

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



Eighteenth meeting of the Conference of the Parties
Colombo (Sri Lanka), 23 May – 3 June 2019

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Transfer of the pancake tortoise, *Malacochersus tornieri*, from Appendix II to Appendix I in accordance with Resolution Conf. 9.24 (Rev. CoP17), Annex 1

Criterion B. The wild population has a restricted area of distribution and is characterized by

- i) fragmentation,
- iii) a high vulnerability to intrinsic and extrinsic factors and iv) an observed decrease in the area of habitat and the number of subpopulations.

Criterion C. A marked decline in the population size in the wild, which has been i) observed as ongoing.

B. Proponent

Kenya and United States of America*:

C. Supporting statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Testudines

1.3 Family: Testudinidae

1.4 Genus, species or subspecies, including author and year:

Malacochersus tornieri (Siebenrock, 1903) as defined in the standard nomenclature reference for turtles, Fritz & Havas (2007)

1.5 Scientific synonyms: *Testudo tornieri* Siebenrock, 1903
Testudo loveridgii Boulenger, 1920

1.6 Common names: English: Pancake tortoise, Crevice Tortoise, Tornier's Tortoise, Softshell Tortoise
French: Tortue à carapace souple, Tortue de Tornier

* The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.

1.7 Code numbers:

2. Overview

The Pancake Tortoise *Malacochersus tornieri* is highly vulnerable to extinction by virtue of its very rigid habitat requirements, low densities and fragmented populations, very low reproductive potential, and continuing overexploitation for the international live animal trade.

Pancake tortoises have extremely rigid microhabitat requirements and only live in rock crevices of suitable dimensions in small rocky hills (kopjes) in dry savannah in parts of Kenya, Tanzania and Zambia. These microhabitats are sparse and few and separated by large areas of unsuitable habitat. This accounts for the species' low population densities.

Pancake Tortoise populations are reported to be severely fragmented, consisting of many disjunct meta-populations with isolated smaller subpopulations in suitable habitat. Due to this isolation, re-colonization of depleted sites is highly unlikely. Low population densities in otherwise seemingly suitable habitat are reported to result from removal and offtake by commercial collectors. Previously known subpopulations of *M. tornieri* in Tanzania and Kenya have been depleted and locally extirpated by ongoing offtake to supply both the legal and illegal international animal trade. Suitable rock crevices for the species are easily identifiable by collectors, making populations vulnerable to depletion.

In Zambia, the species has been described from only one isolated location bordering Tanzania, with an estimated population of only 518 animals. However, more than 24,000 animals were exported from the country between 2006 and 2016.

The species is slow to mature, reaching sexual maturity at five to nine years, and has very low fecundity, with only one or occasionally two eggs laid annually. Mortality rates of eggs and hatchlings in nature are high. Isolation of suitable habitats, coupled with limited dispersal abilities and low recruitment rates, make recovery of depleted populations unlikely. This combination of biological characteristics and life history traits renders this tortoise particularly vulnerable to overexploitation.

Due to its unique appearance and behaviour, with a flat and flexible shell that allows it to wedge into rock crevices, the species is highly desired in the international pet trade. Overexploitation for commercial trade is considered the single most important threat, with large and increasing numbers of animals recorded in trade. In the past 20 years more than 40,000 live animals have been exported according to the CITES trade database, mostly for commercial purposes. While the species has been successfully bred in captivity, it is highly unlikely that the large numbers of animals exported as R, F and C do indeed originate from captive production.

A large proportion of the species' range is in unprotected areas. Habitat for this species is rapidly deteriorating in extent and quality, and the species is reported to survive in low numbers. Habitat degradation and loss from the destruction of its rock crevice micro-habitat, often as a result of collection, is an additional threat.

While the species has been categorized as Vulnerable on the IUCN Red List of Threatened Species since 1996, it was recommended for categorization as Critically Endangered by a Draft Red List Assessment submitted in October 2018. This is based on observed and estimated population reductions of about 80% in the past two generations (30 years) and predicted for the next 15 years (45 years total for three generations) (Mwaya et al. 2018 a).

According to CITES criteria, *M. tornieri* is threatened with extinction and meets the criteria for inclusion into CITES Appendix I due to:

- i) a restricted area of distribution, given that only a very small proportion of the species range provides suitable micro-habitat and that populations are fragmented, discontinuous and disjunct and the number of populations is decreasing [Criterion B i) and iv) of Annex 1, Resolution Conf. 9.24 (Rev. CoP17]
- ii) the species high vulnerability to intrinsic and extrinsic factors [Criterion B iii) of Annex 1, Resolution Conf. 9.24 (Rev. CoP17] due to its late maturity, very low reproductive rate and its specialized niche

requirements, given its dependence on a specific micro-habitat that has limited availability and is being degraded and reduced

- iii) an observed and ongoing marked decline of wild populations (estimated at 80 % within three generations) primarily as a result of trade and aggravated by habitat degradation [Criterion C i) of Annex 1, Resolution Conf. 9.24 (Rev. CoP17)].

Listing under Appendix I is needed to end the ongoing detrimental harvesting of *M. tornieri* for international trade. Given its habitat specialization and its life history traits, experts have been recommending a ban on trade in wild specimens, including an Appendix I listing, for more than two decades (Klemens and Moll, 1995; Chansa and Wagner 2006; Mwaya et al. 2018 b).

3. Species characteristics

3.1 Distribution

M. tornieri occurs in Kenya, Tanzania, and marginally in northern Zambia, where it was only reported in a single study (Iverson 1992; Spawls et al. 2002; Malonza 2003; ZAWA 2004; Chansa and Wagner 2006; TSWG 2017; Mwaya et al. 2018a). Though range and distribution is incompletely known, much of the range appears to be comprised of discontinuous and disjunct populations occurring in isolated patches of suitable habitat. While the area of occupancy (AOO) and extent of occurrence (EOO) appear moderate to large, the actual suitable micro-habitat (rocky areas with appropriate crevices) constitute only a very small proportion of the calculated AOO.

The species is the only tortoise endemic to the Somali Maasai and Zambesian 'miombo' woodland phytochoria in east Africa (Mwaya 2006, Spawls et al. 2002, Broadley 1989, Wood & MacKay 1997, Klemens & Moll 1995).

In Kenya, it occurs disjunctly from northern, northeastern, and central areas southward into the southeastern part of the country, all within the Somalia-Maasai floristic zone on the Precambrian Basement system, creating two sub-populations north and south of the volcanic Nyambene Hills (Malonza 2003).

