



**CONVENTION ON
MIGRATORY
SPECIES**

UNEP/CMS/COP14/Doc.21.2

10 November 2023

Original: English

14th MEETING OF THE CONFERENCE OF THE PARTIES
Samarkand, Uzbekistan, 12 – 17 February 2024
Agenda Item 21.2

**ASSESSMENT OF THE RISK POSED TO CMS APPENDIX I-LISTED SPECIES
BY DIRECT USE AND TRADE**

(Prepared by the Secretariat)

Summary:

The report *Assessment of the Risk Posed to CMS Appendix I-Listed Species by Direct Use and Trade*, contained in this document, accompanies the document [UNEP/CMS/COP14/Doc.21](#) *Conservation Status of Migratory Species*.

The draft of the report was considered by the 6th meeting of the Sessional Committee of the Scientific Council (2023).

Assessment of the risk posed to CMS Appendix I-listed species by direct use and trade



Assessment of the risk posed to CMS Appendix I-listed species by direct use and trade

Prepared for: The Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

Copyright: © 2023 CMS.

Citation: UNEP-WCMC, 2023. Assessment of the risk posed to CMS Appendix I-listed species by direct use and trade. UNEP-WCMC, Cambridge.

Cover photo: Dorcas Gazelle (*Gazella dorcas*). Sarit Richerson/Adobe Stock.



The UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is a global Centre of excellence on biodiversity. The Centre operates as a collaboration between the UN Environment Programme and the UK-registered charity WCMC. Together we are confronting the global crisis facing nature.

This publication may be reproduced for educational or non-profit purposes without special permission, provided acknowledgement to the source is made. Reuse of any figures is subject to permission from the original rights holders. No use of this publication may be made for resale or any other commercial purpose without permission in writing from the UN Environment Programme. Applications for permission, with a statement of purpose and extent of reproduction, should be sent to the Director, UNEP-WCMC, 219 Huntingdon Road, Cambridge, CB3 0DL, UK.

The contents of this report do not necessarily reflect the views or policies of the UN Environment Programme, contributory organisations or editors. The designations employed and the presentations of material in this report do not imply the expression of any opinion whatsoever on the part of the UN Environment Programme or contributory organisations, editors or publishers concerning the legal status of any country, territory, city area or its authorities, or concerning the delimitation of its frontiers or boundaries or the designation of its name, frontiers or boundaries. The mention of a commercial entity or product in this publication does not imply endorsement by the UN Environment Programme.

United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)

219 Huntingdon Road,
Cambridge CB3 0DL, UK
Tel: +44 1223 277314
www.unep-wcmc.org

UNEP promotes environmentally sound practices globally and in its own activities. Our distribution policy aims to reduce UNEP's carbon footprint.

Contents

- Introduction 1
- 1. Rapid assessment of the potential risk from direct use and trade..... 3
- 2. Assessment of taxa in international trade 7
- 3. Assessment of taxa harvested for domestic use 15
- 4. Summary of international and domestic trade/use in higher risk taxa 17
- Conclusion 21
- Annex A: Risk matrix for direct use and trade..... 24
- Annex B: Summary of international trade 30
- Annex C: Additional literature 40

Introduction

At the 13th meeting of the Conference of the Parties to CMS (COP13; Gandhinagar, 2020), the Parties to CMS highlighted concerns about the direct use and trade of Appendix I taxa¹, particularly in the context of Article III, Paragraph 5 of the Convention, which prohibits the taking of Appendix I-listed taxa except under specific circumstances ([UNEP/CMS/COP13/Doc.21](#)). In addition, intentional biological resource use² was identified as one of the most prevalent threats facing Appendix I taxa in a preliminary review of conservation status submitted to COP13 ([UNEP/CMS/COP13/Doc.24](#)). As a result, several Decisions were adopted to explore the threats posed to Appendix I taxa from direct use and trade, including international trade. In particular, Decisions [13.17](#) and [13.24 c](#)), [13.109 a](#)) direct the CMS Secretariat to:

Decision 13.17: [...] “with the support of the Scientific Council and within the scope of the Conservation Status Report (Decision 13.24): a) develop criteria, in collaboration with the CITES Secretariat, to determine the scope and feasibility of assessing the impact of international trade in Appendix I species on their conservation status; and b) based on these criteria, assess the impact of international trade on the conservation status of relevant Appendix I species, including but not limited to, international trade regulated by CITES.”

Decision 13.24 c): “undertake, in consultation with the Scientific Council and in collaboration with competent organizations, and in synergy with other relevant initiatives under the Convention, an assessment of the impact of direct use on the conservation status of species listed on Appendix I.”

Decision 13.109: [...] “working within the Convention’s remit: a) prepare an analysis on the direct and indirect impacts of wild meat taking, trade and consumption of terrestrial and avian species listed on CMS Appendices I and II”

The CMS Secretariat engaged the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) to assess the potential impact of direct use and trade on the conservation status of Appendix I taxa in relation to Decision 13.24 c) and in support of fulfilling Decisions 13.17 and 13.109. Based on the proposed methodology developed in collaboration with IUCN and outlined in [UNEP/CMS/ScC-SC5/Doc.5/Rev.1/Annex 3](#), which was considered and agreed by the CMS Scientific Council in July 2021 at the 5th meeting of its Sessional Committee (ScC-SC5), a rapid assessment was undertaken by UNEP-WCMC. A full output of the CMS Appendix I rapid assessment results, along with corresponding data and metadata, is provided in an accompanying Excel document.

This report provides a descriptive summary of the results of this rapid assessment, as well as additional reflections on international trade and domestic use of Appendix I taxa. The report is divided into four main sections:

¹ ‘Taxa’ refers to the species, subspecies and populations listed in CMS Appendix I. Data for the relevant subspecies and listed populations were incorporated into the analysis where available (for full details, see Annex A).

² Intentional biological resource use refers to the deliberate targeting of species for harvest, and corresponds to IUCN Red List threat categories 5.1.1, 5.4.1 and 5.4.2 for animals, excluding threats considered ‘past, unlikely to return’.

1. **Rapid assessment of the potential risk from direct use and trade:** this section summarises the results of the rapid assessment and identifies the CMS Appendix I taxa that may be more at risk from direct use³ and trade.
2. **Assessment of taxa in international trade:** this section provides an analysis of the legal international trade in CMS Appendix I taxa that are also listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as reported by Parties to CITES. This includes an overview of CITES trade in CMS Appendix I taxa for all trading partners and all populations, to understand overall levels of international trade and demand pressure on the taxa that may have implications for conservation status, as well as a summary of CITES trade in CMS Appendix I taxa that may be in *potential* contravention of CMS.
3. **Assessment of taxa harvested for domestic use:** this section summarises the evidence for domestic use⁴ in CMS Appendix I taxa and the potential threat resulting from harvest driven by domestic demand.
4. **Summary of international and domestic trade/use in higher risk taxa:** this section focusses on 53 CMS Appendix I taxa identified through the rapid assessment in Section 1 as more likely to be at risk from direct use and trade (referred to as 'higher risk' taxa). It draws together information on the conservation status, levels of legal international trade and evidence for domestic use of these 'higher risk' taxa, based on the results of Sections 2 and 3.

Finally, the **Conclusion** of this report provides a summary of the key findings in relation to CMS Appendix I taxa. Priority data gaps and next steps are also discussed.

³ Direct use refers to the utilisation of individuals by those who harvested them. For example, subsistence or local harvesting for purposes such as food (i.e. wildmeat), medicine, apparel and pets/display.

⁴ Within this report domestic use refers to use that occurs at the local (subsistence) or national levels.

1. Rapid assessment of the potential risk from direct use and trade

The rapid assessment outlined in [UNEP/CMS/ScC-SC5/Doc.5/Rev.1/Annex 3](#)⁵ compiled and scored data from comparable, readily available datasets on the direct use⁶ and trade of all 180 Appendix I taxa, reflecting the potential risk from use/trade at both the domestic and international level. The resulting Excel document (accompanying this report) provides a valuable resource of data on Appendix I taxa, responding to the need for improved information on these taxa raised by Parties at COP13 (Gandhinagar, 2020). The Excel document includes data, where available, on threat from use as reported in IUCN Red List of Threatened Species™ assessments, the levels of legal international trade (2015-2019), whether or not domestic use occurs, and evidence for illegal harvest, capture and trade, and can be filtered by different parameters (e.g. taxonomic group or IUCN Red List category) to address different questions and priorities. The rapid assessment assumed that Appendix I taxa should be prioritised if they were facing extinction risk, were threatened by (or biologically vulnerable to) use and/or trade, and were not subject to current management efforts.

This report identified the taxa likely to be most at risk from direct use and trade by compiling the results of the rapid assessment into a risk matrix. Taxa with similar levels of vulnerability, likelihood of threat from use and trade, and management, were grouped together in one of 12 numbered groups. Groups 1-12 were then further classified into three over-arching risk levels ('higher', 'moderate' or 'lower'⁷) according to how likely they are to be at risk from direct use and trade based on available data (Table 1.1, see Annex A for full methods). Taxa in the same risk matrix group were considered more likely to benefit from similar types of action. Whether a taxon is considered to be 'higher', 'moderate' or 'lower' risk is determined by its vulnerability and the likelihood of being threatened by use; the different numbered groups (1-12) additionally reflect variation in the level of management taxa are subject to (see Table A1 for a full list of the criteria used in the rapid assessment).

Table 1.1. Matrix used to assess the potential risk from direct use and trade to the 180 CMS Appendix I listed taxa (see Annex A for full methods). Taxa were assigned to a matrix group based on their mean criteria scores for vulnerability (criteria categories 1-2 in the rapid assessment), likelihood of being threatened by use and trade (category 3) and level of management (category 4). Colours refer to 'higher' (red), 'moderate' (orange) or 'lower' (grey) risk.

		Likelihood of threat from use/trade and level of management			
		Higher (>0.5)		Lower (≤0.5)	
		Lower (>0.5)	Higher (≤0.5)	Lower (>0.5)	Higher (≤0.5)
Vulnerability	Higher (>0.66)	1	2	3	4
	Moderate (0.33-0.66)	5	6	7	8
	Lower (<0.33)	9	10	11	12

⁵ With one edit to the methods for criterion 2.3 (habitat breadth), which is now based on the methodology outlined in Cooke, Eigenbrod and Bates (2019). Projected losses of global mammal and bird ecological strategies. *Nature Communications*. 10, 2279.

⁶ Direct use refers to the utilisation of individuals by those who harvested them. For example, subsistence or local harvesting for purposes such as food (i.e. wildmeat), medicine, apparel and pets/display.

⁷ Taxa classified as 'lower risk' may still be at risk from over-exploitation, and may still benefit from action to ensure trade is sustainable, but in the context of the risk assessment this risk was considered relatively low compared to other CMS taxa.

Results of risk matrix

Over a quarter (30%, 53 taxa) of the 180 CMS Appendix I-listed taxa were considered 'higher risk' within the risk matrix (i.e. they fell into risk matrix groups 1 or 2⁸) on the basis of higher vulnerability and higher likelihood of threat from use and trade (Figure 1.1). These taxa are likely to be most negatively impacted by direct use and trade. Among terrestrial mammals, a disproportionately large number of taxa from the orders Artiodactyla (even-toed ungulates; 9 of 12 taxa) and Carnivora (carnivores; 3 of 4 taxa) were considered to be 'higher risk'. Among the twenty-five 'higher risk' birds, the Accipitriformes (seven species, including three species of vulture), Pelecaniformes (five species, including three species of egrets and herons) and Otidiformes (three species, all bustards) were particularly prevalent. Three of the five 'higher risk' fish were Rajiformes (specifically, manta rays).

A further 96 taxa (53%) were considered 'moderate risk' (risk matrix groups 3-6) on the basis of either higher vulnerability with lower likelihood of threat, or moderate vulnerability with higher likelihood of threat from use and trade. The matrix group for each taxon is detailed in column F of the accompanying Excel document.

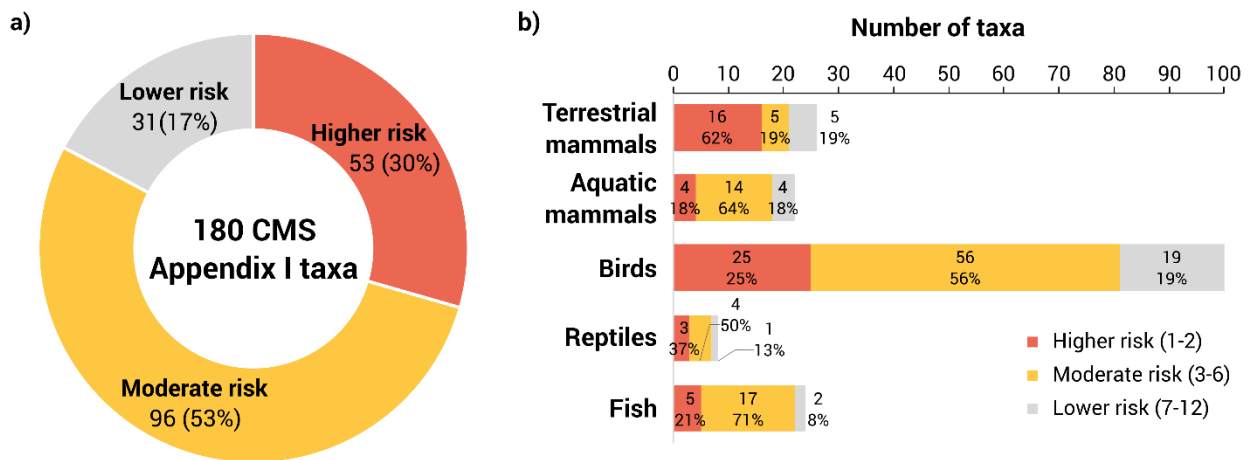


Figure 1.1. Number and proportion of taxa considered higher, moderate and lower risk from direct use and trade based on the risk matrix (see Table 1.1. and Annex A for details of risk matrix) a) for all Appendix I taxa combined, and b) by taxonomic group.

