

## Live animal imports of exotic species/specimens

### Preparing a draft assessment report and application to amend the *List of Specimens taken to be Suitable for Live Import* (Live Import List)

## Terms of Reference

#### 1. Provide information on the taxonomy of the species.

**Common name:** Okapi

**Scientific name:** *Okapia johnstoni*

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Cetartiodactyla

Family: Giraffidae

Genus: *Okapia*



The Okapi, *Okapia johnstoni*, is a giraffid artiodactyl mammal native to the northeast of the Democratic Republic of Congo. There are no subspecies of the Okapi listed<sup>1</sup>.

#### 2. Provide information on the status of the species under CITES.

**CITES listing:** Not listed

**IUCN Red list status:** Endangered (EN)

The Okapi is not listed in the CITES appendices<sup>2</sup> and is listed as Endangered (EN) on the IUCN Red List due to population numbers being in severe decline since 1995, with an estimated rate of decline exceeding 50% over three generations (24 years). Projections suggest this trend will continue resulting from intensifying threats and lack of effective conservation which is hindered by the local security situation<sup>3</sup>.

#### 3. Provide information about the ecology of the species.

##### - Population numbers

IUCN notes that there is no reliable estimate of current population size. Estimates are wide ranging between 10-50 thousand individuals and are heavily debated as they have been extrapolated from a limited number of patchily distributed dung based surveys. As a result, there are inadequate sample sizes for accurate

<sup>1</sup> <http://www.iucnredlist.org/details/full/15188/0>

<sup>2</sup> Convention on International Trade in Endangered Species of Wild Fauna and Flora (2013) *Appendices I, II and III*. <http://www.cites.org/eng/app/appendices.php> Accessed 27/03/2017

<sup>3</sup> <http://www.iucnredlist.org/details/15188/0>

statistical analysis but there is agreement that numbers are declining due to ongoing threats within their geographic range<sup>4</sup>

#### - Lifespan

No wild lifespan data is available, however zoo records indicated individuals have lived up to 33 years in captivity<sup>5</sup>.

#### - Size and weight range

The species ranges in mass with females typically being a little heavier weighing in at 225-350kgs while males weigh 200-300kgs. Body length is between 2-2.2m and tail ranges between 30-42cm<sup>6</sup>.

The Okapi exhibits sexual dimorphism, with females slightly taller and heavier on average, with males ranging from 1.40-1.55m in height and 180-260kgs in weight, while females range from 1.42-1.59m and 240-356kgs<sup>7</sup>.

Furthermore, males have skin-covered horns while females have hair whorls on their heads.

They are a very distinct and unique, making them easily distinguishable from other species.



Source: <http://maps.iucnredlist.org/map.html?id=15188>

#### - Natural geographic range

Distribution extends across parts of central, northern and eastern DR Congo and up until the mid 1970's, Okapi were occasionally identified in the adjoining Semliki Forest in Western Uganda<sup>8</sup>. The elevation of the area ranges between 600m-1500m above sea level with temperatures ranging between 21-32 degrees<sup>9</sup>.

Okapi are restricted closed, high canopy forests, avoiding savannah forest islands or disturbed habitats surrounding human settlements<sup>10</sup>. Males are known to migrate continuously and females maintain a more sedentary life<sup>11</sup>.

This biologically diverse region contains an exceptionally rich bird and mammal fauna. Since 1980, human encroachment, deforestation and forest degradation has eliminated and fragmented important parts of the Okapi's range where the species was previously abundant<sup>12</sup>.

#### - Habitat

Okapi are mainly found within the Ituri Forest and prefer very dense tropical rainforests. While they usually remain in the thick vegetation, they also reside nearby riverbeds and use seasonally inundated areas where

<sup>4</sup> Mallon, D, Kümpel, N, Quinn, A, Shurter, S, Lukas, J, Hart, J, Mapilanga, J, Beyers, R. & Maisels, F. (2015) *Okapia johnstoni*. The IUCN Red List of Threatened Species 2015 <http://www.iucnredlist.org/details/15188/0> Accessed 27/03/2017

<sup>5</sup> ZIMS database search (accessed 28/03/2017)

<sup>6</sup> [http://www.theanimalfiles.com/mammals/hoofed\\_mammals/okapi.html](http://www.theanimalfiles.com/mammals/hoofed_mammals/okapi.html)

