0-2)	0	*Nil or low risk (highly unlikely or not possible).* Although there is a risk of contracting fatal diseases from this species, the probability of products being obtained and used irresponsibly is unlikely.
Stage A. Risk posed by individual animals (risk that a captive or escape animal would harm people)	**Public Safety Risk Score** = A1 + A2 = 2	**Public Safety Risk Ranking** A ≥ 2, Highly Dangerous A = 1, Moderately Dangerous A = 0, Not Dangerous = Highly Dangerous
B1. Climate match score (1-6)	2	*Low climate match score.*
B2. Exotic population established overseas score (0-4)	0	*No exotic populations have been established.*
B3. Overseas range size score (0-2)	0	*Overseas size range <1 million km².* The geographic range is estimated at 173,000km².

B4. Taxonomic class score (0-1)	1	*Mammal.*
Stage B. Likelihood of establishment (risk that a particular species will establish a wild population in Tasmania)	**Establishment Risk Score** = B1 + B2 + B3 + B4 = 3	**Establishment Risk Ranking** B = 11-13, Extreme B = 9-10, High B = 6-8, Moderate B ≤ 5, Low = Low
C1. Taxonomic group (0-4)	0	*Other group.* No taxonomic matches.
C2. Overseas range size (0-2)	0	*Overseas range size <10 million km2.* The geographic range is estimated at 173,000km^2.
C3. Diet and feeding (0-3)	3	*Mammal that is primarily a grazer or a browser.* Observed De Brazza's Monkey spend approximately 47.15% of their time feeding on fruits, and 32.2% feeding on leaves (Karere, 2000). They are also known to eat mushrooms, lizards and invertebrates such as ants, termites and moths.
C4. Competition for native fauna for tree hollows (0-2)	0	*Does not use tree hollows.*
C5. Overseas environmental pest status (0-3)	0	*Never reported as an environmental pest in any country or region.* The species has not been reported to cause declines in abundance of any native species of plants or animal or caused degradation to any natural communities in any country of region.
C6. Climate match to areas with susceptible native species or communities (0-5)	0	*The species has no grid squares within the highest six climate match classes (i.e. 10 to 5) that overlap the distribution of any susceptible native species or ecological communities.*
C7. Overseas primary production (0-3)	2	*Moderate pest of primary production in any country or region.* De Brazza's Monkeys are noted for crop raiding in Kenya.
C8. Climate match to susceptible primary production (0-5)	0	*No match between climate and susceptible primary production.*
C9. Spread disease (1-2)	2	*Mammal.*
C10. Harm to property (0-3)	0	*<$100,000 per year.*
C11. Harm to people (0-5)	4	*Injuries or harm severe or fatal but few*

		people at risk. De Brazza's Monkeys may cause moderate injury by biting and scratching, and transmit diseases such as herpes B. Herpes B can be fatal to humans, although the prevalence of human infection is low.
Stage C. Consequence of Establishment (risk that an established population would cause harm)	**Consequence Risk Score** = sum of C1 to C11 = 11	**Consequence Risk Ranking** C > 19, Extreme C = 15-19, High C = 9-14, Moderate C < 9, Low = Moderate
ASSIGNED THREAT CATEGORY:	**SERIOUS**	
PROPOSED IMPORT CLASSIFICATION:	**IMPORT RESTRICTED TO THOSE COLLECTIONS APPROVED FOR KEEPING SERIOUS THREAT SPECIES**	

5. Risk Management

This risk assessment concludes that De Brazza's Monkeys (*Cercopithecus neglectus*) are a serious threat to Tasmania and that imports be restricted to those license holders approved for keeping serious threat species. On the basis of this risk assessment, it is recommended that De Brazza's Monkeys be placed on the list of imports permitted with conditions.

As defined under the *Policy and Procedures for the Import, Movement and Keeping of Vertebrate Wildlife in Tasmania* (DPIPWE 2011), import of serious threat species will generally be prohibited unless there is a clear public benefit and sufficient measures exist for the secure housing and on-going management of the species. Species will only be permitted for the purpose of public display and education purposes approved by DPIPWE.

The following mandatory conditions will apply to the import and keeping of this species. Additional requirements will be implemented.