The spread of the taxa across the three different data axes (vulnerability, likelihood of threat from use/trade and level of management) reveals different clusters between and within the taxonomic groups (Figure 1.2); this variability indicates that taxa may benefit from different conservation actions and protection measures.

⁸ Taxa in risk matrix group 1 are reported to be subject to a lower level of management than taxa in risk matrix group 2. Of the 53 'higher risk' taxa, only one taxon (*Mobula hypostoma*) fell into risk matrix group 1.

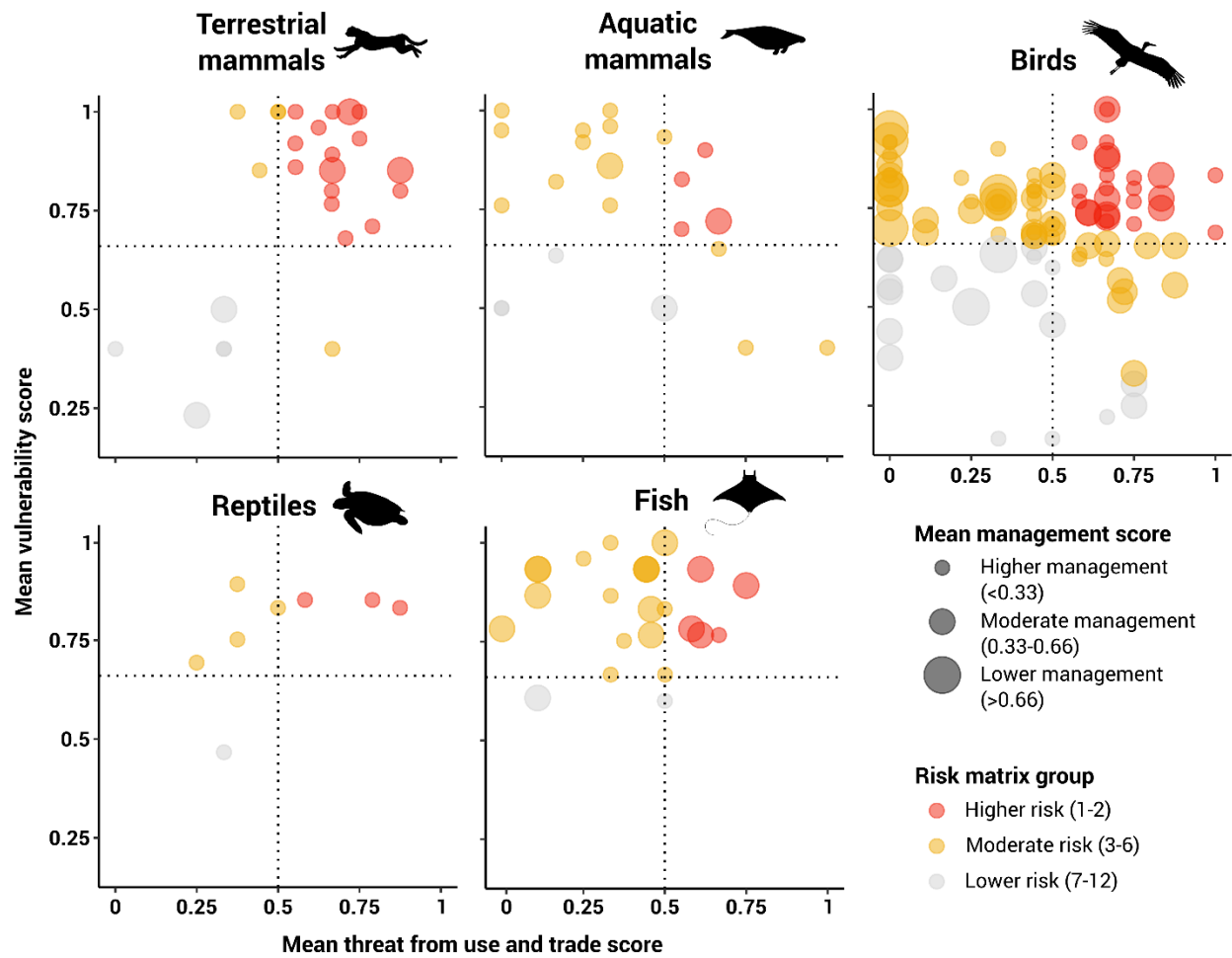


Figure 1.2. Distribution of taxa according to their mean unweighted scores for likelihood of threat from use and trade, vulnerability and level of management, and corresponding risk matrix group (see Table 1.1 and Annex A for details of risk matrix).

Higher risk taxa (n=53 taxa, indicated in red in Figure 1.2)

Of the 53 higher risk taxa, five species (9%) were classified as both very highly vulnerable (mean score ≥ 0.83) and likely to be very highly threatened by use and trade (mean score > 0.75):

- one antelope (*Gazella dorcas* (Dorcas Gazelle));
- two vulture species (*Gyps africanus* (White-backed Vulture) and *G. rueppelli* (Rüppell's Vulture)); and
- two marine turtle species (*Eretmochelys imbricata* (Hawksbill) and *Lepidochelys olivacea* (Olive Ridley)).

All five of these species are considered by IUCN to be globally threatened and experiencing ongoing population declines.

Since the 53 taxa are those likely to be most vulnerable to over-harvesting (due to their more threatened conservation status and intrinsic vulnerability, as well as higher threat from use/trade), their domestic and international use/trade is further examined in section 4 of this report.

Moderate risk taxa (n=96 taxa, indicated in orange in Figure 1.2)

Taxa were classified as 'moderate risk' on the basis of either (a) high vulnerability and lower likelihood of threat from use/trade or (b) moderate vulnerability and higher likelihood of threat from use/trade (taxa grouped 3-4 and 5-6 respectively in column F of the Excel document).

Over 83% of moderate risk taxa (80 taxa) fell into the first grouping (a), with higher extinction risk/biological vulnerability and lower likelihood of threat from use and trade. Should use and trade in these taxa increase, they could be particularly vulnerable to over-harvesting due to their more threatened conservation status and/or sensitive intrinsic biology. This grouping included all of the fish and reptile taxa considered to be moderate risk, as well as 79% of the mammal and bird taxa within this classification. With the exception of 40% of the moderate risk birds, the majority of these taxa were reportedly subject to some management measures.

The remaining 16 moderate risk taxa (17% of all moderate risk taxa) fell within the second grouping (b), and were classified as having a higher likelihood of threat from use and trade, with moderate vulnerability. Although considered to be moderately vulnerable in comparison to other CMS Appendix I taxa, many of these taxa face intense ongoing pressure from use/trade. Four of these taxa had mean threat scores > 0.75 , suggesting that they may be very highly threatened by use and trade, including *Anser erythropus* (Lesser White-fronted Goose) and *Emberiza aureola* (Yellow-breasted Bunting).

Within the group of 96 'moderate risk' taxa, the terrestrial and aquatic mammals, in general, appeared to be subject to a higher level of management effort than the birds (Figure 1.2). It should be noted, however, that *effectiveness* of management measures was not quantified in this rapid assessment.

2. Assessment of taxa in international trade

This section provides an analysis of legal international trade in CMS Appendix I taxa as reported by Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)⁹ in their annual reports. It examines both the number of CMS Appendix I taxa that are listed in the CITES Appendices, as well as the international trade in these species including the number of taxa and transactions reported in trade, the volume of this trade, and the main countries of export. The analysis of trade focuses on specimens reported as taken from the wild in the country of export as an indicator of harvest pressure on native populations for the international market.

The trade data are first analysed for all trading partners over the period 2015-2019 irrespective of specific population-level listings or the year of listing in CMS Appendix I. This approach provides an overview of the levels of harvest for international trade across a species' entire range, which is of relevance to species-level conservation considerations. The CITES trade data are then subset to examine trade by CMS Parties that was in *potential* contravention of Article III, Paragraph 5: the analysis focused on trade that was reported by exporting CMS Parties only, including trade records reported after the year of a species' listing in CMS Appendix I¹⁰ and records originating only from populations covered by the listing (see Annex B for full details of the methods).

Article III, Paragraph 5 of the Convention states that '*Parties that are Range States of a migratory species listed in [CMS] Appendix I shall prohibit the taking of animals belonging to such species*' with the following exceptions: '*a) the taking is for scientific purposes; b) the taking is for the purpose of enhancing the propagation or survival of the affected species; c) the taking is to accommodate the needs of traditional subsistence users of such species; or d) extraordinary circumstances so require; provided that such exceptions are precise as to content and limited in space and time*'. As such, international trade in wild-sourced CMS Appendix I taxa, as reported by CMS Parties in their annual trade reports to CITES, may have been in potential contravention of the provisions of the CMS Convention, unless the take was for the precise purposes outlined in CMS Article III, Paragraph 5.

For taxa not listed in CITES, this section also considers the following to be evidence of international use/trade: taxon classified as having 'international' end uses¹¹ in their IUCN Red List assessment, as well reported imports into the United States of America in LEMIS 2000-2014.

⁹ CITES is an international agreement that aims to ensure that international trade in species listed in the CITES Appendices does not threaten their survival.

¹⁰ Some trade reported from the year of listing in CMS *may* also be in contravention. However, trade occurring during the year of listing was excluded from the analysis of trade that may be in *potential* contravention, as the exact date when trade occurred is not recorded in the CITES Trade Database.

¹¹ [IUCN General Use and Trade Classification Scheme \(version 1.0\)](#)

CMS Appendix I taxa and their status within CITES

Of the 180 CMS Appendix I taxa, 122 (68%) are also listed in CITES¹², including all reptiles (8 taxa) and all but two fish species (22 of 24 taxa) (Figure 2.1). Seventy-two taxa (40%) are listed in Appendix I of both CMS and CITES (Figure 2.1), including most CMS Appendix I terrestrial and aquatic mammals (19 of 26 taxa, and 17 of 24 taxa, respectively) and reptiles (seven taxa). Fish were predominantly listed in CITES Appendix II and over half of birds were not CITES-listed (Figure 2.1).

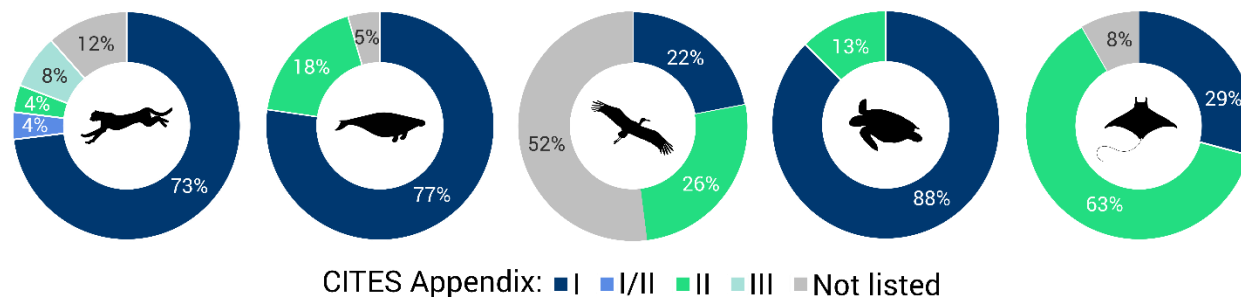


Figure 2.1. The proportion of CMS Appendix I taxa (terrestrial mammals=26, aquatic mammals=22, birds=100, reptiles=8, fish=24) listed in CITES Appendix I, II, or III, or not CITES-listed, within each taxonomic group. I/II refers to split listings, where one or more subspecies or populations of a species are listed in CITES Appendix I, and others are listed in CITES Appendix II.

CITES trade in CMS Appendix I taxa

For the 122 CMS Appendix I taxa also listed in CITES, an analysis of the CITES trade data was conducted to identify the scale of trade in these taxa. Of the remaining 58 taxa not currently listed in CITES, there was evidence of international use/trade for 21 taxa based on the classification of end uses as international in the IUCN Red List, or imports into the United States of America as reported in LEMIS 2000-2014 (Annex B Table B3).

According to the trade reported by CITES Parties in the CITES Trade Database¹³, 40% (48 taxa) of the 122 CMS Appendix I taxa listed in CITES were reported in direct, wild-sourced¹⁴ or ranched trade over the period considered by the assessment (2015-2019) based on both exporter- and importer-reported data (Annex B Table B1). Of these, almost half (46%, 22 taxa) were mammals (11 terrestrial mammals, 11 aquatic mammals). The majority (85%) of CMS Appendix I taxa in trade were categorised as globally

¹² Current as of November 2021, including five CMS subspecies listed in CITES at the species level (*Equus ferus przewalskii* (Przewalski's Horse, as *E. przewalskii*); *Elephas maximus indicus* (Indian Elephant); *Houbaropsis bengalensis bengalensis* (Bengal Florican); *Platanista gangetica gangetica* (Ganges River Dolphin); *Tursiops truncatus ponticus* (Bottlenose Dolphin)).

¹³ Available at trade.cites.org. [Data downloaded on 16/11/2021].

¹⁴ Taking a precautionary approach, CITES trade with unknown source (source 'U') and trade reported without a source specified were considered 'wild'. For CMS Appendix I taxa, there was no direct trade in specimens taken from the marine environment (source 'X') over this period, for the purpose codes considered in the analysis (see Annex B for full details of the Methods).

threatened (Extinct in the Wild¹⁵, Critically Endangered, Endangered and Vulnerable) by the IUCN Red List (Figure 2.2).

