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Scientific Opinion of the Panel on CITES of the Norwegian
Scientific Committee for Food and Environment

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Preparation of the opinion

The Norwegian Scientific Committee for Food and Environment (Vitenskapskomiteen for mat og miljø, VKM) appointed a project group to draft the opinion. The project group consisted of four VKM members and two VKM staff. Two referees commented on and reviewed the draft opinion. The Committee, by the Panel on CITES with supplementation from two members of the Panel on Biodiversity assessed and approved the final opinion.

Authors of the opinion

The authors have contributed to the opinion in a way that fulfils the authorship principles of VKM (VKM, 2019). The principles reflect the collaborative nature of the work, and the authors have contributed as members of the project group or the VKM Panel on CITES with supplementation from the VKM Panel on biodiversity, appointed specifically for the assignment.

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Acknowledgement

VKM would like to thank the referees Vincent Nijman (Oxford Brookes University) and Peter Paul van Dijk (Re:wild) for their valuable comments through critical review of the draft opinion. VKM emphasises that the referees are not responsible for the content of the final opinion. In accordance with VKM's routines for approval of a risk assessment (VKM, 2018), VKM received their comments before evaluation and approval by VKM Panel on CITES with supplementation, and before the opinion was finalised for publication.

Competence of VKM experts

Persons working for VKM, either as appointed members of the Committee or as external experts, do this by virtue of their scientific expertise, not as representatives for their employers or third-party interests. The Civil Services Act instructions on legal competence apply for all work prepared by VKM.

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Summary

VKM has assessed the risk from international trade with tortoises for the survival of the species in the wild. Twelve species that have been imported to, or exported from, Norway since 2010, and two additional species that are traded internationally in substantial volumes, were assessed. This report provides a scientific risk assessment based on the criteria given under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Risk assessments to determine species-specific detriment (cf. Res. Conf. 16.7 (Rev. CoP17)), Non-detriment findings (NDFs), were made for 14 tortoise species in international trade. The NDF is a determination of impact from legal international trade on survival of the species in the wild and considers various aspects of its biology, environment, usage, and management. In this report the outcome may be positive (no detriment), negative (detriment) or inconclusive (more documentation needed and NDFs should be made case-by-case). Based on the species-specific assessments VKM concludes no detriment (positive) for eight species (*Aldabrachelys gigantea*, *Centrochelys sulcata*, *Chelonoidis carbonarius*, *Chersina angulata*, *Stigmochelys pardalis*, *Testudo graeca*, *Testudo hermanni*, and *Testudo marginata*), detriment (negative) for four species (*Chelonoidis denticulatus*, *Indotestudo forstenii*, *Kinixys homeana*, and *Manouria emys*) and inconclusive for two species (*Kinixys spekii* and *Testudo horsfieldii*). The confidence level of the individual assessments (low to high) depends on the quantity and quality of data on biology, traded volumes, and management. Uncertainties and data gaps in the species assessments were in most cases pertaining to the current statuses and trends of wild populations, the extent of illegal trade and the management of the species in their range states. VKM proposes that the NDF for the species should be applied for a period of five years unless the IUCN assessments are updated and changed. Updates should also be made for the two species that have not yet been assessed by IUCN if assessments for these should be published during the next five years.

Key words: *Aldabrachelys*, *Centrochelys*, *Chelonoidis*, *Chersina*, CITES, *Indotestudo*, *Kinixys*, *Manouria*, NDF, Non-detriment finding, Norwegian Environment Agency, Norwegian Scientific Committee for Food and Environment, risk assessment, *Stigmochelys*, *Testudo*, *Testudinidae*, tortoises, trade, VKM.

Sammendrag på norsk

VKM har vurdert hvilken risiko internasjonal handel med landskilpadder har for artenes overlevelse i naturen. Tolv landskilpaddearter som har blitt innført til, eller utført fra, Norge siden 2010 samt to andre arter som er gjenstand for betydelig internasjonal handel, er vurdert. Denne rapporten er en risikovurdering som bygger på kriterier gitt i Konvensjonen om internasjonal handel med truede arter av vill flora og fauna (CITES). For hver av 14 landskilpaddearter som omsettes internasjonalt, har vi vurdert risikoen for om handel er en trussel (cf. Res. Conf. 16.7 (Rev. CoP17), i form av en såkalt 'Non-detriment finding' eller NDF. En NDF er en vurdering av risikoen for om lovlig internasjonal handel med en bestemt art vil være ødeleggende for artens videre overlevelse i naturen, og inneholder evaluering av ulike aspekter av artens biologi, miljø, bruksområder og forvaltning. I denne rapporten kan utfallet av en NDF være positiv (ikke-skadelig eller ikke-'detrimental'), negativ (skadelig eller 'detrimental') eller ingen konklusjon (behov for mer informasjon og NDF må lages for hvert enkelt tilfelle). VKM konkluderer på bakgrunn av de enkelte artenes risikovurderinger: ikke-skadelig (positiv) for åtte arter (*Aldabrachelys gigantea*, *Centrochelys sulcata*, *Chelonoidis carbonarius*, *Chersina angulata*, *Stigmochelys pardalis*, *Testudo graeca*, *Testudo hermanni* og *Testudo marginata*), skadelig (negativ) for fire arter (*Chelonoidis denticulatus*, *Indotestudo forstenii*, *Kinixys homeana* og *Manouria emys*) og ingen konklusjon for to arter (*Kinixys spekii* og *Testudo horsfieldii*). For hver av vurderingene er det oppgitt et konfidensnivå (lav- høy) som avhenger mengden av, og kvaliteten på, data om artens biologi, omfanget av handel og forvaltning. Usikkerhet og kunnskapshull forbundet med vurderingene var stort sett knyttet til mål på størrelse og utvikling for ville bestander, nivået av ulovlig handel og forvaltning i utbredelseslandene. VKM foreslår at NDF for artene gis en gyldighet på fem år, med mindre Verdens naturvernunion (IUCN) kommer med nye vurderinger og artens bevaringsstatus endres. For to arter som ikke ennå er blitt vurdert av IUCN, bør NDF oppdateres dersom slike vurderinger skulle publiseres innen de neste fem år.

Abbreviations

CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora

IUCN – International Union for Conservation of Nature

IUCN SSC – The IUCN Species Survival Commission

NDF – Non-detriment finding

TTWG – Turtle Taxonomy Working Group

Background as provided by the Norwegian Environment Agency

CITES regulates international trade in endangered species. This includes many species of tortoises. Imports to Norway generally require both export permits from foreign CITES authorities and import permits from the Norwegian Environment Agency. Export or re-export of these species also require permits issued by the Norwegian Environment Agency.

The Norwegian Environment Agency receives applications regarding permits for tortoises and specimens or products containing the species. Consequently, a scientific risk assessment (Non-Detriment Finding - NDF) is needed.

The risk assessment shall be used by the Norwegian Environment Agency in the evaluation of applications in accordance with the Norwegian Regulation on import, export, possession, etc. of endangered species of wild fauna and flora (CITES Regulation).

Terms of reference as provided by the Norwegian Environment Agency

1. The Norwegian Environment Agency asks VKM for a scientific risk assessment of trade in tortoises (*Testudinidae* spp.) listed in the CITES appendices and specimens thereof, based on the criteria given under the Convention on International Trade in Endangered Species (CITES). The Norwegian Environment Agency also asks VKM to give an estimate as to when the risk assessment should be updated.

2. The assessment shall be based on the Norwegian CITES Regulation, relevant articles in the convention text and resolutions. The assessment shall contain available knowledge on the following:
 - a. Name, distribution, life history, habitat, role in ecosystem
 - b. Populations and trends
 - c. Legal / illegal harvesting, captive breeding and trade
 - d. Assessment of the threat(s) posed by trade
 - e. Brief summary of other threats and conservation status
 - f. Population monitoring programs in the range area
 - g. National regulations / legislation and in the range countries
 - h. Current management in the range countries, including harvest quotas
 - i. Overall assessment of data quality

3. Limitation: The risk assessment primarily concerns the species imported/exported to/from Norway since 2010.

Background documents:

- Norwegian CITES Regulation FOR - 2018-06-15-889
- CITES Convention text, especially CITES Articles II, III, IV, VII, IX, og XIV.
- Res. Conf. 7.12 (Rev. CoP15) Marking requirements for trade in specimens of taxa with populations in both Appendix I and Appendix II
- Res. Conf. 8.3 (Rev. CoP13) Recognition of the benefits of trade in wildlife
- Res. Conf. 8.13 (Rev. CoP17) Use of coded-microchip implants for marking live animals in trade
- Res. Conf. 9.21 (Rev. CoP18) Interpretation and application of quotas for species included in Appendix I
- Res. Conf. 9.24 (Rev. CoP17) Criteria for amendment of Appendices I and II
- Res. Conf. 10.3 Designation and role of the Scientific Authorities
- Res. Conf. 10.16 Specimens of animal species bred in captivity
- Res. Conf. 10.17 (Rev. CoP14) Animal hybrids
- Res. Conf. 10.21 (Rev. CoP16) Transport of live specimens
- Res. Conf. 11.9 (Rev. CoP18) Conservation of and trade in tortoises and freshwater turtles

- Res. Conf. 11.16 (Rev. CoP15) Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II
- Res. Conf. 12.10 (Rev. CoP15) Registration of operations that breed Appendix-I animal species in captivity for commercial purposes
- Res. Conf. 13.2 (Rev. CoP14) Sustainable use of biodiversity: Addis Ababa Principles and Guidelines
- Res. Conf. 14.7 (Rev. CoP15) Management of nationally established export quotas
- Res. Conf. 16.6 (Rev. CoP18) CITES and livelihoods
- Res. Conf. 16.7 (Rev. CoP17) Non-detriment findings
- Res. Conf. 18.6 Designation and role of Management Authorities
- CITES 'Non-detriment findings' background - <http://cites.org/eng/prog/ndf/index.php>
- Interpretation and application of quotas for species included in Appendix I: <http://www.cites.org/eng/res/09/09-21R13C15.php>

Assessment

1 Introduction

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a multilateral treaty, ratified by and implemented in Norway (since 25 October 1976). The aim of the convention is to ensure that international trade in wild animals and plants does not threaten the continued survival of the species being traded. A scientific risk assessment of trade in tortoises (*Testudinidae* spp.) has been requested from VKM by the Norwegian Environment Agency (NEA) to support the work of the Norwegian CITES Management Authority in the evaluation of applications in accordance with the Norwegian Regulation on import, export, possession, etc. of these species (Norwegian CITES Regulation: [FOR-2018-06-15-889](#)).

The assessment is based on the Norwegian CITES Regulation as well as relevant articles in the CITES convention text and resolutions. The species lists in the Norwegian CITES Regulation ([FOR-2023-02-23-249](#)) correspond with the CITES appendices in the following way: CITES Appendix I is equal to CITES legislation Annex 1, List A; Appendix II to Annex 1, List B; Appendix III to Annex 1, List C.

In 1975, the tortoise genera *Chersina*, *Geochelone* (has later been split into several genera), *Kinixys* and *Testudo* were included in Appendix II, while a family listing of all tortoises, *Testudinidae* spp., in Appendix II was implemented in 1977. Some species within the family *Testudinidae* have later been transferred to Appendix I. For these Appendix I species, import of live animals to Norway can only be permitted for specimens originating from CITES-registered breeding facilities (source code D, see BOX 1.5-1 for definitions), and they were thus not included in the assessment.

Assessments to determine potential species-specific detriment pertaining to international trade (cf. Res. Conf. 16.7 (Rev. CoP17), Non-detriment findings, are made for 14 species listed in Appendix II. Of these, 12 have been registered as imported to Norway since 2010. The last two were selected for periodic review of significant trade by the CITES Animals Committee in 2023 and were also assessed.

1.1 Turtles and tortoises

The reptile order Testudines includes all turtles (also known as chelonians). The tortoises (terrestrial turtles) form a distinct group within Testudines and belong to the family *Testudinidae*.

Turtles have a characteristic, keratin-covered bony shell; the upper or dorsal part is called carapace, which is a modified ribcage and includes the vertebral column, while the ventral part of the shell is called the plastron. The specialized bony carapace and plastron that house both the pectoral and pelvic girdles distinguishes turtles from all other animals (Thomson et al., 2021). Some anatomical features typical of tortoises (adaptations to terrestrial life) are thick, elephantine rear legs, short, web-less feet, and short digits (Zug, 1993). The adult carapace length of tortoises varies among species from 11 to 138 cm (TTWG, 2021).

All tortoises are oviparous, and the sex determination of the offspring is temperature dependent. The fecundity (number of eggs per clutch and number of clutches per year), however, varies considerably among species. Within the same species, individuals at various life stages (hatchlings, juveniles, adults) may differ substantially in coloration, shape, and proportions (van Dijk et al., 2015). Sexual dimorphism (in size, shell shape, coloration, and ornamentation) is common in tortoises; in some species females are the larger sex, while in other species males are larger (TTWG, 2021).

Generally, the life history of turtles is characterized by slow growth, late maturity (10-15 years), longevity (often 60+ years), reproductivity throughout life, but relatively low fecundity. The survival rate of eggs, hatchlings, and juveniles is low but increases for subadults and adults (van Dijk et al., 2015).

The tortoises are widely distributed in South America and Africa and occur in warm regions of North America, Europe, and Asia. They do not occur naturally in Australia. Tortoises inhabit many islands, although numerous island populations and species are now extinct as a result of human activity (Zug, 1993).

1.2 Tortoises in Norway

No tortoises are native to Norway. From 1977 to 2017, it was forbidden by law to keep reptiles as pets in Norway (Lovdata, 1976; Lovdata, 2017). Despite the prohibition, the Norwegian Institute for Nature Research (NINA) estimated in 2012 that around 15,000 turtles and tortoises (mostly *Testudo hermanni*, but also *Chelonoidis carbonarius* and *Stigmochelys pardalis*) were kept as pets in Norway (Dervo et al., 2012). From 2017, 19 species of reptiles, among them two tortoise species (*Testudo hermanni* and *Chelonoidis carbonarius*) have been exempted from this prohibition, and the Norwegian Food Safety Authority has been given the mandate to provide guidance on documents and registration (Lovdata, 2017; Mattilsynet, 2023).

Since 2017, a total of 2,130 live tortoises have been recorded imported to Norway (CITES Trade Database), of these 1,910 (90%) were *Testudo hermanni*. The import to Norway has been almost exclusively from other European countries.

The European Network on Invasive Alien Species (NOBANIS: <http://www.nobanis.org/>) that registers introductions of amphibia and reptiles in North and Central Europe, lists the following tortoises as potentially invasive (in the countries given in the parentheses): *Testudo graeca* (Czech Republic, Germany, Poland), *Testudo hermanni* (Czech Republic, Denmark, Germany), *Testudo horsfieldii* (Czech Republic, Germany), *Testudo marginata* (Germany). However, no turtle species currently included in CITES Appendix II have yet been recorded as having established populations outside their native range (van Dijk et al., 2015). Overwintering by *T. hermanni* has been observed in Norway (Dervo et al., 2012).

1.3 Threats to tortoises

After primates, turtles constitute one of the most threatened vertebrate taxa on the planet, with almost 60% of the 356 species assessed by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species being threatened with extinction (categories Vulnerable (VU), Endangered (EN) and Critically Endangered (CR); Rhodin et al., 2018; Stanford et al., 2020). Large and easily collected terrestrial tortoises have been heavily exploited and consumed by humans throughout history, many driven to extinction (Rhodin et al., 2018). Eight of the ten turtle taxa that have gone extinct in recent human history were tortoises (Graciá et al., 2020; see also Table 1 in TTWG, 2021).

The main threats to tortoises worldwide today are habitat loss and degradation followed by over-collection for consumption (both adults and eggs), for the international pet trade, and for use in traditional medicine (Stanford et al., 2020).

1.4 Tortoises in trade

Among CITES-listed turtles, *Testudinidae* is the most traded family: 748,008 wild-caught specimens were registered in the CITES trade database during the period 1990-2010 (import values of individuals registered as coming from the wild - source code "W", see BOX 1.5-1 for definitions) (Luiselli et al., 2016).

Collection of turtles for subsistence use and local trade is tightly linked to collection for legal (and illegal) international trade. The export of turtles should therefore not be considered in isolation from local trade (van Dijk et al., 2015).

Asian tortoise species have been heavily exploited for food, traditional medicine, and pets for decades. As a result of this, several of these species have become globally threatened (e.g., Sengottuvel et al., 2023). The demand for tortoises has, however, not subsided and a shift towards a higher proportion of non-Asian tortoises in trade has been observed (Luiselli et al., 2016; 2021).

Surveys of Indonesian markets (2004-2015) showed a development where the variety of species for sale increased (Morgan, 2018), with more non-native species offered. Analysis of data from the CITES trade database (2000-2016) undertaken by TRAFFIC revealed that large numbers of non-native, CITES-listed species entered Indonesia for sale in the markets and pet shops both legally and illegally (Morgan, 2018). Two of the African species assessed here, African spurred tortoise, *Centrochelys sulcata*, and leopard tortoise, *Stigmochelys pardalis*, were among the top five species most commonly observed for sale.

The analysis of legal international trade data performed by Luiselli et al. (2016) showed that the largest markets for import were the USA and European countries (combined) followed by China, Hong Kong, and Japan.

In 2021, 428 seizure records within the EU involved live reptiles, of these 69% (300 seizure records) involved 1,543 live turtles/tortoises, 79% of which were

Mediterranean tortoises (*Testudo spp.*) (TRAFFIC, 2022). Mediterranean tortoises were also the most seized species in the EU in the previous years (TRAFFIC, 2020).

1.5 Captive, wild, and ranched

Within CITES, offtake from wild populations is covered by the source codes W and R (see Box 1.5-1 for descriptions). Given the typical tortoise life cycle, the population impact of collecting eggs or hatchlings for trade is very different from the impact of removing adults from the wild (van Dijk et al., 2015). As the mortality of eggs and hatchlings in nature is very high, their removal for ranching will be more sustainable than collection of adults from the wild. VKM has therefore chosen to distinguish between W and R when presenting data from the CITES Trade Database. Trade of specimens from captive facilities are recorded under the source codes C, D, and F (see Box 1.5-1 for definitions).

According to CITES Resolution Conf. 10.16 (Rev. CoP19), parties should consider that trade in specimens declared as bred in captivity has increased over the years and that this trade may in some instances be detrimental to the survival of wild populations. For instance, the numbers of reptiles imported to the EU, reported as captive bred is substantially higher than what the breeding facilities have the capacity to produce (Luiselli et al. 2016). This implies that some animals captured in the wild are falsely reported as captive bred. Moreover, collecting animals from the wild to form breeding stock may in itself be detrimental to the wild population. It has also been argued that although legal trade of captive-bred individuals does not affect the survival of wild populations, the economic values of traded individuals can lead to illegal capture from nature and consequently be detrimental to wild populations (Mucci et al., 2020).

A guide has been produced by CITES to assist in differentiating wild-sourced from captive-produced specimens of turtles and tortoises (Staerk et al., 2018).

Unsustainable levels of international trade in CITES Appendix II-listed species may be identified through the processes of periodic Review of Significant Trade (E-Res-12-08-R18) and reviews of trade in animal specimens reported as produced in captivity (Resolution Conf. 17.7 – Rev. CoP19)).

BOX 1.5-1. CITES source codes. The source code definitions presented here are taken from the CITES website, where they are adapted from Resolution Conf. 12.3 (Rev. CoP19).

Source code	Description	Definition
W	Wild	Specimens taken from the wild.
R	Ranched specimens	Ranched specimens: specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood.
C	Bred in captivity	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev. CoP19), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5.
D	Captive-bred animal or artificially propagated plant	Appendix-I animals bred in captivity for commercial purposes in operations included in the Secretariat's Register, in accordance with Resolution Conf. 12.10 (Rev. CoP15), and Appendix-I plants artificially propagated for commercial purposes, as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 4, of the Convention.
F	Born in captivity	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev. CoP19)), as well as parts and derivatives thereof.

