Australian Government
Department of the Environment

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: Pygmy Hippopotamus
Scientific name: *Choeropsis liberiensis (synonym Hexaprotodon liberiensis)*

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Artiodactyla
Family: Hippopotamidae
Genus: Choeropsis

The Pygmy Hippopotamus, *Choeropsis liberiensis,* is a small hippopotamid native to the forests and swamps of West Africa and is one of two extant species in the family Hippopotamidae. There are two recognised subspecies, *C.I liberiensis* occurring in Cote d'Ivoire, Guinea, Liberia and Sierra Leone and *C.I heslopi* found in the Niger Delta, Nigeria[1]. Pygmy hippopotamus in Australasian zoos are managed at the species level, and the existing zoo population of pygmy hippopotamus in Australasia have not had subspecies determined, but are likely to be considered C.liberiensis liberiensis based on there being no reliable reports of the C.I. heslopi in its limited range since 1945.

2. Provide information on the status of the species under the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES). For example, is the species listed on CITES Appendix I, II or III, and if so, are there any specific restrictions on the movement of this species? Include information on the conservation value of the species.

CITES listing: Appendix II[2]
IUCN Red list status: Endangered C1[3]

[1] Ransom, C, Robinson, P.T. & Collen, B. 2015. *Choeropsis liberiensis*. The IUCN Red List of Threatened Species 2015: http://www.iucnredlist.org/details/10032/0. Accessed 27/03/2017

[2] www.cites.org

[3] http://www.iucnredlist.org/details/10032/0

Pygmy Hippos are legally protected in all range countries, however the level of enforcement is limited. Although Pygmy Hippos are not generally a highly sought after species for trade, they may be taken for their meat. Their teeth have little trade value, however body parts such as the skull, may be used in rituals or traditional medicine (Robinson 1970, Hentschel 1990). The IUCN Redlist lists pygmy hippopotamus as endangered and the global population is unknown but estimates are as low as 2500-3000 has been suggested. The primary threat to pygmy hippopotamus is deforestation of habitat through human encroachment[4].

3. Provide information about the ecology of the species. Include, but do not restrict your response to:

- **Lifespan**

No wild lifespan data was able to be sourced, however zoo records indicated individuals have lived up to 43 years in captivity.

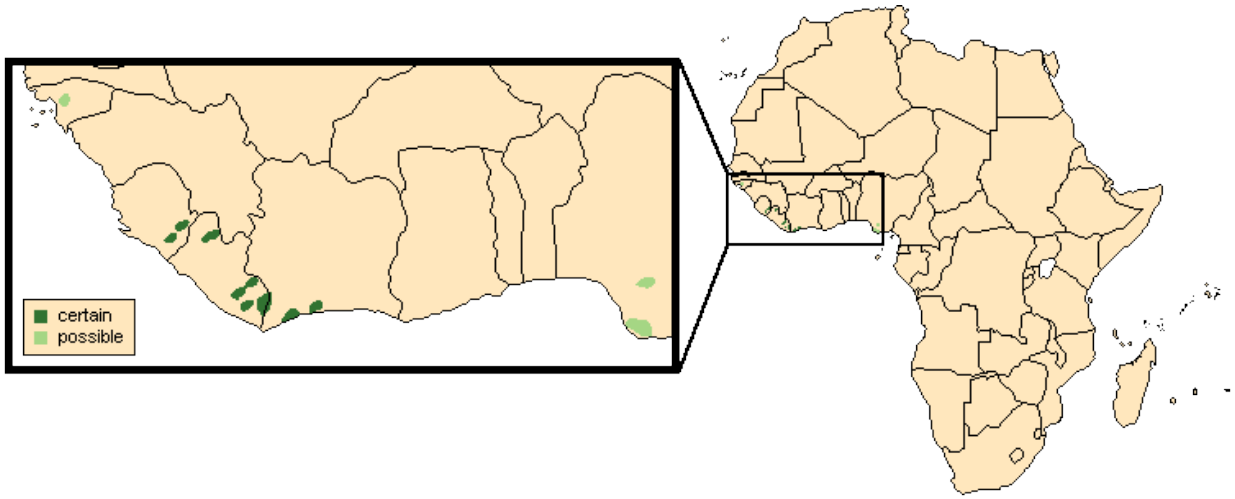
- **Size and weight range**

The species ranges in mass from 160-275kgs, with body length 1.5-1.75m, height to 0.7-1m (at the shoulder) and tail length 0.2m[5].