<sup>7</sup> <http://library.sandiegozoo.org/factsheets/okapi/okapi.htm>

<sup>8</sup> Kingdon, J (1979) *East African Mammals. Volume IIIB*. Academic Press, New York

<sup>9</sup> <http://theokapi.org/History/naturalhistory.aspx>

<sup>10</sup> <http://library.sandiegozoo.org/factsheets/okapi/okapi.htm>

<sup>11</sup> <https://www.aboutanimals.com/mammal/okapi/>

<sup>12</sup> Hart, J (2013) *Okapia johnstoni*. In: J.S. Kingdon and M. Hoffmann (eds), *The Mammals of Africa. Volume VI: Pigs, Hippopotamuses, Chevrotain, Giraffes, Deer and Bovids*, pp. 110-115. Bloomsbury Publishing, London.

substrate is still wet, but do not occupy extensive swamp forest areas and actively avoid disturbed habitats around human settlements.

#### - **Diet**

Okapi are herbivores and are quite unique in being the only species of forest ungulate to depend on the understory foliage. They are known to feed on over a hundred species of plants and while they are diurnal, have been recorded feeding at night<sup>13</sup>.

Clay from riverbeds is also important to their diet, giving them minerals and salt that they may not be getting from vegetation. Okapi are ruminants and consume between 20 and 27 kg of vegetation each day<sup>14</sup>. Similarly to giraffe, the okapi has to spread its legs to get close enough to the ground to drink.

#### - **Social behaviour**

Due to the remoteness and challenges of study within their natural environment there are limited studies on wild Okapi behaviour and social habits, but it is generally accepted that they are solitary and territorial, with the exception of mothers with young<sup>15</sup>. They have scent glands on their feet that spread sticky, tar-like territory markings to alert others of their home range. They are most active during the afternoon and evening, spending this time in search of food, following paths worn through the forest foliage.

Okapi generally avoid individuals in adjacent home ranges, which for females is 3-5km and for males, over 10kms. Territorial behaviours identified in captivity include males marking trees and bushes with urine, while crossing legs in a dance like movement. Females mark using common defecation sites and rubbing necks on trees. These behaviours occur predominantly during courtship<sup>16</sup>.

#### - **Threats**

The main threats to Okapi are leopards and human impact. They have experienced significant habitat loss due to logging and human settlements including the illegal occupation of protected areas, with 1/3 of its known distribution at risk of major incursions<sup>17</sup>.

Okapi are hunted for bush meat and skins and their populations are in rapid decline in areas where there is persistent use of snares. The presence of illegal and armed groups in and around key protected areas is a significant issue, preventing effective conservation action or monitoring of the species.

#### - **Characteristics that may cause harm to humans and other species**

There are no characteristics that have been recorded as to suggest causing harm to humans or other species.

### **4. Reproductive biology**

Okapi reach sexual maturity occurs at 2 years of age. The oestrus cycle occurs every 13-16 days, lasting 2-5 days throughout the year with no seasonal variation. Oestrus can be difficult to detect in females and use of urine and/or faecal hormone analysis is commonly used to determine cycles and be compared to observed behaviours which vary in each individual<sup>18</sup>. Breeding behaviours are similar to other ungulates, displaying

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<sup>13</sup> Nixon, S. and Lusenge, T (2008) Conservation Status of Okapi (*Okapia johnstonii*) in Virunga National Park, Democratic Republic of Congo. Zoological Society of London, London, UK.

<sup>14</sup> <http://www.rainforest-alliance.org/species/okapi>

<sup>15</sup> <http://theokapi.org/Husbandry/social.aspx>

<sup>16</sup> <http://library.sandiegozoo.org/factsheets/okapi/okapi.htm>

<sup>17</sup> Hart, J (2013)

<sup>18</sup> <http://theokapi.org/Husbandry/reproduction.aspx>

flehmen, chin-resting, neck thrusting and male vocalisations. Information regarding the reproductive biology of this species is increasing from captive management experience.