1.6 Sustainability and legality

The sustainability of wildlife trade depends on the viability of harvested populations rather than the trade itself. Thus, both legal and illegal trade in species can be sustainable or unsustainable. The mandate of CITES is to "ensure that international wildlife trade does not threaten the survival of the species". However, unless the species' basic biology and the environmental conditions affecting its viability are understood, and the knowledge is applied when managing wildlife, negative impacts of trade (overexploitation) might not be detected in time (see e.g., Hughes et al. (2023) for examples). Hence, in lack of data, precaution will be particularly important when assessing the risk of detriment.

1.7 Non-detriment findings

Non-Detriment Findings (NDFs) should be undertaken in accordance with Conf. 16.7 (Rev. CoP17) and are an integral part of the management of international trade in specimens of species listed in CITES Appendix I or II, as well as specimens from some captive production facilities and other sources. The NDF is a determination of impact from international trade on survival of the species in the wild. To assess the potential impact of legal international trade (risk), other factors influencing its populations (e.g.,

local trade, illegal trade, environmental issues) must also be considered. In this report the outcome of a NDF may be positive (no detriment), negative (detriment) or inconclusive (more documentation is needed and NDFs should be made case-by-case). The confidence with which each NDF is made depends on the amount of reliable information available.

2 Methodology and data

2.1 Data and information gathering

The primary sources for an overview of available data are assessments and reports published by the IUCN Red List of Threatened Species, Species+, the IUCN Tortoise and Freshwater Turtles Specialist Group, the CITES Trade Database and TRAFFIC. In addition, a standardized literature search and selection strategy was employed for each species assessment as described below (section 2.2). The 14 species assessed are listed in Table 2.1-1.

Table 2.1-1. Information on the species included in the assessment. The scientific nomenclature follows the names adopted by CITES and is taken from Species+. Size estimates are taken from Turtles of the World – Annotated Checklist and Atlas of Taxonomy, Synonymy, Distribution, and Conservation Status (9th Ed.) (TTWG, 2021) and references therein.

Applied scientific nomenclature	English common names	Norwegian common name	Size (Maximum straightline carapace length)		Native distribution
			Male	Female	
<i>Aldabrachelys gigantea</i> (Schweigger, 1812)	Aldabra giant tortoise	Aldabrakjempeskilpadde	138.0 cm	114.0 cm	Seychelles
<i>Centrochelys sulcata</i> (Miller, 1779)	African spurred tortoise, grooved tortoise	Sporeskilpadde	86.0 cm	57.8 cm	Sahel region (Africa)
<i>Chelonoidis carbonarius</i> (Spix, 1824)	Red-footed tortoise, wood tortoise	Rødfotet skogskilpadde	60.0 cm	44.2 cm	Northern South America
<i>Chelonoidis denticulatus</i> (Linnaeus, 1766)	Yellow-footed tortoise, South American yellow-footed tortoise, South American tortoise, forest tortoise, Brazilian giant tortoise	Gulfotet skogskilpadde	82.0 cm	73.1 cm	Amazon Basin (South America)
<i>Chersina angulata</i> (Schweigger, 1812)	Angulate tortoise, bowsprit tortoise, South African bowsprit tortoise, angulated tortoise	Vinkelskilpadde	35.1 cm	21.6 cm	Southern Africa (South-Africa and Namibia)
<i>Indotestudo forstenii</i> (Schlegel & Müller, 1845)	Celebes tortoise, Forsten's tortoise, Sulawesi tortoise, East Indian tortoise	Sulawesiskilpadde	30.9 cm	25.4 cm	Sulawesi (Indonesia)
<i>Kinixys homeana</i> , Bell, 1827	Home's hinged-backed tortoise, home's hinged tortoise, home's hinge-back tortoise	Homes hengsleskilpadde	25.1 cm	25.8 cm	Africa
<i>Kinixys spekii</i> , Gray 1863	Speke's hinged tortoise	Spekes hengsleskilpadde	18.1 cm	21.0 cm	Africa

<i>Manouria emys</i> (Schlegel & Müller, 1840)	Asian giant tortoise, Burmese brown tortoise, black giant tortoise, six-legged tortoise, Asian tortoise, Burmese mountain tortoise	Brun skogskilpadde	60.0 cm	58.0 cm	Southeast Asia
<i>Stigmochelys pardalis</i> (Bell, 1828)	Leopard tortoise, mountain tortoise	Leopardskilpadde	65.6 cm	75.0 cm	Eastern and southern Africa
<i>Testudo graeca</i> Linnaeus, 1758	Common tortoise, Algerian tortoise, Mesopotamian tortoise, Moorish tortoise, Greek tortoise, spur-thighed tortoise	Maurisk landskilpadde	38.9 cm	31.6 cm	North Africa, southern Europe, and southwest Asia
<i>Testudo hermanni</i> Gmelin, 1789	Hermann's tortoise	Gresk landskilpadde	31.4 cm	35.7 cm	Europe
<i>Testudo horsfieldii</i> Gray, 1844	Steppe tortoise, Central Asian tortoise, Horsfield's tortoise, four-toed tortoise, Afghan tortoise	Russisk landskilpadde	19.0 cm	28.6 cm	Eurasia (from the Caspian Sea to Xinjiang, China)
<i>Testudo marginata</i> Schoepff, 1793	Marginated tortoise, margined tortoise	Bredrandet landskilpadde	42.0 cm	40.3 cm	Southern Europe

2.2 Literature search

Searches were conducted in the Web of Science Core Collection (Entitlements: WOS.SCI: 1987 to 2023, WOS.AHCI: 1987 to 2023, WOS.ESCI: 2018 to 2023, WOS.SSCI: 1987 to 2023) and in Lens.org. For each species the scientific name, synonyms and the English common name was searched in combination with the word "trade" or "population". The generic form of the search strategy was; *TS= ("scientific name" OR "scientific synonyms" OR "English common name" OR "English common name synonyms") AND ("trade" OR "population")* for the Web of Science; and *("scientific name" OR "scientific synonyms" OR "English common name" OR "English common name synonyms") AND ("trade" OR "population")* for Lens.org. Scientific name and synonyms and English common name and synonyms were used as listed in the Species+ database.

The search resulted in 1,274 records. Of these there were 738 records unique to Lens.org and 69 records unique to WoS. There were 130 records duplicated across databases. Ninety records came from a variety of sources including the IUCN Red List (and hand searching the bibliographies of the Red List), Google and Google Scholar. A total of 135 records were used in the species assessments (some records were duplicated in individual assessments as they dealt with several species or regions of overlap).

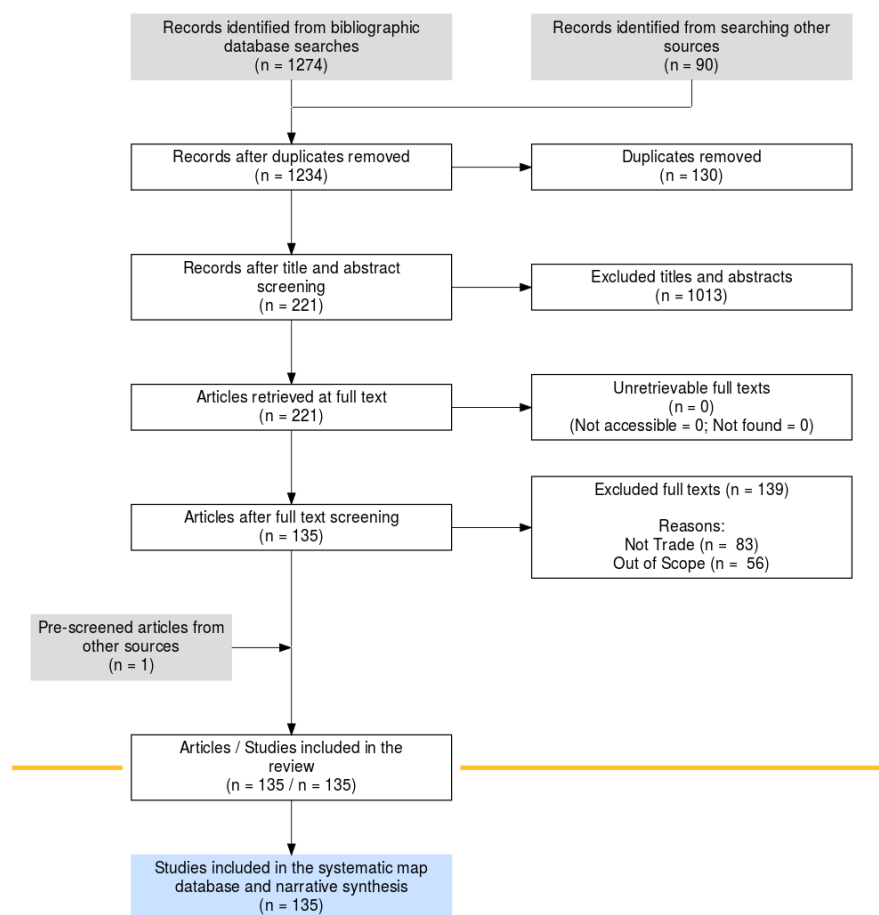


Figure 2.2-1. Flow chart summarizing the literature search.

2.3 Taxonomy

The nomenclature applied in this report follows the CITES taxonomy (see Table 2.1-1). The CITES taxonomy sometimes lags scientific nomenclature as nomenclatural changes are processed by the CITES nomenclature specialists and submitted to the Conference of the Parties (CoP) for approval. For species names, common names, and synonyms the Species+ website was used as source.

2.4 Data from CITES Trade Database

Trade data for the *Testudinidae* family were downloaded from the CITES Trade Database on 18 July 2023 in the format of comparative tabulation reports.

Downloaded data included all export countries, all import countries, all sources, all purposes, and all terms and spanned the entire time range from 1975 – 2022. Trade data were subsetted to the 14 species included in the assignment. Data are presented following the procedures of Hierink et al. (2020), which adopted the approach by Harfoot et al. (2018). Trade data are thus presented in the format of Whole Organism Equivalent (WOEs) which here assumes that each of the trade terms “live”,

“carapaces”, “shells”, “bodies”, “skulls”, “trophies”, “scales”, and “carvings” equate to one organism. Some terms cannot be converted to WOE (e.g., derivatives, leather items, etc.) and are therefore, again following Hierink et al. (2020), excluded from the analysis.

To prevent double counting of trade quantities, re-exports were excluded from the dataset. Following the guidelines for using the CITES Trade Database, direct trade which involves trade exported directly from the country of origin (i.e., is not a reexport) was identified by blank “origin” fields in the data file.

Following Hierink et al. (2020), with the modification of including ranched tortoises as separate category, we compared trade in wild-sourced, ranched, and captive-bred tortoises based on recategorization of the source variable. Wild-sourced tortoises included the sources “wild specimens” (W category in the CITES Trade Database), “unknown source” (U), and “specimens taken from the marine environment” (X), ranched tortoises included “ranched specimens” (R), whereas captive-bred tortoises included the sources “captive bred” (C and D), and “animals born in captivity” (F). Confiscated or seized specimens (I), pre-convention specimens (O), and unreported source (NA) were excluded from the analysis following Hierink et al. (2020).

2.5 Data assessment and recommendation

VKM applied the guidelines for CITES Scientific Authorities in making non-detriment findings for Appendix II exports when selecting information to include in the species assessments. The guidelines are aimed at the exporting country and have a larger emphasis on annual harvest and management than what is obtainable when considering import from all range states, as the assignment to VKM requires. The species assessments in this report contain data on scientific and vernacular nomenclature, distribution, life history, habitat, role in ecosystem, populations and trends, legal and illegal harvesting, captive breeding and trade, assessments of the threat posed by trade, other threats, conservation status, population monitoring programs in the range area, national regulations and legislation in the range countries, current management in the range countries, including harvest quotas, as well as an overall assessment of data quality.

Also aimed at exporting countries, the IUCN SSC’s Tortoise & Freshwater Turtle Specialist Group has prepared a guide for CITES Scientific and Management Authorities on Non-Detriment Findings and trade management for tortoises and freshwater turtles (van Dijk et al., 2015). VKM relied on general knowledge on tortoises and trade conveyed in this report when evaluating the impact of trade in the species assessments.

The IUCN Red List assessments compile data covering the fields relevant for the species assessments, but some species have not been assessed and some assessments are outdated. For some species data was provided in extensive species accounts in ‘Conservation Biology of Freshwater Turtles and Tortoises’ published as part of the

Chelonian Research Monograph series, while for others searches in primary literature were the only source to recent information.

The conclusion of each species assessment (NDF) was given a confidence score of low, medium, or high based on the amount of, and quality of information available (see Table 2.5-1 for description of the criteria used). Note that in cases where conflicting information was found, the level of confidence was lowered.

Table 2.5-1. Description of confidence levels used in the report.

Rating	Descriptors
Low	The information on the species is limited and its status, management and the role of trade not recently assessed. Little peer-reviewed literature is available and empirical and quantitative data to support the assessment is limited.
Medium	Relevant information on the species exists, but the data on its status, management and the role of trade may be limited and/or not up to date. Both grey and peer-reviewed literature may have been used, and the assessment is supported by some empirical and quantitative data.
High	Extensive information on the species, its status, management, and the role of trade is available. Primarily peer-reviewed literature is used, and the assessment is supported by empirical and quantitative data.

3 Species assessments

The individual species assessments are presented in the sections below (3.1-3.14). The species assessments follow a standard structure compiling data on a) Name, distribution, life history, habitat, and role in the ecosystem; b) Populations and trends; c) Legal / illegal harvesting, captive breeding, and trade; d) Assessment of the threat(s) posed by trade; e) Brief summary of other threats and conservation status; f) Population monitoring programs in the range area; g) National regulations / legislation and in the range countries; h) Current management in the range countries, including harvest quotas; i) Overall assessment of data quality.

The data extracted from the CITES Trade Database (2023), as Whole Organism Equivalent (WOEs), covers the period 1975-2022. The traded volumes differ substantially between species, from a few hundred to above 100,000 annual exports for *Testudo horsfieldii* (Figure 3-1). The annual reported imports and exports both increase over time. Altogether a higher number of WOE was reported exported than imported most years.

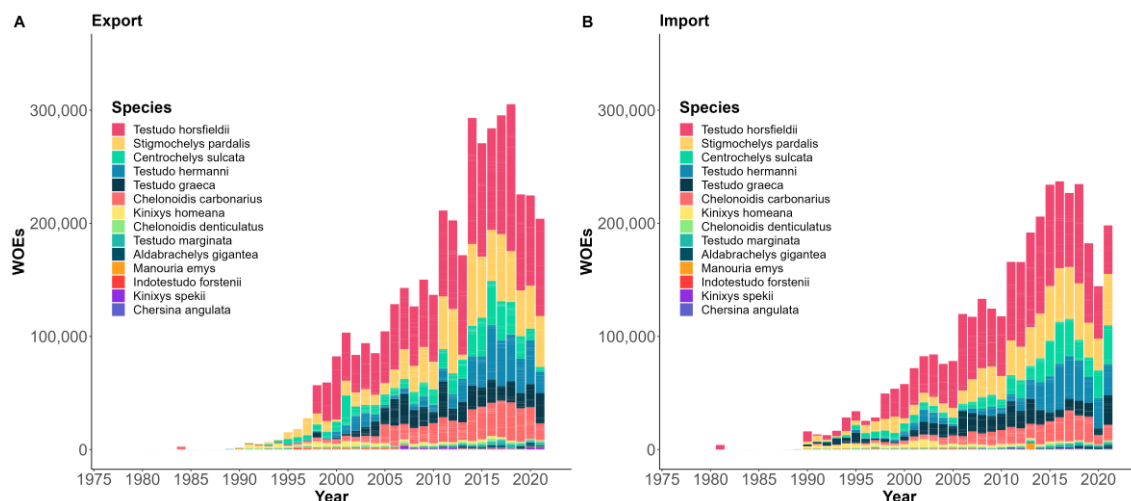


Figure 3-1. Global reported quantities of exported (A) and imported (B) tortoise Whole Organism Equivalents (WOEs) disaggregated by year and tortoise species. Data from CITES trade database, downloaded 18 July 2023.

The discrepancy between annual reported exports and imports is visualized in Figure 3-2, showing that since the late 1990s the exported quantities reported exceed the imported quantities reported with few exceptions. For each of the individual species the reported export also exceeded reported import (see assessment 3.1 to 3.14). This pattern most likely reflects that exporters of live animals in many cases will apply for permits for the maximum number of transactions expected, while importers report only the actual number of transactions. The export of a live animal may then also be recorded in the CITES Trade Database a year prior to the equivalent import.

Discrepancies recorded in the CITES Trade Database could further be due to numerous other reasons, including differences in CITES compliance, typographical errors, smuggling, taxonomic miscategorization, unitless data, and other recording and data management inaccuracies (Blundell & Mascia, 2005; Berec et al., 2018; Robinson & Sinovas, 2018). If years with zero (or very much lower trade volumes compared to adjacent years) occur, it is reason to suspect that this is caused by errors in the recording system.

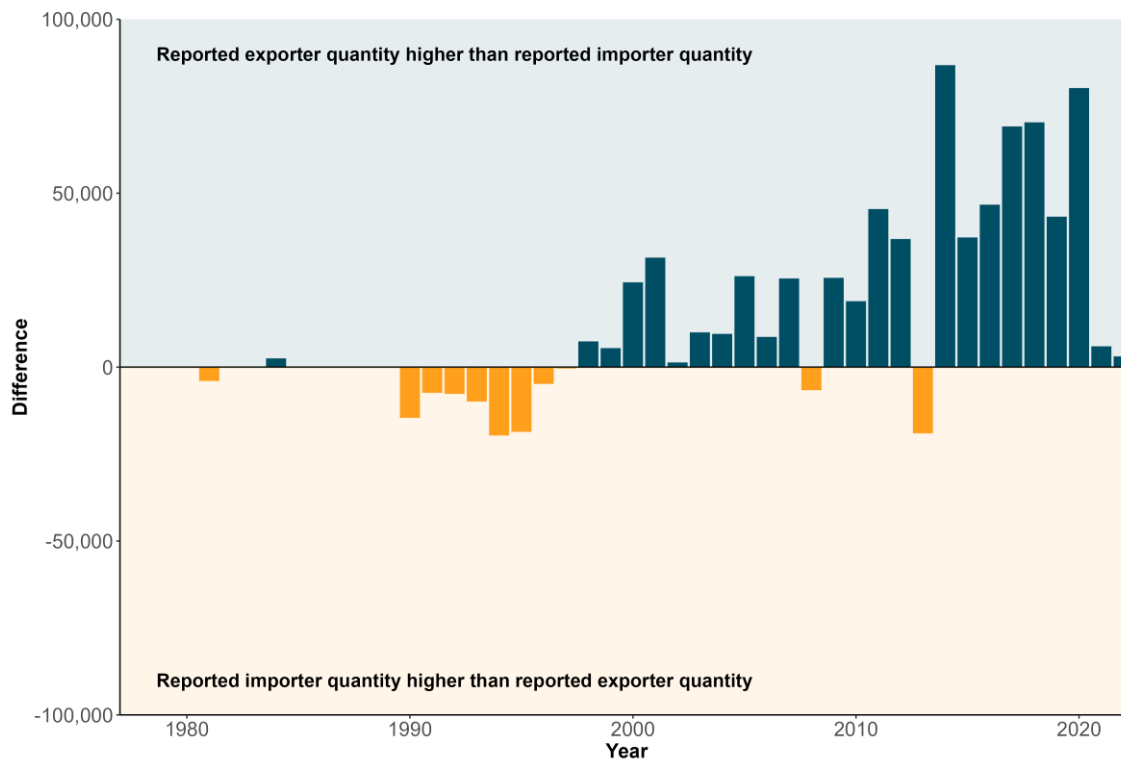


Figure 3-2. Global reported trade discrepancies over time. Reported exporter quantity versus reported importer quantity of tortoises belonging to the 14 species, expressed as whole organism equivalents (WOEs). Data from CITES trade database, downloaded 18 July 2023.