1. The animal must not be released, or be allowed to escape from effective control.
2. Specimens seized or forfeited as a result of illegal or accidental introductions, where rehousing is not available, will be humanely euthanized.
3. Animal welfare requirements under the *Animal Welfare Act 1993* and any approved Code of Practice or Management Plan must be met.
4. Import only permitted by holders approved to keep the species under licence.
5. Individuals to be micro-chipped or otherwise identified, or treated to allow identification.
6. Facility must meet minimum standards for welfare and security.
7. Facility must be available for inspection at any reasonable time.
8. Audits of facilities and collections.
9. The maximum number of individuals of a species held at the facility to be stipulated on the licence, taking into account relevant factors. Gender may also be stipulated.
10. Written approval prior to movement of animals between facilities and trade of species under licence.
11. Record keeping and reporting to DPIPWE as required by DPIPWE.
12. Collections containing species subject to approval by DPIPWE as meeting best practice for keeping the species concerned.
13. Bonds, insurance or cost recovery systems.

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7. Appendices

APPENDIX A: CALCULATING TOTAL COMMODITY DAMAGE SCORE

Column 1	Column 2	Column 3	Column 4	Column 5
Industry	**Commodity Value Index (CVI)**	**Potential Commodity Impact Score (PCIS, 0-3)**	**Climate Match to Commodity Score (CMCS, 0-5)**	**Commodity Damage Score (CDS columns 2 x 3 x 4)**
Cattle (includes dairy and beef)	**11**	N/A		
Timber (includes native and plantation forests)	**10**	N/A	0	0
Aquaculture	**6**	N/A		
Sheep (includes wool and meat)	**5**	N/A		
Vegetables	**5**	3	0	0
Fruit (includes wine grapes)	**5**	3	0	0
Poultry (including eggs)	**1.5**	N/A		
Cereal grain (includes wheat, barley, sorghum etc)	**1**	3	0	0
Other crops and horticulture (includes nuts and flowers)	**1**	3	0	0
Pigs	**1**	N/A		
Bees (includes honey, beeswax, and pollination)	**0.5**	N/A		
Oilseeds (includes canola, sunflower etc)	**0.5**	1	0	0
Grain legumes (includes soybeans)	**0.3**	1	0	0
Other livestock (includes goats and deer)	**0.3**	N/A		
Total Commodity Damage Score (TCDS)				0

APPENDIX B: ASSIGNING SPECIES TO THREAT CATEGORIES

A: Danger posed by individual animals (risk a captive or escaped individual would harm people)	**B: Likelihood of establishment** (risk that a particular species will establish a wild population in Tasmania)	**C: Consequence of establishment** (risk that an established population would cause harm)	**Threat category**	**Implications for any proposed import into Tasmania**
Highly, Moderately or Not Dangerous	Extreme	Extreme	Extreme	Prohibited
Highly, Moderately or Not Dangerous	Extreme	High		
Highly, Moderately or Not Dangerous	Extreme	Moderate		
Highly, Moderately or Not Dangerous	Extreme	Low		
Highly, Moderately or Not Dangerous	High	Extreme		
Highly, Moderately or Not Dangerous	High	High		
Highly, Moderately or Not Dangerous	Moderate	Extreme		
Highly, Moderately or Not Dangerous	High	Moderate	Serious	Import restricted to those collections approved for keeping serious threat species
Highly, Moderately or Not Dangerous	High	Low		
Highly, Moderately or Not Dangerous	Moderate	High		
Highly Dangerous	Moderate	Moderate		
Highly Dangerous	Moderate	Low		
Highly, Moderately or Not Dangerous	Low	Extreme		
Highly, Moderately or Not Dangerous	Low	High		
Highly Dangerous	Low	Moderate		
Highly Dangerous	Low	Low		
Moderately or Not Dangerous	Moderate	Moderate	Moderate	Import restricted to those collections approved for keeping Moderate Threat species
Moderately or Not Dangerous	Moderate	Low		
Moderately or Not Dangerous	Low	Moderate		
Moderately Dangerous	Low	Low		
Not Dangerous	Low	Low	Low	Import Permitted
Unknown	Any value	Any value	Extreme until proven otherwise	Prohibited
Any Value	Unknown	Any value		
Any Value	Any value	Unknown		
Unassessed	Unassessed	Unassessed		

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