In Tanzania *M. tornieri* occurs disjunctly from the southern shores of Lake Victoria eastward and southward through the Maasai Steppe and further south on Precambrian Basement in the Somalia-Maasai and the Zambesian Floristic Regions.

In Zambia the species has only been recorded from 68 animals at a single location in the hilly areas of the northern Nakonde District, an unprotected area bordering Tanzania.

3.2 Habitat

M. tornieri is a habitat specialist. The species distribution is determined by four limiting factors, namely: geology, climate, vegetation and altitude (Malonza, 1999, Malonza, 2003; Spawls et al, 2002). The tortoises are usually found in rock crevices of suitable size on isolated rocky outcrops (kopjes) in semi-arid and arid thornbush and savannah landscapes of the Somali-Maasai regional center of endemism (White 1983). Arid savannah habitats with annual precipitation ranges between 250-500mm appear to represent the predominant vegetation zone. However, populations also extend into adjacent areas of semi-desert as well as moist savanna (Spawls et al. 2002). Although reported at an altitude between 442 and 1800m a.s.l most sightings in Kenya have been recorded below 1000m a.s.l (Malonza, 2003.) In Zambia the species was mostly confined to high altitudes above 1400 meters above sea level which receive more rainfall (over 1000 mm per year) (Chansa and Wagner 2006).

Local population size of *M. tornieri* depends on the number of suitable crevices the outcrops provide (Wood and MacKay, 1997; Moll and Klemens, 1996; Malonza 1999, 2003). The crevices provide buffering against temperature and humidity fluctuations. *M. tornieri* was more frequently encountered on more densely vegetated rocky outcrops, suggesting that the vegetation serves as an additional thermal buffer against overheating (Malonza 2003). The species has a limited home range and exhibits high site fidelity (Mwaya et al. 2018 b). The species is not a migrant, but infrequent, periodic, local movement between crevices has been observed (Moll and Klemens 1996; Malonza 2003; Mwaya et al. 2018 b).

The tortoises can be found in fissures and crevices in and between boulders and bedrock, and remarkably some animals have been found in fissures high up in towering rocks, and one meter deep in vertical clefts in boulders; the tortoises need to climb up the boulder to slide down into the cleft (Broadley 1989). The crevices have a height between 3 and 8 cm, which allow tortoises of appropriate size to wedge themselves in (Kyalo, 2008).

3.3 Biological characteristics

Malacochersus tornieri is slow to mature; age at maturity in captivity is reported at 5-9 years. Life expectancy was estimated at at 35 years (Mwaya et al. 2018 a).

The species has a very limited reproductive output: In the wild it is believed to have only one clutch per year, consisting of one (sometimes two) large elongate egg, laid at the onset of the wet season (Spawls et al., 2002). Due to the cryptic nature of the species little information on reproduction is available from wild populations. In Kenya, Malonza (2003), found that mating occurs in March–May, egg laying in June–July, and egg hatching in November–December.

Most information on reproduction derives from *ex situ* captive observations and records (e.g. Loehr 1997; Loon 1998 and 2003; Honegger 1970; Shaw 1970; Wilke 1984; Pauler 1990; Darlington and Davis 1990; Dathe 2005). In captivity, breeding and egg laying have occurred almost all year round, provided there is a good food supply (Conant and Downs 1940; Shaw 1970; Darlington and Davis 1990; Skelton and Redrobe 2002; Ewert et al. 2004). Between 1 and 4 months after last matings, gravid females search for sites to deposit their egg (Pellegrin 2008). Reproductive potential in captivity is low: from one to six clutches per year have been reported, with clutches usually contained only a single egg, occasionally two eggs (Gyarmaty, 1988; Darlington and Davis, 1990; Legrain and Dumont 2011). Larger clutches are reported to have low fertility (Hatcher, 1997; Highfield, 1996; Kirkpatrick, 1997). Fertility and hatchling rate in captivity has been reported at between 6 to 65%, and, according to Darlington and Davis (1990), “low fertility and hatch rate seem common in captive *M. tornieri*” and was usually far below 50%. In contrast, survival rate of hatchlings appeared rather high between 32 and 100% (Darlington and Davis, 1990). Although captive hatched tortoises are not exposed to the same dangers as in the wild, and 100% attention and care can be applied, it remains a challenge to raise the animals to sexual maturity. Growth has been reported to be relatively fast during the first 2-3 years (Legrain and Dumont 2011).

3.4 Morphological characteristics

Malacochersus tornieri is a small tortoise of up to about 17.8 cm carapace length, rarely weighing more than 500 g.

This species is exceptional compared to all other members of the Testudinidae. Instead of having a domed carapace, the carapace of *M. tornieri* is distinctly flattened and flexible. This flat shape and shell pliability are fundamental adaptations which have enabled the species to successfully utilize rock crevice microhabitats.

Its flat and pliable shell results from limited bony shell development with a covering of thin keratinous scutes. The reduced ossification of the carapace and plastron is maintained during ontogeny and the species has no fixed body bridge connecting plastron to carapace. Therefore the shell is fenestrated and flexible and while the animal is breathing the carapace and plastron move up and down.

Adult *M. tornieri* carapacial color pattern is quite variable, ranging from light yellow or tan, with darker rays running across each scute, to black with yellow rays across the scute. Older adults may be uniformly tan or horn-colored (Loveridge and Williams 1957; Broadley 1989; Moll and Klemens 1996).

According to Kabigumila (2002) the relationship between body mass and carapace length is not sexually dimorphic; females are not significantly larger than males. Adult males have longer and larger tails relative to the shorter and stumpier tails of females (Moll and Klemens 1996; Malonza 2003).

3.5 Role of the species in its ecosystem

Little is known about the species' role in its ecosystem. Pancake Tortoises are reported to eat a variety of grasses, leaves, succulent plants, seeds and nuts. It is likely that they contribute to seed dispersal. Analysis of feces has shown that they also eat beetles (Spawls et al. 2002). Probable predators of

Pancake Tortoises were reported by Moll and Klemens (1996) to be White-tailed Mongoose (*Ichneumia albicauda*) and Neumann's Genet (*Genetta genetta*). Other opportunistic predators include various Felidae, the White-throated Savanna Monitor (*Varanus albigularis*), jackals (*Canis* sp.) and possibly birds (Mwaya et al. 2018 b).

4. Status and trends

4.1 Habitat trends

It has been estimated that only 22.6% of *M. tornieri* habitat is currently protected across its entire range, predisposing them to illegal collection for live trade as well as to habitat disturbance (Bombi et al. 2013).