The proportion of the trade volume involving captive bred animals has increased over time (Figure 3-3, panel A and B). As much as 99.8 percent of the traded units were live animals, but other trade terms were also registered in the Trade Database for transactions involving the 14 assessed tortoise species (Figure 3-3, panel C and D). For example, trade in *Chersina angulata* includes a considerable amount of 'carapaces' and 'shells' (see section 3.5 for species assessment).

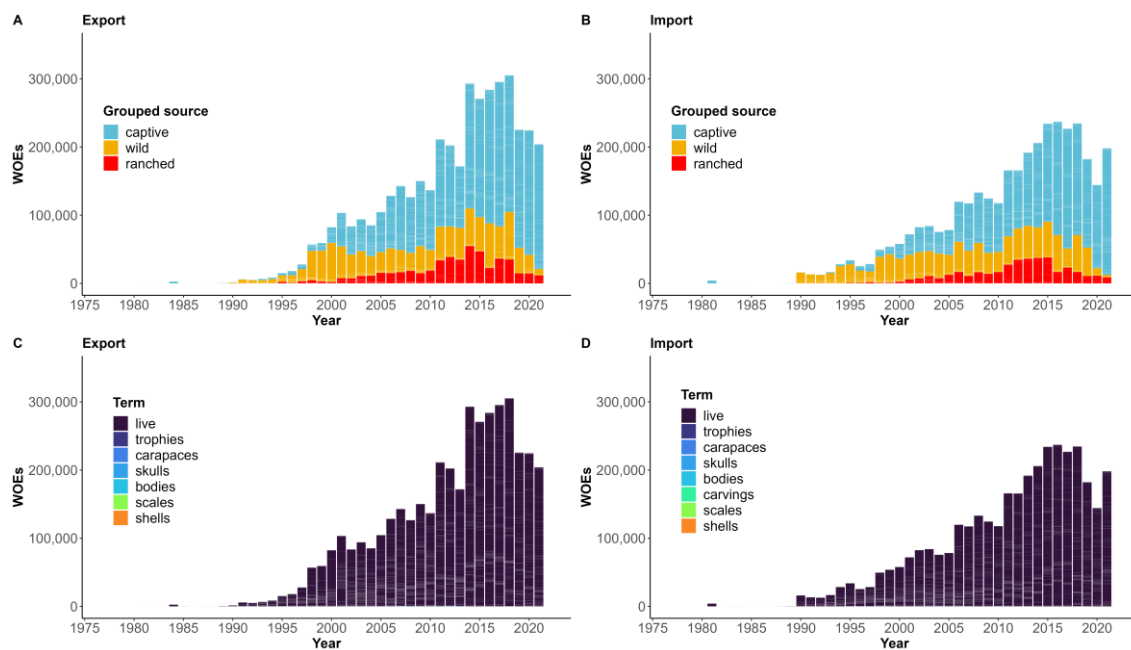


Figure 3-3. Global reported quantities of exported (A and C) and imported (B and D) tortoises belonging to the 14 species, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, and ranched) and in panel C and D by year and trade term (predominantly live specimens (99.8%) have been reported). Data from CITES trade database, downloaded 18 July 2023.

3.1 *Aldabrachelys gigantea*

Conclusion: Positive, with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Aldabrachelys gigantea* in the wild.

Justification: The conclusion is based on the fact that legal trade is dominated by captive-bred live specimens. There is some evidence of illegal trade in the species, but the conservation measures in the native range seem to be well organised and robust.

Maximum straightline carapace length: male 138.0 cm, female 114.0 cm.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Aldabrachelys gigantea* (Schweigger, 1812).

Common name: Aldabra giant tortoise.

Scientific synonyms: *Aldabrachelys elephantina* (Duméril & Bibron, 1835), *Chelonoidis gigantea* (Schweigger, 1812), *Dipsochelys abrupta* (Grandidier, 1868), *Dipsochelys arnoldi* Bour, 1982, *Dipsochelys daudinii* (Duméril & Bibron, 1835), *Dipsochelys dussumieri* (Gray, 1831), *Dipsochelys elephantina* (Duméril & Bibron, 1835), *Dipsochelys grandidieri* (Vaillant, 1885), *Dipsochelys hololissa* (Günther, 1877), *Geochelone arnoldi* (Bour, 1982), *Geochelone dussumieri* (Gray, 1831), *Geochelone gigantea* (Schweigger, 1812), *Geochelone hololissa* (Günther, 1877), *Testudo daudinii* Duméril & Bibron, 1835, *Testudo elephantina* Duméril & Bibron, 1835, *Testudo gigantea* Schweigger, 1812, *Testudo hololissa* Günther, 1877.

Taxonomic note: The taxonomy used by CITES differs to that used by the IUCN Red List of Threatened Species. The IUCN Red List uses *Geochelone gigantea* (note that the Red List has not been updated since 1996; Tortoise & Freshwater Turtle Specialist Group, 1996). There are four recognised subspecies, Aldabra giant tortoise (*Aldabrachelys gigantea gigantea*), Arnold's giant tortoise (*Aldabrachelys gigantea arnoldi*), Seychelles giant tortoise (*Aldabrachelys gigantea hololissa*); and Daudin's giant tortoise (*Aldabrachelys gigantea daudinii*) which went extinct around 1850.

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, originally included as part of the genus listing of *Geochelone* spp.).

EU Wildlife Trade Regulations (338/97, updated), Annex B.

IUCN Red List of Threatened Species (Tortoise & Freshwater Turtle Specialist Group, 1996 – assessed in 1996): Vulnerable (VU; D2) (out of date).

IUCN/SSC TFTSG Provisional Red List (Turtle Taxonomy Working Group, 2021) has assessed the conservation status of the subspecies as follows:

Aldabra giant tortoise (*A. g. gigantea*) – Endangered (EN)

Arnold's giant tortoise (*A. g. arnoldi*) – Critically Endangered (CR)

Seychelles giant tortoise (*A. g. hololissa*) – Critically Endangered (CR)

Daudin's giant tortoise (*A. g. daudinii*) – Extinct (EX, 1850)

Distribution: *Aldabrachelys gigantea* is endemic to the Seychelles (Aldabra atoll, Granitic Islands). Captive animals of the species (and its subspecies) have been introduced to several other countries (islands) including Mauritius (Aigrettes, Rodrigues, Round), Seychelles (Assumption, Alphonse, Astove, Cerf, Cosmolédo, Cousin, Cousine, Curieuse, D'Arros, Desroches, Farquhar, Frégate, Grande Soeur, Moyenne, North Rémire, Silhouette), but have mostly not formed free-ranging populations (Turtle Taxonomy Working Group, 2021).

Life history: *Aldabrachelys gigantea* has among the largest body sizes of all tortoises (~100 kg), the largest male on record had an estimated mass of 300 kg (Grubb, 1971). The maximum lifespan recorded is 176 years. Females produce an average of 13.5 eggs per clutch and two clutches per year (Rodriguez-Caro et al., 2023). Animals reach sexual maturity between 17–23 years for females (Swingland & Coe, 1978).

Habitat: *Aldabrachelys gigantea* spend the dry season in mixed scrub and some more open scrublands, while in the wet season they move to the coastal fringe and feed in high densities (Grubb, 1971; Bourn et al., 1999).

Role in the ecosystem: *Aldabrachelys gigantea* drives important ecosystem functions and dynamics through its feeding behaviours, for example, over 20 herbaceous plants and grasses have coevolved with the species in a habitat type called "tortoise turf" (Grubb, 1971). The biomass of *A. gigantea* has been estimated to be between 3.5 and 58 tonnes per square kilometre, which is more than the combined biomass of various species of large mammalian herbivores in any African wildlife area (Coe et al., 1979).

b) Populations and trends

Historical rapid population declines and several local extinction events because of over-exploitation were recognised early (e.g., Rothschild, 1915), and by the late 1800s the population on the Atoll were considered scarce (Bourn et al., 1999). After this, however, the population recovered to around 100,000 individuals (Bourn et al., 1999), which was thought to be close to the carrying capacity (Gibson & Hamilton, 1984). Later research suggests that differences in rainfall and vegetation type between subpopulations, however, may confound the carrying capacity (Bourn et al., 1999; Turnbull et al., 2015).

There does not appear to be any recent, reliable estimates of population size (although newspaper reports suggest a census occurred in 2022/2023 in some islands [Seychelles News Agency, 2022]). Turnbull et al. (2015) show that the population was stable in the 15 years from January 1998 to December 2012 with slight variations in density and occupancy, but without substantial decline in any of the monitored subpopulations (Grand Terre East, Grand Terre West, Picard, and Malabar).

c) Legal / illegal harvesting, captive breeding, and trade

Most legal, international trade in the last 20 years has been of captive live individuals (Figure 3.1-1). Annual trade has been above 2,000 individuals per year since 2015 with only slight discrepancies between the reported imported and exported volumes.

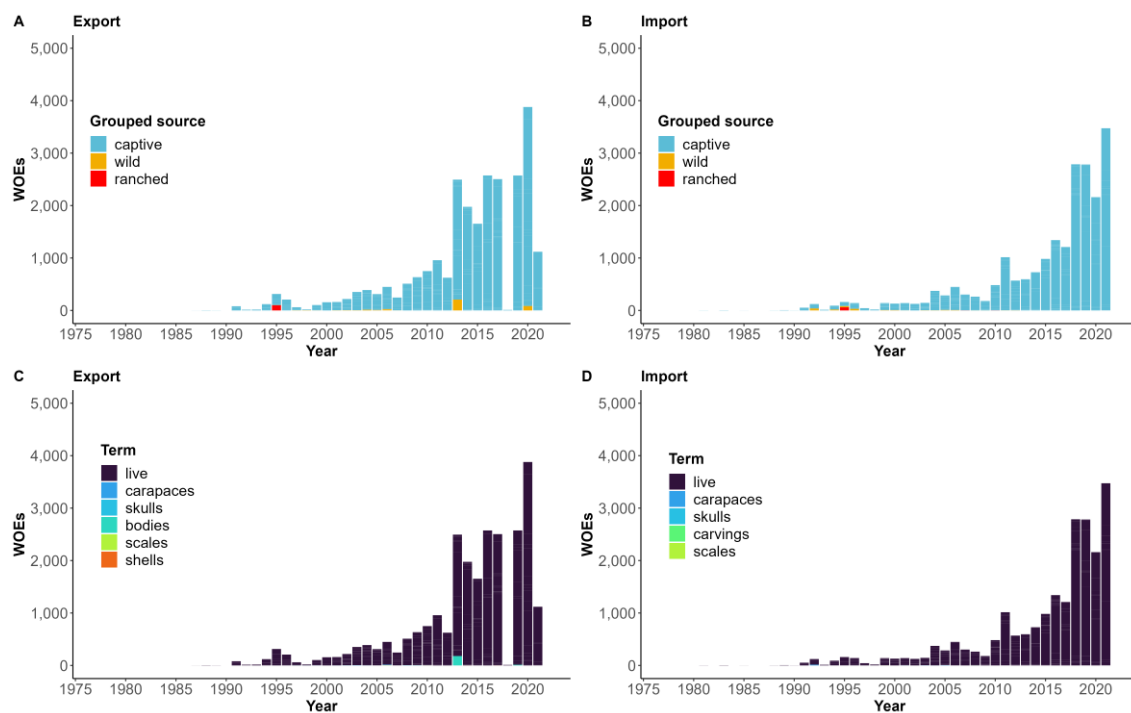


Figure 3.1-1. Reported quantities of exported (A and C) and imported (B and D) *Aldabrachelys gigantea* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

Reports of the species from Assam, India in 2018 and 2020, and Spain in 2023, suggest that there may be a market for the species in the illegal pet trade (Nijman & Shepherd, 2015; Seychelles News Agency, 2023; WWF India, 2023).

The Seychelles Giant Tortoise Conservation Project was established by the Nature Protection Trust of Seychelles in 1997 after the rediscovery of two of the subspecies (*hololissa* and *arnoldi* in 1982; Gerlach, 2003). Reintroduction of captive bred tortoises are ongoing (Reptiles Magazine, 2021) but breeding success outside native conditions is not well documented (Kummrow et al., 2020).

d) Assessment of threat(s) posed by trade

A stable wild population (Turnbull et al., 2015) as well as strong legislative protection in the Seychelles and successful captive breeding programs all suggest that trade does not pose a threat to wild populations.

e) Brief summary of other threats and conservation status

Climate change is thought to hold the largest threat to the species due to the potential inundation of the Seychelles (Falcón & Hansen, 2018).

f) Population monitoring programs in the range area

The Ministry of the Environment in collaboration with the Indian Ocean Tortoise Alliance will register and tag all tortoises in the Seychelles (except Aldabra). This includes captive and free roaming populations (IOTA Seychelles, 4 May 2023) and began in April 2023.

g) National regulations / legislation and in the range countries

The Wild Animals (Giant Land Tortoises) Protection Regulations 1974 (amended in 2000) protect the species from harvest in the Seychelles and only registered tortoise breeders are allowed to export verified captive-bred juvenile tortoises with the correct Ministry of Environment permits. Trade in captive individuals for the pet trade is quite common but trade in wild-caught tortoises is prohibited by the government of the Seychelles ([LAWS OF SEYCHELLES \(fao.org\)](http://laws.fao.org)).

h) Current management in the range countries, including harvest quotas

The tortoises are listed as criteria in the World Heritage Site classification for the Aldabra atoll. Management actions in the [Aldabra Atoll Management Plan 2016](#) include reduction of rats and cats on the atoll (to reduce predation of eggs and young), monitor tortoise populations, assess nesting areas, and investigate genetics.

i) Overall assessment of data quality

The IUCN Red List assessment is from 1996 and therefore out of date, but provisional Red List assessments for subspecies were performed by the Turtle Taxonomy Working Group Assessment in 2021. The species is well represented in the academic literature.

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3.2 *Centrochelys sulcata*

Conclusion: Positive, with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Centrochelys sulcata* in the wild.

Justification: The species' IUCN Red List status is Endangered, and the volumes traded internationally are high, but the species is easily bred in captivity and has high fecundity. A zero quota for trade in animals from the wild has been enforced since 2000. Some illegal trade occurs, but the international pet trade in captive bred animals is not considered a threat to the future survival of the species.

Maximum straightline carapace length: male 86.0 cm, female 57.8 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Centrochelys sulcata* (Miller, 1779).

Common name: African spurred tortoise, grooved tortoise, Sahel tortoise.

Scientific synonyms: *Geochelone sulcata* (Miller, 1779), *Testudo calcarata* Schneider, 1784, *Testudo radiata senegalensis* Shaw, 1802, *Testudo sulcata* Miller, 1779.

Taxonomic note: Genus *Centrochelys* was split from the genus *Geochelone* in 2017, following taxonomic changes adopted at CITES CoP17.

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, originally included as part of the genus listing of *Geochelone* spp.).

EU Wildlife Trade Regulations, Annex B.

IUCN Red List of Threatened Species (Petrozzi et al., 2021 – assessed in 2020):
Endangered (EN; A4bcd).

Distribution: *Centrochelys sulcata* is found in Africa south of Sahara, across the Sahel region and eastward to Eritrea. In addition, a small native population is found southwest on the Arabian Peninsula. Current range states are Burkina Faso, Central African Republic, Chad, Eritrea, Ethiopia, Mali, Mauritania, Niger, Nigeria, Saudi-Arabia, Senegal, Sudan and Yemen (Species+; TTWG, 2021).

Life history: The average annual fecundity of *C. sulcata* is about 45 eggs per female (Petrozzi et al., 2020). The maximum life expectancy in captivity is 75 years (Petrozzi et al., 2020).

Habitat: The species prefers shrubland and savannah, where it occurs at very low density (Petrozzi et al., 2018).

Role in the ecosystem: The species – Africa's largest tortoise – is mainly herbivorous, but can occasionally feed on carrion and garbage. Some individuals have fungi as their preferred food. Various savannah plants depend on these large tortoises for their seed dispersal, and they probably also play a role in soil revitalisation by digging deep burrows (Petrozzi et al., 2021). It is likely (by analogy with the burrows constructed by tortoises of the genus *Gopherus*) that their deep burrows represent important environmental refuges for other animal species.

b) Populations and trends

Decreasing, and the population is severely fragmented (Petrozzi et al., 2021). The low densities set several populations at risk of extinction (Petrozzi et al., 2018).

c) Legal / illegal harvesting, captive breeding, and trade

Since the late 1990s, almost all legal international trade in *C. sulcata* has involved captive bred animals (Figure 3.2-1). In 2016, the traded volume peaked at almost 40,000 Whole Organism Equivalents (WOEs). For 2020 and 2021, the reported imports exceed the reported exports, this could result from delays in the implementation of information in the CITES Trade Database.

France proposed to uplist *C. sulcata* to Appendix I at CoP11 in 2000 (CITES, 2000); since then, a zero annual export quota has been established for specimens removed from the wild and traded for primarily commercial purposes). For all Parties, trade without accompanying proof of captive-bred origin in addition to CITES permits will be illegal. The zero quota for specimens from the wild is also implemented in the Norwegian CITES Regulation (Annex 1 – Species listings).

The species is easily bred in captivity (Petrozzi et al., 2020). However, there are ongoing CITES reviews under Resolution 17.7 of trade in animal specimens reported as produced in captivity for Benin, Ghana, Mali, Sudan, and Togo.

In a survey of total volumes of CITES-listed wildlife found advertised on online platforms in Cameroon, Chad, DRC, Gabon, and Nigeria 2018- 2021, *C. sulcata* was number 4 of all species for sale with 10 adverts (57 specimen) (Woolloff et al., 2022). In twelve surveys in Bangkok, Thailand between 2004 and 2013 a total of 536 *C. sulcata* were found (Nijman & Shepherd, 2015) and 767 individuals were found for sale at markets in Jakarta, Indonesia in 2015 (Morgan, 2018).

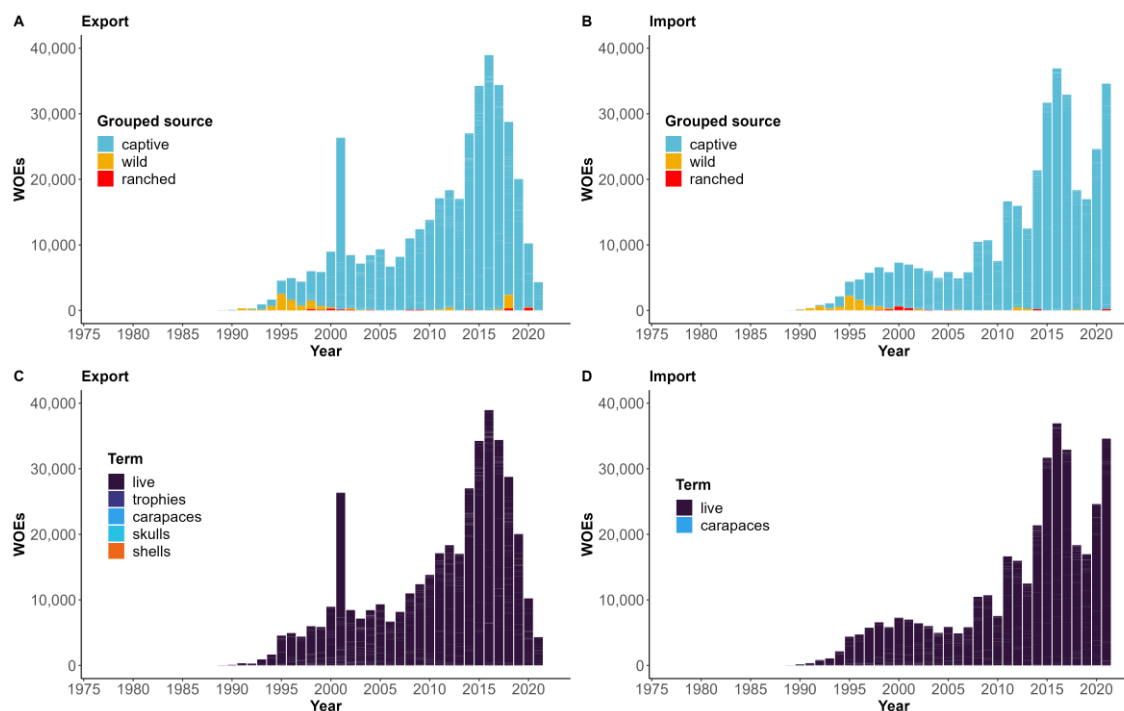


Figure 3.2-1. Reported quantities of exported (A and C) and imported (B and D) *Centrochelys sulcata* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

Exploitation for trade (pets, food, medicine) has been estimated to account for 5% of the extinction risk of *C. sulcata* (Luiselli et al., 2021). Trade does not appear to threaten this species.

e) Brief summary of other threats and conservation status

Habitat destruction and desertification of the Sahel region (caused by e.g. livestock overgrazing and climate change; Petrozzi et al., 2018b) are the main threats, and local extinction is expected in many sites (Luiselli et al., 2021).

f) Population monitoring programs in the range area

Captive colonies exist in range states and elsewhere, and reintroduction programs have started (Petrozzi et al., 2020), e.g., in Burkina Faso (Ardjima et al., 2020).

