

WILDLIFE TRADE IN THE AMAZON COUNTRIES

An analysis of trade in CITES listed species

WILDLIFE TRADE IN THE AMAZON COUNTRIES: AN ANALYSIS OF TRADE IN CITES LISTED SPECIES

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The analyses, results and recommendations expressed in this report reflect the views of the authors and those views are not necessarily shared by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

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EXECUTIVE SUMMARY

The eight South American countries subject of this analysis (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela) enjoy an extremely diverse range of wildlife, encompassing species native to the Amazon basin, but also native to other ecoregions within the countries, such as the Andes, Cerrado, Llanos or the Atlantic Forest, amongst others. This biodiversity includes over 12 000 species listed in the Appendices to the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), the majority in Appendix II.

This report presents the first comprehensive overview of international trade in CITES-listed wildlife in the eight countries above, which cooperate at the regional level as members of the Amazon Cooperation Treaty Organization (ACTO). The analysis provides a baseline of information on trade levels and trends in the eight countries, based on data from their CITES annual reports for the ten-year period 2005-2014, in order to inform trade management in the region.

An overview is presented in section 2 of the report, with more detailed country-level overviews provided in section 3.

Trade in CITES-listed species from the region during 2005-2014 involved primarily native species listed in CITES Appendix II. In particular: caiman and peccary skins and vicuña fibre for the fashion industry; live reptiles for the pet market; live orchids and live arapaima fish for ornamental purposes; caiman, arapaima and queen conch meat for the food industry; sea cucumbers for food and traditional medicine; and Spanish cedar and big-leaf mahogany products for the timber industry.

As part of this analysis, eight case studies are considered in more depth: mammals, parrots, caiman products, live reptiles, frogs, arapaima, orchids and timber. Key findings from these case studies include:

- On average, approximately 41 000 **peccary skins** exported for the fashion industry annually, predominantly collared peccary (*Pecari tajacu*) skins, as well as **vicuña** (*Vicugna vicugna*) fibre exported mainly from Peru to Italy.
- **Live parrot** exports from the Amazon region averaged 12 000 birds per year for the pet industry. Nearly all parrots were wild-sourced from Guyana, Peru and Suriname. Following a 2005 European Union ban on the import of wild birds for health reasons, most parrots were imported by countries in Asia, as well as Mexico and Russia. Over 50 parrot species were exported, with the orange-winged amazon (*Amazona amazonica*) the species most highly traded.
- **Spectacled caiman** (*Caiman crocodilus*) **skins** represented the largest volume of CITES-listed commodities exported from the region. On average, around 770 000 skins were exported per year over the ten-year period for the fashion industry, mainly as captive-bred from Colombia, but with smaller amounts of captive-bred exports also from Brazil and wild-sourced exports from Bolivia, Guyana and Venezuela. The main importers were Singapore, Mexico and Thailand. Caiman skin exports experienced a dip during 2008-2009, possibly as a result of the global financial crisis in those years. Caiman meat, often a by-product of the skin industry, was also exported from the region, albeit only during 2005-2007 from Bolivia and Colombia (mainly to Belgium, the United States and China), as the infrastructure and logistical requirements to meet international food safety standards presented challenges for the continuation of this enterprise.
- Exports of **live reptiles**, chiefly for the pet market, included turtles, lizards, snakes and caimans. The highest volumes related to the export of yellow-spotted Amazon river turtles (*Podocnemis unifilis*) from Peru to Hong Kong (SAR) and China, which experienced a 190-fold increase between 2005 and 2014, with nearly 300 000 live turtles exported in 2014 alone. This increase mirrors the success of local community-led conservation and ranching programmes for the species in the Peruvian Amazon. Exports of the red-footed tortoise (*Chelonoidis carbonarius*), mainly captive-bred in Brazil, Venezuela and Colombia, and exported also to Asia, as well as to the United States, showed a more stable trend averaging 16 000 live tortoise per year.

Green iguanas (*Iguana iguana*), primarily captive-bred in Colombia and to a smaller extent wild-sourced in Suriname, were the main live lizard export, although exports of captive-bred green iguanas from Colombia experienced a marked reduction (from 100 000 to zero) during the ten-year period. This is likely the result of reduced demand in the main importing market, the United States, due to a shift towards easier-to-keep reptile species, combined with breeding of the species within the country.