Number and proportion of CMS Appendix I taxa reported in direct trade 2015-2019

Note: not all trade is in potential contravention of CMS Article III, Paragraph 5

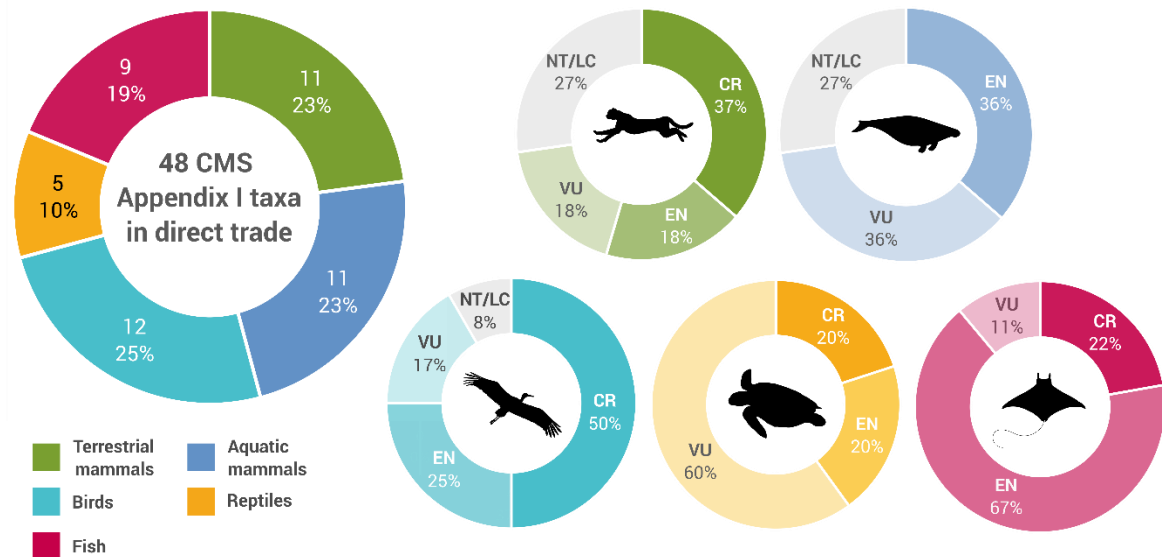


Figure 2.2. The number and proportion of CMS Appendix I taxa reported in direct CITES trade by all exporters and/or importers over the period 2015-2019, for sources ranched ('R'), wild ('W'), source unknown ('U') and no source code reported, and for all purposes other than breeding in captivity ('B'), educational ('E'), reintroduction or introduction into the wild ('N') and scientific ('S')¹⁶, including IUCN Red List category for taxa by taxonomic group. Fish taxa include *Elasmobranchii* spp. only; there was no reported trade in CMS Appendix I Actinopterygii spp. for these trade parameters. **Note:** Not all trade is in potential contravention of the prohibition on take (e.g. not all exporters are CMS Parties, not all populations are covered by CMS, or trade could have occurred prior to listing in CMS Appendix I).

Analysis of trade transactions in CMS Appendix I taxa

In total, there were 1,559 direct transactions in CMS Appendix I taxa as reported by all exporters over the period 2015-2019, 77% of which were for terrestrial mammals (Table 2.1). Nearly all transactions (~99%) were in wild-sourced specimens¹⁷, and all transactions involving birds, reptiles, and fish consisted of globally threatened species. Overall, 80% of transactions consisted of three species (*Vicugna vicugna* (Vicuña; 43%), *Acinonyx jubatus* (Cheetah; 29%), and *Tursiops truncatus* (Bottlenose Dolphin; 8%; listed as *T. truncatus ponticus* in CMS Appendix I)); it should be noted that the majority of the trade in these species originated from populations excluded from the CMS Appendix I listings¹⁸ (see Annex B Table B1 for further details).

¹⁵ *Oryx dammah* (Scimitar-horned Oryx) was reported in direct wild-sourced (source 'W') trade, specifically as hunting trophies/skins from South Africa. As the species is not native to South Africa, the specimens traded were likely sourced from lightly managed populations in fenced areas that are reported as source 'W'.

¹⁶ Further details on the source and purpose codes can be found in [CITES Notification 2023/039 Annex 1](#).

¹⁷ Source code 'W'.

¹⁸ Proportion of the species' transactions that originated from populations excluded from the CMS Appendix I listing: *Vicugna vicugna* (89%, Peru); *Acinonyx jubatus* (>99%, almost entirely Namibia); *Tursiops truncatus* (98%, mostly Japan).

Table 2.1. The number of direct transactions reported by exporters across taxonomic groups 2015-2019, as well as the proportion of these transactions that involved globally threatened ('GT')¹⁹ taxa.

	Terrestrial mammals	Aquatic mammals	Birds	Reptiles	Fish	Total
Total no. of transactions reported by all exporters (% GT)	1,205 (44%)	188 (81%)	48 (100%)	16 (100%)	102 (100%)	1,559 (52%)

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 16/11/2021.

Fifty-one CITES Parties reported directly exporting wild-sourced taxa included in CMS Appendix I based on the trade data parameters outlined in Annex B. The majority of the 1,559 direct transactions were exported by Peru (38%) and Namibia (28%); all of this trade was in species for which the Peruvian and Namibian populations are excluded from the CMS Appendix I listing (*Vicugna vicugna* and *Acinonyx jubatus*, respectively).

Analysis of quantities traded in CMS Appendix I taxa

Overall, approximately 1,215 individual animals (based on terms equivalent to whole organisms²⁰) were reported in CITES trade for 21 CMS Appendix I-listed taxa (Figure 2.3), predominantly from wild sources. Terrestrial and aquatic mammals jointly accounted for 91% of this trade (49% and 42% respectively). *Tursiops truncatus* (only *T. truncatus ponticus* is listed in CMS Appendix I) and *Acinonyx jubatus* hunting trophies were traded in particularly high quantities, although almost all trade in these two taxa was from populations not included in the CMS Appendix I listing²¹. Further details on trade volumes by taxon can be found in Annex B Table B1.

¹⁹ Extinct in the Wild, Critically Endangered, Endangered, Vulnerable.

²⁰ Bodies, fingerlings, live, skeletons, skins, skulls, and trophies.

²¹ With the exception of three live *Tursiops truncatus* (listed in CMS Appendix I as *T. truncatus ponticus*) exported by the Russian Federation for circus or traveling exhibition purposes (purpose code 'Q') and two *Acinonyx jubatus* hunting trophies reported by South Africa.

Top CMS Appendix I taxa reported in direct trade 2015-2019, by number of individuals

Note: not all trade is in potential contravention of CMS Article III, Paragraph 5

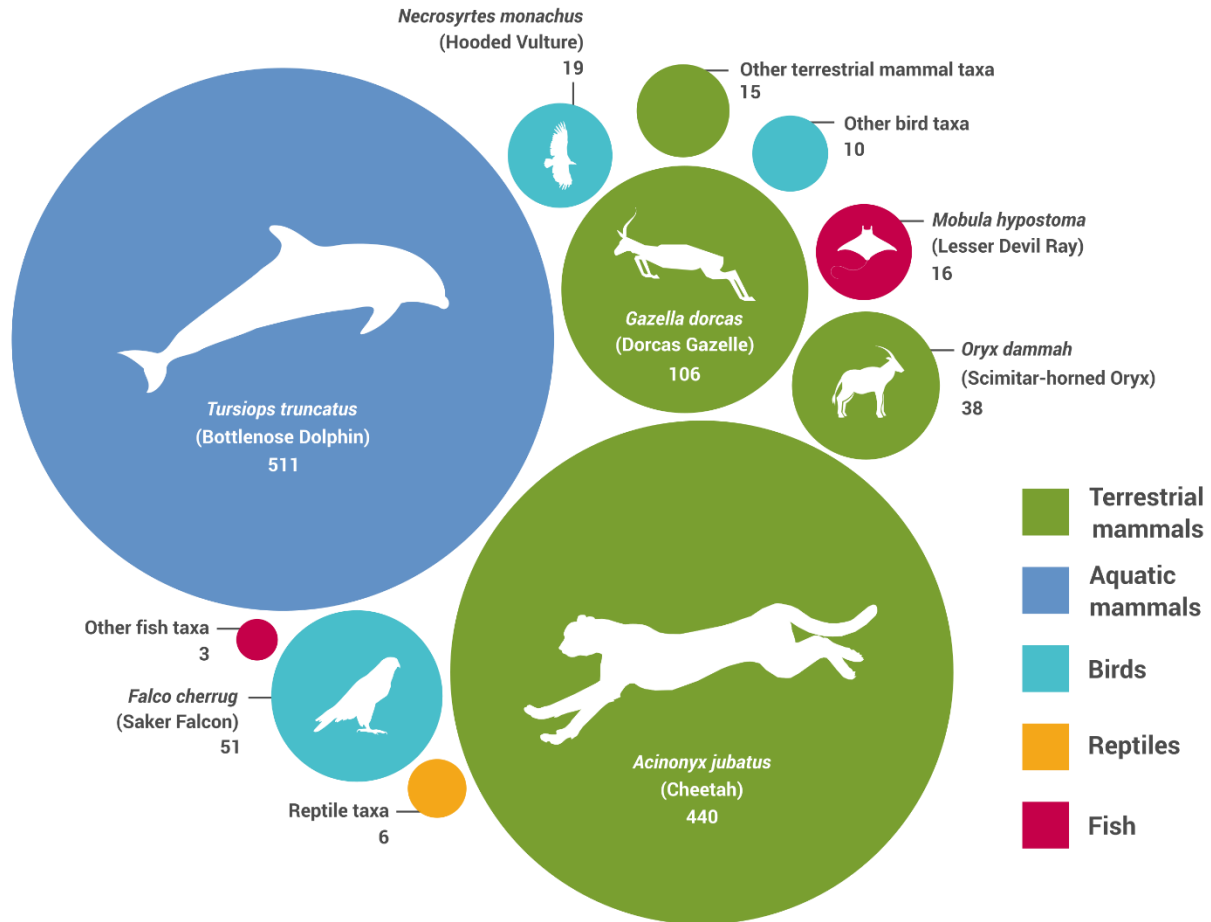


Figure 2.3. CMS Appendix I taxa reported in direct trade by all CITES exporters as number of individuals (terms equivalent to whole organisms²²) over the period 2015-2019 (n=1,215 individuals). **Note:** Not all trade is in potential contravention of the prohibition on take (e.g. not all exporters are CMS Parties, not all populations are covered by CMS, and trade could have occurred prior to listing in CMS Appendix I).

Trade in other parts and derivatives by number that could not be equated to one individual²³, as reported by all exporters, included: 513 *Carcharhinus longimanus* (Ocean Whitetip Shark) fins; smaller quantities of baleen, bones, and carvings of Cetacea spp. (Cetaceans); and low levels of carvings and carapaces of Testudines spp. (Turtles). Direct trade in CMS Appendix I taxa reported by weight by all exporters exceeded 5.4 million kg, 96% of which was *Balaenoptera physalus* (Fin Whale) meat exported by Iceland to

²² Bodies, fingerlings, live, skeletons, skins, skulls, and trophies.

²³ Baleen, bones, bone carvings, bone pieces, carapaces, carvings, eggs, eggs (live), fins, gall, gall bladders, horn carvings, horn pieces, horns, ivory pieces, ivory carvings, meat, plates, scales, shells, skin pieces, teeth, tusks. As there are no agreed-upon conversion factors allowing these trade terms to be equated to a number of individual animals, trade in these parts and derivatives were analysed in the unit reported.

Japan in 2015 and 2017^{24,25}. The second most highly traded species by weight was *Vicugna vicugna* (~3% of trade by weight, amounting to 137,703 kg) which consisted mostly of hair. Although the quantities involved accounted for less than 1% of the trade by weight, notable quantities of Mobulidae spp. (17,179 kg) and other Elasmobranchii spp. (9,622 kg) were also reported as being in trade. Most of the trade reported by weight in Mobulidae spp. consisted of *Mobula japonica* (Japanese Devil Ray) and *Mobula tarapacana* (Box Ray) gill plates; for the other Elasmobranchii spp., trade reported by weight entirely comprised *Carcharhinus longimanus* and *Carcharodon carcharias* (Great White Shark) fins (6,027 and 3,595 kg respectively).

CITES trade in CMS Appendix I taxa in potential contravention of CMS

Trade records were also analysed to explore where international trade in CITES-listed taxa (as reported in CITES annual reports) may have occurred in potential contravention of CMS Article III, Paragraph 5, unless any of the specified exceptions were made. Trade was considered to be in potential contravention of Article III, Paragraph 5 when: i) the exporting country was a CMS Party, ii) the trade was reported *after* the year the taxon was listed in CMS Appendix I²⁶, iii) the trade records originated from populations covered by the Appendix I listing, and iv) there were no reservations in place to the listing of the species in trade made by the exporting country.

When considering only CITES trade records that may have been in potential contravention of Article III, Paragraph 5, 142 transactions were reported by 15 exporting CMS Parties (Table 2.2). The greatest number of transactions were reported for *Mobula tarapacana* (38), *Oryx dammah*²⁷ (Scimitar-horned Oryx; 37) and *Mobula japonica* (30). Further details of the transactions that may have been in potential contravention of Article III, Paragraph 5 are provided in Annex B Table B2.

²⁴ 5.2 million kg of *Balaenoptera physalus* meat was estimated as equivalent to approximately 73 individuals if full adult weight were traded in each instance (based on an adult weight of 70,000 kg as estimated in Gambell (1985). Fin whale – *Balaenoptera physalus*. In Ridgway and Harrison (eds) (1985). Handbook of marine mammals. Volume 3. The sirenians and baleen whales. Academic Press, London).

²⁵ All *Balaenoptera physalus* meat was reported as purpose T (commercial trade). Neither Iceland nor Japan are Parties to CMS; both countries have issued CITES reservations for this species that cover the relevant years of trade.