Centrochelys sulcata is present in several protected areas and is a focal species for eco-tourism (Luiselli et al., 2021).

g) National regulations / legislation and in the range countries

Unknown.

h) Current management in the range countries, including harvest quotas

The species is present in several protected areas in Benin, Burkina Faso, Cameroon (possibly extirpated), Central African Republic, Eritrea, Ethiopia, Mali, Mauritania, Niger, and Togo (Luiselli et al., 2021).

In 2023, Ghana has a quota for export of 4,000, and Togo for 700 captive bred individuals. There are ongoing CITES reviews of trade in animal specimens reported as produced in captivity for Benin, Ghana, Mali, Sudan, and Togo (Species+; see also AC32 Doc. 15.1).

i) Overall assessment of data quality

Relatively much and recent literature is available on *C. sulcata*, and the IUCN Red List assessment is from 2020. The same year a monograph was published by the Tortoise and Freshwater Turtle Specialist Group. There are data gaps pertaining to the impact of environmental changes in the distribution area on the declining, and increasingly fragmented wild population.

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3.3 *Chelonoidis carbonarius*

Conclusion: Positive, with low confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Chelonoidis carbonarius* in the wild.

Justification: Little is known about this species and no IUCN Red List assessment exists. The species is herbivorous to omnivorous and occurs in a wide range of habitats, including open, dry forests and patches of forest vegetation in savannahs. The legal international trade is dominated by captive-bred live specimens. Wild-caught specimens are a minor contribution to trade and subject to national quotas.

Photo from Wikimedia Commons to go here.
Maximum straightline carapace length: male 60.0 cm, female 44.2 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Chelonoidis carbonarius* (Spix, 1824).

Common name: Red-footed tortoise, wood tortoise.

Scientific synonyms: *Chelonoidis carbonaria* (Spix, 1824); *Geochelone carbonaria* (Spix, 1824); *Testudo boiei* Wagler, 1833; *Testudo carbonaria* Spix, 1824; *Testudo hercules truncata* Gray, 1830.

Taxonomic note: *Chelonoidis carbonarius* was originally listed as *Chelonoidis carbonaria*, which was subject to a nomenclature change in 2017, following taxonomic changes adopted at CITES CoP17. The species might hybridize with the sympatric *C. denticulata* (Farias et al., 2007).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, originally included as part of the genus listing of *Geochelone* spp.).

The species has not been evaluated for the IUCN Red List of Threatened Species since 1996. The IUCN Tortoise and Freshwater Turtle Specialist Group (TFTSG) has listed the species as Vulnerable (VU) in their Provisional Red List 2011 (Turtle Taxonomy Working Group, 2021).

Distribution: *Chelonoidis carbonarius* is found in northern parts of South America. Range states are Argentina, Bolivia, Brazil, Colombia, French Guiana (FR), Guyana, Panama, Paraguay, Peru, Suriname, Venezuela. Outside its native range the species is found on several Caribbean islands and in Nicaragua ([Species+](#)).

Life history: The clutch size typically ranges from 2 to 15 eggs (Paull, 1997).

Habitat: *Chelonoidis carbonarius* occurs in a wide range of habitats, including open, dry forests and patches of forest vegetation in savannahs (Zug, 1993; Jerozolimski, 2005).

Role in the ecosystem: This species is omnivorous and is influenced by the seasonal availability of food, consuming parts of plants such as flowers, fruits and leaves,

invertebrates, vertebrates, and fungi (Moskovits & Bjorndal, 1990; Jerozolimski et al., 2009; Wang et al., 2011). Fruit is a major dietary item for *C. carbonarius* and research suggests it plays an important role in the ecosystem as a seed disperser (Wang et al., 2011; Lautenschlager et al., 2022). Furthermore, *C. carbonarius* is popular for human consumption (Farias et al., 2007).

b) Populations and trends

Little known. Based on genetics, Farias et al. (2007) concluded that the species is undergoing a rapid range expansion and suggest that this might be due to an increase in suitable habitat of drier forests resulting from deforestation and plantation agroforestry. It should be noted that this study is based on a small number of samples and the results should not be interpreted as conclusive.

c) Legal / illegal harvesting, captive breeding, and trade

Most of the legal international trade in *C. carbonarius* is reported to be in captive bred animals (Figure 3.3-1). The reported traded volumes (import and export) are increasing and nearing 30,000 live individuals annually in recent years.

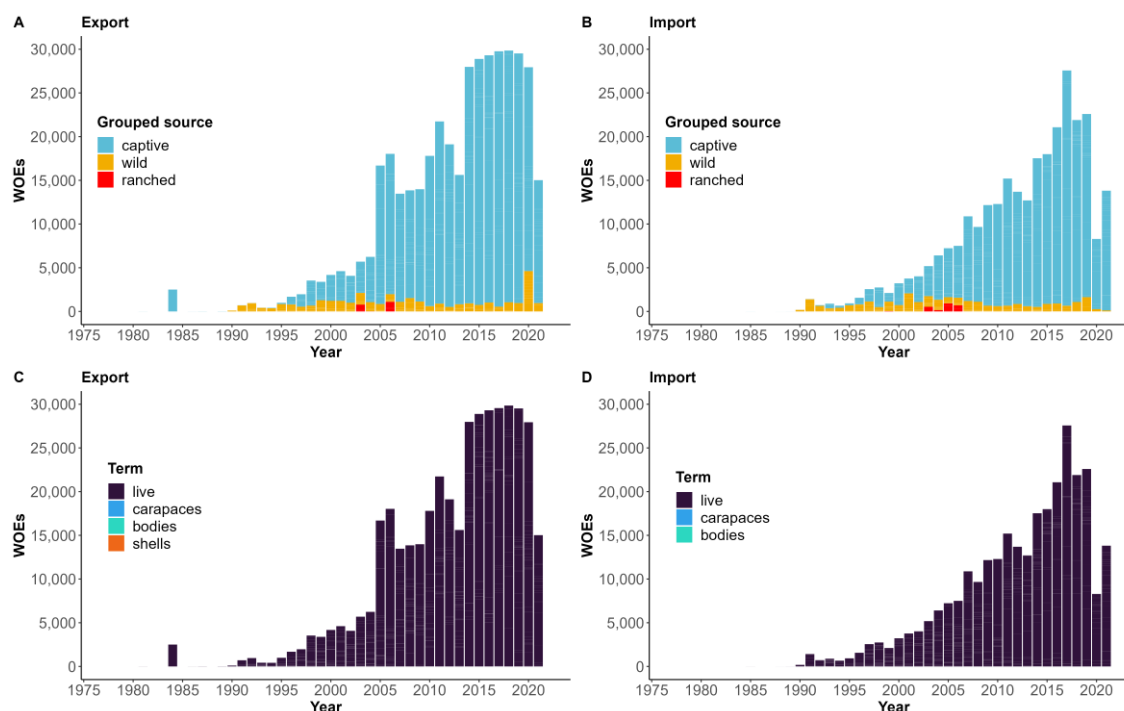


Figure 3.3-1. Reported quantities of exported (A and C) and imported (B and D) *Chelonoidis carbonarius* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

Several range states set annual quotas for the species, including Guyana, Suriname, and Colombia (Species+). The EU gave positive decisions in 2018 for trade from Guyana and Suriname of tortoise with carapace lengths of <10 cm from wild origin (Species+). Legal trade in captive-bred specimens and harvesting restrictions in range states suggest that the species breeds well in captivity.

d) Assessment of threat(s) posed by trade

The impact of local trade is unknown; however, the international trade is almost exclusively in captive bred live animals. Trade does not appear to threaten this species.

e) Brief summary of other threats and conservation status

Unknown.

f) Population monitoring programs in the range area

Unknown.

g) National regulations / legislation and in the range countries

Panama suspended export permits for all wildlife specimens harvested from the wild in 2023 ([Species+](#)).

h) Current management in the range countries, including harvest quotas

Several range States set annual quotas for the species, including Guyana, Suriname, and Colombia ([Species+](#); [CITES E-Notif 2023-057](#)).

i) Overall assessment of data quality

No IUCN Red List assessment has been made for the species and very little data is available to evaluate the status and trends of its wild populations.

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3.4 *Chelonoidis denticulatus*

Conclusion: Negative, with medium confidence.

VKM concludes that international trade currently poses a threat to the continued survival of *Chelonoidis denticulatus* in the wild.

Justification: The IUCN Red List assessment from 1996 lists this species as Vulnerable, but its current status has not been assessed. The proportion of legal, international trade involving captive-bred animals is increasing, although no evidence of captive breeding exists. Studies of hunting and domestic meat trade have shown increasing scarcity and prices. The most recent population studies suggest that some populations are being heavily depleted as a result of overexploitation resulting from domestic meat trade.

Maximum straightline carapace length: male 82.0 cm, female 73.1 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Chelonoidis denticulatus* (Linnaeus, 1766).

Common name: Yellow-footed tortoise, South American yellow-footed tortoise, South American tortoise, forest tortoise, Brazilian giant tortoise.

Scientific synonyms: *Chelonoidis denticulata* (Linnaeus, 1766); *Geochelone denticulata* (Linnaeus, 1766); *Testudo cagado* Spix, 1824; *Testudo denticulata* Linnaeus, 1766; *Testudo foveolata* Schinz, 1833; *Testudo hercules* Spix, 1824; *Testudo planata* Gmelin in Gray, 1831; *Testudo sculpta* Spix, 1824; *Testudo tabulata* Schoepff, 1792; *Testudo terrestris americana* Schweigger, 1812; *Testudo tessellata* Schneider, 1792.

Taxonomic note: *Chelonoidis denticulatus* was originally listed as *Chelonoidis denticulata*, which was subject to a nomenclature change in 2017, following taxonomic changes adopted at CoP17. The species might hybridize with the sympatric *C. denticulata* (Farias et al., 2007).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, originally included as part of the genus listing of *Geochelone* spp.).

IUCN Red List of Threatened Species (Tortoise & Freshwater Turtle Specialist Group, 1996): Vulnerable (VU, A1cd+2cd).

Distribution: Bolivia; Brazil; Colombia; Ecuador; French Guiana; Guyana; Peru; Suriname; Trinidad and Tobago; Venezuela. Introduced to Dominica and Guadeloupe (Species+).

Life history: The species has an average clutch size of five eggs (range 3–15) (Mayor et al., 2023).

Habitat: *Chelonoidis denticulata* occurs mainly in moist tropical forests (Zug, 1993; Jerozolimski, 2005).

Role in the ecosystem: This species is omnivorous and is influenced by the seasonal availability of food, consuming parts of plants such as flowers, fruits and leaves, invertebrates, vertebrates, and fungi (Moskovits & Bjørndal, 1990). *Chelonoidis denticulata* may play an important role in forest dynamics due to its highly frugivorous diet, ability to disperse viable seeds, and predilection for resting in forest gaps for thermoregulation (Guzman & Stevenson, 2008; Jerozolimski et al., 2009).

b) Populations and trends

Little known, but a study of *C. denticulatus* trade over 12 years in the Brazilian Amazon, showed that productivity of tortoise hunting in the monitored communities severely decreased with time. In addition, the price per kilogram of tortoise greatly increased in the urban market (Morcatty & Valsecchi, 2015). Similarly, Mayor et al. (2023) suggest that some populations of *C. denticulatus* are being heavily depleted as a result of overexploitation.

c) Legal / illegal harvesting, captive breeding, and trade

Legal international trade in *C. denticulatus* appears to be increasing, with captive bred animals playing an increasingly important role (Figure 3.4-1). The reported traded volumes (import and export) are increasing and exceeding 1,500 live individuals annually in recent years.

Guyana and Suriname are under ongoing CITES review of significant trade for this species (Species+).

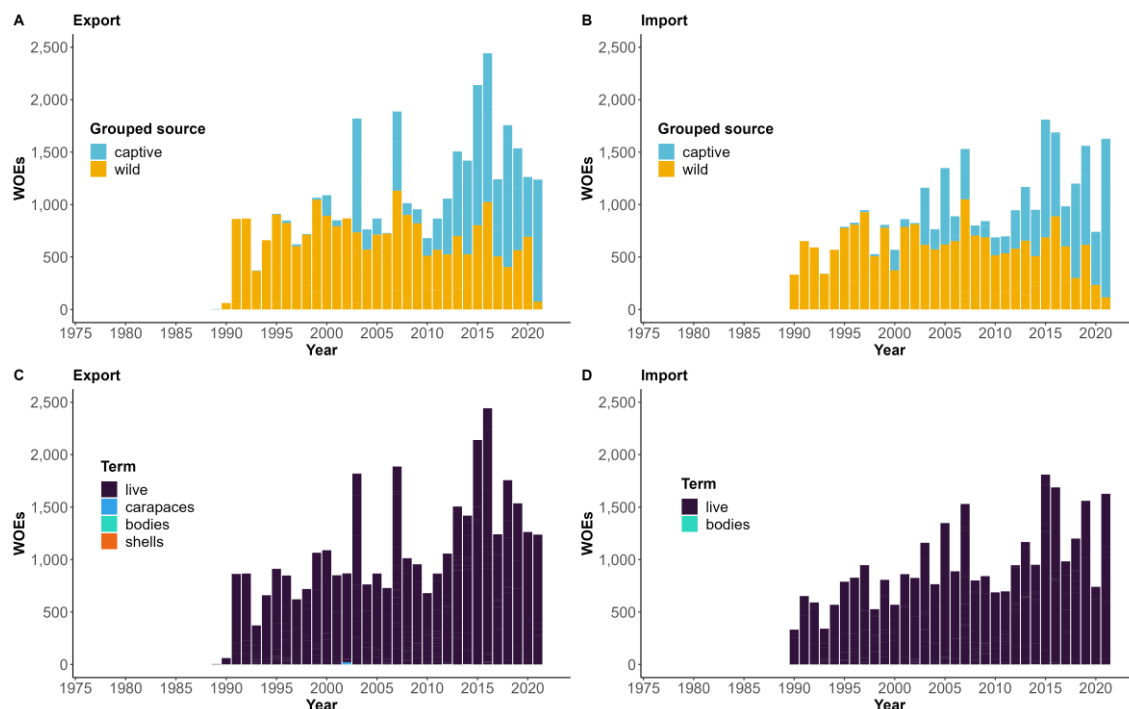


Figure 3.4-1. Reported quantities of exported (A and C) and imported (B and D) *Chelonoidis denticulatus* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive or wild) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

Mayor et al. (2023) suggests trade is significant in the Peruvian Amazon, and Morcatty & Valsecchi (2015) conclude that domestic meat trade poses a significant threat in the Brazilian Amazon. Both studies suggest that domestic trade poses a threat to the species.

No data exist on the impact of trade in captive-bred juvenile specimens on the wild population. International trade could be detrimental to the survival of the species in the wild.

e) Brief summary of other threats and conservation status

The preferred habitat of *C. denticulatus* is moist tropical forests (Zug, 1993; Jerozolimski, 2005). This forest type is threatened by degradation, including logging, land use change, climate change and others.

f) Population monitoring programs in the range area

Unknown.

g) National regulations / legislation and in the range countries

Unknown.

h) Current management in the range countries, including harvest quotas

Guyana and Suriname have set zero quotas for the species after being selected for periodic review of significant trade by the CITES Animals Committee in 2014 (AC27 Doc. 12.5).

i) Overall assessment of data quality

The IUCN assessment is from 1996, provides no information, cites no literature, and is outdated. Available data to assess populations, trends, trade – both illegal and legal, monitoring, management and conservation is sparse. The analysis of legal trade reported to the CITES Trade Database shows trade in both wild-harvested and captive-bred specimens, but little is known about captive breeding facilities or breeding success in captivity.

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3.5 *Chersina angulata*

Conclusion: Positive, with medium confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Chersina angulata* in the wild.

Justification: The species' IUCN Red List status is Least Concern, and the volumes traded internationally are low. The species is easily bred in captivity. Some illegal poaching occurs in its range, but the international pet trade at its current levels is not considered a major threat to the future survival of the species.

Maximum straightline carapace length: male 35.1 cm, female 21.6 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Chersina angulata* (Schweigger, 1812).

Common name: Angulate tortoise, bowsprit tortoise, South African bowsprit tortoise, angulated tortoise.

Scientific synonyms: *Testudo angulata* (Schweigger, 1812), *Testudo bellii* (Gray, 1828), *Testudo tabulata africana* (Schoepff, 1792).

Taxonomic note: DNA markers indicate the presence of two distinct clades associated with the west and southern regions of South Africa (Daniels et al., 2007).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975 as part of the genus listing of *Chersina spp.*)

IUCN Red List of Threatened Species (Hofmeyr & Keswick, 2018): Least Concern (LC)

Distribution: The species is endemic to Southern Africa (Namibia and South Africa) (Species+).

Life history: Males and females reach sexual maturity at 10-12 years and can live over 30 years (Branch, 1989). Females produce one egg at a time but can have up to six clutches per year. Population density can be high (30-35 individuals/ha; Branch 1984). Adult tortoises are vulnerable to wildfires (Baard et al., 2001).

Habitat: *Chersina angulata* can be found in a wide range of biomes across the Cape including Fynbos, Albany Thicket, Succulent Karoo, and Nama Karoo, with tortoises preferring sandy substrates (Hofmeyr, 2009). They occur along the coastal plains but also up to 1,200 m above sea level.

Role in the ecosystem: The species has a diverse diet and consumes vegetation (herbs and grasses), mosses, mushrooms, snail shells and animal faeces (Joshua, 2008).

b) Populations and trends

Common over most of its range in South Africa and on the edge of its range in Namibia, the species is thought to be stable (Hofmeyr & Keswick, 2018).

c) Legal / illegal harvesting, captive breeding, and trade

Trade in the species according to the CITES Trade Database is dominated by live trade of captive and wild individuals (Figure 3.5-1). The traded volumes reported (import and export) are at the most a few hundred Whole Organism Equivalents (WOEs) annually. Some deviations can be observed in the annual trade volumes and trade terms reported by exporter and importer.

Chersina angulata is common in the pet trade but mostly of captive individuals because strict legislation in South Africa and Namibia (Hofmeyr, 2009).