- **Natural geographic range:**

Distribution is limited to fragmented populations in the upper Guinea forests of West Africa, including Côte d'Ivoire, Guinea, Liberia and Sierra Leone[6].

Pygmy Hippopotamus Geographic Range



Source: http://www.ultimateungulate.com/artiodactyla/hexaprotodon_liberiensis.html

The subspecies *C.I.heslopi* formally occurred in Nigeria, however there have been no reliable reports of the subspecies since 1945 and their presence is assumed to be unlikely[7].

[4] http://www.iucnredlist.org/details/10032/0
[5] http://animaldiversity.org/accounts/Hexaprotodon_liberiensis/
[6] http://www.iucnredlist.org/details/10032/0

- **Habitat**

The species inhabits lowland primary and secondary forests, alongside rivers, streams and Raphia palm tree swamps, sometimes being found along gallery forests extending into transitional woodland and the southern Guinea savannah. Preferred habitat characteristics include small streams with submerged trees, root hollows, swampy depressions, and the size and density of ground vegetation[8].

- **Diet**

Predominantly terrestrial and semi-aquatic plants, including ferns, tender roots, grasses, herbs, stems and leaves of young trees, vegetables and fallen fruits. They have also been observed feeding on sweet potato leaves, okra, pepper plants, cassava on plantations near the forest edges, but are not regarded as crop pests[9].

- **Social behaviour**

Solitary, only seen in pairs when mating or with young.

- **Territorial and aggressive behaviours**

The species is not believed to hold strong territories, with home ranges of multiple individuals overlapping. Aggressive behaviours have been observed in captivity during attempts to house adults (regardless of sex), except during oestrus periods[10].

- **Natural predators**

Leopard *(Panthera pardus),* Nile Crocodile *(Crocodylus niloticus).* Young are also vulnerable to the African Golden Cat *(Caracal aurata),* Africa Civet *(Civettictis civetta)* and African Rock Python *(Python sebae)*[11].

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

Although Pygmy hippopotamus have tusks capable of inflicting significant wounds they are generally shy and non-confrontational. Additionally, due to their size there is the potential to cause harm to humans for instance in a confined space.

4. Reproductive biology

- **The age at maturity**

Sexual maturity occurs at 3-5 years of age, with a gestation period of 188-210 days[12].

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[7] Robinson, P (2013) *Choeropsis liberiensis* Pygmy Hippopotamus. In: J. Kingdon and M. Hoffmann (eds), *Mammals of Africa. Volume VI: Pigs, Hippopotamuses, Chevrotain, Giraffes, Deer and Bovids*, Bloomsbury Publishing, London

[8] http://www.iucnredlist.org/details/10032/0

[9] http://www.iucnredlist.org/details/10032/0

[10] Flacke, G, Chambers, B, Martin, G, Paris, M (2015), *'The Pygmy Hippopotamus Choeropsis liberiensis (Morton 1849): Bringing to light research priorities for the largely forgotten, smaller hippo species'*, Der Zoologische Garten, vol.84, pp.234-265

[11] http://www.iucnredlist.org/details/summary/10032/0

- **Breeding information**

Breeding can occur throughout the year, with weaning occuring at 6-8 months. The breeding interval is between 7-9 months. One offspring is normally produced and the occurrence of twins is rare (one in every 200 births)[13].

There is limited information regarding the reproductive biology of this species and there is no evidence to determine if the female can store sperm.

No case of hybridisation of this species has been recorded.

5. **Provide information on whether this species has established feral populations, and if so, where those populations are. Include information on whether this species has been introduced to other countries, even if it has not established feral populations.**

There are no known feral populations of this species. In 2009 there was a single reporting of a Pygmy Hippopotamus which was shot having been mistakenly identified it as a wild pig in the Northern Territory. It is likely this hippopotamus originated from an exotic wildlife sanctuary, Tipperary Station, where animal disposition and other related matters involved extensive legal proceedings[14].