Snake exports were dominated by captive-bred *Boa constrictor* from Colombia, at an average of 10 500 individuals per year, but with an overall decline. A variety of other wild-sourced Boid species were also exported at lower volumes from Guyana and Suriname, presenting a similar declining trend. Declines in live snake exports from the region may be the result of reduced demand for imports in the United States, the main market, as a result of increased domestic breeding of reptile pet species, including sought-after morphs.

- Exports of CITES-listed **amphibians** comprised almost exclusively live poison dart frogs (family Dendrobatidae), averaging 2500 frogs per year during 2005-2014. Exports were dominated by four species: dyeing dart frog (*Dendrobates tinctorius*), three-striped poison frog (*Ameerega trivittata*), reticulated poison frog (*Ranitomeya ventrimaculata*) and yellow-banded poison dart frog (*Dendrobates leucomelas*). Most frogs exported from the region were sourced from the wild in Suriname and Guyana; the remainder of the trade, which has increased in importance since 2011, comprised primarily captive-produced frogs from Colombia and Peru and ranched frogs from Ecuador, reflecting the establishment of new amphibian management and trade programmes. Countries in Europe and North America imported nearly all the frogs from the region.
- **Arapaima** (*Arapaima gigas*) is a large fish from the Amazon basin that is increasingly valued in international markets for its meat and as an ornamental species. There has been a notable increase in the export from the region of both arapaima meat (mainly from Peru and Brazil to the United States) and live arapaima (mainly from Peru to Hong Kong, SAR), particularly after 2010, with over 100 000 kg of meat and over 30 000 live fish per year exported in recent years. The increase in exports appears to be related to the recent development of arapaima aquaculture that can feed international demand.

- **Orchids** were one of the groups exported in highest quantities from the region, with an average of over 150 000 plants exported per year. The vast majority (over 99%) were reported as artificially-propagated and exported from Brazil and Ecuador to Germany, Netherlands, United States and Japan. *Cattleya*, *Laelia*, *Masdevallia*, *Oncidium* and *Pleurothallis* were the most exported genera.
- Exports of CITES-listed **timber** comprised of predominantly two species: Spanish cedar (*Cedrela odorata*) and big-leaf mahogany (*Swietenia macrophylla*), exported mainly from Bolivia, Brazil and Peru to the United States and Mexico. Export volumes declined over the ten-year period as a result of the introduction of national level stricter controls and trade restrictions, including a zero export quota for mahogany set by Bolivia since 2011, following concerns over sustainability.

The total **financial value** of CITES-listed exports from the region (based on declared import prices and global retail websites, for plants) is estimated to be USD128 million per year on average (USD1.3 billion over the ten-year period). The trade in individual taxa with the highest estimated value related to caiman skins (USD50 million per year) and timber (USD35 million per year), followed by peccary skins (USD7 million per year), live reptiles (USD6 million per year), live parrots (USD5 million per year) and orchids (USD3 million per year). It is important to note that the socio-economic importance of the trade may be amplified at local scales and go beyond its international financial value.

The analysis also highlights species showing **noteworthy trade trends** (high volume and/or sharp increase in trade) based on criteria equivalent to those used to inform the CITES Review of Significant Trade process. Cases that may need further consideration are noted in section 5, including parrots and reptiles from Guyana and Suriname, amongst other.

In addition, the report identifies **species native to Amazonian countries** that were exported from other countries, both as wild-sourced and captive-bred or artificially-propagated, highlighting those that are endemic to a single Amazonian country. Implications for conservation, benefit sharing, knowledge transfer and understanding of sustainable use potential are discussed.

Recommendation arising from the report, including on reporting of trade data, management and conservation considerations, and topics for future work are outlined in section 7 of the report.

PREAMBLE

The enormous diversity of flora and fauna in the Amazon region is traded in large quantities towards the United States, as well as to countries in Europe and Asia. This movement, increasingly involving Amazon countries, is documented for the first time in the present report, which provides a regional perspective of international trade figures and trends. Meeting the global demand for flora and fauna requires effective monitoring and control, particularly for species that may be threatened by trade.