²⁶ Trade reported from the year of CMS listing was excluded to avoid highlighting trade that is likely to have occurred before the CMS Appendix I listing came into force.

²⁷ *Oryx dammah* (Scimitar-horned Oryx) was reported in direct wild-sourced (source 'W') trade, specifically as hunting trophies/skins from South Africa. As the species is not native to South Africa, the specimens traded were likely sourced from lightly managed populations in fenced areas that are reported as source 'W'."

Table 2.2. The number of direct transactions reported by exporters across taxonomic groups 2015-2019, which may have been in potential contravention of Article III, Paragraph 5²⁸, as well as the proportion of these transactions which involved globally threatened ('GT')²⁹ taxa.

	Terrestrial mammals	Aquatic mammals	Birds	Reptiles	Fish	Total
No. of transactions reported by CMS Parties in potential contravention of Article III, Paragraph 5 (% GT)	44 (91%)	7 (100%)	6 (83%)	14 (100%)	71 (100%)	142 (96%)

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 16/11/2021.

In total, 80 individual animals from 17 taxa³⁰, largely terrestrial mammals (55%, predominantly *Oryx dammah* (Scimitar-horned Oryx)) and birds (36%, mostly *Falco cherrug* (Saker Falcon)) were reported in CITES trade in potential contravention of Article III, paragraph 5, along with <1 of trade reported by weight (totalling 20,127 kg). The majority (75%) of the trade by weight consisted of gill plates from *M. tarapacana* (8,854 kg) and *M. japonica* (6,270 kg), which respectively accounted for 44% and 31% of the total amount that may have been in contravention of Article III, Paragraph 5.

Seventy-seven percent of the transactions that may have been in potential contravention of Article III, Paragraph 5 were reported by two exporters (South Africa and Sri Lanka; Table B2 in the Annex). Further considerations that could have relevance for whether or not trade may have been in contravention of the Convention are outlined in Table B2.

²⁸ Subset of trade data reported by exporting CMS Parties, including only trade records reported from the year after a species was listed in CMS Appendix I. Trade records originating from populations not covered by the listing were excluded, as were those from CMS Parties with a reservation in place for the listing of the species in trade.

²⁹ Extinct in the Wild, Critically Endangered, Endangered, Vulnerable.

³⁰ 23 taxa if importer reported data were also included in the total.

Threat from intentional biological resource use

According to the IUCN Red List, 122 CMS Appendix I taxa were considered to be threatened by intentional biological resource use³¹. This subsection focuses on these 122 taxa and, within this subset, considers those with evidence of use at the international level.

Based on the analysis presented above (see '*CITES trade in CMS Appendix I taxa*'), 48 CMS Appendix I taxa were reported in direct, wild-sourced trade over the period 2015-2019, according to the CITES Trade Database, and evidence of international trade/use was identified for an additional 21 non-CITES listed taxa (see Annex B Table B3). Of these 69 CMS Appendix I taxa, 54 (78%) were considered threatened by intentional biological resource use. International trade may therefore represent a *threat* to these taxa, although it should be noted that uses at other scales (e.g. at subsistence or national level) may be driving the threat from intentional biological resource use.

In addition to the 69 CMS Appendix I taxa discussed above, there was also evidence of international use for a further 50 of the CITES-listed taxa in CMS Appendix I that had not been reported in recent direct, wild-sourced CITES-trade (2015-2019). For these taxa, evidence of international use was based on the scale of end uses reported in IUCN Red List assessments and/or 2000-2014 imports reported in LEMIS³², which may indicate, among other things, historic international trade that has now ceased, or trade in purposes or sources not assessed here (see Annex B for methods). If a precautionary approach is taken, and these 50 CITES-listed taxa are also considered, the total number of Appendix I taxa assessed as being traded internationally rises to 119. Of these 119 taxa, 87 (73%) were considered threatened by intentional biological resource use.

Four taxa threatened by biological resource use were also considered to *only* be in international, but not domestic use based on the data considered³³ (*Calidris pusilla* (Semipalmated Sandpiper), *Carcharhinus longimanus*, *Grus japonensis* (Japanese Crane) and *Tursiops truncatus* (only *Tursiops truncatus ponticus* is listed in CMS Appendix I)). Trade in *C. longimanus* and *T. truncatus* is summarised above; additionally, one live *G. japonensis* was reported in trade in 2015 of unknown source. *C. pusilla* is not listed in CITES, meaning CITES trade data were not available.

³¹ Red List threat categories 5.1.1, 5.4.1 and 5.4.2, excluding those considered 'past, unlikely to return'.

³² Import data reported in LEMIS 2000-2014 predates the period considered in the analysis of CITES trade data (2015-2019). Similarly, IUCN Red List assessments for these taxa may have been produced prior to 2015-2019.

³³ Based on all data available in this report, including the IUCN Red List assessments, international trade reported in the CITES Trade Database and LEMIS, and evidence of domestic use from additional literature (see Section 3). This is likely to be an underestimate. Since end uses, and the scale of end uses, are not compulsory data fields in Red List assessments, they may not have been completed for all taxa.

Whilst *Necrosyrtes monachus* (Hooded Vulture) and *Trigonoceps occipitalis* (White-headed Vulture) were also reported as only in international trade according to the Red List, there was evidence of this taxon being sold domestically in wild meat markets in Buij *et al.* (2016). Trade of threatened vultures and other raptors for fetish and bushmeat in West and Central Africa. *Oryx*, 50(4), 606-616.

3. Assessment of taxa harvested for domestic use

Many migratory taxa are harvested for domestic use in one or more of their Range States³⁴. Since migratory populations typically rely on multiple geographically separated sites, their continued survival depends on adequate and coordinated management of harvest across all Range States along a migratory pathway.

This section identifies CMS Appendix I taxa recorded in domestic use and considers them in the context of their conservation status and international trade. Taxa in domestic use were identified using the results of the rapid assessment criterion 3.3 (domestic use/consumption³⁵, see Annex A), supplemented by recent studies on the impacts of hunting for wild meat on CMS-listed terrestrial mammals³⁶ and aquatic megafauna³⁷, as well as additional literature on wild meat harvest (see Annex C for a full list of additional literature). Since the data did not provide an indication of the *levels* of domestic use, this section considers only the presence or absence of evidence of domestic use.

CMS Appendix I taxa harvested for domestic use

Over three quarters (77%, 139 taxa, Table 3.1) of CMS Appendix I taxa were identified as harvested for domestic use, including all reptiles (8 taxa), all but two terrestrial mammal species (24/26 taxa), and all but three fish species (21/24 taxa). Most of these (114 taxa) had ‘subsistence’ and/or ‘national’ uses specified in their IUCN Red List assessments, with evidence of domestic use found in the supplementary literature for a further 25 taxa. Almost three quarters (72%, 100 taxa) of the taxa harvested for domestic use, including all reptiles, were also reportedly in international trade/use (Table 3.1).

Table 3.1. *The number of taxa harvested for domestic use, and, of these, the number of taxa also considered to be in international trade.*

Taxonomic group	No. of taxa in domestic use (% total in taxonomic group)	No. of taxa in both domestic and international use (% total in domestic use)
Terrestrial mammals (n=26)	24 (92%)	19 (79%)
Aquatic mammals (n=22)	16 (73%)	11 (69%)
Birds (n=100)	70 (70%)	45 (64%)
Reptiles (n=8)	8 (100%)	8 (100%)
Fish (n=24)	21 (88%)	17 (81%)
Total (n=180)	139 (77%)	100 (72%)

Sources: IUCN Red List (version 2021-1), CITES Trade Database, LEMIS and additional literature on domestic use (see Annex C)

³⁴ E.g. Ripple *et al.* (2016). Bushmeat hunting and extinction risk to the world’s mammals. *Royal Society Open Science*, 3(10), 160498.

³⁵ In criterion 3.3, taxa with any [end uses](#) (other than research and establishing *ex-situ* production) classified as ‘national’ or ‘subsistence’ were considered to be in domestic use. Taxa considered ‘not utilised’ under the IUCN Red List assessment of use and trade were considered ‘not in domestic use’.

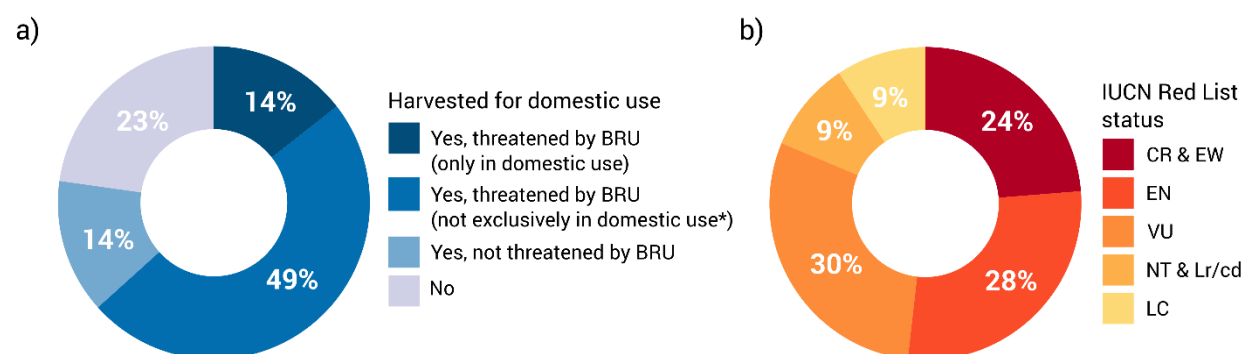
³⁶ Coad *et al.* (2021). Impacts of taking, trade and consumption of terrestrial migratory species for wild meat. Prepared for the Secretariat of the Convention on Migratory Species (CMS) by the Center for International Forestry Research (CIFOR). Available at: <https://www.cms.int/en/publication/impacts-taking-trade-and-consumption-terrestrial-migratory-species-wild-meat-report>.

³⁷ Ingram *et al.* (2022). Widespread use of migratory megafauna for aquatic wild meat in the tropics and subtropics. *Frontiers in Marine Science*, 9, 837447.

Threat from domestic use

Of the 139 Appendix I taxa harvested for domestic use, 82% (114 taxa) were considered to be *threatened* by intentional biological resource use³⁸ according to the IUCN Red List. This includes 26 taxa that were reported as *only* in domestic, but not international use, based on information on the scale of end uses documented in IUCN Red List assessments (Figure 3.1a)³⁹. This suggests that *at least* these 26 taxa are likely to be threatened by domestic use. As the scale of end uses has not been documented for all taxa in the IUCN Red List, the remaining 88 taxa threatened by biological resource use may also be threatened by use domestically, internationally, or at both scales.

Overall, 81% (113 taxa) of the 139 taxa in domestic use were also categorised as globally threatened (Figure 3.1b), indicating that their populations may be more vulnerable to threats, including over-harvesting. This includes all fish, 87.5% of reptiles, 77.5% of mammals and 77.1% of birds considered to be in domestic use.



* Evidence of use/trade at domestic and international scales, or no scale of end use was available

Figure 3.1. a) Proportion of CMS Appendix I taxa (n=180) considered harvested for domestic use, and the threat from biological resource use (BRU), b) the IUCN Red List status of CMS Appendix I taxa considered to be harvested for domestic use (n=139) [Key to IUCN status: EW=Extinct in the Wild, CR=Critically Endangered, EN=Endangered, VU=Vulnerable, NT=Near Threatened, Lr/cd=Lower risk/conservation dependent, LC=Least Concern].

³⁸ Red List threat categories 5.1.1, 5.4.1 and 5.4.2, excluding those considered 'past, unlikely to return'.

³⁹ This is likely to be an underestimate. Since end uses, and the scale of end uses, are not compulsory data fields in Red List assessments, they may not have been completed for all taxa.

4. Summary of international and domestic trade/use in higher risk taxa

This section provides more information on the 53 taxa identified as being at 'higher risk' from direct use and trade (see risk matrix described in Section 1) including on their conservation status and more details of their international and domestic use based on the results of Sections 2 and 3. Individual summaries of direct trade and use for all 53 taxa are also provided (Table 4.1).

All but one⁴⁰ of the 53 higher risk taxa were considered threatened by intentional biological resource use by the IUCN Red List, of which 50 were categorised as globally threatened in the IUCN Red List.

All 53 taxa were reported as being harvested for domestic use, and 41 were reported as being in international use and/or trade, including 29 CITES-listed taxa. There was also evidence to suggest that almost half of these taxa (25 taxa, 47%) were subject to illegal harvest, capture and trade⁴¹ (Table 4.1).

⁴⁰ *Physeter macrocephalus* was considered historically threatened by intentional use (threat code 5.4.2) but this was classified as "unlikely to return"

⁴¹ Based on the rapid assessment criterion 3.4 (illegal harvest) and supplemented with additional literature. Data comprised seizure records in either the LEMIS or TRAFFIC datasets as well as reports of illegal bird harvesting in: Brochet *et al.* 2016. Preliminary assessment of the scope and scale of illegal killing and taking of birds in the Mediterranean. *Bird Conservation International* 26, 1-28; Brochet *et al.* (2019). Illegal killing and taking of birds in Europe outside the Mediterranean: assessing the scope and scale of a complex issue. *Bird Conservation International*. 29, 10-40; and Brochet *et al.* (2019). A preliminary assessment of the scope and scale of illegal killing and taking of wild birds in the Arabian Peninsula, Iran and Iraq. *Sandgrouse*. 41, 154-175.

Table 4.1. Summary of wild-sourced⁴² international trade and evidence of illegal harvest, capture and trade for the 53 'higher risk' priority taxa identified through the risk matrix in section 1. All taxa were reported as harvested for domestic use, and all but one (*Physeter macrocephalus*) were considered threatened by intentional biological resource use⁴³ in their Red List assessments. [IUCN Red List status: CR=Critically Endangered, EN=Endangered, VU=Vulnerable, NT=Near Threatened; population trend: ↑ =increasing, - = stable, ↓ =decreasing, ? =unknown].