One offspring is normally produced following a gestation period of 425-491 days. Healthy calves stand within half an hour of parturition and are nursing within two hours. Okapi are notably private during the birthing process, requiring the female to be familiarized with the surroundings and a hands-off approach has been preferred by other holding institutions. Wild born Okapi are hidden in a nest for the first few weeks of their life as a protection measure against predators, with their first defecation generally not occurring for up to a month. These behaviours have been reflected in captive births and have been effectively managed through husbandry and planning of the birthing areas<sup>19</sup>. Weaning occurs at 8-9 months and the breeding interval is estimated to be 8 years based on calculations made for the global captive population.

No cases of hybridisation of this species has been recorded. It will not be possible for Okapi to hybridise with any Australian native species due to lack of reproductive isolation, ecological constraints, natural behaviours of the Okapi or physiological processes required for successful speciation.

**5. Provide information on whether this species has established feral populations, and if so, where those populations are.**

The Okapi has been introduced into the USA, Europe and Asia and is held in captivity in over 50 institutions around the world<sup>20</sup>. There have been no recorded escapes or establishment of feral populations.

**6. Provide information on, and the results of any other environmental risk assessments undertaken on the species both in Australia and overseas, including any Import Risk Analyses undertaken by Biosecurity Australia.**

The Okapi is not included in the Vertebrate Pests Committee's 2007 "List of Exotic Vertebrate Animals in Australia"<sup>21</sup>. No environmental risk assessments have been completed for the Okapi, although a number of other species that belong to the order *Cetartiodactyla* (eve-toed ungulate) are approved and eligible for import;

<i>Camelus dromedaries</i>	Dromedary (Arabian) Camel	Live specimen not requiring an import permit
<i>Lama glama</i>	Llama	Permit required, no conditions for import listed
<i>Lama pacos</i>	Alpaca	Permit required, no conditions for import listed

An IRA for the family giraffidae has been prioritised by the Zoo and Aquarium Association in consultation with DAFF. The Department of Agriculture and Water Resources have conducted assessments and approved the importation of semen for giraffidae species from the United States, citing conditions related to prevention of spreading bovine TB and that it must not have been diagnosed in the donor animals and in animals in the zoo population/s in which the donor giraffe has been held in the past five years<sup>22</sup>.

<sup>19</sup> <http://theokapi.org/Husbandry/reproduction.aspx>

<sup>20</sup> ZIMS, 2017

<sup>21</sup> <http://www.pestsmart.org.au/wp-content/uploads/2010/03/VPCListJuly2007.pdf>

<sup>22</sup> Biosecurity Australia, 2000

## **7. Assess the likelihood that the species could establish a breeding population in the Australian environment should it ever be released from effective human control.**

The likelihood of Okapi establishing a breeding population in Australia outside effective human control is considered extremely low and no country where Okapi are held in zoological institutions have individuals escaped or feral populations become established.

Okapi will be housed in secure enclosures as guided by the successful designs utilised for exhibits in other zoos. Exhibits are routinely checked for signs of damage and the implementation of Taronga's operational and husbandry guidelines also greatly reduce the chance of animals escaping.

In the highly unlikely event that Okapi are released from human control, their low rate of reproduction means it is improbable that a breeding population will successfully be established. Furthermore, being a solitary animal it would require multiple undetected escapes, identification of suitable undisturbed habitat and adaptation to the local environment in order to facilitate successful breeding. This is considered extremely unlikely and is not considered a risk for importing this species.

Okapi do not have any specific characteristics that would give it an advantage in the Australian environment. The Okapi's preferred habitat in dense, undisturbed rainforest which only accounts for 3% of Australia's total native forest area<sup>23</sup>. Australia has a predominantly arid landscape, with average temperature ranges outside the preferred natural range for Okapi, meaning the required conditions for them to establish a successful breeding population are not present in the Australian landscape.

## **8. Provide a comprehensive assessment of the potential impact of the species should it establish feral population/s in Australia.**

### **- Similar niche species (i.e. competition with other species for food, shelter etc.)**

The Okapi's closest relative is the giraffe and they have no similar niche species native to Australia. In terms of adverse effects on Australian wildlife, Okapi are not predatory but could potentially compete for food with herbivorous native species. As an example bovines and equids consume grass, leafy vegetation and occupy rural farm and wilderness areas so there is potential for competition in the highly unlikely event that Okapi were to become established in areas occupied by these species.

Potential impact of the import proposed is very low, being housed in an urban zoo that is well contained with high levels of security to prevent escape. The species has niche living requirements that differ from Australian native species, and the area surrounding Taronga Zoo is highly urbanised.