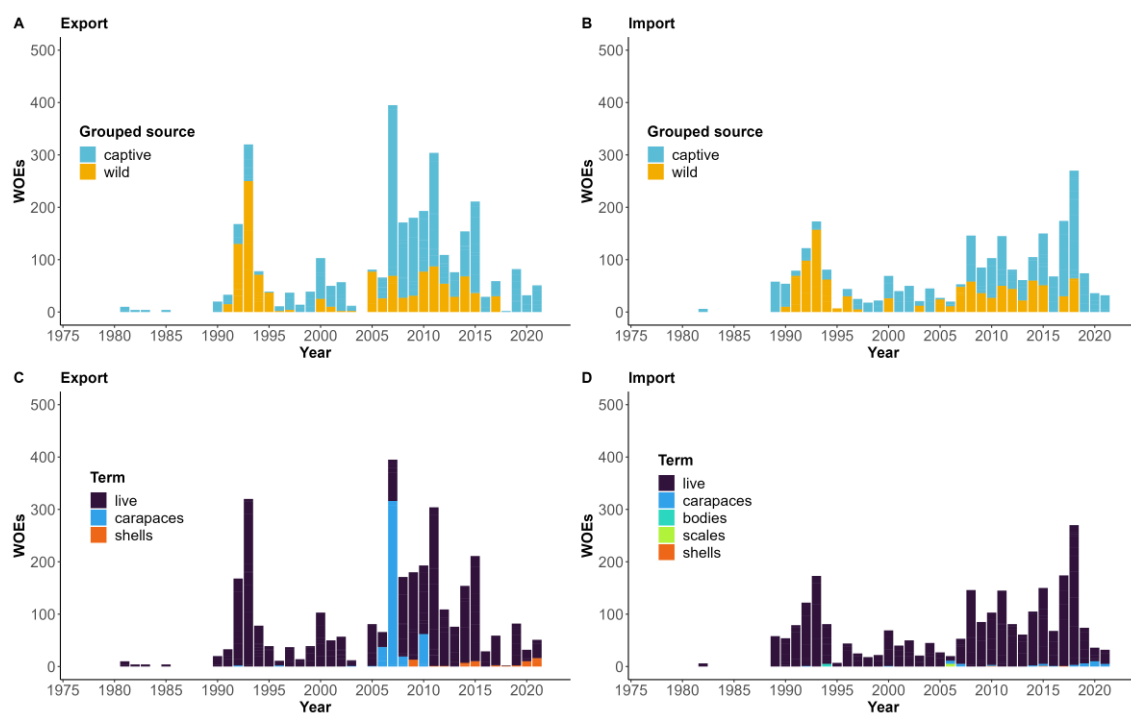


Figure 3.5-1. Reported quantities of exported (A and C) and imported (B and D) *Chersina angulata* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive or wild) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

It is not clear to what extent the pet trade in the species impacts the wild population (Hofmeyr & Keswick, 2018). The level of international trade is low and currently does not appear to threaten this species.

e) Brief summary of other threats and conservation status

The species has been utilised as a food source in the past with some indications that this is ongoing (through illegal poaching), but not very widespread (Henen et al., 2013). Habitat degradation and urbanisation have affected significant areas of the species distribution, but the species appears to be quite resilient (Hofmeyr, 2009). Invasive plants within the Fynbos increase the frequency and intensity of fires which may affect populations. Baard et al. (2001) (cited in Hofmeyr, 2009) reported 98,000 to 275,000 tortoises killed in an uncontrolled wildfire which destroyed 18,000 ha of coastal Fynbos in January 2000.

f) Population monitoring programs in the range area

We found no information about ongoing monitoring of the species specifically in the range area. The species is found within several national parks and nature reserves in Namibia and South Africa (Hofmeyr & Keswick, 2018).

g) National regulations / legislation and in the range countries

Nature Conservation Ordinance 19 of 1974 (2000), Republic of South Africa requires a permit to keep the species. In Namibia, the species is also protected as a Peripheral Protected Game species (Griffin, 2003).

h) Current management in the range countries, including harvest quotas

There is no official captive breeding program. The species breeds well in captivity (Hofmeyr, 2009).

i) Overall assessment of data quality

Data on the species is of good quality. The latest IUCN Red List assessment was undertaken in 2017.

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3.6 *Indotestudo forstenii*

Conclusion: Negative, with medium confidence.

VKM concludes that international trade may pose a threat to the continued survival of *Indotestudo forstenii* in the wild.

Justification: The species' IUCN Red List status is Critically Endangered. The volumes traded internationally are low, but mostly in wild-sourced animals. The species is endemic to Indonesia where it is not protected by law, the species/country combination is under periodic review of significant trade. Some illegal trade is known to occur. No data on the status of the population exists and hence the impact of international trade on its future survival is unpredictable.

Maximum straightline carapace length: male 30.9 cm; female 25.4 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Indotestudo forstenii* (Schlegel & Müller, 1845).

Common name: Celebes tortoise, Forsten's tortoise, Sulawesi tortoise, East Indian tortoise.

Scientific synonyms: *Geochelone forstenii* (Schlegel & S. Müller, 1844), *Testudo forstenii* Schlegel & S. Müller, 1844.

Taxonomic note: *Indotestudo travancorica* was previously considered to be the same species (Rhodin et al., 2021).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, part of family listing of *Testudinidae* spp. since 04/02/1977).

IUCN Red List of Threatened Species (Kusrini et al., 2021, assessed in 2018): Critically Endangered (CR, A4cd).

Distribution: *Indotestudo forstenii* is endemic to the Indonesian island Sulawesi (Kusrini et al., 2021).

Life history: In captivity, the female lays 1-2 eggs per clutch and can produce eggs throughout the year (Kusrini et al., 2021).

Habitat: *Indotestudo forstenii* lives in dry and humid forest, including plantations (Ives et al., 2008).

Role in the ecosystem: There are few observations of the species in the wild (Kusrini et al., 2021).

b) Populations and trends

Decreasing, no population data exists, but a population decline of over 80% over three generations is suspected (Kusrini et al., 2021).

c) Legal / illegal harvesting, captive breeding, and trade

Most of the legal international trade in *I. forstenii* is reported to be in wild-caught animals (Figure 3.6-1). The traded volumes reported (import and export) is a few hundred Whole Organism Equivalents (WOEs) annually, which is a decrease since the 1990s and 2000s.

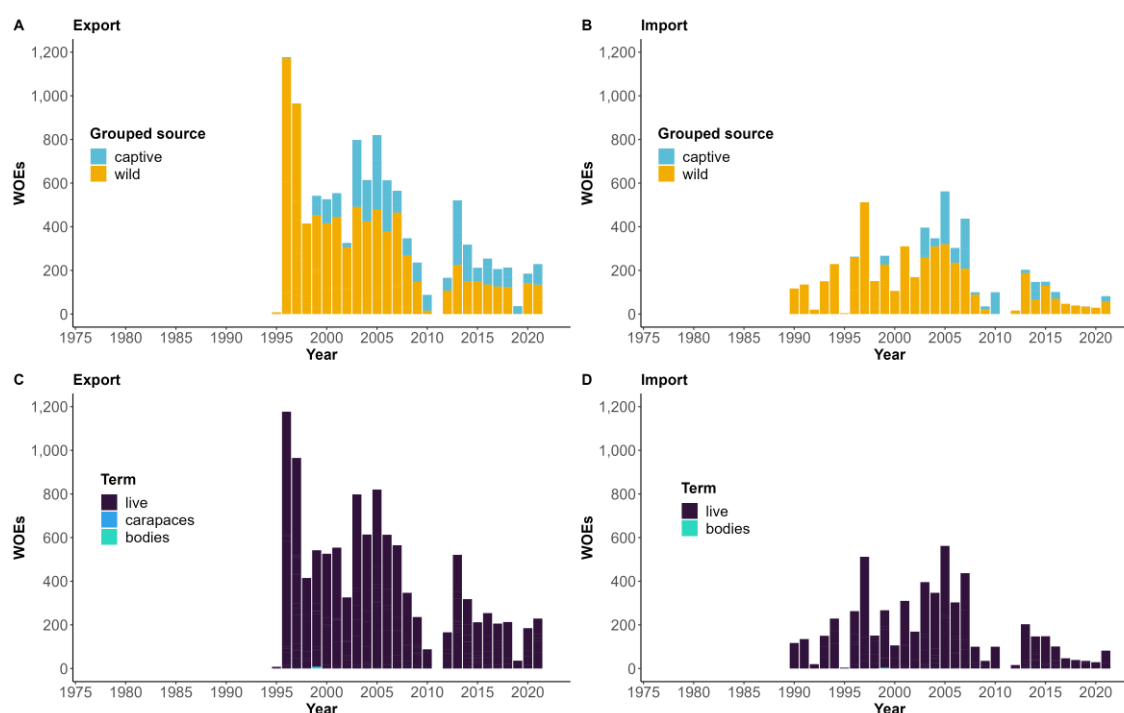


Figure 3.6-1. Reported quantities of exported (A and C) and imported (B and D) *Indotestudo forstenii* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive or wild) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

The species/country combination *I. forstenii* and Indonesia was selected for periodic review of significant trade (RST) at the 32nd meeting of the Animals Committee in 2023, but not included after Indonesia agreed to forbid trade in wild until a NDF has been approved by the chair of the Animals Committee (AC32 Sum. 4 [Rev. 1]). It was also selected for RST following CITES Cop14 and CoP18.

EU has suspended import of wild sourced individuals since 1997 (European Commission, Directorate-General for Environment, 27.9.2019).

Illegal trade in *I. forstenii* was revealed by TRAFFIC surveys of Jakarta pet markets (Morgan, 2018).

d) Assessment of threat(s) posed by trade

Indotestudo forstenii has been collected intensively for the international pet trade for decades (Kusrini et al., 2021). Trade could be detrimental to future survival if continued.

e) Brief summary of other threats and conservation status

Habitat destruction is considered the main threat to the future survival of *I. forstenii* (Ives et al., 2008).

f) Population monitoring programs in the range area

Indotestudo forstenii is found within some protected areas (Riyanto et al., 2008).

g) National regulations / legislation and in the range countries

The species is not protected by law in Indonesia (Kusrini et al., 2021).

h) Current management in the range countries, including harvest quotas

The species is claimed to be bred in captivity in Indonesia and elsewhere. The 2023 export quota for Indonesia is 143 individuals (Species+).

i) Overall assessment of data quality

The IUCN assessment of *I. forstenii* was undertaken in 2018, but no reliable data on the status of its population exists. Data on ecology and conservation measures of wild populations are lacking.

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3.7 *Kinixys homeana*

Conclusion: Negative, with medium confidence.

VKM concludes that international trade currently may pose a threat to the continued survival of *Kinixys homeana* in the wild.

Justification: The species' IUCN Red List status is Critically Endangered. Most trade is still in wild sourced individuals and the species is known to be difficult to keep and breed in captivity. International trade is not the main threat, but any outtake from the decreasing wild population could be detrimental to its future survival. The range states, Ghana and Togo, are under periodic review of significant trade.

Maximum straightline carapace length: male 25.1 cm; female 25.8 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Kinixys homeana*, Bell, 1827.

Common name: Home's hinged-backed tortoise, Home's hinged tortoise, Home's hinge-back tortoise.

Scientific synonyms: *Cinixys homeana* (Bell, 1827).

Taxonomic note: Can be confused with *K. erosa* (Luiselli and Diagne, 2013). A complete molecular phylogeny of the genus *Kinixys* (hinge-back tortoises) is lacking (Hailey et al., 2021).

CITES listing and IUCN assessment: CITES Appendix II (since 01/07/1975 as part of genus listing of *Kinixys* spp.).

IUCN Red List of Threatened Species (Luiselli et al., 2021a, assessed in 2019): Critically Endangered (CR, A2bcd+4bcd).

Distribution: Western and Central Africa, in the continuous Guinea-Congo West Africa rainforest region. Range States: Benin, Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sierra Leone, Togo (Species+).

Life history: Clutch size 2-4 eggs (Akani et al., 2004). The estimated longevity in captivity is 60 years (Luiselli et al., 2021a).

Habitat: The species prefers moist forests that provide closed canopy and shady microhabitats (Luiselli & Diagne, 2013). Its habitat choice is influenced by human hunting behaviour, and it will prefer denser vegetation types in areas where it is hunted (Luiselli, 2003).

Role in the ecosystem: The species is omnivorous, with a diet based primarily on mushrooms with the addition of invertebrates and small amphibians (Luiselli and Diagne, 2013 and references therein).

b) Populations and trends

Decreasing and the population is severely fragmented (Luiselli et al., 2021a). It is likely that the species has been extirpated from areas where they are easily captured (Misfud & Stapleton, 2014).

c) Legal / illegal harvesting, captive breeding, and trade

Around 1995, the reported source code used for the majority of legally traded *K. homeana* shifted from wild to ranched (Figure 3.7-1). There are pronounced discrepancies between the annual numbers reported to the trade database as export and import, in both volumes and source codes. Source code 'captive bred' is used for a small proportion of the transactions both for export and import, but not for the same years and same amounts. The peak in the annual number of Whole Organism Equivalents is somewhat higher for import (ca. 6,000 in 2002) than export (ca. 5,000 in 2001). The volume of trade has decreased over the last few years.

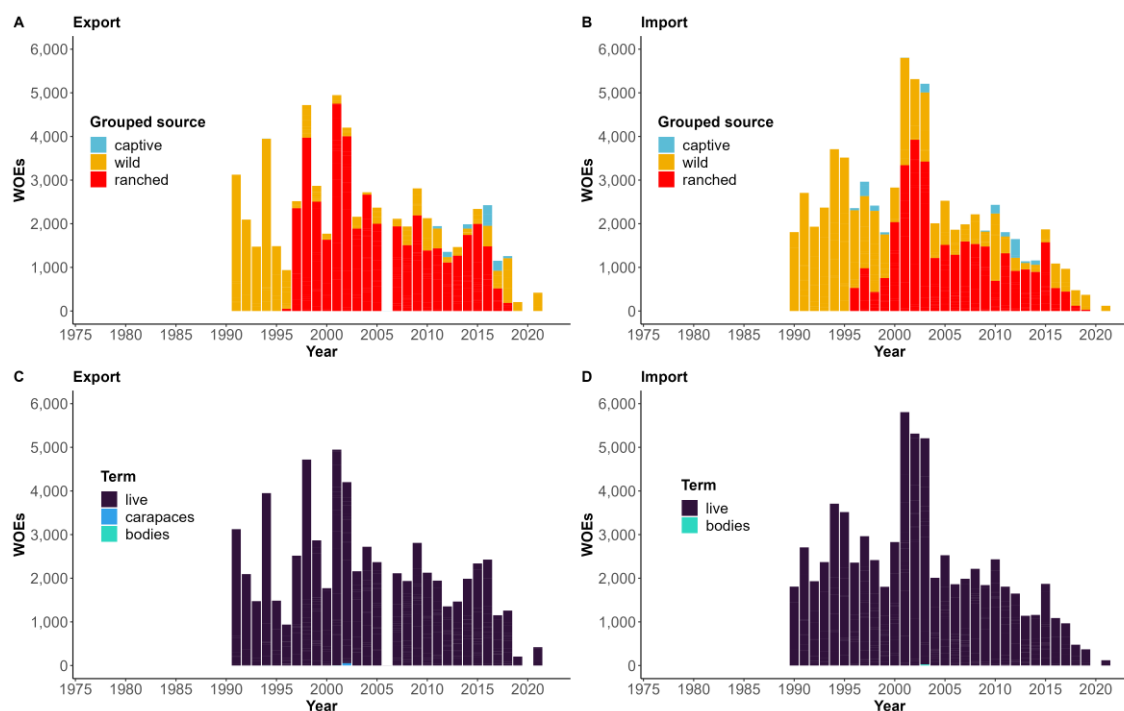


Figure 3.7-1. Reported quantities of exported (A and C) and imported (B and D) *Kinixys homeana* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

Kinixys ssp. are sold in markets throughout Africa and exported internationally for pet trade, consumption, and medicinal purposes (Luiselli et al., 2021b).

Kinixys homeana is known to be difficult to keep and breed in captivity (Luiselli & Diagne, 2013).

d) Assessment of threat(s) posed by trade

It has been estimated that exploitation for international trade (pets, food, medicine) accounts for 10% of the extinction risk in *K. homeana* (Luiselli et al., 2021b).

Combined with other threats, trade could be detrimental to this species.

e) Brief summary of other threats and conservation status

Habitat loss (deforestation) and local consumption are the main threats to *K. homeana* (Luiselli et al., 2021a, b). Both the hunting pressure and deforestation rate is increasing with human population growth in the distribution range (Luiselli et al., 2021a).

Conservation measures have been suggested by Mifsud & Stapleton (2014), who concluded that "At present, it appears that there is virtually no country that can reliably preserve this species. Further legislation should also be developed to protect this species at the international level."

f) Population monitoring programs in the range area

There are several protected areas throughout the range of *K. Homeana*, however, collection of tortoises still occurs (Luiselli et al., 2021a and references therein).

g) National regulations / legislation and in the range countries

In Togo, the species is protected under Article 62, Section 2, Chapter II of law N° 2008-005 (regulating environment protection and wildlife conservation), while Nigeria has banned export (Mifsud & Stapleton, 2014).

h) Current management in the range countries, including harvest quotas

For 2023, Ghana has a quota for 230 wild-taken individuals. Benin (all sources -under CITES suspension) and Togo (live, ranched, and wild) have zero quotas. Three of the range states are under CITES periodic Review of significant trade: Ghana from 2023, Benin and Togo since 2011 ([Species+](#)).

i) Overall assessment of data quality

The IUCN Red List assessment is from 2021 and the population decline seems to be well documented. Some peer review literature on ecology and conservation exists.

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3.8 *Kinixys spekii*

Conclusion: Inconclusive, with low confidence.

VKM is not able to conclude whether or not international trade currently poses a threat to the continued survival of the *Kinixys spekii* in the wild.

Justification: Data on the species is deficient, with significant gaps to assess detriment. The species has not been assessed by the IUCN and the population trend is unknown. International trade is not considered to be the main threat and has for the last few years been dominated by captive bred animals. It is unclear how wild populations of *K. spekii* are regulated in order to prevent unsustainable trade.

Maximum straightline carapace length: male 18.1 cm, female 21.0 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Kinixys spekii*, Gray 1863.

Common name: Speke's hinged tortoise.

Scientific synonyms: *Homopus darlingi* Boulenger, 1902; *Kinixys australis* Hewitt, 1931; *Kinixys jordani* Hewitt, 1931; *Kinixys youngi* Hewitt, 1931, *Testudo procterae* Loveridge, 1923.

Taxonomic note: *Kinixys spekii* was traditionally (until 2007) considered a subspecies of *Kinixys belliana*, and its trade was previously reported under that name. A complete molecular phylogeny of the genus *Kinixys* (hinge-back tortoises) is lacking (Hailey et al., 2021).

CITES listing and IUCN assessment: CITES Appendix II (since 01/07/1975, as part of genus listing of *Kinixys* spp).

Not assessed by IUCN.

The IUCN SSC Tortoise and Freshwater Turtle Specialist Group provisionally assessed the species as globally Vulnerable (VU) in 2013 (Hailey et al., 2021).

Distribution: Range States: Angola, Botswana, Burundi, Congo-Kinshasa, Eswatini, Kenya, Malawi, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Zambia, Zimbabwe (Species+).

Life history: The clutch size is 2–6 eggs and more than one clutch may be laid per year. The species can be dormant 7-8 months per year during the dry season (Hailey et al., 2021).

Habitat: *Kinixys spekii* inhabits grassland and woodland (Lambiris et al., 1989).

Role in the ecosystem: *Kinixys spekii* is omnivorous, with a diet consisting of vascular plants, fungi, and invertebrates, the mortality from mammalian and avian predators is high (Coulson et al., 2001; Hailey et al., 2021).

b) Populations and trends

Unknown, but *K. spekii* populations are likely declining throughout the species' range (Mifsud & Stapleton, 2014).

c) Legal / illegal harvesting, captive breeding, and trade

The international trade of *K. spekii* registered in the CITES trade database starts in 2006 (Figure 3.8-1) and is partly in wild-sourced, and partly in captive bred individuals. The maximum reported traded volumes (in Whole Organism Equivalents) are generally higher for export (>1,500 in 2011) than for import (ca. 500 in 2011). The highest quantity of *K. spekii* was exported from Mozambique. Since 2019, almost all the transactions have been reported to involve captive bred individuals.