This species is currently held in captivity in over 17 institutions around the world, including Adelaide Zoo, Melbourne Zoo and Taronga Zoo, with three other institutions listing to hold the species in the future to support the regional management program.

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.**

There is not a current IRA for Hippopotamus. However, the Australasian Zoo and Aquarium Association considers this a priority IRA for development to support zoo-breeding programs.

The United States Department of Agriculture Animal and Plant Health Inspection Service have developed Protocols for the Import of Elephants, Hippos, Rhinos and Tapirs (2014)[15]

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. Include at least the following factors:**

- **Establishment of a breeding population**

- It is unlikely that a viable breeding population of pygmy hippopotamus could establish in Australia. The species is large and therefore quite easy to detect. Additionally, they are also securely contained in accredited zoological facilities. Pygmy hippos are solitary and usually maintained singularly, therefore multiple releases into wild would be required to facilitate a breeding population.

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[12] Steck, B (2014) Pygmy Hippopotamus *Choeropsis liberiensis* (Morton, 1844) International Studbook 2013 (20th ed.), Zoo Basel, Switzerland, Basel

[13] http://www.iucnredlist.org/details/summary/10032/0

[14] http://www.abc.net.au/news/2009-11-16/nt-man-shoots-pygmy-hippo-by-mistake/1145336

[15] https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-and-animal-product-import-information/import-live-animals

- **Ability to find food sources**

Given the generalist herbivore diet of this species, it would have reasonable ability to find suitable food sources.

- **Rate of reproduction**

Pygmy hippos have a slow reproductive rate, they can potentially reproduce every 16 months producing a single offspring. Unpublished observations by Zschokke and Steck imply that females have the ability to ovulate and conceive within one or two months of the birth of the previous calf. Studbook data provides further evidence that the female can be fertile while she is still lactating.

- **Ability to survive and adapt to different climatic conditions (e.g. temperatures, rainfall patterns)**

Pygmy hippopotamus can survive in a range of climatic conditions, but are limited by the requirement for a water body (eg river) and grazing access.

- **Any characteristics that the species has which could increase its chance of survival in the Australian environment.**

No additional characteristics that will see it have a distinct advantage in the Australian environment.

8. **Provide a comprehensive assessment of the potential impact of the species should it establish feral population/s in Australia. Include, but do not restrict your assessment to the impact of this species on:**

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

There are no similar semi-aquatic species that are in the Australian environment. There may be potential for competition for grazing land with other terrestrial grazing animals.

- **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 Fowler[16] notes they pose few veterinary problems with regards to diseases, however based on the common hippopotamus they may be susceptible to a range of exotic diseases and pests. This includes but is not limited to rinderpest, brucella, leptospira, BHV2 and IBR contagious bovine pleuropneumonia.

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

There is potential impact on certain crops if they were able to gain access to these areas.

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

Zoos monitor the location of their animals like hippos several times a day. In the event that an escape were to occur, it would be likely that the hippo would be contained within zoo grounds. Should the zoo's perimeter be breached, it would be possible to work with local authorities to track, locate and recover the hippo as quickly as possible. Although pygmy hippopotamus can be

[16] Fowler, M & Miller E (2015), Fowler's Zoo and Wild Animal Medicine: Volume 8, Saunders Elsvier, chapter 56, pp.584-592

cryptic they are a large animal with specific habitat requirements making it likely recovery would be successful

The requirement for secure containment both within species-appropriate enclosures and within the zoological property as a whole is key to preventing the establishment of a feral population.

- **any characteristic or behaviour of the species which may cause land degradation i.e. soil erosion from hooves, digging**

The feeding behaviours of this species may have an impact on grazing lands alongside rivers, contribute to soil erosion, disruption to sedimentation in the waterways from hippo movements and potential changed channel geomorphology.

There are no documented incidents of threats to humans.

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.).**

Listing this species 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.. The only other species in the Hippopotimidae family *Hippopotamus amphibious* is listed in the Live Import List with this condition applied.

The proposed import is to support the Zoo and Aquarium Association Australasian Species Management Program for Pygmy Hippopotamus. As such, as animals imported into the program would be subject to ZAA policy and procedure including the requirement that program participation is limited ZAA accredited zoological facilities.