“Strengthening, from a regional perspective, the institutional and technical capacity of countries in the Amazon region regarding the management, monitoring and control of wildlife threatened by trade” is the goal that the Amazon Cooperation Treaty Organization (ACTO) has set within the Amazon Cooperation Strategic Agenda in order to undertake activities to improve the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). To this end, ACTO has over the last eight years received technical and financial support from the Amazon Regional Program (BMZ/DGIS/GIZ).

A robust base for regional dialogue has been established through active participation by Amazon countries, facilitating the identification of a wide range of measures to develop capacities in the region in relation to CITES. Within this context, the management of information related to trade in species listed in the Convention is one of the relevant topics that has been addressed regionally.

In 2015, the *Workshop on management and analysis of wildlife information for CITES Authorities* was undertaken in Brazil and organised jointly by Brazil’s Ministry of Environment (MMA), Chico Mendes Biodiversity Conservation Institute (ICMBio) and Brazilian Environment Institute (IBAMA). The present analysis of wildlife trade in Amazon countries was undertaken as a result of the workshop, with technical support from UN Environment – WCMC. The results of the study were analysed and validated in 2017 during the *Regional workshop on the analysis of CITES trade from ACTO countries*, organised jointly by Colombia’s Ministry of Environment and Sustainable Development and the Humboldt Institute in Colombia.

The present study aims to provide a baseline of information to assist CITES Authorities in Amazon countries and other relevant stakeholders to strengthen activities on management, monitoring and control of wildlife in international trade.

Amazon Regional Program

1. INTRODUCTION

This report provides a comprehensive overview of international trade in CITES-listed wildlife from the eight ACTO Member Countries during the period 2005-2014. The ACTO countries considered in this analysis are: the Plurinational State of Bolivia (hereafter Bolivia), Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and the Bolivarian Republic of Venezuela (hereafter Venezuela; see Figure 1.1).

The Amazon region covers an area of 7.7 million km², accounting for approximately 40% of South America and over half of the area of the eight ACTO countries. A total of over 12 000 species native to the Amazonian countries are listed in the Appendices to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The aim of this analysis is to provide CITES Authorities from countries in the region, as well as other interested

stakeholders, with a baseline of international trade levels and trends in Amazonian countries, and to inform trade management in the region, in order to ensure that such wildlife trade is legal, sustainable and traceable. A thorough exploration of legal trade patterns can also contribute to our understanding of the illegal trade.

The analysis summarises both exports from and imports into the ACTO countries, as well as trade among countries in the region, providing regional as well as country-by-country insights and focusing on the case studies of greatest relevance to the region, i.e. mammal skins, parrots, caiman skins, live reptiles, live frogs, arapaima, timber and orchids. The analysis also includes an estimation of the financial valuation of the trade, an assessment of noteworthy trade trends, and information on species native to the region that are traded by other countries.



Figure 1.1: Map of the Amazon Cooperation Treaty Organisation (ACTO) Member States

The analysis is based on CITES trade data reported by ACTO countries, as well as by their trading partners, in their annual reports to CITES and available in the CITES Trade Database (trade.cites.org).

Further details on the data included and methods applied throughout the analysis are available in Annexes A and B.



Ara chloropterus

Box 1. Sources of trade

Trade of specimens harvested from the wild is subject to different provisions than trade in specimens from a breeding facility, for example. Consequently, CITES Parties are required to report on the source of trade, based on a particular terminology which is also used throughout this analysis. An animal is '*captive-bred*' (source code 'C') when it is produced in a controlled environment under certain conditions, including that reproduction took place in that environment and that the breeding stock is maintained without the introduction of specimens from the wild. Those specimens which are born in captivity (F1 or subsequent generations) but do not meet these criteria are considered '*captive-born*' (source code 'F'). Plants are considered to be '*artificially-propagated*' (source code 'A') when they are grown under controlled conditions and have been derived from cultivated parental stock.

'*Ranched*' (source code 'R') specimens are those taken as eggs or juveniles from the wild, where they would otherwise have had a very low survival probability, and reared in a controlled environment, often with the release of some of the offspring back into the wild. Finally, specimens not fitting under the above categories are considered to be '*wild-sourced*' (source code 'W').

