



Australian Government

Department of the Environment and Energy

Department Risk Analysis

**Application to add *Choeropsis liberiensis* (Pygmy Hippopotamus) to the Environment Protection and Biodiversity Conservation Act 1999
*List of Specimens taken to be Suitable for Live Import***

November 2018

INTRODUCTION

Purpose of the proposed import

Taronga Conservation Society Australia (Taronga) seeks to import an unspecified number of Pygmy Hippopotamus' (*Choeropsis liberiensis*) into Australia for a conservation captive breeding program and for exhibition. The hippos will be featured in zoo-based educational displays and will serve as ambassadors for the plight of western African fauna and the environmental challenges faced by wildlife in this region.

Importation of these animals would contribute to the Zoo and Aquarium Association's (ZAA) Pygmy Hippopotamus breeding program and support the ongoing conservation of this species in captivity for education, advocacy and genetic insurances for remaining wild populations, which are in decline.

Progeny that are produced from any successful breeding events will be subject to ZAA's guidelines for transfer between facilities and the breeding of these animals will be controlled to avoid the production of excess animals.

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 Pygmy Hippo was released for public comment in February 2018.

Biology and Ecology of *Choeropsis liberiensis*

Introduction

The Pygmy Hippopotamus, *Choeropsis liberiensis* (from here on referred to as Pygmy Hippo) is a small hippopotamid native to West Africa and is one of two species in the family Hippopotamidae. Two subspecies are recognised in the literature: the Liberian Pygmy Hippo (*Choeropsis liberiensis liberiensis*) is distributed sparsely through Ivory Coast, Guinea, Liberia and Sierra Leone. The closely related subspecies, *Choeropsis liberiensis heslopi* or Heslop's Pygmy Hippo, is allegedly found in the Niger Delta in Nigeria, however reliable records of this subspecies have been difficult to obtain and this species has not been positively identified in the wild since 1947 (Mallon *et al.*, 2011).

Description

The Pygmy Hippo is significantly smaller than the Common Hippo (*Hippopotamus amphibious* – 1500-1800 kg and approx. 1.5 meters at the shoulder), reaching weights of 180–270 kg and a height of 70-80 cm at the shoulder and has comparatively longer limbs and neck and a smaller head. From observations in the field it is thought that the Pygmy Hippo is less aquatic than *H. amphibious* and spends more time on land. Adaptations for this can be seen in the Pygmy Hippo having an anteriorly sloped body and more moderate webbing on its toes.

Pygmy Hippos still show some aquatic adaptations such as strong muscular valves to the ears and nostrils as well as still remaining largely dependent on water for thermoregulation as the species does not have any discernible sebaceous glands or sweat glands. Pygmy Hippos must also keep their skin moist to prevent cracking from prolonged exposure to the sun. The skin of Pygmy Hippos can secrete a clear, oily substance which allows the animals to remain in either water or on land for extended periods. This substance may have antiseptic properties and protect Pygmy Hippos from sun exposure (Mallon *et al.*, 2011).

The reproductive and courtship behaviours of Pygmy Hippo in the wild are not well studied. Sexual maturity under captive conditions has been recorded between three and five years of age. Breeding occurs throughout the year with an interval between seven and nine months. The gestation period for pregnancies ranges between 188-210 days. Only one offspring is usually produced with the occurrence of twins being quite rare at a rate of approximately one occurrence in every 200 births. The weaning of Pygmy Hippos has been observed when offspring are at an age of 6-8 months (Steck, 2012).

Some observations of this species caring for its young have been recorded. In 1981, a newborn Pygmy Hippo and mother was observed in Tai National Park on the Ivory Coast. The offspring was left alone in an isolated pool by the female who then returned at intermittent times to feed it (Mallon *et al.*, 2011).

There is no evidence to determine if the female can store sperm and this ability is not in evidence in any other hippo species. Pygmy Hippos have not been recorded as hybridising with any other species. The longevity of this species in the wild is not well studied, however in captivity individuals have lived up to 56 years of age (Steck, 2012, Mallon *et al.*, 2011).

Habitat/ Special adaptations

Pygmy Hippos inhabit floodplains dominated by tall herbaceous vegetation and patches of riverine forest and *Raphia* sp. (Calameae) palm dominated swampland. This species has a clear preference for small streams with complex habitat structures such as fallen submerged trees, hollows formed by root systems of large trees, swampy areas and dense vegetation (Mallon *et al.*, 2011).