No data on illegal trade is available, but the species is known to be sold in Asian markets and online (Hailey et al., 2021 and references therein).

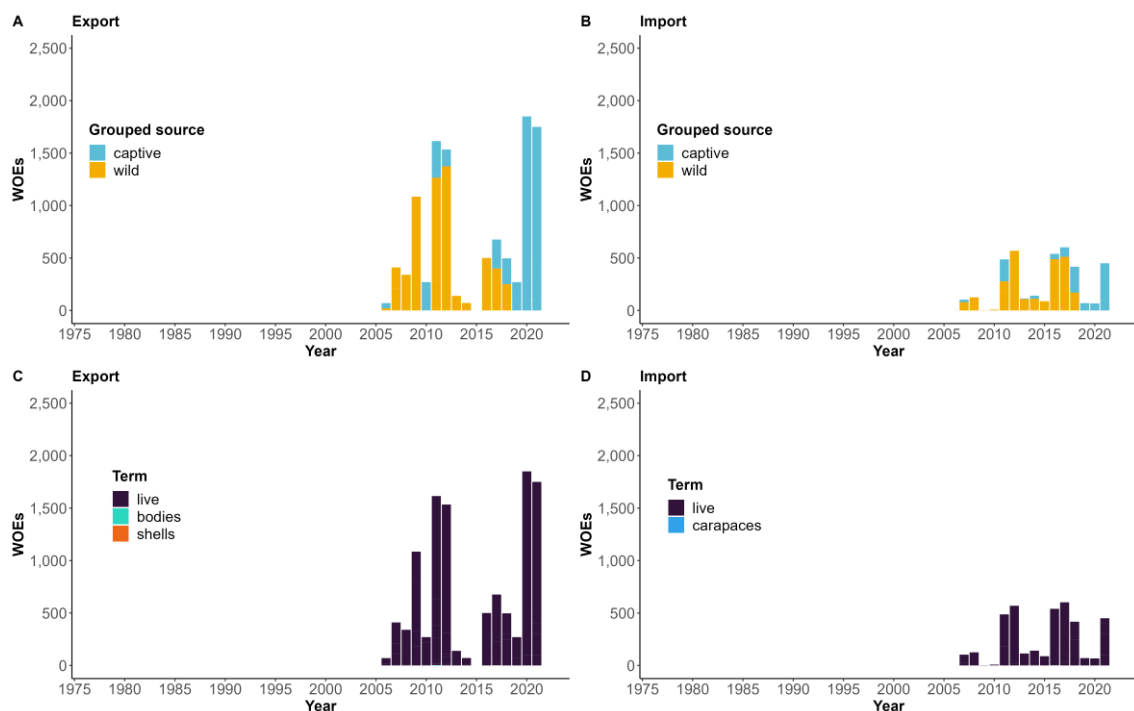


Figure 3.8-1. Reported quantities of exported (A and C) and imported (B and D) *Kinixys spekii* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive or wild) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

International trade is considered a minor threat compared to local collection for consumption and habitat loss, but contributes to the overall threat to this species (Mifsud & Stapleton, 2014).

e) Brief summary of other threats and conservation status

Local consumption and habitat loss are the main threats. Conservation measures have been suggested by Mifsud & Stapleton (2014).

f) Population monitoring programs in the range area

Kinixys spekii is found within several protected areas within eastern and southern Africa (Hailey et al., 2021 and references therein).

g) National regulations / legislation and in the range countries

Unknown.

h) Current management in the range countries, including harvest quotas

For 2023, the Democratic Republic of the Congo has a quota of 100 live individuals (Species+). The species breeds in captivity (Hailey et al., 2021).

i) Overall assessment of data quality

Kinixys spekii has not been assessed by IUCN and empirical studies of the species are scarce. The Tortoise and Freshwater Turtle Specialist Group has, however, assessed the species as Vulnerable for a provisional Red List in 2013, and published a monograph about the species in 2021. Data on population size and trends are missing.

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3.9 *Manouria emys*

Conclusion: Negative, with medium confidence.

VKM concludes that international trade currently poses a threat to the continued survival of *Manouria emys* in the wild.

Justification: The IUCN Red List assessment from 2019 lists this species as Critically Endangered and nearly all populations are decreasing. The species has been extensively harvested for local consumption and international trade. Most range states have outlawed trade or set zero quotas. Most of the legal international trade has shifted to captive-bred animals. Captive-breeding is feasible, and increasingly widespread.

Maximum straightline carapace length: male 60.0 cm, female 58.0 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Manouria emys* (Schlegel & Müller, 1840).

Common name: Burmese brown tortoise, black giant tortoise, six-legged tortoise, Asian tortoise, Asian giant tortoise, Burmese mountain tortoise.

Scientific synonyms: *Geochelone emys* (Schlegel & S. Müller, 1844); *Manouria fusca* Gray, 1854; *Teleopus luxatus* LeConte, 1854; *Testudo emydoides* Duméril, Bibron & Duméril, 1851; *Testudo emys* Schlegel & S. Müller, 1844; *Testudo falconeri* Gray, 1869; *Testudo nutapundi* (Reimann in Wirot, 1979); *Testudo phayrei* Blyth, 1853.

Taxonomic note: There are two recognized subspecies: *M. e. emys* occurring in southern Thailand, Malaysia, Sumatra, Borneo; and *M. e. phayrei*, occurring from northwestern Thailand to northeastern India. Taxonomic research is needed, particularly regarding subspecies and northeast Indian status (TTWG, 2021).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, part of FAMILY listing of Testudinidae spp. since 04/02/1977).

IUCN Red List of Threatened Species (Choudhury et al., 2019, assessed in 2018): Critically Endangered (CR, A2cd+4cd).

Distribution: The species is native extant in Bangladesh; India; Indonesia; Malaysia; Myanmar; Thailand; Extinct in Singapore; Presence Uncertain & Origin Uncertain in Brunei Darussalam. The subspecies *M. e. emys* inhabits Thailand south of the Phang-nga-Surat Gap, Malaysia, Borneo, and Sumatra. The subspecies *M. e. phayrei* occurs from Peninsular Thailand northwards through Myanmar to the northeastern Indian and eastern Bangladeshi hill tracts (Iverson, 1992; Platt et al., 2018).

Life history: The clutch size typically ranges from 30 to 60, with larger females producing more eggs (Stanford et al., 2015).

Habitat: *Manouria emys* inhabits dense forest at mid-level elevations (typically 600–1,500 m) across its range (Stanford et al., 2015).

Role in the ecosystem: *Manouria emys* eats plants and fungi (Wanchai, 2008).

b) Populations and trends

Decreasing. Nearly all accounts of *M. emys* note it to be uncommon, rare, or very rare, and declining (Choudhury et al., 2019), except in central Borneo ((I. Das pers. comm., 2018 in Choudhury et al., 2019), and in Kaeng Krachan National Park in Thailand (Wanchai, 2008).

c) Legal / illegal harvesting, captive breeding, and trade

Most of the legal international trade in *M. emys* was reported to be in wild-caught animals, but since 2008 this has shifted to captive animals (Figure 3.9-1). The CITES Trade Database shows a spike in trade from Laos in 2013 caused by a single shipment of 5,000 live captive-bred specimens from Laos to China. Laos is not a range state of the species, and this trade could either be from captive-breeding or a misidentification (Choudhury et al., 2019). The reported traded volumes (import and export) are a few hundred Whole Organism Equivalents (WOEs) annually, with a sharp decline from 2008 onwards.

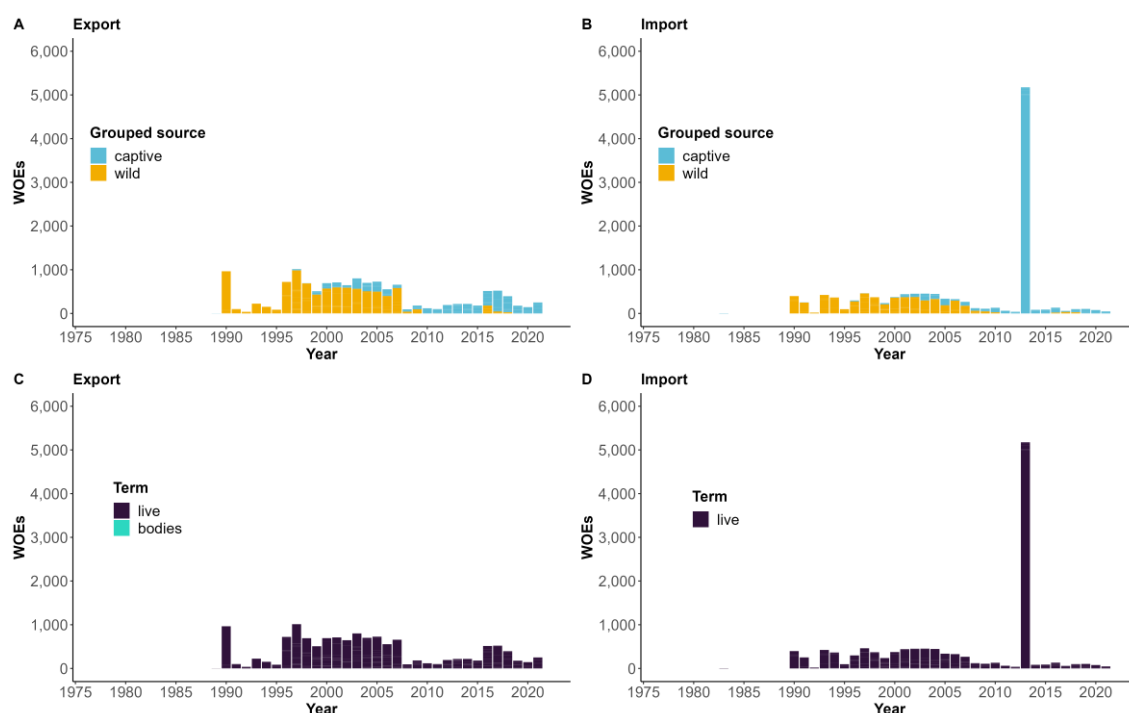


Figure 3.9-1. Reported quantities of exported (A and C) and imported (B and D) *Manouria emys* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive or wild) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

EU has suspended import of wild sourced individuals since 1997, doc no. 2019/1587. The Turtle Survival Alliance confiscated 65 *M. e. phayrei* in Myanmar recently (Stanford et al., 2015). A total of at least 507 live specimens, in seven shipments, were reported as seized from illegal trade during the period 2000-2015 (CITES CoP17 Doc. 73). Stanford et al. (2015) report that captive-breeding of the species can be very

successful using the right conditions. Auliya (2009) reports that registered reptile breeders from Java and Bali have both wild specimens and F1 specimens in their facilities.

d) Assessment of threat(s) posed by trade

Manouria emys has suffered long-term subsistence collection and intensive commercial exploitation for East Asian consumption trade in recent years. Turtle exploitation through most of its range remains beyond effective control, subsistence collection and poaching occur widely, even in some protected areas (Choudhury et al., 2019). Trade poses a significant threat to the species.

e) Brief summary of other threats and conservation status

Habitat destruction, degradation of lowland and mid-elevation evergreen forests through logging, clearing for agriculture, forest fires, and hydroelectric dams and reservoirs and associated infrastructure (Choudhury et al., 2019).

f) Population monitoring programs in the range area

The species occurs in protected areas in India (Ahmed & Das, 2010), Bangladesh (Rahman et al., 2015), Myanmar (Choudhury et al., 2019), Thailand (Wanchai, 2008), Malaysia (Lambert & Howes, 1994; Lim & Das, 1999; Norsham et al., 2000; Høybye-Mortensen, 2004) and Indonesia (Choudhury et al., 2019).

g) National regulations / legislation and in the range countries

The species is protected in India, Myanmar, Thailand, and Malaysia. The species is not yet protected by law in Indonesia (Choudhury et al., 2019).

h) Current management in the range countries, including harvest quotas

From 1997 to 2009, Malaysia and Indonesia set annual export quotas for live animals, ranging from 50 to 900 animals. From 2010, Malaysia has set zero quotas. From 2010 to 2018, Indonesia has set low quotas, 27 to 180, and has ceased reporting quotas from 2019 (Species+).

i) Overall assessment of data quality

The IUCN assessment of *M. emys* from 2019 is based on an overall assessment of the available evidence at that time. No later data or studies were available.

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3.10 *Stigmochelys pardalis*

Conclusion: Positive, with medium confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Stigmochelys pardalis* in the wild.

Justification: The species' IUCN Red List status is Least Concern, the volumes traded internationally are relatively high but mostly from captive origin. In some parts of the range (East Africa) high offtake of wild individuals for the pet trade has been responsible for local declines. Occurrence of the species in illegal trade has been documented.

Maximum straightline carapace length: male 65.6 cm, female 75.0 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Stigmochelys pardalis* (Bell, 1828).

Common name: Mountain tortoise, leopard tortoise.

Scientific synonyms: *Geochelone pardalis* (Bell, 1828), *Testudo pardalis* Bell, 1828.

Taxonomic note: The phylogenetic placement of the species has been debated (Baker et al., 2022).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, as part of FAMILY listing of Testudinidae spp. since 04/02/1977).

IUCN Red List of Threatened Species (Baker et al., 2022, assessed in 2014): Least Concern (LC).

Distribution: The species has the largest distribution of all African tortoises (Khosa, 2021). Range states: Angola; Botswana; Burundi; Democratic Republic of the Congo; Djibouti; Eswatini; Ethiopia; Kenya; Malawi; Mozambique; Namibia; Rwanda; Somalia; South Africa; South Sudan; United Republic of Tanzania; Uganda; Zambia; Zimbabwe (Species+).

Life history: The body size of *S. pardalis* varies across its range with large individuals in the northernmost and southernmost regions (40 kg, 700 mm carapace length) to much smaller individuals in the intermediate regions. The species can live between 30 and 75 years in captivity (maximum 100 years) and are mature at 12 – 15 years old (Branch, 2008). Females lay between 5 and 30 eggs and can have 5 to 7 clutches annually (Branch, 2008).

Habitat: *Stigmochelys pardalis* inhabits a wide range of habitats, including grassland, savannah, thickets, and miombo woodland (open woodland/savannah) (Baker et al., 2022).

Role in the ecosystem: The species is predominately herbivorous (Branch, 2008). Dung beetles bury their eggs in the tortoise faeces and this burying also facilitates seed germination (seed dispersal; Khosa, 2021).

b) Populations and trends

Estimates of population size and trends are missing (Baker et al., 2022). The species is generally considered to be common in southern Africa with lower density in East Africa.

c) Legal / illegal harvesting, captive breeding, and trade

Post 2000, the majority of international trade has been in live captive-bred individuals (Figure 3.10-1).

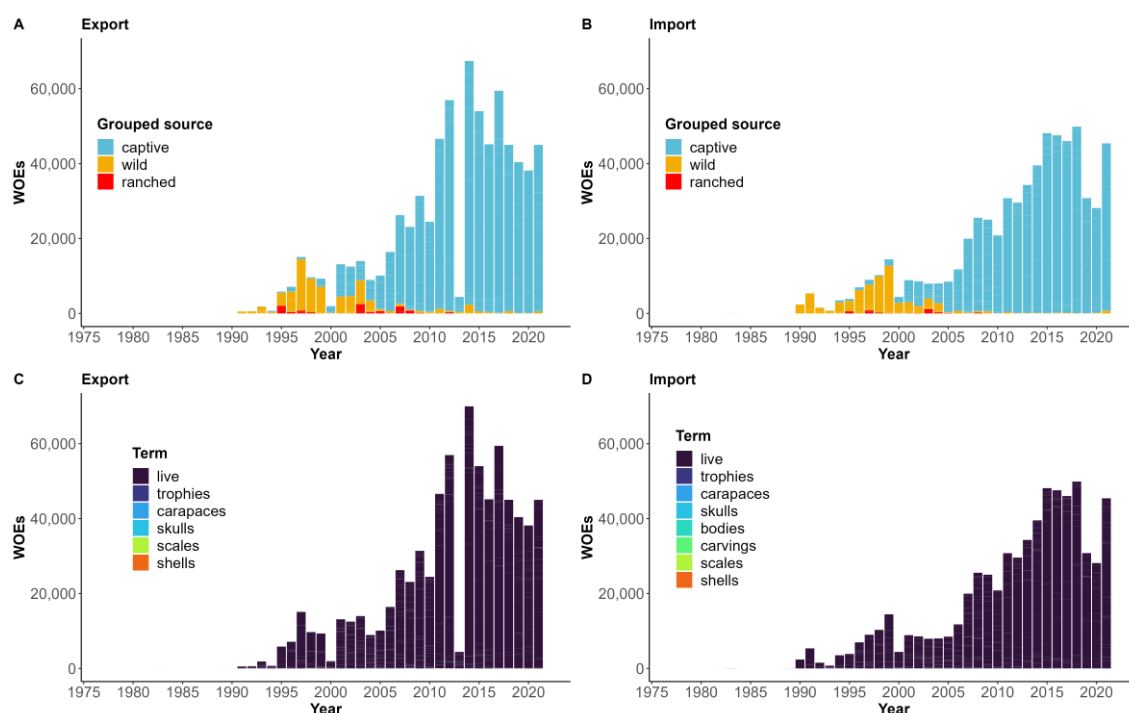


Figure 3.10-1. Reported quantities of exported (A and C) and imported (B and D) *Stigmochelys pardalis* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

Stigmochelys pardalis is a major contributor to Southern and Eastern Africa's Wildlife trade revenue. Around 70% of all regional trade in tortoises comes from captive bred and captive-born live *S. pardalis*. The species has been highlighted as showing noteworthy patterns of trade (CITES Secretariat & UNEP-WCMC, 2023). Between 2014 and 2018 international trade in the species increased sharply (in particular from Mozambique). Captive-bred individuals made up 98.9% of international trade in this time period (CITES Secretariat & UNEP-WCMC, 2023).

Captive-bred individuals can be distinguished from wild-caught by "pyramidal growth syndrome" where dietary differences in captivity lead to the development of pyramid shaped horny plates on the shell (Staerk et al., 2019).

d) Assessment of threat(s) posed by trade

Most exports (from Kenya and Tanzania) originate from captive breeding operations which relieve collection pressure on the wild population (Baker et al., 2022). The threat posed by international trade is therefore considered to be low, but in some localities (for example, Ethiopia; Asefa et al., 2020) local illegal trade is thought to be problematic for local populations.

e) Brief summary of other threats and conservation status

Mortality associated with electric fences appears to be disproportionately high for this species (Holt et al., 2021).

f) Population monitoring programs in the range area

Stigmochelys pardalis is reportedly found in multiple protected areas throughout its range, in Ethiopia, Kenya, South Africa, Tanzania and Zimbabwe (Baker et al., 2022 and references therein).

g) National regulations / legislation and in the range countries

The species is protected by provincial nature conservation ordinances and biodiversity laws at a regional level in South Africa (<http://speciesstatus.sanbi.org/assessment/last-assessment/02684/>).

h) Current management in the range countries, including harvest quotas

For specimens removed from the wild, Tanzania has a zero annual export quota (since 2009). The Democratic Republic of Congo has been under a trade suspension for this species since 2001 ([CITES, Notification 2013/013](#)).

Ethiopia has a quota of 900 live ranched specimens and 500 live wild-caught specimens since 2023. All commercial trade of CITES-listed specimens from Somalia (2019) and Djibouti (2011; 2019) is suspended ([Species+](#)).

It is illegal to import the species to the United States of America because of the risk of tick-borne diseases (associated with African tortoises) for cattle (Smith & Redding, 2001).

i) Overall assessment of data quality

This is a well-studied species that is relatively common across its range. The data appears mostly up-to-date, but there is a need for more data on the local effects of illegal pet and consumption trade in some countries in the range (particularly in East Africa).