10. **Provide a summary of the types of activities that the specimen may be used for if imported into Australia (e.g. pet, commercial, scientific). You must discuss:**

- **The benefit of this species for these activities**

Pygmy hippopotamus feature in zoo-based educational displays and will serve as ambassadors for the plight of 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 Hippopotamus records 353 living Pygmy Hippopotami kept in 133 institutions.

Despite recent breeding success, there are only five pygmy hippopotamus in Australia. 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 develop annual breeding and transfer recommendations, breeding is carefully planned and avoids production of surplus animals.

- **Potential trade in the species**

Animals to be imported into Australia will be from captive bred individuals, sourced preferably from zoo breeding programs overseas.

Animals imported into the ZAA pygmy hippopotamus breeding program will be transferred to support goals outlined in ZAA Australasian Species Management Program report Transfer between ZAA member zoos is standard via open exchange and is limited to ZAA program participants.

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. You must include:

- **Health Checks, Weighing and Measuring**

An annual schedule of health checks, including parasite checks are carried out by each holding zoo is recommended.

- **Transport Equipment**

Wooden transport crates with mesh top and upper panels are used for long distance.

Transport by air is undertaken in containers consistent with requirement 22 of the International Air Transport Association (IATA) live animal regulations (IATA 2013) and under permit requirements issued by Department of the Environment, and Biosecurity Australia (Department of Agriculture) to Australia.

- **Containment**

There is no standard for containment for ungulate species in Australia, however each institution adheres to high standards for animal display, health, welfare and husbandry procedures, in alignment with ZAA best practice for animal husbandry and care. Exhibits are designed to allow for the display of natural behaviours and held in settings reflective of their natural social groupings.

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.

Husbandry and transport protocols, including the secure containment of this species have been well established, noting that Pygmy Hippopotamus have been in zoological care in Australia for over 60 years[17]

- **The disposal options for surplus specimens**

Production of surplus animals is avoided by zoos participating in the ZAA breeding program, as breeding is planned in line with the program requirements. To avoid breeding sexes can be separated and desexing may be appropriate in some circumstances. The ZAA breeding program works with other zoo- based breeding programs overseas and there is the possibility of transferring or exchanging animals to overseas zoos.

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

[17] ZIMS records for Pygmy Hippopotamus

The species has been held in Victoria, New South Wales, Tasmania , South Australia, Northern Territory, Queensland and Western Australia and the movement of the Pygmy Hippo is controlled by permitting authorities respective Australian states.

The Vertebrate Pest Committee List of Exotic Vertebrate Animals in Australia (July 2007) lists Pygmy Hippopotamus as "Extreme" based on risk to public safety, establishment risk and pest risk. Consequently, this species can only be maintain in facilities approved to hold "extreme" threat species by their relevant state and territory authorities

References cited:

Fowler, M & Miller E (2015), Fowler's Zoo and Wild Animal Medicine: Volume 8, Saunders Elsvier, chapter 56, pp.584-592

Leidy (1991) 'Pygmy Hippopotamus' in 'Walker's Mammals of the World, vol.2, 5th edition' eds Nowak R, John Hopkins University Press, Baltimore Maryland

Ransom, C, Robinson, P.T. & Collen, B. 2015. *Choeropsis liberiensis*. The IUCN Red List of Threatened Species 2015: http://www.iucnredlist.org/details/10032/0.

Robinson, P, Flacke, G, Hentschel, K (2017), *'The Pygmy Hippo story: West Africa's Enigma of the Rainforest'*, Chapter 26, Oxford University Press.

Robinson, P (2013) *Choeropsis liberiensis* Pygmy Hippopotamus. In: J. Kingdon and M. Hoffmann (eds), *Mammals of Africa. Volume VI: Pigs, Hippopotamuses, Chevrotain, Giraffes, Deer and Bovids*, Bloomsbury Publishing, London

Steck, B (2014) Pygmy Hippopotamus *Choeropsis liberiensis* (Morton, 1844) International Studbook 2013 (20th ed.), Zoo Basel, Switzerland, Basel