Diet

The diet of Pygmy Hippos is mainly terrestrial and semi-aquatic plants surrounding whatever water source they are living in. This can include ferns, grasses, herbs, and the young roots, stems and leaves of young trees, vegetables and fallen fruits. Pygmy Hippos may also feed on crop plants such as sweet potatoes, okra, pepper and cassava however this species is not noted as a crop pest (Mallon *et al.*, 2011).

Physiologically, the Pygmy Hippo has four chambers in its stomach and it appears that the microbial assisted digestion of food occurs in the front three stomach chambers. This arrangement is seen as an adaptation to a "low-quality" vegetable diet with a high fibre content and supports the observations of this species as a general browser and forager of vegetable matter (Ransom *et al.*, 2015).

Home range and social structure

There is very little information available about Pygmy Hippo movement patterns, social structure or interactions in the wild due to a lack of field data. Based on the limited studies conducted, females of the species have overlapping home ranges of approximately 40-60 ha, while males have a range of approximately 150 ha. Movement within these ranges each day appears to be minimal with a maximum of 1.5 km of movement per day. Home ranges seem to be positively associated with suitable habitat being available rather than other factors, however further study would be needed to identify other factors. During the rainy season of May–September within their native distribution, individuals of this species have been reported as dispersing over wide areas and this may be associated with breeding behaviour. Pygmy hippos are noted as being largely solitary outside of the breeding season with strong territorial behaviour in evidence (Ransom *et al.*, 2015).

Environmental tolerances

Whilst this species is kept all over the world, in captivity Pygmy Hippos are not cold hardy and require a heated pool in their enclosure as well as heated containment areas when not on display. Limited ecological data makes this kind of information difficult to supply for Pygmy Hippos in the wild, however the mean temperature in the core of their home range in Liberia is approximately 27 °C with a range of approximately 23° C to 31° C (Robinson *et al.*, 2017). It can therefore be inferred that if this species was to comfortably establish, it would require similar conditions to thrive.

Pygmy Hippos have been reported to feed for up to six hours per day, between mid-afternoon and midnight. However, camera trapping studies have shown they may feed throughout the night (Ransom *et al.*, 2015).

Distribution and endemism (as regards conservation status)

Range Description:

The Pygmy Hippo is endemic to the Upper Guinea Forest of West Africa and occurs in four countries. These are Cote d'Ivoire, Guinea, Liberia and Sierra Leone. *C. heslopi*, as previously mentioned, has been previously recorded only from the Niger Delta in Nigeria.

The historic distribution of the Pygmy Hippo has been determined to be far more extensive than the current distribution. In the present day, populations of this species have become fragmented and difficult to detect. Add to this a lack of surveys of many of these areas and the true distribution of Pygmy Hippos may be misrepresented by the data. However, in the absence of further surveys the best representation of this species' range can be seen in Figure 1 below. (Mallon *et al.*, 2011).



Fig.1:

Distribution map from **Ransom *et al.*, 2015** with the yellow shaded areas representing the current distribution and the red shaded areas representing former distribution where the species is now thought to be extinct.

Reason for import (captive breeding program etc.)

Pygmy hippos feature in zoo-based educational displays and will serve as ambassadors for the plight of (west/central?) African wildlife and the threats faced by wildlife in this region.

As of 31 December 2013, the World Zoo and Aquarium Association International Studbook for the Pygmy Hippo records 353 living Pygmy Hippos kept in 133 institutions.

Despite recent breeding success, there are only five Pygmy Hippos in Australia, two females and three males located at Adelaide zoo, Melbourne zoo, and Taronga zoo in Sydney. An import into the ZAA breeding program would benefit the program genetically and demographically as well as support zoo based conservation and advocacy efforts for the species.

Establishment of additional holdings of this species in participating zoos may provide for research opportunities into reproductive biology, health and physiology. It will also allow the optimisation of husbandry practices and collectively contribute to the global conservation strategy for the species, with wild population trends showing a continual decline.

The ZAA breeding program develops annual breeding and transfer recommendations, breeding is carefully planned and avoids production of surplus animals.

Importation of Pygmy Hippos would also be subject to an importation approval by the Commonwealth Department of Agriculture and Water Resources.

Conservation status

Choeropsis liberiensis:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listing: Appendix II (CITES, 2018)
- International Union for the Conservation of Nature (IUCN) Red list status: Endangered C1 (IUCN, 2018)

The Pygmy Hippo is listed as Endangered on the IUCN Red List, under criterion C1, based on a population size of fewer than 2,500 mature individuals and a continuing decline estimated to reach 20% over the next 20 years (Mallon *et al.*, 2011). Although the current population of Pygmy Hippo is not accurately known it is thought to be in decline due to the continued destruction of habitat and the poaching of this species within its home range (Ransom *et al.*, 2015).