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3.11 *Testudo graeca*

Conclusion: Positive, with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of the *Testudo graeca* in the wild.

Justification: The species' IUCN Red List status is Vulnerable, but the conservation status could have changed since the assessment was made in 1996. The internationally traded volumes are high but have for the last ten years predominantly been in captive animals. Illegal trade in wild-caught individuals is known to occur, but the species is protected by law in many range states.

Maximum straightline carapace length: male 38.9 cm, female 31.6 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Testudo graeca* Linnaeus, 1758.

Common name: Common tortoise, Algerian tortoise, Mesopotamian tortoise, Moorish tortoise, Greek tortoise, spur-thighed tortoise.

Scientific synonyms: *Furculachelys nabeulensis* Highfield, 1990, *Furculachelys whitei* (Bennett, 1836), *Testudo anamurensis* Weissinger, 1987, *Testudo antakyensis* Perälä, 1996, *Testudo armeniaca* Chkhikvadze & Bakradze, 1991, *Testudo cyrenaica* Pieh & Perälä, 2002, *Testudo flavominimalis* Highfield & Martin, 1990, *Testudo lamberti* Pieh & Perälä, 2004, *Testudo marokkensis* Pieh & Perälä, 2004, *Testudo mauritanica* Duméril & Bibron, 1835, *Testudo nabeulensis* (Highfield, 1990), *Testudo pallasii* Chkhikvadze & Bakradze, 2002, *Testudo perses* Perälä, 2002, *Testudo pusilla* Linnaeus, 1758, *Testudo sousensis* Pieh, 2001, *Testudo whitei* Bennett in White, 1836, *Testudo zarudnyi* Nikolsky, 1896.

Taxonomic note: The taxon is a species-complex with unresolved taxonomy (van Dijk et al., 2004), 10 subspecies are currently recognized (TTWG, 2021). *Testudo graeca* is sometimes divided into a western and eastern clade (Escoriza et al., 2022; Türkozan et al., 2023). Hybridization may occur among species of the genus *Testudo*.

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, as part of genus listing of *Testudo* spp.).

IUCN Red List of Threatened Species – Global assessment (Tortoise & Freshwater Turtle Specialist Group, 1996): Vulnerable (VU, A1cd).

IUCN Red List of Threatened Species – Europe assessment (van Dijk et al., 2004): Vulnerable (VU, A2bcde+4bcde).

Distribution: Populations of *T. graeca* are found in North-Africa, Southern Europe, and West-Asia. The eastern clade is found in the Balkans (southeastern Europe) and southwestern Asia, while the western clade occupies northern Africa and southwestern Europe (Escoriza et al., 2022; Türkozan et al., 2023). Range states are Albania, Algeria, Armenia, Azerbaijan, Bulgaria, Cyprus (introduced), Egypt, France (introduced), Georgia, Greece, Iran (Islamic Republic of), Iraq, Israel, Italy (introduced), Jordan, Lebanon, Libya, Malta (introduced), Montenegro, Morocco, North Macedonia, Republic of Moldova, Romania, Russian Federation, Serbia, Spain (introduced in mainland, native to Ceuta), State of Palestine, Syrian Arab Republic, Tunisia, Türkiye, Turkmenistan (Species+).

Life history: The clutch size is 1-8 eggs and females lay 1-3 clutches per year. Winter rest is more pronounced in northern populations (Türkozan et al., 2023). Longevity of up to 148 years has been recorded in captivity (Türkozan et al., 2023 and references therein).

Habitat: The species is found in varied habitats: humid, semi-arid and dry (Escoriza et al., 2022; Türkozan et al., 2023).

Role in the ecosystem: *Testudo graeca* is a generalist vegetarian. Particularly in the eastern range, tortoises are preyed upon by eagles and other birds of prey and a diverse group of mammalian predators (Türkozan et al., 2023).

b) Populations and trends

Testudo graeca from the western clade is common in North Africa and under steep decline and increasingly fragmented in Europe, except in Sardinia (Escoriza et al., 2022). Eastern *T. graeca* is still common throughout its wide range, although some populations are locally threatened (Türkozan et al., 2023).

c) Legal / illegal harvesting, captive breeding, and trade

Testudo graeca has for a long time been, and still is among CITES-species traded at high volumes internationally (Türkozan et al., 2008).

Since the 2000s, most legal international trade in *T. graeca* has been in captive bred individuals (Figure 3.11-1). The peak in the annual trade volume (in Whole Organism Equivalents) is almost 30,000 for export in 2011 and >25,000 for import in 2021. The source codes reported for the annual transactions differ between export and import for some years. Since 2017 almost all trade has been reported to be in captive bred animals.

In 2023 (at the 32nd meeting of the CITES Animals Committee), Jordan was selected for CITES periodic review of trade in animal specimens reported as produced in captivity, Jordan is also under review of significant trade for *T. graeca* (Species+).

Adult specimens of *T. graeca* captured in the wild are still exported to Europe illegally, from Morocco, Algeria, and Tunisia (Escoriza et al., 2022) as documented by seizures within the EU (TRAFFIC, 2020; 2022).

Surveys of Moroccan markets 2014-2015 revealed that *T. graeca* was sold illegally for medicinal purposes (5%) and as pets (95%) (Nijman & Bergin, 2017).

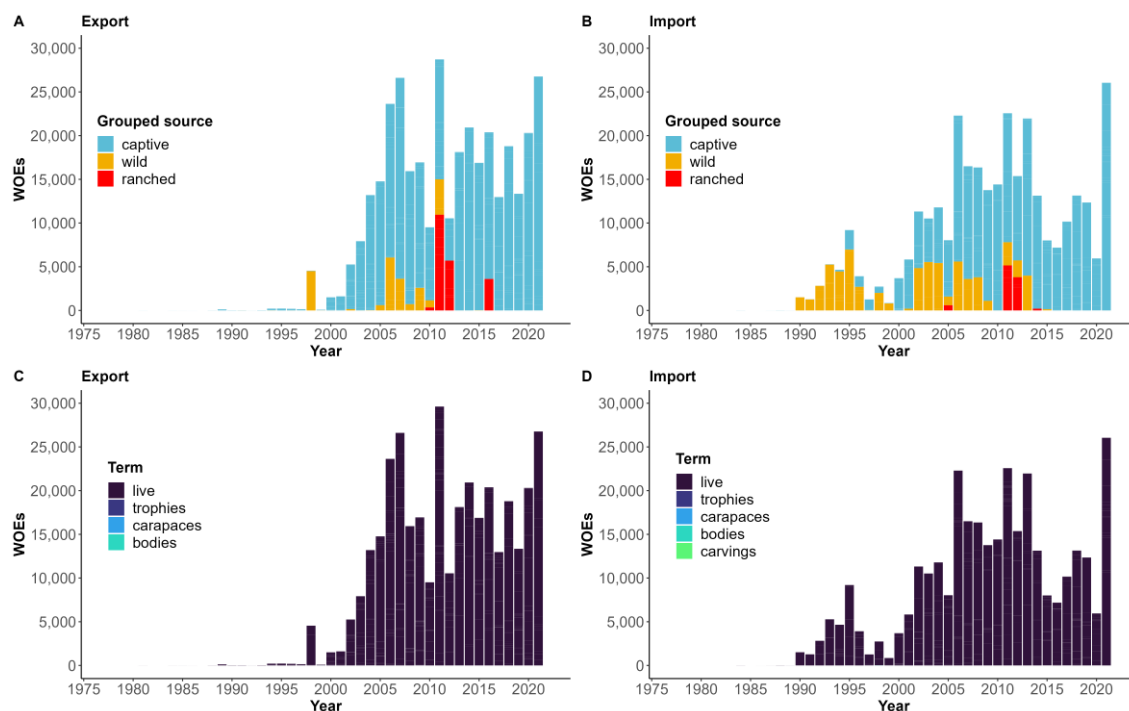


Figure 3.11-1. Reported quantities of exported (A and C) and imported (B and D) *Testudo graeca* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

International trade is regulated (particularly in Europe) and not considered a major threat to *T. graeca* (Escoriza et al., 2022; Türkozan et al., 2023).

e) Brief summary of other threats and conservation status

Habitat loss (caused by human activity and fires) and local collection for pets (particularly in North Africa) are main threats to *T. graeca* (Escoriza et al., 2022; Türkozan et al., 2023).

f) Population monitoring programs in the range area

Testudo graeca is found within numerous protected areas. The species is frequently kept and bred in captivity, with a permanent stock of captive-bred individuals (Escoriza et al., 2022; Türkozan et al., 2023).

g) National regulations / legislation and in the range countries

Testudo graeca is listed in EU Wildlife Trade Regulations 338/97 Annex A (Species+). Trade has been banned in Morocco since 1978. In Algeria, the capture and trade of this species has been illegal since 1983. It is protected by law in Tunisia. In Spain, the subspecies, *T. g. whitei*, has been legally protected since 1980 (see Escoriza et al., 2022 and references therein). In Greece, it is protected by the National legislation for the flora and fauna, and in Bulgaria under the Biological Diversity Act. In Türkiye it is included under the national hunting law. In Israel, tortoises are protected by law and cannot be legally hunted, collected, sold, or kept (see Türkozan et al., 2023 and references therein).

h) Current management in the range countries, including harvest quotas

Jordan has a CITES zero-quota and is under review for significant trade and significant captive breeding, and Afghanistan is suspended from all export of CITES-listed species (Species+).

i) Overall assessment of data quality

The latest global IUCN Red List assessment is from 1996 and clearly outdated. However, the Tortoise and Freshwater Turtle Specialist Group has published monographs on the eastern and western clade of the species complex in 2022 and 2023, respectively. Numerous scientific studies of ecology, conservation and trade in local populations exists.

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3.12 *Testudo hermanni*

Conclusion: Positive, with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Testudo hermanni* in the wild.

Justification: The species' IUCN Red List status is Near Threatened, and the volumes traded internationally are very high, but the species is easily bred in captivity. A zero quota for trade in animals from the wild is in place and the species occurs in a number of protected areas. Some illegal trade occurs, but the international pet trade is not considered a major threat to the future survival of the species as long as a zero quota of wild collected material is continued.

Maximum straightline carapace length: male 31.4 cm; female 35.7 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Testudo hermanni* Gmelin, 1789.

Common name: Hermann's tortoise (the two subspecies are referred to as western Hermann's tortoise (*T. h. hermanni*) and the eastern Hermann's tortoise (*T. h. boettgeri*).

Scientific synonyms: *Testudo enriquesi* Parenzan, 1932, *Testudo graeca bettai* Linnaeus, 1758, *Testudo graeca hercegovinensis* Linnaeus, 1758, *Testudo hercegovinensis* Werner, 1899, *Testudo hermanni boettgeri* Mojsisovics 1889, *Testudo hermanni hermanni* Gmelin 1789.

Taxonomic note: There are many local forms. Only two subspecies are generally accepted: *T. h. hermanni* and *T. h. boettgeri*. Names used in the literature but not generally accepted are *T. h. robertmertensi*, *T. h. hercegovinensis*, known as the Dalmatian tortoise, and the Peloponnesian tortoise, *T. h. peloponnesica* (van der Kuyl et al., 2002). *T. hermanni* can hybridize with *T. horsfieldii* (Kirsche, 1984).

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, as part of genus listing of *Testudo* spp.).

IUCN Red List of Threatened Species (van Dijk et al., 2004): Near Threatened (NT).

Distribution: Southern Europe in areas with a Mediterranean and humid continental climate. The two subspecies have non-overlapping distributions separated by the plain of the Po River in northeastern Italy (Zenboudji et al., 2016). *T. h. hermanni* is distributed in isolated spots in Spain, France, and Italy and on the islands of Sicily, Sardinia, Corsica, Majorca, and Minorca. *T. h. boettgeri* is found in southeastern Europe: Balkan Peninsula including Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Montenegro, North Macedonia, Romania, Serbia, potentially Slovenia and Turkish Thrace (Türkozan et al., 2019). The species is listed as introduced on Malta (TTWG, 2021)

Life history: The species is a long-lived species and can reach an age of more than 100 years in captivity. Sexual maturity is at about 12 years. *Testudo hermanni* has an active season from March to November, and a hibernation period from about November to March (Stubbs & Swingland, 1985). *T. hermanni* lays two or three clutches of 3-22 eggs per year.

Habitat: *Testudo hermanni* can be found from lowlands up to about 1,500 m with most populations found below 500 m (Duro et al., 2021). It inhabits a variety of habitats, from meadows, dry rocky pastures, macchia, forest edges, forest, thickets, and Mediterranean shrubs to rural and agricultural landscapes (Nikolić et al., 2018).

Role in the ecosystem: *Testudo hermanni* is a generalist vegetarian. Tortoises are preyed upon by birds of prey and a diverse range of mammalian predators (Bertolero et al., 2011).

b) Populations and trends

Decreasing. *Testudo hermanni* occurs in a patchy array of isolated areas (Fritz et al., 2006). It is assumed that *T. hermanni* underwent strong population decline throughout most of its distribution range due to human actions, such as habitat destruction and overharvesting in the past, as well as climate fluctuations (Bertolero et al., 2011; Cheylan et al., 2011).

c) Legal / illegal harvesting, captive breeding, and trade

Testudo hermanni used to be collected from the wild for the pet trade in numbers of tens of thousands annually until the European tortoise trade was banned in the early 1980s. The species still constitutes 13% of the total *Testudo* trade (Duro et al., 2021; TRAFFIC, 2020). Since the 2000s, most legal international trade in *T. hermanni* has been in captive bred individuals (Figure 3.12-1). The peak in the annual trade volume is almost 50,000 for export in 2016 dropping to ca. 20,000 for export in 2021. Areas around the Adriatic coast and facing the Balkan regions are known to source illegally traded individuals (Nikolic et al., 2018; Biello et al., 2021). The SRG took the following decisions under Articles 4.1(a)(i) and 4.2(a) of Council Regulation (EC) No 338/97: *Testudo hermanni* North Macedonia (C, W) (continue) is "in consultation" SRG 97/5/1.

In 2019, *T. hermanni* was the most seized species within the EU, both in terms of number of seizure records (17) and number of individuals seized (104 individuals). Internal seizures of live reptiles were mainly reported by Spain and Hungary (TRAFFIC, 2020).

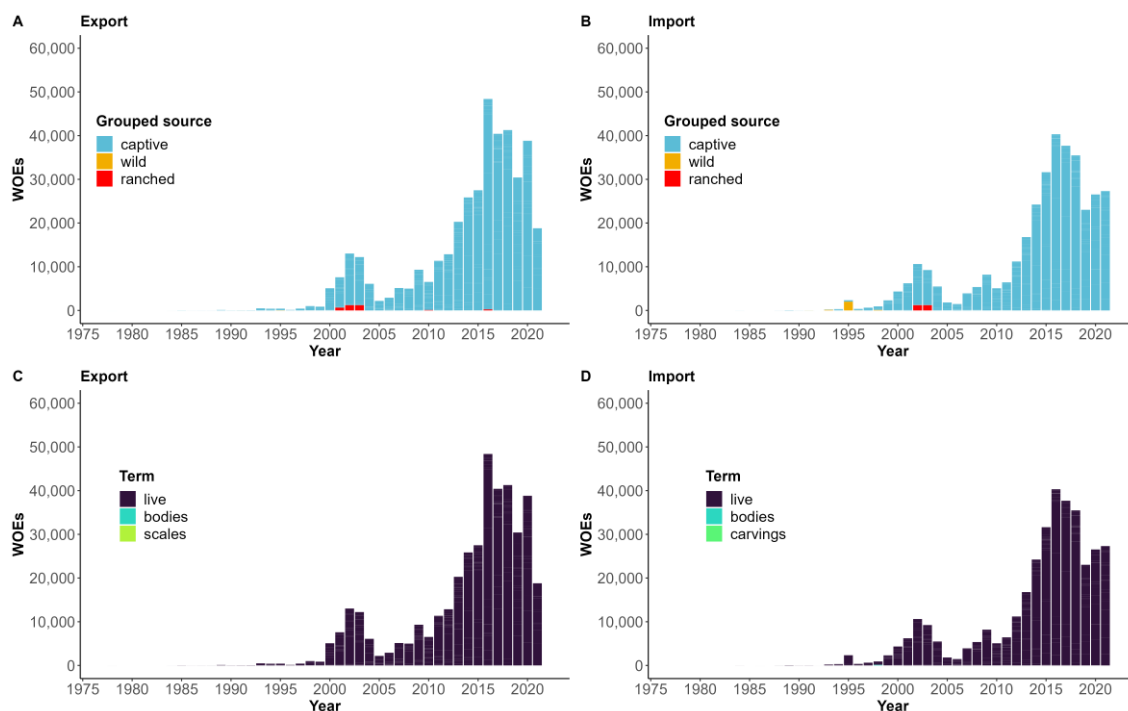


Figure 3.12-1. Reported quantities of exported (A and C) and imported (B and D) *Testudo hermanni* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

The international pet trade is not currently considered a major threat to the future survival of the species in the wild.

e) Brief summary of other threats and conservation status

Testudo hermanni is threatened by many factors, such as rapid urbanization and habitat loss (Stanford et al., 2020), climate change, increasing ambient temperatures, multiple summer fires, prolonged droughts, or floods, and increased human activity (Debussche et al., 1999; Livoreil, 2009).

f) Population monitoring programs in the range area

There is no concerted monitoring program, but several population studies have been published in the last few years (Perez et al., 2014; Drechsler et al., 2016; Nikolic et al., 2018; Golubovic et al., 2019).

g) National regulations / legislation and in the range countries

The species is listed in Annex A of the EU Wildlife Trade Regulation. Listed on family level as part of [Commission Regulation \(EU\) 2023/966 of 15 May 2023 Annex II](#).

h) Current management in the range countries, including harvest quotas

Testudo hermanni is listed in Annex A of the [Commission Regulation \(EU\) 2023/966 of 15 May 2023](#). This means that no trade is allowed for individuals collected from the

wild. Various protected areas exist throughout most of the species' range. There are conservation programs in Spain, France and Italy (Zenboudji et al., 2016).

i) Overall assessment of data quality

Much information is available on the species, including IUCN species assessment (van Dijk et al., 2014) and a review by the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group from 2011. In addition, several population studies and trade assessments have been published.

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3.13 *Testudo horsfieldii*

Conclusion: Inconclusive, with low confidence.

VKM is not able to conclude whether or not international trade currently poses a threat to the continued survival of the *Testudo horsfieldii* in the wild.

Justification: The species' IUCN assessment from 1996 is outdated and the volumes traded internationally are very high. A zero quota for trade in animals from several countries (e.g., the EU) is in place. There is continued trade of wild collected specimens and doubt about sustainability as well as accuracy of application of the correct source code for trade. Uzbekistan is under CITES Review of Significant Trade for *T. horsfieldii*.

Maximum straightline carapace length: male 19.0 cm; female 28.6 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Testudo horsfieldii* Gray, 1844.

Common name: Steppe tortoise, Central Asian tortoise, Horsfield's tortoise, four-toed tortoise, Afghan tortoise.

Scientific synonyms: *Agrionemys horsfieldii* (Gray, 1844), *Homopus burnesii* Blyth, 1854, *Testudo baluchiorum* Annandale, 1906.

Taxonomic note: The Turtle Taxonomy Working Group lists five subspecies of Russian tortoise, not all are universally accepted. *T. h. bogdanovi* Chkhikvadze, 2008 from southern Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan. *T. h. horsfieldii* (Gray, 1844) from Afghanistan/Pakistan and southern Central Asia, *T. h. kazachstanica* Chkhikvadze, 1988 from Kazakhstan/Karakalpakstan, *T. h. kuznetzovi* Chkhikvadze, Ataev, Shammakov & Zatoka, 2009 from northern Turkmenistan, southern Uzbekistan and *T. h. rustamovi* Chkhikvadze, Amiranschvili & Atajew, 1990 from southwestern Turkmenistan. Hybridization between formerly separate populations may occur (Smith & Porsch, 2015)

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, as part of genus listing of *Testudo* spp.).