Taxon	IUCN Red List status and population trend	International use/trade ⁴⁴ [summary of CITES trade data: no. of exporter transactions 2015-2019; main terms in trade by quantity]	Illegal harvest, capture and trade ⁴⁵
Terrestrial mammals			
<i>Acinonyx jubatus</i> (Cheetah) ^a	VU ↓	✓ [445; 429 trophies]	✓
<i>Addax nasomaculatus</i> (Addax)	CR ↓	✓ [1; 1 trophy]	✓
<i>Bos grunniens</i> (Yak)	VU ↓	✓	
<i>Bos sauveli</i> (Kouprey)	CR ⁴⁶ ↓	✓	
<i>Camelus bactrianus</i> (Bactrian Camel)	CR ↓	✓	
<i>Elephas maximus indicus</i> (Asian Elephant)	EN ↓	✓ [6; 4 live, 2 trophies] ⁴⁷	✓
<i>Equus africanus</i> (African Wild Ass)	CR ↓		
<i>Equus grevyi</i> (Grevy's Zebra)	EN -	✓	✓
<i>Eudorcas rufifrons</i> (Red-fronted Gazelle)	VU ↓		
<i>Gazella dorcas</i> (Dorcas Gazelle) ^b	VU ↓	✓ [29; 106 live]	✓
<i>Gazella leptoceros</i> (Rhim Gazelle)	EN ↓	✓	
<i>Hippocamelus bisulcus</i> (Huemul)	EN ↓		
<i>Nanger dama</i> (Dama Gazelle)	CR ↓	✓	✓
<i>Pan troglodytes</i> (Chimpanzee)	EN ↓	✓ [5; 3 live, 345 specimens]	✓
<i>Panthera onca</i> (Jaguar)	NT ↓	✓ [3; 1 live, 22 specimens]	✓
<i>Uncia uncia</i> (Snow Leopard)	VU ↓	✓ [no relevant trade]	✓

⁴² 'Wild-sourced' trade includes wild 'W', ranched 'R', unknown 'U', and unreported sources. No trade was reported in source code 'X' (specimens taken from the marine environment).

⁴³ Red List threat categories 5.1.1, 5.4.1 and 5.4.2, excluding those considered 'past, unlikely to return'.

⁴⁴ Based on rapid assessment criterion 3.2 (in international trade, see Annex A), and supplemented, where relevant, with more up-to-date CITES trade data (details in Annex B Table B1). Rapid assessment criterion 3.2 classified taxa as 'in trade' over the period 2015-2019, based on the presence of records in the CITES Trade Database (for CITES-listed taxa), or (for non-CITES taxa) records from the CITES Trade Database (for EU Annex D taxa), the LEMIS database, or whether IUCN Red List assessments classified any end uses (other than research and establishing *ex-situ* production) as 'international'.

⁴⁵ Based on rapid assessment criterion 3.4, see Annex A.

⁴⁶ The IUCN Red List assessment considers *B. sauveli* to be Critically Endangered (Possibly Extinct), with the last published record reported to be from 1974.

⁴⁷ Reported to CITES at the species level *Elephas maximus*.

Taxon	IUCN Red List status and population trend	International use/trade ⁴⁴ [summary of CITES trade data: no. of exporter transactions 2015-2019; main terms in trade by quantity]	Illegal harvest, capture and trade ⁴⁵
Aquatic mammals			
<i>Balaenoptera physalus</i> (Fin Whale)	VU ↑	✓ [18; 5,258,000 kg meat]	
<i>Lontra felina</i> (Marine Otter)	EN ↓	✓	
<i>Lontra provocax</i> (Southern River Otter)	EN ↓		
<i>Physeter macrocephalus</i> (Sperm Whale)	VU ?	✓ [9; 2,948 kg derivatives]	✓
Birds			
<i>Anser cygnoid</i> (Swan Goose)	VU ↓	✓	
<i>Aquila heliaca</i> (Eastern Imperial Eagle)	VU ↓	✓ [1; 2 live]	✓
<i>Ardeola idae</i> (Madagascar Pond-heron)	EN ↓		
<i>Aythya baeri</i> (Baer's Pochard)	CR ↓	✓	
<i>Brotogeris pyrrhoptera</i> (Grey-cheeked Parakeet)	EN ↓		
<i>Calidris pygmaea</i> (Spoon-billed Sandpiper)	CR ↓		
<i>Chlamydotis undulata</i> (Houbara Bustard) ^b	VU ↓	✓	✓
<i>Egretta eulophotes</i> (Chinese Egret)	VU ↓	✓	
<i>Falco cherrug</i> (Saker) ^c	EN ↓	✓ [33; 51 live]	✓
<i>Fregata andrewsi</i> (Christmas Frigatebird)	CR ↓	✓	
<i>Geronticus eremita</i> (Northern Bald Ibis)	EN -	✓	✓
<i>Gorsachius goisagi</i> (Japanese Night-heron)	VU ↓	✓	
<i>Gyps africanus</i> (White-backed Vulture)	CR ↓	✓ [1; 12 eggshells]	✓
<i>Gyps coprotheres</i> (Cape Vulture)	EN ↓	✓ [4; 2 trophies, 1 live, 12 eggshells]	
<i>Gyps rueppelli</i> (Rüppell's Vulture)	CR ↓	✓ [1; 3 trophies] ⁴⁸	
<i>Houbaropsis bengalensis bengalensis</i> (Bengal Florican)	CR ↓		
<i>Leucogeranus leucogeranus</i> (Siberian Crane)	CR ↓	✓ [no relevant trade]	✓
<i>Necrosyrtes monachus</i> (Hooded Vulture)	CR ↓	✓ [4; 14 trophies, 5 live, 12 eggshells]	
<i>Neophron percnopterus</i> (Egyptian Vulture)	EN ↓	✓	✓

⁴⁸ Reported under CITES taxonomy as *Gyps rueppellii*.

Taxon	IUCN Red List status and population trend	International use/trade ⁴⁴ [summary of CITES trade data: no. of exporter transactions 2015-2019; main terms in trade by quantity]	Illegal harvest, capture and trade ⁴⁵
<i>Otis tarda</i> (Great Bustard)	VU ↓	✓ [no relevant trade]	✓
<i>Phoenicoparrus jamesi</i> (James's Flamingo)	NT -	✓	
<i>Spheniscus humboldti</i> (Humboldt Penguin)	VU ↓		✓
<i>Sporophila cinnamomea</i> (Chestnut Seedeater)	VU ↓		
<i>Thalasseus bernsteini</i> (Chinese Crested Tern)	CR ↓		
<i>Torgos tracheliotos</i> (Lappet-faced Vulture)	EN ↓	✓ [2; 1 trophy, 12 eggshells]	✓
Reptiles			
<i>Dermochelys coriacea</i> (Leatherback Turtle)	VU ↓	✓	✓
<i>Eretmochelys imbricata</i> (Hawksbill Turtle)	CR ↓	✓ [8; 96 jewellery]	✓
<i>Lepidochelys olivacea</i> (Olive Ridley Turtle)	VU ↓	✓ [5; 5 live]	✓
Fish			
<i>Manta birostris</i> (Oceanic Manta Ray)	EN ↓	✓ [4; 750 kg gill plates, 2 live]	
<i>Mobula hypostoma</i> (Atlantic Devil Ray)	EN ↓	✓ [3; 16 live]	
<i>Mobula japanica</i> (Japanese Devil Ray)	EN ↓ ⁴⁹	✓ [30; 6270 kg gill plates, 630 kg fins, 225 kg live]	✓
<i>Pristis clavata</i> (Dwarf Sawfish)	EN ↓		
<i>Rhincodon typus</i> (Whale Shark)	EN ↓	✓ [1; 1 specimen]	✓

^a Except the populations of Botswana, Namibia and Zimbabwe; ^b Only Northwest African populations; ^c Except Mongolian populations

Sources: CMS Appendix I Rapid assessment, IUCN Red List (version 2021-1), CITES Trade Database

⁴⁹ *M. japanica* is considered a synonym of *M. mobular* in the IUCN Red List.

Conclusion

This report found evidence of direct use and trade at domestic and/or international levels for the majority (88%) of the 180 taxa currently listed in CMS Appendix I, including all CMS Appendix I-listed reptiles and the majority of fish and mammals. Almost two thirds (61%) of these taxa were classified as globally threatened⁵⁰ due, at least in part, to threats attributed to intentional biological resource use⁵¹.

Higher risk taxa

The rapid assessment risk matrix (Section 1) identified 53 CMS Appendix I taxa likely to be at higher risk of over-harvesting for direct use and trade due to their more threatened conservation status and intrinsic vulnerability, as well as higher existing threat from use/trade. As such, this group of taxa may benefit from wider awareness of the risks they face, as well as more cooperation and collaboration amongst CMS Parties to minimise these threats. This may include efforts to address threats from harvest and trade by ensuring that the taking of these taxa is prohibited by national or territorial legislation in all CMS Party Range States in line with the provisions of the Convention; these efforts can be supported by the National Legislation Programme. In order to understand the severity of threat posed to these taxa by use and trade, and to prioritise efforts towards those most at risk, more detailed, **taxon-level review** may be beneficial. Further in-depth review may also indicate priority countries where support may be needed.

International CITES-reported trade in CMS Appendix I taxa

Over two thirds (122; 68%) of the taxa currently listed in CMS Appendix I are also listed in CITES. Of these, 72 are currently listed in Appendix I of both CMS and CITES, including most CMS Appendix I terrestrial mammals, aquatic mammals and reptiles. CMS Appendix I fish were predominantly listed in CITES Appendix II (which generally permits commercial trade) and over half of the birds were not CITES-listed, meaning they are not currently regulated or monitored through this mechanism. It is important to note, however, that the two Conventions have different listing criteria, approaches, definitions and goals meaning that it is to be expected that the Appendices do not fully align.

For those taxa that are CITES-listed, international trade data are reported by CITES Parties in their annual reports to CITES and these data are available in the [CITES Trade Database](#). Analysing trade patterns in these taxa at the global level across all trading partners can shed light on the pressures they may face across their entire range as a result of trade driven by international demand. Direct, wild-sourced or ranched trade was reported by CITES Parties for 48 CMS Appendix I taxa during 2015-2019⁵², almost half of which were terrestrial or aquatic mammals. The majority of CMS Appendix I taxa in CITES trade (85%) were categorised as globally threatened by the IUCN Red List (Annex B Table B1).

The majority of CITES trade in CMS Appendix I taxa was from populations not covered by the CMS Appendix I listing⁵³. When considering only international trade that may have been in potential

⁵⁰ Categorised as Extinct in the Wild, Critically Endangered, Endangered, Vulnerable in the IUCN Red List.

⁵¹ Red List threat categories 5.1.1, 5.4.1 and 5.4.2, excluding those considered 'past, unlikely to return'.

⁵² These findings are in broad agreement with a previous study of CMS Appendix-listed Species in international trade ([UNEP/CMS/COP13/Inf.37](#)): this study analysed CITES trade data over the period 2015-2018 and found that "CMS Parties have engaged in trade across a range of species that are included in CMS Appendix I, both as importers and exporters".

⁵³ Article III.5 provides that "Parties that are Range States of a migratory species listed in Appendix I shall prohibit the taking of animals belonging to such species", with a narrow set of exceptions to this obligation defined. However, Range States that are not Parties to CMS are not subject to this obligation and the listing of some species in Appendix I excludes some populations.

contravention of the provisions of the Convention⁵⁴ (unless any of the specified exceptions have been made) 17 taxa from 15 exporting CMS Parties (totalling 142 transactions) were reported in trade (Annex B Table B2).

Of the 58 Appendix I taxa not listed in CITES, a further 21 non-CITES taxa had evidence of international end uses in the IUCN Red List or reported imports into the United States of America, giving an indication of presence in international trade (Annex B Table B3).

Potential threat to CMS Appendix I taxa from domestic and international use

Over three quarters (77%, 139 taxa) of CMS Appendix I were identified as harvested for domestic use. Of these, 81% (113 taxa) were also categorised as globally threatened, which is the same proportion of Appendix I species harvested for international trade that are globally threatened (96/119 taxa⁵⁵). When considering just the Appendix I taxa threatened by intentional biological resource use (122 taxa), a higher proportion were considered to be in domestic compared to international use/trade (114 taxa, 93% compared to 87 taxa, 71%). This included 26 taxa reported as *only* in domestic, but not international, use/trade.

Whilst this does suggest that, in line with Coad *et al.* (2021)⁵⁶, more Appendix I taxa are likely harvested for domestic rather than international use, and are more likely to be threatened by harvesting for use at the domestic scale, further taxon-specific research would be required to draw firmer causal links between the scale of use and threat.

Next steps

While this assessment integrates a wide range of data sources relevant to direct use and trade, readily comparable data on all aspects of use/trade is still lacking for many species. Although steps were taken to minimise the impact of missing data on the results of the rapid assessment (see Annex A for full details of the methods and key data considerations), there may be additional Appendix I species at high risk from use/trade, that were not identified by the assessment due to a lack of data. There are several key areas in which **additional data** would help to improve the robustness of the conclusions drawn:

- **Standardised domestic use data for CMS species:** As highlighted previously by Coad *et al.* (2021)⁶¹, datasets allowing levels of domestic use to be quantified and reliably compared across species are not widely available. Although information on domestic use may be available for individual species at a local scale, variation between studies in methodology and sampling effort make it challenging to generalise more broadly across a species' range. For terrestrial species, the continued development and expansion of initiatives such as the WILDMEAT

⁵⁴ Trade was considered to be in potential contravention of Article III, Paragraph 5 when: i) the exporting country was a CMS Party, ii) the trade was reported after the year the taxon was listed in CMS Appendix I, iii) the trade records originated from populations covered by the Appendix I listing, and iv) there were no reservations in place to the listing of the species in trade made by the exporting country.