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 Pygmy Hippo (**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 Invasive Plants and Animals Committee (formerly Vertebrate Pest Committee) threat category of Low (using Table 2.3 in Bomford, 2008).

The climate match, comparing the native range of the species to Australian climates, indicates that the Pygmy Hippo has a low climate match to Australia (**Appendix B**). This species has a highest Climatch class of five and these matches correspond to coastal regions in central and northern Queensland and the far north of the Northern Territory. In their native distribution, the Pygmy Hippo is confined to relatively undisturbed dense tropical rainforest habitat with permanent flowing or static water sources (Ransom *et al.*, 2015). Some of the areas identified in the Climatch data would contain suitable habitat for this species to survive, however as this species is neither small nor cryptic and has relatively low fecundity (characteristics that have contributed to its decline in its native range) it would be relatively unlikely to establish a self-sustaining feral population. One report of a Pygmy Hippo being shot in the Northern Territory (near Kakadu National Park) has been substantiated (ABC News 2009), but this was an isolated individual and likely the result of an escape/release from a wildlife park in the area.

The application states that Pygmy Hippo 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 Western Africa, the species has a restricted range and is reliant on undisturbed wetland or riverine forested habitat being available.

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 endangered and CITES Appendix II status, and for the welfare of those animals that are to be imported, it will be a requirement that these be contained in secure facilities. This containment will assist in preventing the escape of this species into suitable habitat.

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 February – March 2018. The Department received responses from the ACT government only:

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

No further comments were received in relation to this application.

Response from second round of consultation with Commonwealth, state and territory Departments.

No responses were received during the Govdex consultation round between 5 November and 23 November.

Conclusion

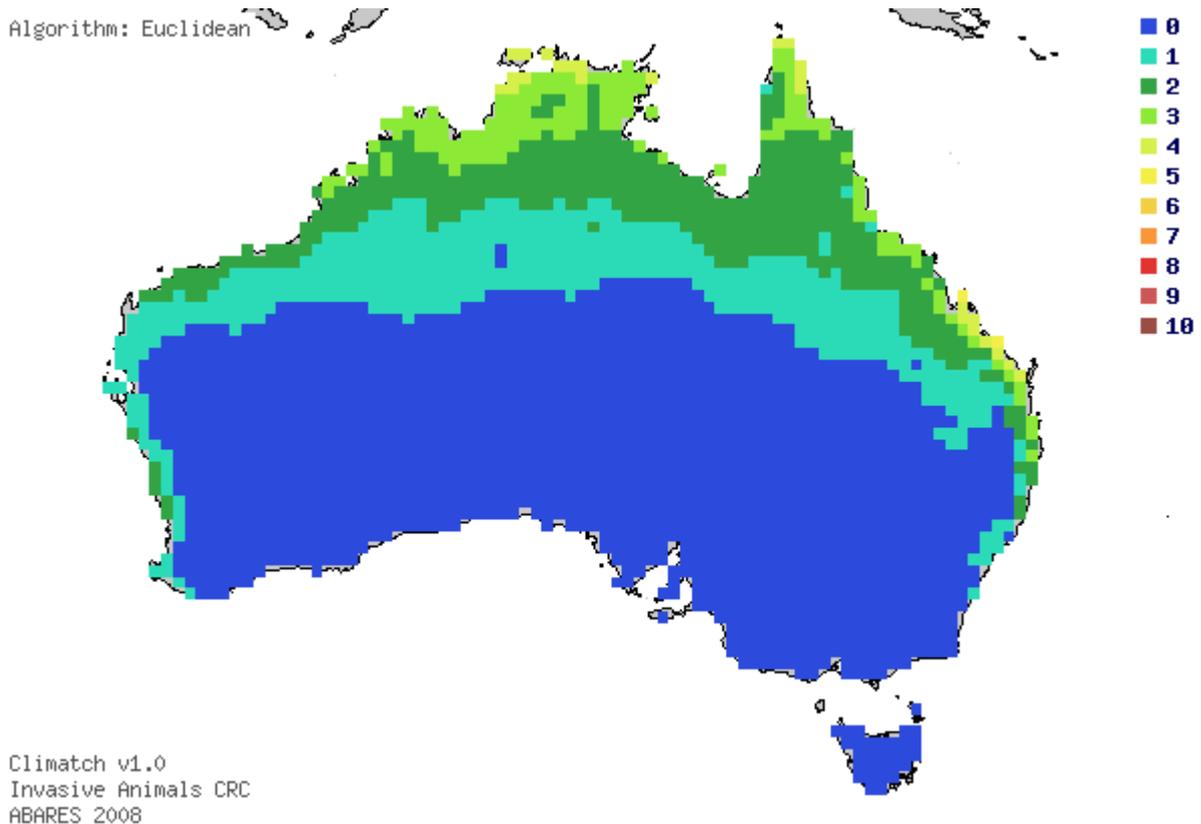
Having undertaken an analysis and reviewed the available information, the Department recommends listing *Choeropsis liberiensis* (Pygmy Hippopotamus) on Part 2 of the Live Import List with conditions: **Eligible non-commercial purpose only excluding household pets.**