The area surrounding the zoo is highly urbanised, not suitable habitat and areas that Okapi would actively avoid due to human presence and activity.

### **- Is the species susceptible to, or could transmit any pests or disease**

Limited information is available concerning the natural health profile of the species and there is little information on endemic disease, so the risks from potentially exotic diseases are therefore largely unknown. In captivity medical management is similar to other medium/large ruminants and they are also susceptible to many diseases common to domestic ruminants<sup>24</sup>. Based on that information, this would include contagious

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<sup>23</sup> <http://www.agriculture.gov.au/abares/forestsaustralia/profiles/rainforest>

<sup>24</sup> <http://www.theokapi.org/Husbandry/health.aspx>

diseases such as clostridial diseases, leptospirosis, brucellosis, anthrax, pasteurellosis, Johne's disease and TB<sup>25</sup>.

Prior to export, individuals will require comprehensive health assessments to ascertain their health status and to ensure they met all pre-export requirements. Being held in captivity, there will be no interactions with domestic livestock or direct contact with giraffe or other ruminants, minimising the risk of disease transmission.

- **probable prey/food sources, including agricultural crops**

Okapi are selective browsers with a preference for high quality tender foliage in the wild. The consumption of plant fruit has not been recorded. Foraging Okapi could cause damage to agricultural crops and young trees, so populations could potentially have adverse effects if they became established in agricultural areas. However this is not likely to occur, as Okapi are a forest dwelling species so most of Australia, including agricultural areas, are not suitable habitats that could support the establishment of a feral population. This is further demonstrated by their wild counterparts who actively avoid disrupted habitat and remain localised in dense forest environments, being an elusive and shy flight species.

- **any control/eradication programs that could be applied in Australia if the species was released or escaped**

In the unlikely event of an escape and establishment of a feral herd, it would be possible to work with authorities to track, locate, capture or seize the animals and remove them very quickly. Okapi are large, distinct animals and could be located easily if individuals escaped, however the requirement for secure containment both within species-appropriate enclosures and within the zoological property as a whole will be key to preventing the establishment of a feral population.

**9. What conditions or restrictions, if any, could be applied to the import of the species to reduce any potential for negative environmental impacts (e.g. single sex imports, desexing animal prior to import etc.).**

As with other giraffidae species no special conditions or restrictions such as single sex or desexing are warranted. It is recommended that the species be considered for listing under Part 2 of the Live Import List and applying the condition *Eligible non-commercial purpose only, excluding household pets* would reduce potential for negative environmental impacts.

**10. Provide a summary of the types of activities that the specimen may be used for if imported into Australia**

Okapi will be featured in zoo-based educational displays and will serve as ambassadors for the plight of central African fauna and the environmental challenges faced by wildlife in this region.

Importation of Okapi would allow Australia to participate in and contribute to the species survival plan (SSP), including breeding to support the ongoing conservation of this species in captivity for education, advocacy and genetic insurances for remaining wild populations.

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<sup>25</sup> <http://www.australasianzookeeping.org/Husbandry%20Manuals/Husbandry%20manual%20Giraffe.pdf>

This species is generally solitary and territorial with the exception of mother and calf. Planned breeding events in line with the breeding program will ensure excess progeny will not be generated. A single calf with a long gestation period is conducive to a slow population growth rate.

An initial import of a breeding pair of Okapi is intended, however it is hoped that additional imports may be facilitated through the AZA species survival plan of genetically suitable captive-bred animals may follow. Zoo-based breeding programs in Australia generally target a population of 50 individuals.

Establishment of additional holdings of this species in participating institutions will open up research opportunities into reproductive biology, health and physiology. It will also allow the optimisation of husbandry practices and collective contribution to the global conservation strategy for the species.

#### - **Potential trade in the species**

As part of an international breeding program plans in there may be recommendations for transfers of individuals to maintain genetic diversity and avoid inbreeding with individuals within program. Trade will be via open exchange between AZA/ZAA institutions, as per normal practice with SSP programs.

#### **11. Provide detailed guidelines on the way in which the species should be kept, transported and disposed of in accordance with the types of activity that the species may be used for if imported into Australia.**

Okapi can be held in both indoor and outdoor enclosures. At most USA institutions, Okapi spend approximately 50% of their time inside, due primarily to weather concerns and ensuring animal safety overnight. Optimal stall space for a single animal is recommended at 28sq/m with interior walls at 1.8m high.