⁵⁵ Based on a precautionary approach to identify CMS Appendix I taxa that are harvested for international use (see Section 2 – 'Threat from intentional biological resource use' for further details).

⁵⁶ Coad *et al.* (2021). Impacts of taking, trade and consumption of terrestrial migratory species for wild meat. Prepared for the Secretariat of the Convention on Migratory Species (CMS) by the Center for International Forestry Research (CIFOR). Available at: <https://www.cms.int/en/publication/impacts-taking-trade-and-consumption-terrestrial-migratory-species-wild-meat-report>.

database⁵⁷ will help to address this key data gap. There is also a general need for more fisheries catch data reported at the species-specific level, the level of incidental catch that is opportunistically retained and discards for marine CMS Appendix I species.

- **International trade data for non-CITES species:** Accurately gauging the scale of legal international trade requires representative, quantitative trade data, which is currently lacking at sufficient taxonomic resolution for taxa that are not CITES-listed. Additional trade data relevant to the 58 non-CITES Appendix I taxa may be available at the national level in some countries, or from other species-specific sources not considered in this assessment, which could be collated to better understand legal international trade in these taxa and to identify gaps in knowledge where enhanced national data collection may be needed. However, ideally, global datasets are needed for a more complete picture of trade in these species.
- **Life history data:** Additional life-history data for less-studied taxonomic groups, including rays and sharks, and more refined indices of biological vulnerability (available for some taxonomic groups such as fish but not across other taxonomic groups to a degree that would be comparable) would be beneficial to better understand their inherent resilience or vulnerability to direct use and trade (see Annex A Table A4 for further details on levels of data coverage).

Next steps that CMS could consider to further enhance the understanding of the threats posed to Appendix I species by direct use and trade is the compilation of **in-depth case studies**. A case study approach could be beneficial for certain species or species groups, in particular for the 53 identified as high priority taxa. These case studies could expand beyond the scope of the rapid assessment and utilise additional national/regional level and/or species-specific data compiled from a range of sources, including the scientific literature, to fill data gaps and further explore this issue.

⁵⁷ The WILDMEAT database (www.wildmeat.org) has been established as a repository for standardised data on hunting impacts, wild meat consumption and wild meat market sales. The results from Coad *et al.* (2021), which help to underpin the analysis presented within this review, draw upon data obtained from the WILDMEAT database.

Annex A: Risk matrix for direct use and trade

Methods

The rapid assessment scored criteria on extinction risk, biological vulnerability, threat from direct use and trade, and the level of management effort to provide insights into the potential risk from direct use and trade to the conservation status of Appendix I-listed taxa (see Table A1 for criteria). The full rapid assessment methodology is outlined in document [UNEP/CMS/ScC-SC5/Doc.5/Rev.1/Annex 3](#)⁵⁸ and the output from the assessment is provided in an Excel file with the corresponding data, metadata and scores.

Table A1. Criteria used to assess the potential risk from direct use and trade to the conservation status of CMS Appendix I-listed taxa. Full methodology outlined in document [UNEP/CMS/ScC-SC5/Doc.5/Rev.1/Annex 3](#).

Category	Criteria
1. Extinction risk	1.1 Red List category
	1.2 Population trend
2. Biological vulnerability	2.1 Body size
	2.2 Reproductive output
	2.3 Habitat breadth
	2.4 Range size
3. Threat to species	3.1 Threat from use
	3.2 In legal international trade
	3.3 Domestic use/consumption
	3.4 Illegal harvest, capture and trade
4. Management effort	4.1 Existing measures under CITES
	4.2 Conservation actions in place
	4.3 Prohibition of take (Article III(5))

To identify the taxa at greater risk from direct use and trade, and to help inform potential future actions, taxa were assigned to one of 12 groups within a risk matrix (see Table A2) based on their mean scores calculated across all relevant criteria for which data were available⁵⁹ for the following three axes:

- (a) vulnerability (categories 1 and 2),
- (b) likelihood of threat from use and trade (category 3) and
- (c) level of management (category 4).

⁵⁸ With one edit to the methods for criterion 2.3 (habitat breadth), which is now based on the methodology outlined in Cooke *et al.* (2019). Projected losses of global mammal and bird ecological strategies. *Nature Communications*, 10, 2279.

⁵⁹ Each mean score was only calculated from criteria for which a score was available.

Table A2. Matrix used to assess the potential risk from direct use and trade to the 180 CMS Appendix I listed taxa. Taxa were assigned to a matrix group based on their mean criteria scores for vulnerability (categories 1-2 in the rapid assessment), the likelihood of being threatened by use and trade (category 3) and level of management (category 4). Colours refer to higher (red), moderate (orange) or lower (grey) risk.

		Threat from use/trade and management			
		Higher (>0.5)		Lower (≤0.5)	
		Lower (>0.5)	Higher (≤0.5)	Lower (>0.5)	Higher (≤0.5)
Vulnerability	Higher (>0.66)	1	2	3	4
	Moderate (0.33-0.66)	5	6	7	8
	Lower (<0.33)	9	10	11	12

Rapid assessment data considerations

The results of the rapid assessment (based on methodology outlined in [UNEP/CMS/ScC-SC5/Doc.5/Rev.1/Annex 3](#) and provided in an accompanying Excel document) were underpinned by a number of different data sources including the IUCN Red List of Threatened Species™, trade datasets and CMS National Reports. All datasets were mapped to a central CMS taxonomic backbone from Species+, with both CITES and IUCN taxonomy mapped by both accepted name and, where necessary, by synonym to account for taxonomic differences between the different datasets. All other datasets were mapped to the central CMS backbone by accepted name only, so some data may not have been included due to differences in nomenclature. Table A3 details further considerations for interpreting data based on specific datasets.

Population and subspecies level listings

Among the 180 Appendix I-listed taxa there are nine subspecies level listings⁶⁰, as well as 13 species and subspecies for which only certain populations are listed in CMS Appendix I⁶¹. As the rapid assessment criteria were developed to assess taxa at the global level, the following caveats should be considered when interpreting the results:

Subspecies: For some criteria, data were only available at species level. The nine Appendix I subspecies were therefore scored in the rapid assessment based on a combination of subspecies and species level data⁶².

Population level listings: The 13 taxa for which only certain populations are listed in CMS Appendix I were predominantly assessed across the taxon’s full range and not at the level of their listing. However, data for the relevant populations were considered separately where available. Data from National Red List assessments have been included as metadata for these populations in the full rapid assessment Excel output to provide insights into their conservation status.

⁶⁰ *Cervus elaphus barbarus*, *Cervus elaphus yarkandensis*, *Ursus arctos isabellinus*, *Tursiops truncatus ponticus*, *Platanista gangetica gangetica*, *Equus ferus przewalskii*, *Elephas maximus indicus*, *Calidris canutus rufa*, *Houbaropsis bengalensis bengalensis*.

⁶¹ *Gazella dorcas*, *Vicugna vicugna*, *Cervus elaphus yarkandensis*, *Acinonyx jubatus*, *Ursus arctos isabellinus*, *Delphinus delphis*, *Ziphius cavirostris*, *Trichechus manatus*, *Falco cherrug*, *Chlamydotis undulata*, *Pelecanus onocrotalus*, *Podocnemis expansa*, *Rhinobatos rhinobatos*. Details of the specific populations that are listed are provided as metadata in the accompanying excel output.

⁶² Some data were available at the subspecies level for all subspecies except *Houbaropsis bengalensis bengalensis*.

Table A3. Key considerations associated with the data sources used in the rapid assessment of the potential risk from direct use and trade. See Table A1 for summary of criteria and [UNEP/CMS/ScC-SC5/Doc.5/Rev.1/Annex 3](#) for full details of methodology.

Data source	Relevant criteria	Data considerations
IUCN Red List of Threatened Species™ ⁶³ (version 2021-1)	1.1 (Red List category), 1.2 (Population trend), 2.3 (Habitat breadth), 2.4 (Range size), 3.1 (Threat from use), 3.2 (In legal international trade), 3.3 (Domestic use/consumption), 4.2 (Conservation actions in place)	<p>IUCN Red List assessments reflect the state of knowledge at the time of the assessment. Older assessments (e.g. >10 years old) may not reflect a taxon's current conservation status. <i>To assist in interpreting the Red List data, metadata on the date of Red List assessment and any historic Red List categories were also included.</i></p> <p>Criterion 2.3: using the number of IUCN-defined habitats is sensitive to how separate habitats are defined and may not capture the full complexity of a taxon's habitat niche.</p> <p>Criterion 2.4: range size, as measured by Extent of Occurrence, reflects the extent of a taxon's range, but does not account for suitable habitat within it.</p> <p>Criteria 3.1-3.3: threat and use classifications are assumed to be comprehensive and comparable within and between taxonomic groups. <i>To avoid confounding non-recorded data with evidence of no threat/use, taxa with no threat or use classification were not scored for the relevant criteria.</i></p>
Life history data ⁶⁴ : Amniote Life History database ⁶⁵ , AnAge ⁶⁶ , FishBase ⁶⁷ , data on Chondrichthyan life history traits ⁶⁸	2.1 (Body size), 2.2 (Reproductive output)	Class-level thresholds used to determine levels of intrinsic biological vulnerability will be influenced by the representativeness of the species included within the databases.
CITES Trade Database ⁶⁹	3.2 (In legal international trade)	Representative, quantitative data on legal international trade are only available for CITES-listed taxa. <i>To mitigate this, the scoring criteria for non-CITES-listed taxa also considered data from LEMIS and the IUCN Red List.</i>
TRAFFIC Wildlife Trade Portal ⁷⁰	3.4 (Illegal harvest, capture and trade)	Data on seizures/illegal trade may be influenced by variation in reporting effort and enforcement levels.

⁶³ Available at www.iucnredlist.org.

⁶⁴ The life history variables included in the rapid assessment were considered good predictors of vulnerability, and had readily available data, across a wide range of taxonomic groups. Prior to conducting the rapid assessment, correlations between the biological vulnerability criteria and IUCN Red List category were tested; the considerable overlap observed in the data distribution between Red List categories indicated the biological vulnerability criteria provided distinct data independent of the taxon's IUCN Red List category.

⁶⁵ Myhrvold *et al.* (2015). An amniote life-history database to perform comparative analyses with birds, mammals, and reptiles. *Ecology*, 96(11), 3109

⁶⁶ Available at <https://genomics.senescence.info/>

⁶⁷ Available at <https://www.fishbase.se/>

⁶⁸ Rigby and Simpfendorfer (2013). Patterns in life history traits of deepwater chondrichthyans. *Deep Sea Research Part II Topical Studies in Oceanography*, 115(1), 30-40.

⁶⁹ Available at <https://trade.cites.org/>.

⁷⁰ TRAFFIC International (2021). Wildlife Trade Portal. Available at www.wildlifetradeportal.org.

Data source	Relevant criteria	Data considerations
LEMIS ⁷¹	3.2 (In legal international trade), 3.4 (Illegal harvest, capture and trade)	Limited geographic scope, as LEMIS only provides data on imports into and exports from the United States of America, however it does include trade levels in non-CITES taxa. Only data 2000-2014 were available, meaning emerging trends or new taxa entering the US market were likely not included.
Brochet <i>et al.</i> (2016) ⁷²	3.4 (Illegal harvest, capture and trade)	Data limited by taxonomic and geographic coverage to records of illegal taking and killing of avian taxa in the Mediterranean region.
CITES ⁷³	4.1 (Existing measures under CITES)	Criterion 4.1 only considered the existence of CITES measures and did not assess their implementation or effectiveness. <i>Further details on existing measures under CITES are included as metadata.</i>
CMS National Reports ⁷⁴	4.3 (Prohibition of take (Article III(5)))	Not all Range States are CMS Parties, and of the current CMS Parties, 61% submitted National Reports by the reporting deadline during the latest national reporting cycle, with 96% completing the question relating to prohibition of take. <i>Taxa with low Range State reporting (<20% Range States) were excluded to avoid skewing the results, and additional metadata on the number of reporting Range States was also provided to help with interpretation.</i>

General considerations for data on domestic use and illegal harvest, capture and trade

Taxa in domestic use were identified using IUCN Red List data on end uses and supplemented in this report by additional literature on wild meat harvest (see Annex C Table 1). It is important to recognise that the absence of evidence for domestic use/consumption in some species may reflect the lack of available data, rather than necessarily indicating that these taxa are not in domestic use.

Datasets containing information on illegal harvest, capture and trade are also subject to a range of intrinsic biases. Available assessments of illegal taking are often limited to certain geographical regions where monitoring or expert opinion exists. Illegal trade records, which are typically based on market surveys or reports of seizures, are likely to be influenced by differences in enforcement effort between countries, or variation in the detectability of certain types of illicit trade, as well as biases in reporting. Although this assessment did not attempt to quantify levels of illegal trade, thus minimising the impact of these well-known biases, it is important to recognise the inherent limitations of these datasets.

⁷¹ Eskew *et al.* (2020). United States wildlife and wildlife product imports from 2000-2014. *Scientific Data*, 7, 22.

⁷² Brochet *et al.* (2016). Preliminary assessment of the scope and scale of illegal killing and taking of birds in the Mediterranean. *Bird Conservation International*. 26(1), 1-28.

⁷³ Available at www.cites.org.

⁷⁴ Available at <https://www.cms.int/en/documents/national-reports>.

Whilst the taxonomic coverage of different datasets also varied across different criteria, data for a high proportion of taxa (>62%) were available for most criteria (Table A4). Criterion 3.4 (illegal harvest) is an exception to this. Since there are known reporting challenges and biases in seizure/illegal trade data, taxa were not scored when there were no available data: the absence of data was not considered evidence of no illegal activity taking place.