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

Species identification and sources		
Common name	Pygmy Hippopotamus	
Scientific name	<i>Choeropsis liberiensis</i>	
Date assessed	22-Oct-18	
Literature Search Type And Date:	IUCN, CITES, Google Scholar	
Risks posed by captive or released individuals		
Value	Comment	
A1. Risk to people from individual escapees (0-2)	1	Moderate risk to humans
A2. Risk to public safety from individual captive animals (0-2)	1	Moderate risk to humans
A. Risk posed by captive or released individuals (= Sum of A 1 to 2).	2	Not dangerous
Risk of establishment		
Value	Comment	
B1. Climate Match Score (1-5)	1	confined to far northern Australia (primarily Cape York and northern
B2. Exotic Population Established Overseas Score (0-4)	0	Enter comment
B3. Overseas Range Size Score (0-2)	0	Overseas range confined to coastal west Africa in isolated patches in Liberia, Ivory Coast, Guinea and Sierra Leone.
B4. Taxonomic Class Score (0-1)	1	Mammal
B5. Diet Score (0-1)	1	<i>C. liberiensis</i> is a generalist browser/ forager of aquatic and waterside vegetation.
B6. Habitat Score (0-1)	0	<i>C. liberiensis</i> is only known from relatively undisturbed habitat within its native range.
B7. Migratory Score (0-1)	0	<i>C. liberiensis</i> is not known to be migratory.
Model		
B. Risk of Establishment (Model 1 = Sum of B1 to B4; Model 2 = Sum of B1 to B7).	3	
Risk of becoming a pest		
Value	Comment	
C1. Taxonomic group (0-4)	0	<i>C. liberiensis</i> 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	Overseas range confined to coastal west Africa in isolated patches in Liberia, Ivory Coast, Guinea and Sierra Leone.
C3. Diet and feeding (0-3)	3	<i>C. liberiensis</i> is a generalist browser/ forager of aquatic and waterside vegetation.
C4. Competition with native fauna for tree hollows (0-2)	0	<i>C. liberiensis</i> does not occupy tree hollows.
C5. Overseas environmental pest status (0-3)	0	<i>C. liberiensis</i> is not identified as an environmental pest in any of the literature.
C6. Climate match to areas with susceptible native species or communities (0-5)	0	<i>C. liberiensis</i> is unlikely to have significant impact upon any threatened native species as its environmental niche doesn't significantly overlap that of any native species. In addition to this, the Climatch model generated using this species distribution indicates that there are a very small number of significant (above a climatch score of 5) matches for suitable climate within Australia. This would further limit the opportunities for this species to impact upon native fauna and flora.
C7. Overseas primary production pest status (0-3)	0	<i>C. liberiensis</i> has not been identified in the literature as a primary production pest.
C8. Climate match to susceptible primary production (0-5) Hint: Use the "commodity" sheet created when a CLIMATCH grid is opened.	0	See comment above.
C9. Spread disease (1-2)	2	Species is mammalian. Score of 2 is predetermined.
C10. Harm to property (0-3)	1	While <i>C. liberiensis</i> is significantly smaller than the Common Hippo, this species is still large enough (180-270kg weight and up to 80cm at the shoulder) to cause some damage to property or ecosystems. However due to the limited potential range of this species within Australia according to the Climatch modelling in this assessment, there would be limited interaction between this species and the environment or property. Hence the score of 1.
C11. Harm to people (0-5)	2	As mentioned above, whilst not nearly as large or dangerous as the Common Hippo, <i>C. liberiensis</i> is still large enough to potentially cause injury to humans if it comes into contact with within the limited range it might occupy within Australia. Despite having sharp tusks in their mouths, <i>C. liberiensis</i> is noted as being far less aggressive than the Common Hippo and has never been implicated in any attacks on humans.
C. Pest Risk Score (= Sum of C 1 to 11).	8	Low
Summary		
Value	Comment	
A. Risk to public safety posed by captive or released individuals	2	Not dangerous
B. Risk of establishing a wild population	3	Low
C. Risk of becoming a pest following establishment.	8	Low

APPENDIX B: CLIMATCH PREDICTED RANGE.



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