In Kenya most pancake tortoise populations occur in the southeast where habitat alteration is a major problem (Kyalo 2008). Habitat quality has undergone great transformation over the years in Kenya owing to increasing population pressure and the need for farming land (Ngwava, 2015; Malonza, 2003).

In Zambia's Nakonde District, the only area where the species was scientifically described so far, 98 % of land area has been reported to be deforested through land clearance for agriculture, firewood collection and charcoal production (Chansa and Wagner 2006).

4.2 Population size

Due to the cryptic nature of this rock-crevice dwelling species, reliable estimates of quantitative data on its population size are difficult to achieve and therefore poorly known. However, relative population data (such as abundance and the number of specimens per person-hour of searching time) have been obtained from various populations and time trends clearly document a decline (Mwaya et al. 2018 b).

The abundance of this species is generally low. It varies from one area to another and local population density appears to be a function of habitat quality, including the presence of appropriately oriented and well-exfoliated rock crevices with suitable interior dimensions (Moll and Klemens 1996, Malonza 2003). In Kenya, recorded densities in appropriate habitats have ranged from 8.86 tortoises /km² in Voo, Kitui County (Malonza 2003), to as low as 1.2 tortoises /km² in Nguni, Kitui County (Malonza 2003, Kyalo 2008).

In Zambia, 68 animals were found at eight sites in Nakonde District inhabited by 2–25 individuals per site (Chansa and Wagner 2006). Based upon a mark-recapture study conducted at eight sites in suitable habitat at Nakonde District, a population size estimate of 518 animals was obtained by ZAWA (2004) and a density of 11 individuals/km² (Chansa and Wagner 2006).

In Tanzania abundance was estimated by Klemens and Moll (1995) based on the number of specimens per person-hour (ph) of searching time. Encounter rates varied between 8.5 tortoises/ph in the Iyoli area to 0.23 tortoises/ph on the border of Tarangire National Park; on average, tortoise encounter rates were 2.42 tortoises per person-hour search effort in six different areas of unexploited habitats, whereas the average encounter rate in five areas where tortoises had been exploited was 0.27 tortoises per person-hour.

4.3 Population structure

Populations are reported to be severely fragmented, consisting of many disjunct meta-populations with isolated smaller subpopulations in suitable habitat. Past studies that investigated trade in Tanzania demonstrated that collection for trade decreased population densities and changed age-class compositions toward a larger proportion of juveniles in wild populations, as compared to undisturbed populations (Kirkpatrick, 1997; Klemens and Moll, 1995).

4.4 Population trends

While the species has been categorized as Vulnerable (VU A1bd) in the IUCN Red List since 1996 it was first provisionally assessed as Critically Endangered (CR) by the IUCN Tortoise and Freshwater Turtle Specialist Group at the Sub-Saharan African Turtle and Tortoise Red Listing Workshop in Togo in 2013. In October 2018 a draft Red List Assessment was finalized, again assessing the species as Critically Endangered based on observed and estimated population reductions of about 80% in the

past two generations (30 years) and predicted for the next 15 years (45 years total for three generations) (Mwaya et al. 2018a).

In Kenya, the low population density in the Nguni area is reported to be due to past collection, as this was the only area where the species was earlier known to occur in Kenya (Wood and MacKay 1997). Kyalo reported in 2008 that collection of specimens for international trade has been identified as a major threat to populations in areas around Nguni, Mataka and Katse in Mwingi district and in Kianjeru, Mbeere district. Meanwhile, even relatively high-density populations are reported to have become rapidly depleted: Ngwava (2015) found no Pancake Tortoises in Voo when resurveying the area in 2014 although this was the area found to have the highest species density in Kenya by Malonza (2003). A commercial farming operation for Pancake Tortoises had been established near Voo and likely specimens from the local wild population have been collected to provide breeding stock for the farm (Ngwava 2015; Mwaya et al. 2018). Other areas in Kenya surveyed by Malonza (2003) that had good Pancake Tortoise populations at that time were also noted by Ngwava (2015) to be depleted in 2014 (Mwaya et al. 2018).

Results of preliminary surveys indicated that in less than 10 years of intensive collection (1985-1995), the pancake tortoise had become severely threatened throughout its range in Tanzania (Klemens and Moll, 1995; Klemens, 1996).

4.5 Geographic trends

No information is available on geographic trends in the species' morphology, population density, reproductive or growth rates, habitat use, or exploitation pressures; the biology of the species is understood to be similar throughout its area of occurrence.

5. Threats

The peculiar flattened profile of this species combined with a lizard-like behavior distinguishes *M. tornieri* from other tortoises, and has heightened its appeal for private collections and zoological institutions (Kirkpatrick, 1997; Klemens and Moll, 1995; Moll and Klemens, 1996).

Over-collection of this species from the wild for international trade in live animals has universally been identified as the single most important threat to *M. tornieri* (Klemens and Moll 1995; Luijff 1997; Malonza 2003; Goh and O'Riordan 2007; Nijman and Shepherd 2007; Ngwava 2015; Mwaya et al. 2018). Moll and Klemens (1997) specifically described ongoing, large scale collection for trade as the single most important threat to the species in Tanzania. Overexploitation for trade can rapidly deplete previously stable populations of *M. tornieri*, as recolonization is limited due to the species' limited movement (small home range and high site fidelity). All available and suitable micro-habitats in any given area can be easily identified, with many animals extracted and the population depleted and possibly extirpated in a very short time.

Moll and Klemens (1997) described ongoing, large scale collection for trade as the single most important threat to the species in Tanzania.

Chansa and Wagner (2006) described illegal collection for international trade as the major threat to the pancake tortoises in Zambia and report that implementation of the national legislation and CITES convention has been hampered by shortage of staff and finances, complicating the conservation of the species, specifically as it was only found in an unprotected area.

Habitat degradation from rock destruction is also an important threat, especially as related to illegal tortoise collection (range-wide), construction purposes and slab and ballast extraction in Kenya, and kiln building for charcoal production in Zambia (Klemens and Moll 1995; Malonza 2003; Goode et al. 2005; Chansa and Wagner 2006). Vegetation removal through slash-and-burn cultivation, wildfires and charcoal burning (Wood and MacKay 1997; Malonza 2003; Ngwava, 2015) are also detrimental to the species because they are likely to negatively affect the ability to feed, and increase exposure to predation and thermal stress (Mwaya 2006, 2009). Livestock grazing does not seem to be as big a problem for Pancake Tortoises as the other various human activities, as it results in little destruction of crevice microhabitats (Malonza 2003).