In outdoor exhibits ample shade is required for this forest species, as they are intolerant of extreme heat and sun. Minimum recommended size for two animals is 500sq/m with 1.8m perimeter walls. Visual, acoustic and olfactory barriers are utilised as Okapi have acute hearing and can find loud, frequent noise unsettling.

Breeding males are often maintained alone but adjacent to females. Females with young calves are maintained by themselves and the most stable groups in a captive setting have been related females or young females raised together from an early age<sup>26</sup>.

As part of normal husbandry routines the animals and exhibits are checked, monitored and reported on daily, including regular basic health checks, weighing and measuring in addition to routine veterinary health checks. Experienced wildlife vets are onsite to respond to any arising issues.

#### - **Transport Equipment**

Okapi travel well in a stall of a modified horse trailer and is a preferred option for long overland shipments (2-3 days). They are also commonly transported in crates, designed so the animal can't turn around, which are better suited for shorter transfers. For international shipments, wider crates in which the animal can turn and lie down have been successfully used and are considered the preferred method for air transport. Minimum crate size is dependent on the individual being transported and in all cases the Okapi should be able to stand in a normal stance. Access to forage and water is recommended to be readily available during shipment. Thick wood shavings covered with hay provide appropriate bedding for transport and

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<sup>26</sup> <http://theokapi.org/Husbandry/social.aspx>

temperature should be maintained between 19 and 26 degrees. Management of light, noise and distractions is recommended during loading and shipment to manage the stress levels of the animal<sup>27</sup>.

## - Containment

Australian States have respective regulatory agencies that oversee codes of practices with requirements for safe and secure housing for animals on public exhibition:

*NSW - General Standards for Exhibiting Animals Part 5 – ‘enclosures ..must be constructed of such materials and be maintained in sufficiently good repair so as to ensure that they will contain the animals at all times and are safe for the animals; an animal cannot escape except in circumstances that cannot reasonably be foreseen and guarded against’;*

In addition, membership of the Zoo and Aquarium Association is contingent on meeting professional standards of animal care, including the safe and secure containment of animals, which is validated through the Accreditation process.

## - The disposal options for surplus specimens

Surplus specimen numbers would be regulated by the implementation of controlled regional breeding programs established by the AZA/ZAA and facilitated by the species coordinator for this species. Surplus animals would be avoided by separation of sexes or desexing where necessary.

## 12. Provide information on all other Commonwealth, state and territory legislative controls on the species, including:

There are no Australian Government regulations relating specifically to Okapi.

## References:

Biosecurity Australia (2000), *Animal Biosecurity Policy Memorandum 2000/56: Importation of giraffe semen from the United States of America*, Biosecurity Australia website, <http://www.agriculture.gov.au> (accessed 30/03/2017)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (2013) *Appendices I, II and III*. <http://www.cites.org/eng/app/appendices.php> Accessed 27/03/2017

Hart, J (2013) *Okapia johnstoni*. In: J.S. Kingdon and M. Hoffmann (eds), *The Mammals of Africa. Volume VI: Pigs, Hippopotamuses, Chevrotain, Giraffes, Deer and Bovids*, pp.110-115. Bloomsbury Publishing, London.

Mallon, D, Kumpel, N, Quinn, A, Shurter, S., Lukas, J, Hart, J, Mapilanga, J, Beyers, R & Maisels, F (2015) *Okapia johnstoni*, The IUCN Red List of Threatened Species 2015 <http://www.iucnredlist.org/details/15188/> (accessed 27/03/2017)

DeRosa, T, Lyon, F & Petric, A (2004) *Husbandry Guidelines for the Okapi SSP*, <http://theokapi.org/Husbandry> (accessed 29/03/2017)

The Animal Files: Okapi (2014), [http://www.theanimalfiles.com/mammals/hoofed\\_mammals/okapi.html](http://www.theanimalfiles.com/mammals/hoofed_mammals/okapi.html) (accessed 06/04/2017)

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<sup>27</sup> <http://theokapi.org/Husbandry/transport.aspx>

The Okapi Management Website (2016), <http://theokapi.org/welcome.aspx> (accessed 06/04/2017)