Although coverage was generally high for mammals, birds and reptiles, data coverage was less complete for the fish. In particular, biological vulnerability data were missing for many of the sharks and rays listed in CMS Appendix I (Table A4).

To minimise the impact of any gaps in data coverage, individual taxa were assigned final scores based on the mean score across all criteria that could be assessed; for a given taxon, criteria with missing or incomplete data did not contribute to the final score.

Table A4. Levels of data coverage for the rapid assessment criteria used to identify taxa at greater potential risk from direct use and trade.

Criterion (coverage score)	Terrestrial mammals (n=26)	Aquatic mammals (n=22)	Birds (n=100)	Reptiles (n=8)	Fish (n=24)	Total % data coverage
Extinction risk						
1.1 Red List category	100%	100%	100%	100%	100%	100%
1.2 Population trend	96%	64%	97%	75%	100%	92%
Biological vulnerability						
2.1 Body size	96%	100%	89%	100%	21%	83%
2.2 Reproductive output	96%	95%	84%	100%	38%	82%
2.3 Habitat breadth	96%	91%	100%	88%	100%	98%
2.4 Range size	23%	9%	100%	25%	4%	62%
Threat to species						
3.1 Threat from use	81%	77%	93%	88%	100%	90%
3.2 In legal international trade	100%	100%	100%	100%	100%	100%
3.3 Domestic use/consumption	100%	100%	100%	100%	100%	100%
3.4 Illegal harvest, capture and trade	62%	18%	26%	100%	38%	34%
Management effort						
4.1 Existing measures under CITES	100%	100%	100%	100%	100%	100%
4.2 Conservation actions in place	96%	77%	100%	63%	92%	93%
4.3 Prohibition of take (Article III(5))	81%	86%	74%	100%	100%	81%

Results

Table A5. Number of taxa within each group of the risk matrix for direct use and trade, disaggregated by taxonomic group (see Table 1.1 for further details of how taxa were assigned to each group). Colours refer to higher (red), moderate (orange) or lower (grey) risk.

Matrix group	No. species				Totals
	Mammalia	Aves	Reptilia	Fish (Actinopterygii, Elasmobranchii)	
1	0	0	0	1	1
2	20	25	3	4	52
3	0	9	0	6	15
4	15	35	4	11	65
5	0	0	0	0	0
6	4	12	0	0	16
7	1	3	0	0	4
8	7	11	1	2	21
9	0	0	0	0	0
10	0	3	0	0	3
11	0	0	0	0	0
12	1	2	0	0	3

Annex B: Summary of international trade

Methods

CITES trade data were extracted from the CITES Trade Database at the shipment level on 16/11/2021 for all CMS Appendix I taxa reported in direct trade in the years 2015-2019⁷⁵, for sources 'R' (ranching)⁷⁶, 'W' (wild), 'U' (unknown) and unreported, and for all purposes other than 'B' (captive breeding), 'E' (education), 'N' ((re)introduction into the wild) and 'S' (scientific). There was no direct trade reported in specimens taken from the marine environment (source 'X') during this period for the purposes specified above. Exporter-reported data were used throughout the analysis, except where specified otherwise. CITES taxonomy is used throughout the trade analysis (Section 2 and Annex B) to reflect the data reported in the CITES Trade Database; where CMS taxonomy differs, the accepted name according to CMS is indicated.

Based on these parameters, the trade data were first analysed for all trading partners and all relevant years, irrespective of specific population-level listings or the year of listing in CMS Appendix I in order to understand overall harvest and demand pressures on the taxa. The CITES trade data were then subset to examine trade that may have been in potential contravention to Article III, Paragraph 5: exporter trade records from non-CMS Parties, trade reported prior and during the year of listing in CMS Appendix I, trade originating from populations not covered by the listings and trade from a CMS Party with a reservation in place for the listing of the species were excluded from this dataset. A full taxon-breakdown of trade levels is provided in Table B1, and a complete list of exporters by number of trade transactions for the trade data subset taking year of listing and population-level listings into consideration is provided in Table B2.

⁷⁵ 2019 was the most recent year with complete CITES trade data at the time of the analysis.

⁷⁶ Trade reported from 'ranching' sources was also included as this involves the taking of eggs or juveniles from the wild (see [CITES Notif.2023/039 Annex 1](#) for definition).

Table B1. Full breakdown of all CMS Appendix I taxa reported in direct trade by all CITES Parties 2015-2019 for the data parameters outlined; trade may not have been reported by CMS Parties. A subset of trade data that may have been in potential contravention of Article III, Paragraph 5, is also presented below; only trade reported after the year of listing was included in this subset. Source: CITES Trade Database, UNEP-WCMC, Cambridge. UK downloaded on 16/11/2021. Key to exporter ISO codes can be found in the [Guidelines for the preparation and submission of annual reports](#) (Annex 1 of CITES Notification to the Parties No. 2023/039).

CITES taxon (CMS name, where different)	Year listed on CMS App. I	CITES Appendix	Source	Reporter type	Summary of trade 2015-2019			Summary of trade 2015-2019 in potential contravention of Article III, Paragraph 5 ⁷⁷		
					Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)	Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)
Terrestrial mammals										
Artiodactyla										
<i>Addax nasomaculatus</i>	1979	I	R	Exporter	1	trophies (1)	US (1)	No reported trade in potential contravention		
				Importer	1	trophies (1)	US (1)	No reported trade in potential contravention		
<i>Gazella dorcas</i>	1979	III	W	Exporter	29	live (106)	NE (29)	No reported trade in potential contravention		
				Importer	2	live (14)	SD (2)	No reported trade in potential contravention		
<i>Oryx dammah</i>	1994	I	R	Exporter	1	trophies (1)	US (1)	No reported trade in potential contravention		
				Importer	3	trophies (2), skins (2)	ZA (3)	All reported trade may have been in potential contravention		
			W	Exporter	37	trophies (36), skins (1)	ZA (37)	All reported trade may have been in potential contravention		
				Importer	60	trophies (36), skins (7), horns (4), bodies (3), skulls (2), specimens (118)	ZA (50), TD (10)	All reported trade may have been in potential contravention		
			-	Importer	1	bodies (1)	ZA (1)	All reported trade may have been in potential contravention		
<i>Vicugna vicugna</i>	1979	II	W	Exporter	677	hair (134,912 kg), fibres (1,460 kg), garments (1,319 kg)	PE (600), AR (51), BO (22), EC (4)	4	live (5)	EC (4)
				Importer	416	fibres (38,769 kg), hair (1,872 kg), garments (1,122)	PE (344), AR (40), BO (30), CL (2)	2	fibres (89 kg)	CL (2)

⁷⁷ This includes both exporter and importer reported data and it should be noted that, in some instances, trade may have been reported by the importer only and not the exporting Party.

CITES taxon (CMS name, where different)	Year listed on CMS App. I	CITES Appendix	Source	Reporter type	Summary of trade 2015-2019			Summary of trade 2015-2019 in potential contravention of Article III, Paragraph 5 ⁷⁷		
					Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)	Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)
Carnivora										
<i>Acinonyx jubatus</i>	2009	I	W	Exporter	445	trophies (429)	NA (442), ZA (2), ZM (1)	2	trophies (2)	ZA (2)
				Importer	447	trophies (404), skulls (18), skins (17), bodies (5), rugs (2)	NA (437), ZA (6), ZW (3), XX (1)	6	bodies (4), trophies (3), skulls (1)	ZA (6)
<i>Panthera onca</i>	2020	I	W	Exporter	3	specimens (22), live (1)	BZ (2), PA (1)	No reported trade in potential contravention		
				Importer	1	live (1)	PA (1)	No reported trade in potential contravention		
<i>Ursus arctos isabellinus</i>	2018	I	W	Importer	1	trophies (1)	TJ (1)	No reported trade in potential contravention		
Primates										
<i>Gorilla beringei</i>	1979	I	W	Importer	1	specimens (0.03 l)	RW (1)	All reported trade may have been in potential contravention		
<i>Gorilla gorilla</i>	1979	I	W	Exporter	1	specimens (300)	NG (1)	All reported trade may have been in potential contravention		
<i>Pan troglodytes</i>	2018	I	U	Exporter	3	hair (1)	CH (3)	No reported trade in potential contravention		
				Importer	2	live (5)	CZ (1), NL (1)	No reported trade in potential contravention		
			W	Exporter	2	live (3), specimens (45)	CF (1), NG (1)	No reported trade in potential contravention		
				Importer	1	specimens (0.003 l)	RW (1)	No reported trade in potential contravention		
Proboscidea										
<i>Elephas maximus (Elephas maximus indicus)</i>	2020	I	U	Exporter	1	live (2)	UZ (1)	No reported trade in potential contravention		
				Importer	3	ivory carvings (5)	AT (1), IN (1), VN (1)	No reported trade in potential contravention		
			W	Exporter	2	derivatives (1 kg)	LK (2)	No reported trade in potential contravention		
				Importer	2	ivory carvings (2), live (1)	CN (1), IN (1)	No reported trade in potential contravention		
			-	Exporter	3	live (2), trophies (2)	BD (2), SC (1)	No reported trade in potential contravention		
Aquatic mammals										
Carnivora										
<i>Monachus monachus</i>	1979	I	W	Importer	10	tusks (10)	CA (10)	No reported trade in potential contravention		
Cetacea										
<i>Balaena mysticetus</i>	1979	I	W	Exporter	27	bone carvings (17), baleen (17 kg; 17)	GL (19), US (6), CA (2)	No reported trade in potential contravention		

CITES taxon (CMS name, where different)	Year listed on CMS App. I	CITES Appendix	Source	Reporter type	Summary of trade 2015-2019			Summary of trade 2015-2019 in potential contravention of Article III, Paragraph 5 ⁷⁷		
					Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)	Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)
<i>Balaena mysticetus</i> (cont.)				Importer	19	baleen (16; 1 kg), carvings (4), bone carvings (2)	GL (13), CA (4), RU (2)	No reported trade in potential contravention		
<i>Balaenoptera borealis</i>	2002	I	W	Exporter	1	bones (3 kg)	FK (1)	No reported trade in potential contravention		
<i>Balaenoptera musculus</i>	1979	I	U	Importer	1	bones (3)	AO (1)	All reported trade may have been in potential contravention		
			W	Importer	1	baleen (1)	FR (1)	All reported trade may have been in potential contravention		
<i>Balaenoptera physalus</i>	2002	I	W	Exporter	18	meat (5,258,000 kg)	IS (17), GL (1)	No reported trade in potential contravention		
				Importer	8	meat (1,961 kg), baleen (1)	IS (7), FR (1)	1	baleen (1)	FR (1)
<i>Delphinus delphis</i>	2006	II	W	Exporter	1	specimens (470)	AR (1)	No reported trade in potential contravention		
<i>Megaptera novaeangliae</i>	1979	I	W	Exporter	7	baleen (28)	GL (6), VC (1)	No reported trade in potential contravention		
				Importer	4	baleen (21)	GL (3), VC (1)	No reported trade in potential contravention		
<i>Physeter macrocephalus</i>	2002	I	W	Exporter	9	derivatives (2,948 kg), teeth (3), bone carvings (1)	LK (5), NZ (2), GL (1), TO (1)	7	derivatives (2,948 kg), teeth (1), bone carvings (1)	LK (5), NZ (2)
				Importer	8	carvings (31), teeth (8 and 1 kg), bone carvings (2)	GL (6), BE (1), NZ (1)	2	bone carvings (2 kg), teeth (1 kg)	BE (1), NZ (1)
				U	Importer	2	teeth (2)	GB (2)	All reported trade may have been in potential contravention	
<i>Tursiops truncatus</i> (<i>Tursiops truncatus ponticus</i>)	2009	II	W	Exporter	125	live (511)	JP (101), CU (6), JM (6), VG (3), BH (2), RU (2), KN (2), DO (1), EC (1), PK (1)	No reported trade in potential contravention		
				Importer	101	live (323)	JP (69), CU (19), RU (7), VG (4), LB (1), SA (1)	No reported trade in potential contravention		
				-	Importer	1	unspecified (2)	RU (1)	No reported trade in potential contravention	
Sirenia										
<i>Trichechus manatus</i>	2000	I	W	Importer	4	carvings (4)	GP (4)	No reported trade in potential contravention		