6. Utilization and trade

6.1 National utilization

In Tanzania, Hadza women living in the Yaedachini Game Controlled Area above Lake Eyasi are known to eat tortoises (Klemens 1992; Mwaya et al. 2018). No other local use is known.

6.2 Legal trade

The species' unusual appearance and behavior make it popular in the live pet trade (WCMC et al 1991), where specimens currently fetch up to 595 USD for breeding age adults in the U.S.² In Europe captive bred juveniles are offered between 220 to 400 Euros breeding age adults can fetch up to 700 Euros³. The vast majority of *M. tornieri* specimens is traded as live animals for the commercial pet trade.

Since the species was first listed on CITES in 1975, a total of 47,061 live animals were recorded as exported and 48,342 imported, according to CITES trade statistics. Annual export and import totals for live animals from all sources between 1975 and 2016 derived from the CITES Trade Database, UNEP WCMC (2018), are provided in Annex 1.

The vast majority of exports, 25,040 animals, were declared to originate from captive breeding (Source Code C), 8,139 were declared as captive born (F), 1,144 as R and 6,943 as wild (W). 5,372 exports contained no source code, 88 were of unknown source (U) and 322 were seized (I).

Very little information is publicly available on the operation of breeding facilities (such as the number and origin of breeding stock, offspring produced, ratio of adults to hatchlings, marking of animals etc.). Given the very low reproductive rate of the species concerns have been expressed about the accuracy of source codes used in trade (Mwaya et al. 2018 a).

Trade has been significantly increasing: 40,729 of the recorded exports and 33,208 of the imports occurred in the last 20 years (1997 – 2016). Moreover, when looking closer at the last 20 years, in the first decade (1997 – 2006) 14,975 exports and 12,121 imports were recorded, rising to 25,754 exports and 21,087 imports in the second decade (2007 – 2016).

Tanzania has previously been the biggest exporter of the species, with a total of 10,966 recorded exports and 18,889 recorded imports between 1985 and 2016. Of these exports, 6,384 were recorded as F, 694 as R and 128 as wild (W). 3,950 exports before 1991 occurred without provision of a source code.

However, Zambia has emerged as the major exporter since 2006, soon after the species was confirmed to exist in the country. Zambia exported a total of 24,310 specimens until 2016, with 21,830 of these declared to have been bred in captivity (C). Export numbers from Zambia have been highly fluctuating from year to year, with a maximum of 6,400 declared exports in 2011 (see Annex 1).

In Zambia, collection for illegal trade is reported to be the major threat to Pancake Tortoise survival (Chansa and Wagner 2006). With no public information available on the operation of breeding facilities in Zambia and only a single Zambian population described in an isolated, unprotected area and an estimated population of 518 animals, concerns have been raised that tortoises may actually originate from other countries (Mwaya et al. 2018 b).

Kenya discontinued exporting *M. tornieri* from the wild in 1981. However meanwhile at least three breeding farms have been licensed (Kyalo 2008) and between 2005 and 2016 1,701 exports of captive bred live animals were permitted. In addition 678 wild animals and 250 with source code R were exported.

In some years, significant exports have been recorded from non-range states: The Democratic Republic of Congo exported 3,100 wild specimens between 1999 and 2007 and Mozambique exported

² [http://www.theturtlesource.com/i.asp?id=225689798&p=African-Pancake-Tortoise-\(Young-Adults\)](http://www.theturtlesource.com/i.asp?id=225689798&p=African-Pancake-Tortoise-(Young-Adults)) viewed on 27 November 2018

³ http://terrarium.com/tb/list_classifieds.php viewed on 27 November 2018

2,125 wild animals in 1997 and 1998. No imports have been recorded into these countries and all exports from them contained no information about the country of origin.

The major importer of the species in the last two decades has been Japan, followed by the United States., Hong Kong and the EU Member States. The EU has listed the species on Annex A of its trade regulations since 1997, which prohibits trade in specimens of wild origin equivalent to CITES App. I. Nevertheless, trade of animals with source codes W, F and R have been recorded to various EU countries between 1991 and 2014 (UNEP WCMC 2018).

6.3 Parts and derivatives in trade

Hardly any parts and derivatives are in trade. In the CITES trade statistics a few bodies, carapaces and “skins” have been recorded.

6.4 Illegal trade

Declared exports (without corresponding import records) from Mozambique (2,125 animals in 1997-1998) and the Democratic Republic of the Congo (3,700 live animals 1999-2007) may indicate the likelihood of extensive illegal trade and corresponding complications of monitoring trade in this species and its impact on populations (Mwaya et al. 2018a).

In Zambia, illegal collection for international trade was described as the major threat to the species (Chansa and Wagner 2006). Moreover, as noted in section 6.2, concerns have been raised that tortoises exported from Zambia may actually originate from other countries (Mwaya et al. 2018 b).

The CITES Secretariat reported the seizure of 370 specimens allocated to 13 seizure cases between 2000-2015 (CITES 2016). In 2006, officials in Hungary seized 55 *M. tornieri* and other tortoises from a lorry arriving from Serbia and destined to Rotterdam (TRAFFIC 2007). The Czech authorities are reported to have seized 888 *M. tornieri* in the year 2000 (Theile et al. 2004).

6.5 Actual or potential trade impacts

The single most serious human threat to *M. tornieri* is overexploitation for the live exotic animal trade (Klemens and Moll 1995; Luijff 1997; Malonza 2003; Goh and O’Riordan 2007; Nijman and Shepherd 2007; Ngwava 2015; Mwaya et al. 2018). Overexploitation for trade can rapidly deplete previously stable populations of *M. tornieri*, as recolonization is limited due to the species’ limited movement (small home range and high site fidelity). All available and suitable *M. tornieri* micro-habitats in any given area can be easily identified, with many animals extracted and the population depleted and possibly extirpated in a very short time.

Formerly described populations in Kenya have been reported as rapidly depleted through collection for trade (Mwaya et al. 2018 b). Studies in Tanzania have demonstrated that collection for trade decreased population densities and changed age-class compositions towards a larger proportion of juveniles in wild populations (as adults were specifically targeted), as compared to undisturbed populations (Kirkpatrick, 1997; Klemens and Moll, 1995). Isolation of suitable habitats coupled with limited dispersal abilities and low recruitment rates make recovery of depleted populations unlikely (Klemens and Moll, 1995).