IUCN Red List of Threatened Species – Global assessment (Tortoise & Freshwater Turtle Specialist Group, 1996): Vulnerable (VU, A2d).

Distribution: *Testudo horsfieldii* might be one of the most widespread and abundant of all living tortoises (Lagarde et al., 2002). It can be found in Afghanistan, China, Iran, Islamic Republic of, Kazakhstan, Kyrgyzstan, Pakistan, Russian Federation, Tajikistan, Turkmenistan, Uzbekistan and introduced in Latvia (Species+).

Life history: *Testudo horsfieldii* usually remain buried for over 9 months during winter. Females lay an average of one to three clutches of about six eggs (Theile, 2000;

Lagarde et al., 2002). The species is long-lived reaching a lifespan of 50-150 years (Vasilyev et al., 2014).

Habitat: *Testudo horsfieldii* prefers arid environments and are most commonly found in dry, open and sandy locations, where they burrow. These burrows can be as deep as 2 meters (Lagarde et al., 2003).

Role in the ecosystem: *Testudo horsfieldii* is a generalist vegetarian eating herbs and grasses, as well as twigs, flowers, and some fruits (Bauer et al., 2019). Tortoises are preyed upon by birds of prey and a diverse range of mammalian predators (Vilardell et al., 2012).

b) Populations and trends

Testudo horsfieldii populations have decreased across its distribution range due to harvest for pet trade which has led to strict regulations in some countries such as Kazakhstan and Tajikistan, but not in Uzbekistan where pressure from wild harvest continues (Bondarenko, 2022). Smith & Porsch (2015) suggest that the Chinese populations have all but collapsed.

c) Legal / illegal harvesting, captive breeding, and trade

Data recorded from 1998 show annual trade of more than 20,000 individuals collected in the wild (Figure 3.13-1). Over the years an increasing number of ranched and captive bred individuals were also registered, and the annual trade volumes reached a level of above 80,000 WOE. In 2020 and 2021 the number of captive-bred individuals was higher than the combined wild and ranched individuals.

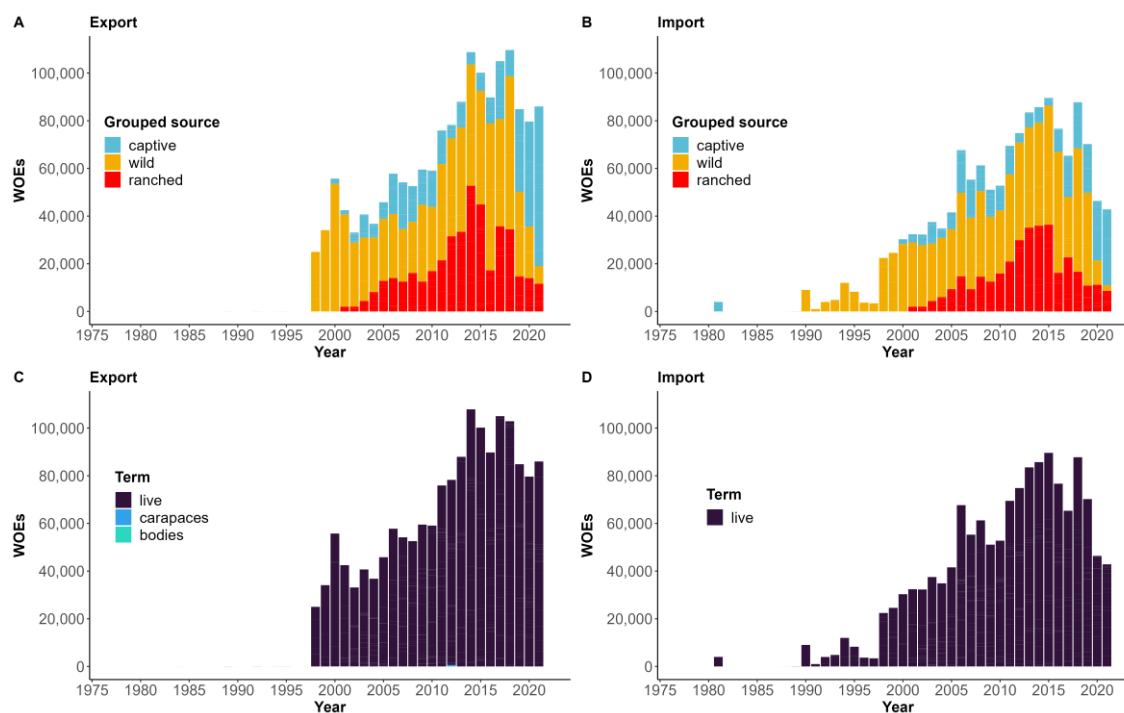


Figure 3.13-1. Reported quantities of exported (A and C) and imported (B and D) *Testudo horsfieldii* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live

specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

Testudo horsfieldii are still being harvested from the wild in central Asia, mainly for American and Asian markets including Russia (Lagarde et al., 2002; UNEP-WCMC, 2020, see Figure 3.13-1.). There seem to be a thriving trade of wild harvested individuals from within its distribution range via Russia (Lee & Smith, 2010).

Uzbekistan was selected for review of significant trade as well as Review of animals reported as captive bred at the CITES 32nd Animals Committee meeting in 2023 ([CITES AC23 SR](#)).

Illegal wild harvesting continues to threaten wild populations of *T. horsfieldii* in Uzbekistan and Kazakhstan (Theile, 2000; Bondarenko, 2020) and potentially other countries (Smith & Porsch, 2015). *Testudo horsfieldii* occurs naturally also in Turkmenistan that is not party to CITES. The Ukraine has been an important trading place for illegally harvested wild individuals (Smith & Porsch, 2015) in addition to Russian Federation, Slovenia, Pakistan, and Turkey (Lee & Smith, 2010).

d) Assessment of threat(s) posed by trade

The increasing proportion of traded animals originating from captive breeding has been questioned and is currently under investigation. The threat posed by trade is therefore uncertain and local illegal trade is thought to be potentially problematic for local populations (Theile, 2000; Bondarenko, 2020).

e) Brief summary of other threats and conservation status

Testudo horsfieldii is threatened by habitat loss, fragmentation, wildfires, illegal harvesting, and potentially by introgression between formerly separate populations (Smith & Porsch, 2015).

f) Population monitoring programs in the range area

Unknown.

g) National regulations / legislation and in the range countries

There seems to be few national laws protecting *T. horsfieldii*. Some Central Asian countries, especially Kazakhstan and Tajikistan, seem to restrict export but information is sparse for Afghanistan, Armenia, Azerbaijan, China, Iran, Kyrgyzstan, Pakistan, Russian Federation, Turkmenistan, and Uzbekistan.

h) Current management in the range countries, including harvest quotas

There is little information available on enforcement of harvest quotas (Lee and Smith, 2010). Harvesting has been banned in Kazakhstan and Tajikistan. Uzbekistan remains the only country that receives annual CITES export quota for harvesting wild-born tortoises (Bondarenko, 2022; [Species+](#)). In 2022, the quota for live individuals born in captivity (F1) was 106,081 while a quota of 300 was allocated to ranched specimens and 6.728 for wild caught ([Species+](#)).

i) Overall assessment of data quality

The latest global IUCN Red List assessment is from 1996 and thereby outdated. There is no monograph by the Tortoise and Freshwater Turtle Specialist Group available.

Some literature has been published on population trends, trade, but there is an overall lack of data.

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3.14 *Testudo marginata*

Conclusion: Positive, with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Testudo marginata* in the wild.

Justification: The species' IUCN Red List status is Least Concern, and the volumes traded internationally are moderate. The species is easily bred in captivity. A zero quota for trade in animals from the wild is in place and the species occurs in a number of protected areas. Some illegal trade occurs, but the international pet trade is not considered a threat to the future survival of the species in the wild.

Maximum straightline carapace length: male 42.0 cm, female 40.3 cm

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Testudo marginata* Schoepff, 1793.

Common name: Margined tortoise, marginated tortoise.

Scientific synonyms: *Testudo campanulata* Strauch, 1862, *Testudo graja* Hermann, 1804, *Testudo nemoralis* Schreiber, 1875, *Testudo weissingeri* Bour, 1996.

Taxonomic note: *Testudo marginata* is closely related to *Testudo graeca*. There are commonly at least two, sometimes more, subspecies accepted: *T. m. marginata*, *T. m. sarda* and *T. m. weissingeri*, the latter a dwarf form from southern Greece.

CITES listing and IUCN assessment:

CITES Appendix II (since 01/07/1975, as part of genus listing of *Testudo* spp.).

IUCN Red List of Threatened Species (van Dijk et al., 2004): Least Concern (LC).

Distribution: The species occurs naturally in Albania and Greece and has been introduced to Italy (northeastern Sardinia) and Cyprus. It is found on islands in the Ionian and Aegean seas (Perez et al., 2012; Vasilyev et al., 2014).

Life history: The species is known to be long-lived and can reach up to 140 years of age. *Testudo marginata* hibernates in winter. Larger animals may lay eggs at least three times annually, with around 6-14 eggs per clutch. Females start laying eggs at 10-12 years of age (Escoriza et al., 2023).

Habitat: *Testudo marginata* lives mostly in dense thorny scrubland up to 1,600 meters above sea level, but mostly occurs below 800 m in warm areas with scorched-dry (xeric) to sub-humid Mediterranean climates (Escoriza et al., 2023).

Role in the ecosystem: Marginated tortoises are herbivorous. Eurasian tortoises are most commonly predated before they hatch or as juveniles by birds of prey and smaller mammals (Escoriza et al., 2023).

b) Populations and trends

Testudo marginata occurs in low population densities in often isolated populations throughout its natural range (Escoriza et al., 2023). Populations are reported to be stable (van Dijk et al., 2004). A limited number of population level studies have been published in the last years (Perez et al., 2006; Perez et al., 2012).

c) Legal / illegal harvesting, captive breeding, and trade

Trade data indicate a steady increase since the 1990s reaching a peak around 2017 with around 3,000 individuals traded annually (Figure 3.14-1). Almost all trade is reported to involve captive bred animals.

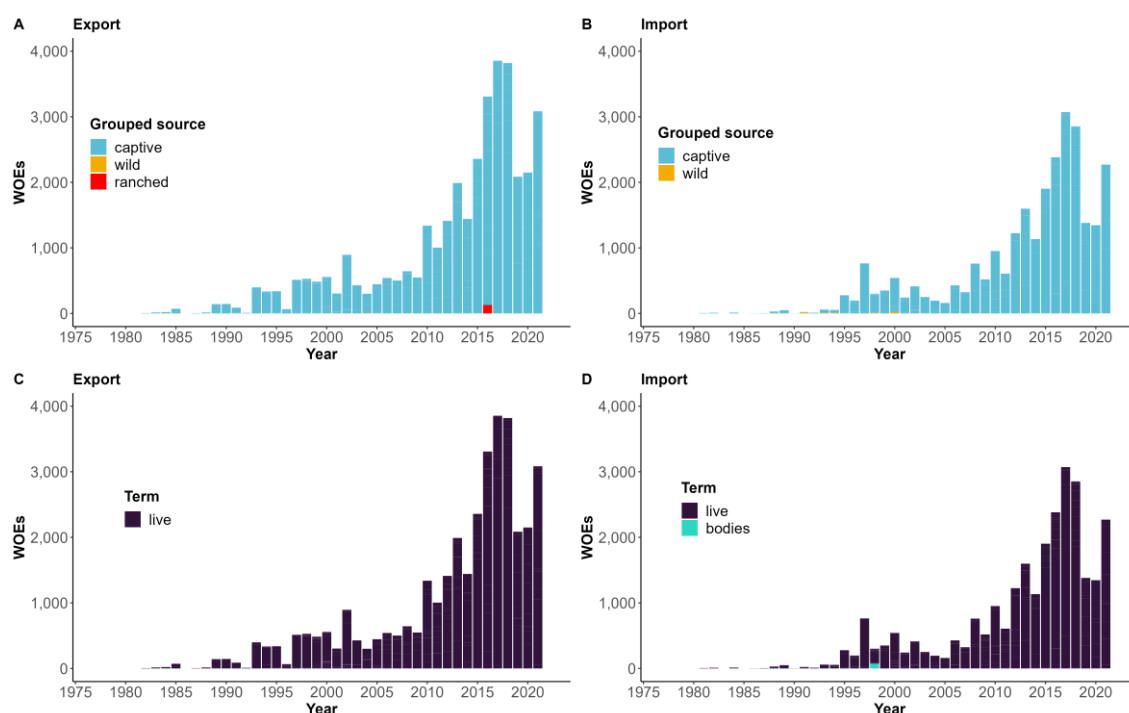


Figure 3.14-1. Reported quantities of exported (A and C) and imported (B and D) *Testudo marginata* specimens, expressed as whole organism equivalents (WOEs). In panel A and B reported quantities are disaggregated by year and source (captive, wild, or ranched) and in panel C and D by year and term (predominantly live specimens have been reported). Data from CITES trade database, downloaded 18 July 2023.

d) Assessment of threat(s) posed by trade

The IUCN/SSC Tortoise and Freshwater Turtle Specialist Group point out in their most recent report that trade is currently not seen as a threat to the species survival in the wild (Escoriza et al., 2023).

e) Brief summary of other threats and conservation status

Testudo marginata is threatened by habitat destruction (Hailey & Willemsen, 2003, Stanford et al., 2020), wildfires and climate change. Threats to tortoises in general largely arise from their slow population growth and limited dispersal, as most species have relatively broad habitat and food requirements (Graciá et al., 2020; Escoriza et al., 2023).

f) Population monitoring programs in the range area

The species is present in numerous protected areas throughout its range in Greece, Albania, and Sardinia. These protected areas are conserved under the Natura 2000 network (Stanford et al., 2020).

g) National regulations / legislation and in the range countries

Testudo marginata is listed in Annex A of the EU Wildlife Trade Regulations (Species+). In Greece, *T. marginata* is protected by the National legislation for the flora and fauna and is listed as Least Concern in the Red Book of threatened animals of Greece. In Albania, the species is categorized as Lower Risk/conservation dependent (LR/cd) in the National Red List of Flora and Fauna of Albania. On Sardinia, this species has been included in the Legge della Regione Sardegna (no. 23) since 1988 as especially protected wildlife (Escoriza et al., 2023).

h) Current management in the range countries, including harvest quotas

In Europe individuals from wild populations are microchipped to prevent fraudulent sale (Brugnola et al., 2013).

i) Overall assessment of data quality

The IUCN Red List assessment was last updated in 2004, but an extensive monograph was published by the Tortoise and Freshwater Turtle Specialist Group in 2023. A number of scientific studies of population genetics, ecology, conservation and trade in local populations exist.

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4 Conclusions (with answers to the terms of reference)

The Norwegian Environment Agency requested VKM to conduct a scientific risk assessment of trade in tortoises (*Testudinidae* spp.) listed in the CITES appendices and specimens thereof, based on the criteria given under the Convention on International Trade in Endangered Species (CITES). The Terms of Reference specified that the assessment shall be based on CITES, the Norwegian Cites Regulation, relevant articles in the convention text and resolutions. Additionally, paragraph 3 of the Terms of Reference specified that the risk assessment should be limited to species traded with Norway since 2010. Assessments to determine species-specific detriment pertaining to international trade (cf. [Res. Conf. 16.7 \(Rev. CoP17\)](#)), Non-detriment findings, are made for 14 species listed in Appendix II. The NDF is a determination of impact from international trade on survival of the species in the wild. In this report the outcome may be positive (no detriment), negative (detrimental) or inconclusive (more documentation is needed, but assessments might be able on a case-by-case basis with sufficient information to determine risk). The confidence with which each NDF is made depends on the amount of reliable information available. Based on the species-specific detriment assessments VKM concludes no detriment (positive) for eight species (*Aldabrachelys gigantea*, *Centrochelys sulcata*, *Chelonoidis carbonarius*, *Chersina angulata*, *Stigmochelys pardalis*, *Testudo graeca*, *Testudo hermanni* and *Testudo marginata*), detriment (negative) for four species (*Chelonoidis denticulatus*, *Indotestudo forstenii*, *Kinixys homeana* and *Manouria emys*) and inconclusive for two species (*Kinixys spekii* and *Testudo horsfieldii*) (Table 4-1).

VKM proposes that the NDF for the species should be applied for a period of five years unless the IUCN assessments are updated and changed. Updates should also be made for the two species that have not yet been assessed by IUCN if assessments for these should be published during the next five years.

Table 4-1. Overview of risk assessments for the 14 tortoise species included in the assignment.

Species	CITES Appendix	IUCN Red List	Non-detriment finding (NDF) ¹	Confidence
<i>Aldabrachelys gigantea</i>	II	VU-1996	positive	high
<i>Centrochelys sulcata</i>	II	EN-2020	positive	high
<i>Chelonoidis carbonarius</i>	II	NE ²	positive	low
<i>Chelonoidis denticulatus</i>	II	VU-1996	negative	medium
<i>Chersina angulata</i>	II	LC-2017	positive	medium
<i>Indotestudo forstenii</i>	II	CR-2018	negative	medium
<i>Kinixys homeana</i>	II	CR-2019	negative	medium
<i>Kinixys spekii</i>	II	NE ²	inconclusive	low
<i>Manouria emys</i>	II	CR-2018	negative	medium
<i>Stigmochelys pardalis</i>	II	LC-2014	positive	medium
<i>Testudo graeca</i>	II	VU-1996	positive	high
<i>Testudo hermanni</i>	II	NT-2004	positive	high
<i>Testudo horsfieldii</i>	II	VU-1996	inconclusive	low
<i>Testudo marginata</i>	II	LC-2004	positive	high

¹The NDF is an assessment of the risk of negative impact of international trade. In this report the outcome may be positive (low risk), negative (high risk) or inconclusive (more documentation on e.g. breeding facilities and management of wild populations is needed on a case-by-case basis to determine risk). ²Not Evaluated by IUCN.

5 Uncertainties

Uncertainties in the risk assessments of tortoises are mostly related to the current population statuses and trends of their wild populations. For some species with vast distribution ranges, covering multiple countries (e.g., *Stigmochelys pardalis* and *Testudo horsfieldii*), detailed knowledge about populations may exist from parts of the range while lack completely from other areas. Without population data it is difficult to evaluate the potential impact of both legal and illegal trade. Moreover, for widespread species the protection status, management efforts and law enforcement will often differ among range states. For species where international trade mostly involve captive bred individuals, local collection from the wild for consumption or pets may occur and pose a threat (e.g., *Chelonoidis denticulata*, *Kinixys spekii*). In general, data on illegal trade mainly stem from seizures and the extent will largely be unknown.

The latest evaluation of the conservation status (IUCN) for many species was more than a decade old and might not reflect the present situation for these species. Two of the species (*Chelonoidis carbonarius* and *Kinixys spekii*) have not yet been assessed by IUCN. Overall assessment of data quality was included for each species.

To reflect the influence of uncertainty on the conclusions, confidence levels were provided with the outcomes of the NDFs. For two species (*Kinixys spekii* and *Testudo horsfieldii*) VKM was unable to conclude.

6 Data gaps

For each individual species assessment (sections 3.1-3.14), the most prominent data gaps are summarised in subsection i) "Overall assessment of data quality". The most common data gaps encountered when performing the species assessments were:

- Lack of reliable estimate of population size.
- Lack of knowledge about population trends.
- Lack of complete data on ecology.
- Lack of knowledge about legal protective status, harvest levels and management in the range states.
- Lack of knowledge about law enforcement.
- Lack of knowledge about levels of illegal trade.

7 References

Note that the references for the individual species assessments are given at the end of each individual species assessment (section 3.1-3.14).

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