CITES taxon (CMS name, where different)	Year listed on CMS App. I	CITES Appendix	Source	Reporter type	Summary of trade 2015-2019			Summary of trade 2015-2019 in potential contravention of Article III, Paragraph 5 ⁷⁷		
					Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)	Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)
<i>Trichechus senegalensis</i>	2009	I	W	Importer	9	live (18)	CG (5), CD (2), CM (1), ML (1)	All reported trade may have been in potential contravention		
Birds										
Falconiformes										
<i>Aquila clanga</i> (<i>Clanga clanga</i>)	1997	II	W	Importer	2	feathers (3)	CA (2)	No reported trade in potential contravention		
<i>Aquila heliaca</i>	1997	I	W	Exporter	1	live (2)	IL (1)	All reported trade may have been in potential contravention		
				Importer	1	live (2)	IL (1)	All reported trade may have been in potential contravention		
<i>Falco cherrug</i>	2012	II	W	Exporter	31	live (31)	KW (31)	No reported trade in potential contravention		
				Importer	32	live (177)	MN (32)	No reported trade in potential contravention		
				-	2	live (20)	KZ (2)	All reported trade may have been in potential contravention		
				U	1	live (1)	DE (1)	All reported trade may have been in potential contravention		
<i>Gyps africanus</i>	2018	II	W	Exporter	1	eggshell (12)	ZA (1)	No reported trade in potential contravention		
				Importer	3	trophies (7), live (4)	TZ (2), MZ (1)	No reported trade in potential contravention		
<i>Gyps bengalensis</i>	2018	II	R	Importer	1	specimens (8)	NP (1)	No reported trade in potential contravention		
<i>Gyps coprotheres</i>	2018	II	W	Exporter	4	eggshell (12), trophies (2), live (1)	ZA (3), LS (1)	1	trophies (1)	ZA (1)
				Importer	3	bodies (2), trophies (1)	ZA (3)	2	bodies (2)	ZA (2)
<i>Gyps rueppellii</i> (<i>Gyps rueppelli</i>)	2018	II	W	Exporter	1	trophies (3)	TZ (1)	No reported trade in potential contravention		
				Importer	3	live (6), trophies (3)	TZ (3)	No reported trade in potential contravention		
<i>Haliaeetus albicilla</i>	1986	I	W	Exporter	1	bodies (1)	NO (1)	All reported trade may have been in potential contravention		
				Importer	1	bodies (1)	NO (1)	All reported trade may have been in potential contravention		
<i>Necrosyrtes monachus</i>	2018	II	W	Exporter	4	trophies (14), eggshell (12), live (5)	GH (3), ZA (1)	1	live (5)	GH (1)
				Importer	2	trophies (14)	GH (1), MZ (1)	No reported trade in potential contravention		
<i>Sarcogyps calvus</i>	2018	II	W	Importer	1	trophies (3)	CA (1)	No reported trade in potential contravention		
<i>Torgos tracheliotus</i> (<i>Torgos tracheliotos</i>)	2018	II	W	Exporter	2	eggshell (12), trophies (1)	ZA (1), TZ (1)	No reported trade in potential contravention		
				Importer	2	live (1), trophies (1)	TZ (2)	No reported trade in potential contravention		

CITES taxon (CMS name, where different)	Year listed on CMS App. I	CITES Appendix	Source	Reporter type	Summary of trade 2015-2019			Summary of trade 2015-2019 in potential contravention of Article III, Paragraph 5 ⁷⁷		
					Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)	Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)
<i>Trionocephs occipitalis</i>	2018	II	W	Importer	1	trophies (4)	MZ (1)	No reported trade in potential contravention		
Reptilia										
Testudines										
<i>Caretta caretta</i>	1986	I	U	Exporter	1	carapaces (1)	MC (1)	All reported trade may have been in potential contravention		
				Exporter	1	live (1)	TT (1)	All reported trade may have been in potential contravention		
				Importer	1	live (1)	LB (1)	All reported trade may have been in potential contravention		
<i>Chelonia mydas</i>	1986	I	W	Importer	2	bodies (2)	CN (2)	No reported trade in potential contravention		
<i>Dermochelys coriacea</i>	1983	I	W	Exporter	1	specimens (54)	KN (1)	No reported trade in potential contravention		
<i>Eretmochelys imbricata</i>	1986	I	W	Exporter	8	jewellery (96), carvings (3)	PA (7), JM (1)	7	jewellery (96)	PA (7)
				Importer	4	jewellery (91)	MX (1), QA (1), TO (1), XX (1)	No reported trade in potential contravention		
<i>Lepidochelys olivacea</i>	1986	I	W	Exporter	5	live (5)	MV (5)	All reported trade may have been in potential contravention		
				Importer	3	live (4)	MV (3)	All reported trade may have been in potential contravention		
Fish										
Carcharhiniformes										
<i>Carcharhinus longimanus</i>	2020	II	W	Exporter	18	fins (6,027 kg)	OM (7), IN (4), LK (2), YE (2), EC (1), FJ (1), SC (1)	No reported trade in potential contravention		
				Importer	12	fins (2,771 kg)	OM (5), LK (2), FJ (1), SN (1), SC (1), XX (1), US (1)	No reported trade in potential contravention		
Lamniformes										
<i>Carcharodon carcharias</i>	2002	II	W	Exporter	7	fins (3,595 kg)	OM (6), NI (1)	No reported trade in potential contravention		
				Importer	3	fins (236 kg), bones (2)	MG (1), NI (1), TW (1)	1	bones (2)	MG (1)
<i>Cetorhinus maximus</i>	2006	II	W	Exporter	1	skins (1)	IE (1)	All reported trade may have been in potential contravention		

CITES taxon (CMS name, where different)	Year listed on CMS App. I	CITES Appendix	Source	Reporter type	Summary of trade 2015-2019			Summary of trade 2015-2019 in potential contravention of Article III, Paragraph 5 ⁷⁷		
					Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)	Number of transactions	Main terms in trade (quantity)	Exporters (No. transactions)
Myliobatiformes										
<i>Manta birostris</i>	2012	II	W	Exporter	4	gill plates (750 kg), live (2)	LK (2), US (2)	2	gill plates (750 kg)	LK (2)
				Importer	3	gill plates (250 kg), live (2)	US (2), LK (1)	1	gill plates (250 kg)	LK (1)
<i>Mobula hypostoma</i>	2015	II	W	Exporter	3	live (16)	US (3)	No reported trade in potential contravention		
				Importer	9	live (22)	US (9)	No reported trade in potential contravention		
<i>Mobula japanica</i>	2015	II	W	Exporter	30	gill plates (6,270 kg and 550 plates), fins (630 kg), live (225 kg)	LK (29), IN (1)	All reported trade may have been in potential contravention		
				Importer	7	gill plates (2,123 kg)	LK (4), IN (3)	All reported trade may have been in potential contravention		
<i>Mobula tarapacana</i>	2015	II	W	Exporter	38	gill plates (8,854 kg and 300 plates), fins (250 kg), live (200 kg)	LK (34), IN (4)	All reported trade may have been in potential contravention		
				Importer	8	gill plates (1,769 kg)	LK (6), IN (2)	All reported trade may have been in potential contravention		
Orectolobiformes										
<i>Rhincodon typus</i>	2018	II	W	Exporter	1	specimens (1)	CN (1)	No reported trade in potential contravention		
Pristiformes										
<i>Pristis pristis</i>	2015	I	-	Importer	1	live (1)	AU (1)	All reported trade may have been in potential contravention		

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK downloaded on 16/11/2021.

Table B2. CMS Parties reporting direct exports of CMS Appendix I taxa in their annual reports to CITES (ranked by total number of transactions). Records reported prior to and during a taxon's year of listing in CMS Appendix I, or those originating from populations not covered by the listing, have been excluded to provide a subset of trade data that may have been in potential contravention of Article III, Paragraph 5. All trade was reported in CITES annual reports as source 'W' except where otherwise indicated.

Exporting CMS Party (ISO2)	Year of accession to CMS	2019 CMS National Report submitted (if so, prohibition of take indicated)	Total no. of transactions	Top species traded (no. of transactions)	Main terms in trade for top species (quantity)	Considerations
Sri Lanka (LK)	1990	✓ (for all Appendix I species)	70	<i>Mobula tarapacana</i> (34); <i>Mobula japanica</i> (29)	<i>Mobula tarapacana</i> : gill plates (8,235 kg and 300 plates), fins (250 kg), live (200 kg); <i>Mobula japanica</i> : gill plates (6,170 kg and 550 plates), fins (630 kg), live (225 kg)	
South Africa (ZA)	1991	✓ (take not prohibited by national legislation ⁷⁸)	40	<i>Oryx dammah</i> (37)	trophies (36), skin (1)	Not native; reported as hunting trophies and skins likely sourced from managed populations in fenced areas that are reported as source 'W'
Panama (PA)	1989	✓ (for all Appendix I species)	7	<i>Eretmochelys imbricata</i> (7)	jewellery (96)	
India (IN)	1983	✓ (for some species)	5	<i>Mobula tarapacana</i> (4)	gill plates (619 kg)	
Maldives (MV)	2019	× (new Party not expected to report)	5	<i>Lepidochelys olivacea</i> (5)	live (5)	All transactions reported prior to year of accession
Ecuador (EC)	2004	✓ (for all Appendix I species)	4	<i>Vicugna vicugna</i> (4)	live (5)	
Kazakhstan (KZ)	2006	✓ (for all Appendix I species)	2	<i>Falco cherrug</i> (2)	live (20)	Both transactions were reported without a source specified
New Zealand (NZ)	2000	✓ (for all Appendix I species)	2	<i>Physeter macrocephalus</i> (2)	bone carvings (1), teeth (1)	
Ghana (GH)	1988	×	1	<i>Necrosyrtes monachus</i> (1)	live (5)	
Nigeria (NG)	1987	✓ (for all Appendix I species)	1	<i>Gorilla gorilla</i> (1)	specimens (300)	

⁷⁸ However, South Africa indicated in the National Report that steps were being taken to develop new legislation to prohibit the taking of relevant species, with legislation drafted and being considered for adoption.

Exporting CMS Party (ISO2)	Year of accession to CMS	2019 CMS National Report submitted (if so, prohibition of take indicated)	Total no. of transactions	Top species traded (no. of transactions)	Main terms in trade for top species (quantity)	Considerations
Ireland (IE)	1983	x	1	<i>Cetorhinus maximus</i> (1)	skins (1)	
Israel (IL)	1983	x	1	<i>Aquila heliaca</i> (1)	live (2)	
Monaco (MC)	1993	✓ (not answered)	1	<i>Caretta caretta</i> (1)	carapaces (1)	Trade reported as source 'U'
Norway (NO)	1985	✓ (for all Appendix I species)	1	<i>Haliaeetus albicilla</i> (1)	bodies (1)	
Trinidad and Tobago (TT)	2018	✓ (for all Appendix I species)	1	<i>Caretta caretta</i> (1)	live (1)	All transactions reported prior to year of accession

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK downloaded on 16/11/2021.

Table B3. Evidence of international use/trade in 21 non-CITES-listed taxa that are listed in CMS Appendix I based on information on end uses in IUCN Red List assessments and/or wild-sourced/ ranched imports into the United States of America (USA) 2000-2014 as reported in LEMIS. The table also shows whether or not the taxon is threatened by intentional biological resource use, according to threats documented in species assessments for the IUCN Red List. International biological resource use refers to the deliberate targeting of species for harvest and corresponds to threat categories 5.1.1, 5.4.1 and 5.4.2 for animals, excluding threats considered 'past, unlikely to return'. It should be noted that threat from intentional biological resource use may not be being driven by international trade, and may be due to uses at other scales (e.g. at subsistence or national level).

Taxon	International end use (IUCN)	Imports into USA (reported in LEMIS)	Threatened by intentional biological resource use (IUCN)
Terrestrial mammals			
<i>Camelus bactrianus</i>		✓	✓
<i>Tadarida brasiliensis</i>		✓	
Birds			
<i>Acrocephalus paludicola</i>	✓		
<i>Anser cygnoid</i>	✓		✓
<i>Anser erythropus</i>		✓	✓
<i>Aythya baeri</i>	✓	✓	✓
<i>Aythya nyroca</i>		✓	✓
<i>Calidris pusilla</i>	✓		✓
<i>Chloephaga rubidiceps</i>	✓		
<i>Coracias garrulus</i>	✓	✓	✓
<i>Egretta eulophotes</i>	✓		✓
<i>Emberiza aureola</i>	✓	✓	✓
<i>Gorsachius goisagi</i>	✓		✓
<i>Larus audouinii</i>	✓		
<i>Larus leucophthalmus</i>	✓		✓
<i>Marmaronetta angustirostris</i>	✓		✓
<i>Pelecanus onocrotalus</i>	✓		✓
<i>Platalea minor</i>	✓		
<i>Polysticta stelleri</i>	✓	✓	✓
<i>Serinus syriacus</i>	✓		✓
Fish			
<i>Squatina squatina</i>		✓	✓

Annex C: Additional literature

Table C1. Additional literature used to supplement the results of the rapid assessment by providing further evidence for domestic use/consumption and the illegal harvest and capture of CMS Appendix I taxa.

Literature source	Relevant data
Brochet <i>et al.</i> (2019). Illegal killing and taking of birds in Europe outside the Mediterranean: assessing the scope and scale of a complex issue. <i>Bird Conservation International</i> , 29, 10-40.	Evidence for illegal killing and taking of birds in Northern and Central Europe and the Caucasus.
Brochet <i>et al.</i> (2019). A preliminary assessment of the scope and scale of illegal killing and taking of wild birds in the Arabian Peninsula, Iran and Iraq. <i>Sandgrouse</i> , 41, 154-175.	Evidence for illegal killing and taking of birds in the Arabian Peninsula, Iran and Iraq.
Buij <i>et al.</i> (2016). Trade of threatened vultures and other raptors for fetish and bushmeat in West and Central Africa. <i>Oryx</i> , 50(4), 606-616.	Estimated trade in vultures and other raptors in West and Central Africa 2008-2013, based on carcass counts during surveys of fetish and bushmeat markets.
Coad <i>et al.</i> (2021). Impacts of taking, trade and consumption of terrestrial migratory species for wild meat. Prepared for the Secretariat of the Convention on Migratory Species (CMS) by the Center for International Forestry Research (CIFOR).	Evidence for wild meat consumption, compiled from the WILDMEAT database and through a systematic online literature review.
Ingram <i>et al.</i> (2022). Widespread use of migratory megafauna for aquatic wild meat in the tropics and subtropics. <i>Frontiers in Marine Science</i> , 9, 837447.	Overview of contemporary use of aquatic megafauna in the global tropics and subtropics, focussing on 37 CMS-listed species identified as being used for aquatic wild meat.
UNEP/CMS/COP12/Doc.24.2.3/Rev.1 Aquatic Wild Meat	Summary of the available literature on the impacts of wild meat use on CMS-listed aquatic mammals and reptiles.
UNEP/CMS/COP13/Doc.26.2.4/Rev.1/ Annex 2 The Harvest of CMS Appendix I listed Sharks and Rays as Aquatic Wild Meat	Background information on the harvest of CMS Appendix I-listed sharks and rays as aquatic wildmeat, based on studies of artisanal fisheries.