7. Legal instruments

7.1 National

In Kenya hunting and trade in wildlife and wildlife products have been outlawed by an Act of Parliament since 1977 and 1978 respectively. However, Section 67 of the Wildlife Act allows the Minister in charge of wildlife to make regulations for the better management of wildlife farming and within these provisions trade in specimens of captive bred pancake tortoises has been permitted. In 2008 Kenya had licensed three breeding farms for the species (Kyalo 2008).

Tanzania protects the species under the Wildlife Conservation (National Game) Order, 1974. Currently, at least four farms have been licensed to breed the Pancake Tortoise in Tanzania (Kabigumila 1998; Mbassa and Maganga 2002). For details on export quotas set by Tanzania see section 7.2 and Annex 2.

7.2 International

M. tornieri has been listed in Appendix II as part of the higher taxon listing of Testudines since 1975. International trade is regulated by Article IV of the Convention. However, the Appendix II listing has been unable to reduce trade to a level that is non-detrimental to the wild populations.

The species was included in Phase I of the Significant Trade Review process. As a result the Animals Committee recommended in 1992 that the United Republic of Tanzania introduce a moratorium on trade, and, *inter alia*, initiate a population survey. Owing to lack of response to the Animals Committee recommendations, at its 29th meeting (March 1993) the CITES Standing Committee recommended that all Parties suspend imports of specimens of *M. tornieri* from the United Republic of Tanzania. In March 1995, the Management Authority of the United Republic of Tanzania's informed the Secretariat that, following abuses of quota allocations by traders, export of *M. tornieri* had been banned since 1992. However, the Management Authority wished to allow exports of specimens from four farms. At the 40th Standing Committee meeting in March 1998 Tanzania's request to export ranched/captive-bred specimens was agreed, based on the condition that annual export quotas were agreed between the Secretariat and the Tanzanian Management Authority, and that exports be limited to specimens with a carapace length of 8 cm or smaller. At CoP11 (2000) a proposal to list the species in Appendix I was submitted and withdrawn.

Between 2000 and 2017 the United Republic of Tanzania set export quotas for specimens born in captivity (F1) with a carapace length of 8 cm or less. While the quotas decreased from 756 in 2002 to 342 in 2007, they started to increase in 2008, reaching 940 animals in 2017. No quota has been published for 2018. For details on annual quotas established see Annex 2.

Based on assurances from the United Republic of Tanzania that there was no intention to resume the export of wild specimens, the 70th CITES Standing Committee in October 2018 removed the trade suspension established in 1993, subject to the publication of a zero export quota for wild animals on the CITES website. It was also decided that the United Republic of Tanzania would need to present a non-detriment finding to the Secretariat and the Chair of the Animals or Plants Committee if it should wish to resume trade in wild-collected specimens of the species (CITES 2018).

Other than CITES, there are no other relevant international control measures for trade in the species.

8. Species management

8.1 Management measures

No information is available on dedicated management plans.

The management of pancake tortoises has been of concern in CITES for a long time: In 2002 during the 12th meeting of the Conference of the Parties CITES Parties had agreed Decision 12.43 (CITES 2008), stating:

The Animals Committee, particularly its working group on tortoises and freshwater turtles, shall, before the 13th meeting of the Conference of the Parties, in collaboration with the Secretariat and the Management and Scientific Authorities of the known range States of *Malacochersus tornieri* (pancake tortoise):

- a) review the biology, genetic variability, conservation status and distribution of this species in the wild;
- b) assess the current production systems of this species with the aim of advising on adequate control, management and monitoring practices;
- c) consider appropriate identification and marking systems for specimens in trade and for breeding stocks in captivity in the range States; and
- d) advise on training and capacity-building needs to manage and control the trade in this species.

However, a lack of available funding meant that no practical steps were taken to implement this Decision, and it was deleted at CoP13 (2004).

8.2 Population monitoring

No information about current population monitoring is available. The species was involved within a specific conservation project, "Status, survey and pilot project for the conservation of the pancake tortoise (*Malacochersus tornieri*) in Kenya and Tanzania" (IUCN 1991). Malonza (2003) carried out field studies on the ecology, distribution and conservation of the pancake tortoise in Kenya in the past.

8.3 Control measures

8.3.1 International

No measures other than the existing trade restrictions under CITES are in place.

8.3.2 Domestic

Generally, little information is available. Kyalo provided information on the licensing and control of breeding farms in Kenya (Kyalo 2008).

8.4 Captive breeding and artificial propagation

Although the species has been bred in captivity (e.g. Kirkpatrick 1997; Loehr 1997; Loon 1998 and 2003; Honegger 1970; Shaw 1970; Wilke 1984; Pauler 1990; Darlington and Davis 1990; Dathe 2005), there is a lack of information on operations breeding the species for commercial purposes in the range states (see 8.1). Given the late maturity and very low reproductive rate of the species it has been questioned whether the large volumes of animals in trade have been produced in captive facilities.

All three range states have been exporting animals from captive sources in recent years:

Kenya has licensed three breeding farms and exported 1,701 captive bred (C) animals between 2005 and 2016, an average of 47 specimens per farm per year.

At least four captive production facilities are reported to exist in Tanzania. While some Parties have recorded imports of some captive bred animals from Tanzania, the country does not record any exports of C animals. The vast majority of exports from Tanzania, 6,384 animals from 1999 to 2016, have been declared as born in captivity (F) another 694 animals as R, averaging 98 specimens per facility per year.

Zambia started to regularly export the species as captive bred (source code C), in accordance with Res.Conf. 10.16 in 2006, soon after a study had found the species to exist in one location in Zambia (ZAWA 2004; Chansa and Wagner 2006). Since then exported numbers of C animals have been highly fluctuating, averaging 1985 animals per year, with a maximum of 6,300 in 2011.

Many specimens are held in zoos and private collections (Honegger, 1979), although the total size of the captive population is unknown.

8.5 Habitat conservation

A majority of Pancake Tortoise populations occur outside protected areas. Bombi et al. (2013) estimated that only 22.6% of *M. tornieri* habitat is currently protected across its entire range.

In Kenya, about 95% of the total *M. tornieri* population occurs outside protected areas. Pancake Tortoise presence has been confirmed in the following protected areas, from south to north: Tsavo East National Park (northern sector), Kitui South, Shaba, Buffalo Springs and Samburu National Reserves, and Namunyak Wildlife Conservancy (Malonza 2003; Mwaya et al. 2018). It has also been recorded in some adjacent Laikipia Conservancies (Malonza, unpubl. data).

In Tanzania, Pancake Tortoise populations have been reported from or next to 4 of 16 gazetted national parks, namely Serengeti, Tarangire, Ruaha, and Mkomazi (Broadley and Howell 1991; Moll and Klemens, 1996; Malonza 2003).

No protection of the area known to support the single Pancake Tortoise population in Zambia is provided by ZAWA (Chansa and Wagner 2006).

8.6 Safeguards

Other than the legal instruments and management efforts previously described, no safeguards are in place for this species.

9. Information on similar species

There are no other species in the genus *Malacochersus*. Tortoise species of the genus *Homopus* also live in rock crevices of rocky outcrops and have a dorso-ventrally flattened shell (although not to the extent of *M. tornieri*), however this genus is only found in South Africa and Namibia (Boycott and Bourquin, 2000).

10. Consultations

The CITES Management Authority for Kenya consulted with the government of the United Republic of Tanzania and the Government of the Republic of Zambia, as the only other known range States for the species, vide a letter dated 10 December 2018 requesting for comments/feedback by 17 December 2018. At time of submitting this proposal, no responses had been received from either of the range States.

11. Additional remarks

12. References

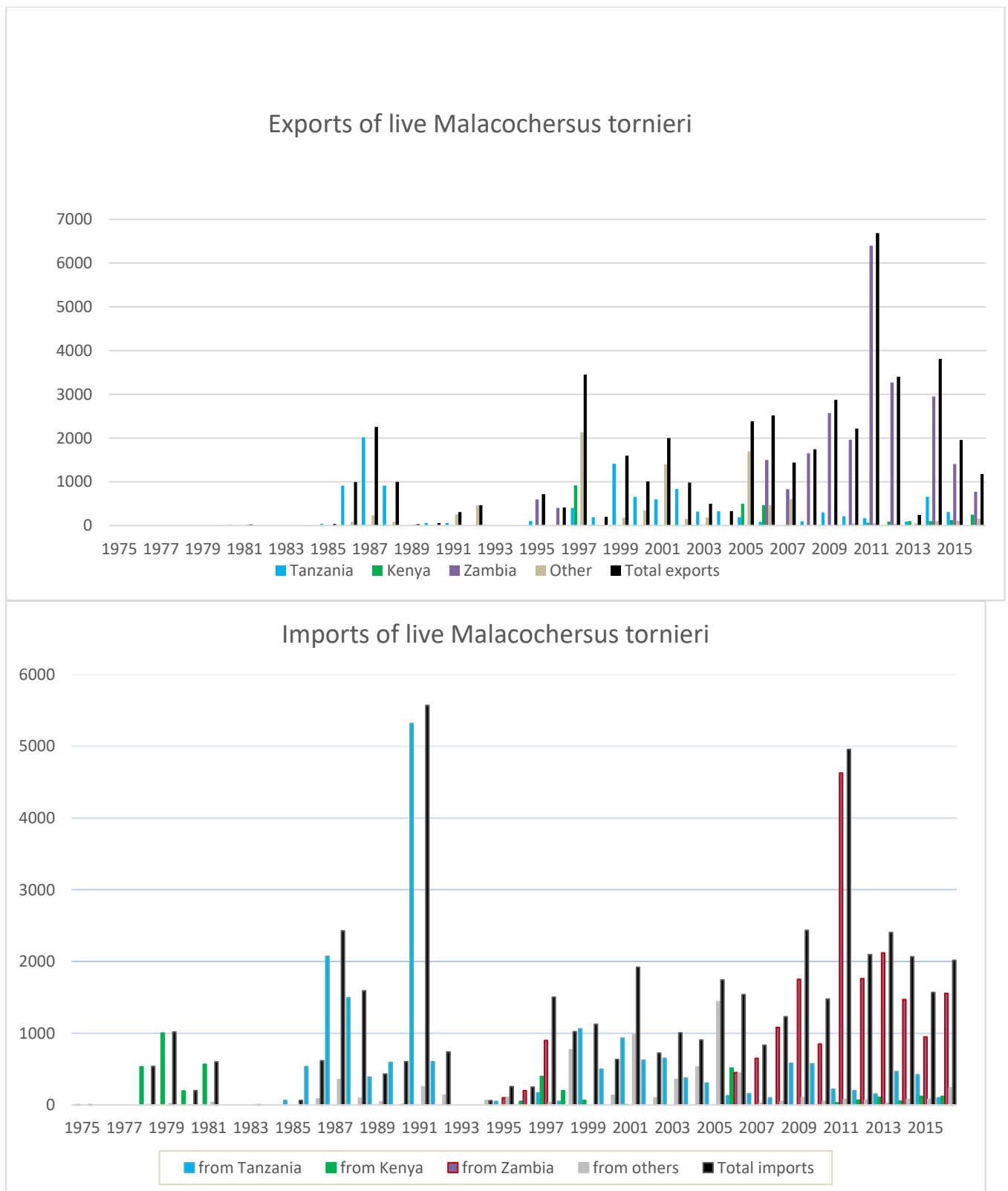
- Bombi, P., D'Amen, M., and Luiselli, L. 2013. From continental priorities to local conservation: a multi-level analysis for African tortoises. PLoS ONE. 8:1–9; e77093.
- Boulenger, G.A. 1920. Une tortue extraordinaire: *Testudo loveridgii*, sp.n. C.R. Acad. Sci. Paris 170: 263-266.
- Boycott, R.C., Bourquin, O., 2000. The South African tortoise book: a guide to South African tortoises, terrapins and turtles. Southern Book Publishers, Johannesburg.
- Broadley, D. G. 1989. *Malacochersus tornieri*, Pancake Tortoise; Soft-shelled Tortoise. pp. 62-63 in The Conservation Biology of Tortoises, (I. R. Swingland & M. W. Klemens, eds.). Occasional Papers IUCN Species Survival Commission, no. 5, IUCN, Gland, Switzerland.
- Broadley, D.G., and K.M. Howell 1991. A checklist of the reptiles of Tanzania, with synoptic keys. Syntarsus 1: 1–70.
- Chansa, W. and P. Wagner 2006. On the status of *Malacochersus tornieri* (Siebenrock, 1903) in Zambia. Salamandra 42 (2/3): 187-190.
- CITES 2008. Implementation Res.Conf.12.8 (Rev.CoP13) Review of Recommendations to Suspend Trade and Implementation of related measures by Range States. SC57 Doc 29.2 Annex 2 <https://www.cites.org/sites/default/files/eng/dec/valid13/E12-Dec.pdf>
- CITES 2016. Species specific matters. Tortoises and Freshwater Turtles (Testudines spp.) CITES CoP17 Doc. 73 <https://cites.org/sites/default/files/eng/cop/17/WorkingDocs/E-CoP17-73.pdf>
- CITES 2018. Summary Record Thursday 4th October 2018 Morning. SC70 Sum 8 <https://cites.org/sites/default/files/eng/com/sc/70/exsum/E-SC70-Sum-08.pdf>
- Conant, R. and Downs, A. 1940. Miscellaneous notes on the eggs and young of reptiles. Zoologica 25:33–48.
- Darlington, A. F. and R. B. Davis 1990. Reproduction in the pancake tortoise, *Malacochersus tornieri*, in captive collections. Herp Review 21: 16-18.
- Dathe, F. 2005. Pflege und Vermehrung der Spaltenschildkröte, *Malacochersus tomieri* (Siebenrock, 1903), im Tierpark Berlin-Friedrichsfelde. Milu, Berlin 11: 585-595.
- Ewert, M.A., R. E. Hatcher and J. M. Goode 2004. Sex Determination and Ontogeny in *Malacochersus tornieri*, the Pancake Tortoise. Journal of Herpetology 38(2): 291–295.
- Goode, M. 1990. Breeding semi-aquatic and aquatic turtles at the Columbus Zoo. pp. 66-76, in: Proceedings of the First International Symposium on Turtles & Tortoises: Conservation and Captive Husbandry, Chapman University, Orange, CA, August 9-12 (Beaman, Caporaso, McKeown & Graff, eds.). California Turtle & Tortoise Club, Van Nuys, CA.

- Goh, T.Y. and O’Riordan, R.M. 2007. Are tortoises and freshwater turtles still traded illegally as pets in Singapore? *Oryx* 41:97–100.
- Gyarmaty, C. 1988. Births and hatchlings. *Colombus Zoo AAZK Chapter. Animal Keepers Forum* 15: 5.
- Hatcher, R. E. 1997. Breeding the pancake tortoise (*Malacochersus tornieri*). *Reptile and Amphibian Magazine* (June 1997): 39-43.
- Highfield, A. C. 1996. *Practical encyclopedia of keeping and breeding tortoises and freshwater turtles*. Carapace Press, Excelsior, Minnesota.
- Honegger, R.E. 1970. Beitrag zur Fortpflanzungsbiologie einiger tropischer Reptilien. *Z. Freunde des Kölner Zoos* 13: 175-179.
- Honegger, R. 1979. *Red Data Book, Vol. 3: Amphibia and Reptilia*. IUCN, Gland, Switzerland.
- IUCN 1991. *Tortoises and Freshwater Turtles – An Action Plan for their Conservation*. IUCN /SSC Tortoise and Freshwater Turtle Specialist Group, 2nd Ed., IUCN, Gland Switzerland, 48 pp.
- IUCN. 1996. *1996 IUCN Red List of Threatened Animals*. IUCN, Gland, Switzerland.
- Iverson, J. B. 1992. *A Revised Checklist with Distribution Maps of the Turtles of the World*. Privately Printed, Richmond, Indiana, 363pp.
- Kabigumila, J. 2002. Morphometrics of the pancake tortoise (*Malacochersus tornieri*) in Tanzania. *Tanz. J. Sci.* 28(2): 33-46-
- Kirkpatrick, D. T. 1997. Pancake tortoises. *Reptiles* (February): 76-81.
- Klemens, M.W. 1992. Letter from the field: hunting and gathering among the Hadza. *Rotunda* 17:4–5.
- Klemens, M. W. 1996. Flat as a pancake... tortoise: Popularity threatens a bizarre east African reptile. *Wildlife Conservation* 99(6): 48-53.
- Klemens, M. W. and D. Moll. 1995. An assessment of the effects of commercial exploitation on the pancake tortoise, *Malacochersus tornieri*, in Tanzania. *Chelonian Conservation and Biology* 1(3): 197-206.
- Kyalo, S. 2008. Conservation, Management, and Control of Trade in pancake tortoise *Malacochersus tornieri* (Siebenrock, 1903) in Kenya: the non-detriment finding studies case study. NDF Workshop Case Studies, WG 7 – Reptiles and Amphibians, CASE STUDY 3. https://cites.org/sites/default/files/ndf_material/WG7-CS3.pdf
- Legrain, A. and N. Dumont 2011. Maintenance et expérience de reproduction de la Tortue à carapace souple - *Malacochersus tornieri* (Siebenrock, 1903). *Chéloniens* 24: 32-37.
- Loveridge, A., and E. E. Williams. 1957. Revision of the African tortoises and turtles of the suborder Cryptodira. *Bulletin of the Museum of Comparative Zoology of Harvard* 115: 163-557.
- Loehr, V. 1997. Verzorging, gedrag en voortplanting van de Pannenkoekschildpad (*Malacochersus tornieri*) in het terrarium. *Lacerta*, Vol. 55 (6): 234-247.
- Loon, v. F. 1998. De Pannekoekschildpad (*Malacochersus tornieri*) in gevangenschap. *De Schildpad* [Journal Dutch Turtle & Tortoise Society], Vol. 24 (5): 230-237.
- Loon, v. F. 2003. De Pannekoekschildpad (*Malacochersus tornieri*) in gevangenschap. *De Schildpad* [Journal Dutch Turtle & Tortoise Society], Vol. 25 (6): 254-264.
- Luijff, W. 1997. CITES and the tortoise and turtle trade. In: van Abbema, J. (Ed.). *Conservation, Restoration and Management of Tortoises and Turtles - An International Conference*. Purchase, NY: New York Turtle and Tortoise Society, pp. 125–134.
- Mbassa, G.K. and Maganga, S.L.S. 2002. Biological and economic processes in wildlife farming in Tanzania. In: Semuguruka, W.D., Magasa, M.W., Kusiluka, L.J.M., Nkwenguliba, G., Nyundo, B., Mlingwa, C.O., Sabuni, G., Mduma, S., and Keyym, J.D. (Eds.). *Proceedings of the Third Annual Scientific Conference, December 2002, Arusha International Conference*. Arusha, Tanzania: Tanzania Wildlife Research Institute, pp. 242–253.
- Malonza, P.K. 1999. Status, ecological characteristics and conservation of the pancake tortoise *Malacochersus tornieri* in Nguni and Nuu areas, Kenya. Unpublished MSc. Thesis, Addis Ababa University, Ethiopia.
- Malonza, P.K. 2003. Ecology and Distribution of the pancake tortoise, *Malacochersus tornieri* in Kenya. *Journal of East African Natural History* 92: 81-96.

- Mautner, A.-K., A. E. Latimer, U. Fritz, and T. M. Scheyer 2017. An Updated Description of the Osteology of the Pancake Tortoise *Malacochersus tornieri* (Testudines: Testudinidae) with Special Focus on Intraspecific Variation. *Journal of Morphology* 278: 321–333.
- Moll, D., and M. W. Klemens 1996. Ecological characteristics of the pancake tortoise, *Malacochersus tornieri*, in Tanzania. *Chelonian Conservation and Biology* 2(1): 26-35.
- Moll, D. and W. Klemens 1997. Ecology and exploitation of the pancake tortoise in Tanzania. *Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles-An International Conference*, by the New York Turtle and Tortoise Society: 135-138
- Mwaya, R.T. 2006. Some insights of the Pancake Tortoise, *Malacochersus tornieri*: Testudinidae ecology from Tarangire National Park, Tanzania. *Chelonii* 4:115–126.
- Mwaya, R.T. 2009. The floristic composition of the habitat of *Malacochersus tornieri* at a hill in Tarangire National Park, Tanzania. *Salamandra* 45:115–118.
- Mwaya, R.T., Malonza, P.K., Ngwava, J.M., Moll, D., Schmidt, F.A.C. & Rhodin, A.G.J 2018 a. *Malacochersus tornieri*. Draft IUCN Red List Assessment. 25. October 2018
- Mwaya, R.T., Moll, D., Malonza, P.K., and Ngwava, J.M. 2018 b. *Malacochersus tornieri* (Siebenrock 1903) – Pancake Tortoise, Tornier’s Tortoise, Soft-shelled Tortoise, Crevice Tortoise, Kobe Ya Mawe, Kobe Kama Chapati. In: Rhodin, A.G.J., Iverson, J.B., van Dijk, P.P., Stanford, C.B., Goode, E.V., Buhlmann, K.A., Pritchard, P.C.H., and Mittermeier, R.A. (Eds.). *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. *Chelonian Research Monographs* 5(12):107.1–15.
- Ngwava, J.M. 2015. Distribution and conservation of the Pancake Tortoise (*Malacochersus tornieri*) in Kenya. Unpublished Report to Mohamed bin Zayed Species Conservation Fund, Grant No. 13257804.
- Nijman, V. and Shepherd, C.R. 2007. Trade in non-native, CITES-listed, wildlife in Asia, as exemplified by the trade in freshwater turtles and tortoises (Chelonidae) in Thailand. *Contributions to Zoology* 76:207–212.
- Pauler, I. 1990. Zur Nachzucht der Spaltenschildkröte *Malacochersus tornieri* (Siebenrock, 1903). *Herpetofauna*, Vol. 12: 6-10.
- Pellegrin, N. 2008. Élevage et reproduction en captivité de la tortue à carapace souple *Malacochersus tornieri* (Siebenrock, 1903). *Manouria* 11(39): 16-22.
- Shaw, C. E. 1970. The hardy (and prolific) soft-shelled tortoises. *International Turtle and Tortoise Journal*, Vol. 4 (1): 6-9, 30-31.
- Siebenrock, F. 1903. Über zwei seltene und eine neue Schildkröte des Berliner Museums. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse*, Vol. 112 (1): 439-446.
- Skelton, T. and Redrobe, S. 2002. The African Pancake Tortoise *Malacochersus tornieri*: management guidelines for the welfare of zoo animals. *Federation of Zoological Gardens of Great Britain and Ireland*, pp. 1–11.
- Spawls, S., K. Howell, R. Drewes and J. Ashe. 2002. *A Field Guide to the Reptiles of East Africa*. Academic Press, London & San Diego. 543 pp.
- Theile, S., Steiner, A. and Kecse-Nagy, K. (2004). Expanding borders: New challenges for wildlife trade controls in the European Union. *TRAFFIC Europe*, Brussels, Belgium.
- TTWG [Turtle Taxonomy Working Group: Rhodin, A.G.J., Iverson, J.B., Bour, R. Fritz, U., Georges, A., Shaffer, H.B., and van Dijk, P.P.]. 2017. *Turtles of the World: Annotated Checklist and Atlas of Taxonomy, Synonymy, Distribution, and Conservation Status (8th Ed.)*. In: Rhodin, A.G.J., Iverson, J.B., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Pritchard, P.C.H., and Mittermeier, R.A. (Eds.). *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. *Chelonian Research Monographs* No. 7, doi: 10.3854/crm.7.checklist.atlas.v8.2017.
- TRAFFIC 2007. *TRAFFIC Bulletin* Volume 21 No. 2
- UNEP World Conservation Monitoring Centre. 2018 CITES Trade statistics derived from the CITES Trade Database. Downloaded on 17/11/2018
- White, F. 1983. *The vegetation of Africa*. UNESCO, Switzerland, 356 pp.

- Wilke, H. 1984. Breeding the Pancake tortoise *Malacochersus tornieri* at Frankfurt Zoo. *Int. Zoo Year Book* 23: 137-139.
- Wood, R. C. and A. MacKay. 1997. The distribution and status of the pancake tortoises, *Malacochersus tornieri*, in Kenya.- pp. 314-321, in: *Proceedings: Conservation, Restoration and Management of Tortoises and Turtles - An International Conference, 11-16 July 1993, S.U.N.Y. Purchase, New York* (van Abbema, ed.). New York Turtle and Tortoise Society and WCS Turtle Recovery Program.
- World Conservation Monitoring Centre, IUCN/SSC Trade Specialist Group and TRAFFIC Network. 1991. *Review of Significant Trade in Animal Species Included in CITES Appendix II. Draft report to the CITES Animals Committee.*
- ZAWA (Zambia Wildlife Authority). 2004. *A Survey Report on Zambia as a Range State for the Pancake Tortoise (Malacochersus tornieri). Annual report to CITES. 5 pp.*
<https://www.cites.org/sites/default/files/common/cop/13/inf/E13i-04.pdf>

Imports and exports of live animals from range states and other countries between 1975 and 2016
 (downloaded from UNEP-WCMC Trade Database on 17/11/2018); for clarity, exports from non-range states have been combined as 'Other'



Annex 2

Quotas established by the United Republic of Tanzania for export of *Malacochersus tornieri*, only for F1 specimens with a carapace length of 8 cm or less

Year	Export Quota
2000	719
2001	833
2002	756
2003	552
2004	470
2005	392
2006	390
2007	342
2008	400
2009	404
2010	404
2011	500
2012	500
2013	510
2014	530
2015	900
2016	940
2017	940
2018	no quota published

Source: CITES Secretariat Website www.cites.org