Additional details can be found in Annex C and in CITES Resolutions Conf. 12.3 (Rev. CoP17), Conf. 10.16 (Rev.), Conf. 11.11 (Rev. CoP17) and Conf. 11.16 (Rev. CoP15).

2. OVERVIEW

This chapter provides a general overview of international wildlife trade in the Amazonian countries, focusing first in exports and then imports. More detailed insights into the trade by country and in groups of particular interest to the region are presented in the chapters that follow.

Over 12 000 species native to the Amazonian countries are listed in CITES¹, which include recently listed species of sharks, rays and timber trees. Of these native CITES-listed species, 99% are included in Appendix II (Figure 2.1). Eighty-nine per cent of direct trade transactions involved Appendix II listed taxa.

Note that entry into effect of shark and ray listings adopted at the 16th Conference of the Parties to CITES in 2013 did not enter into force until September 2014; additional listings adopted at the 17th Conference of the Parties to CITES in 2016, such as additional shark and ray species, all rosewoods (*Dalbergia* spp.) or the Appendix II Cispata Bay (Colombia) populations of the American crocodile (*Crocodylus acutus*) did not enter into force until January 2017. As such, trade data for these taxa is not yet available from the CITES Trade Database.

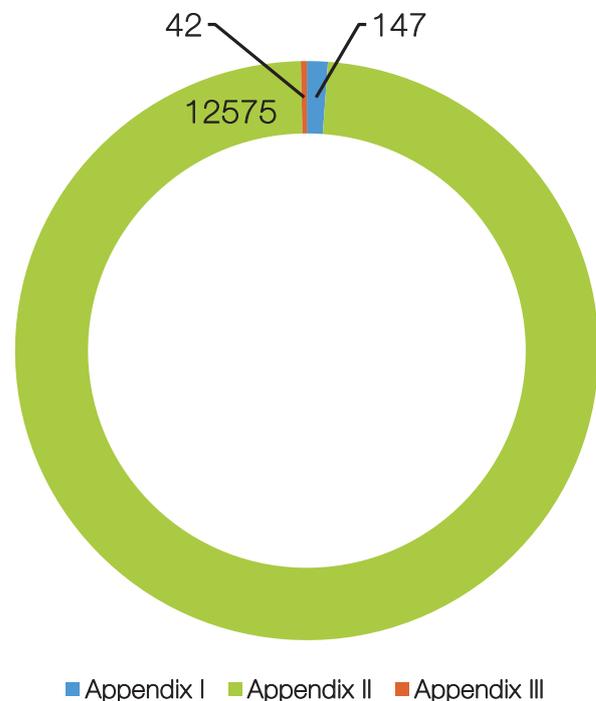


Figure 2.1: Number of CITES-listed species native to the Amazonian countries, by CITES Appendix. Source: CITES Checklist (checklist.cites.org).

2.1 EXPORTS

Direct exports

Direct exports from the countries of the region included 14 million items that can be equated to individuals (Figure 2.2), one million kg of commodities reported by weight (i.e. in kilograms or equivalent units, Figure 2.3) and 0.27 million m³ of commodities reported by volume (i.e. in cubic meters or equivalent units, Figure 2.4). Key commodities exported by the region included the following:

- Materials for the **fashion industry**: spectacled caiman (*Caiman crocodilus*) and collared peccary (*Pecari tajacu*) skins and vicuña (*Vicugna vicugna*) fibre;
- Live reptiles for the **pet market**: side-necked turtles (*Podocnemis* spp.), green iguanas (*Iguana iguana*) and boas (*Boidae*);

¹ For more details on the CITES Appendices, see: <https://cites.org/eng/app/index.php>

- Live orchids (*Orchidaceae*) and live arapaima (*Arapaima gigas*) for **ornamental purposes**;
- Meat for the **food industry** (arapaima, spectacled caiman and queen conch *Strombus gigas* meat;
- Brown sea cucumber (*Isostichopus fuscus*) bodies, which are used also in **traditional medicine**; and
- Forestry products for the **timber industry**: Spanish cedar (*Cedrela odorata*) and big-leaf mahogany (*Swietenia macrophylla*).

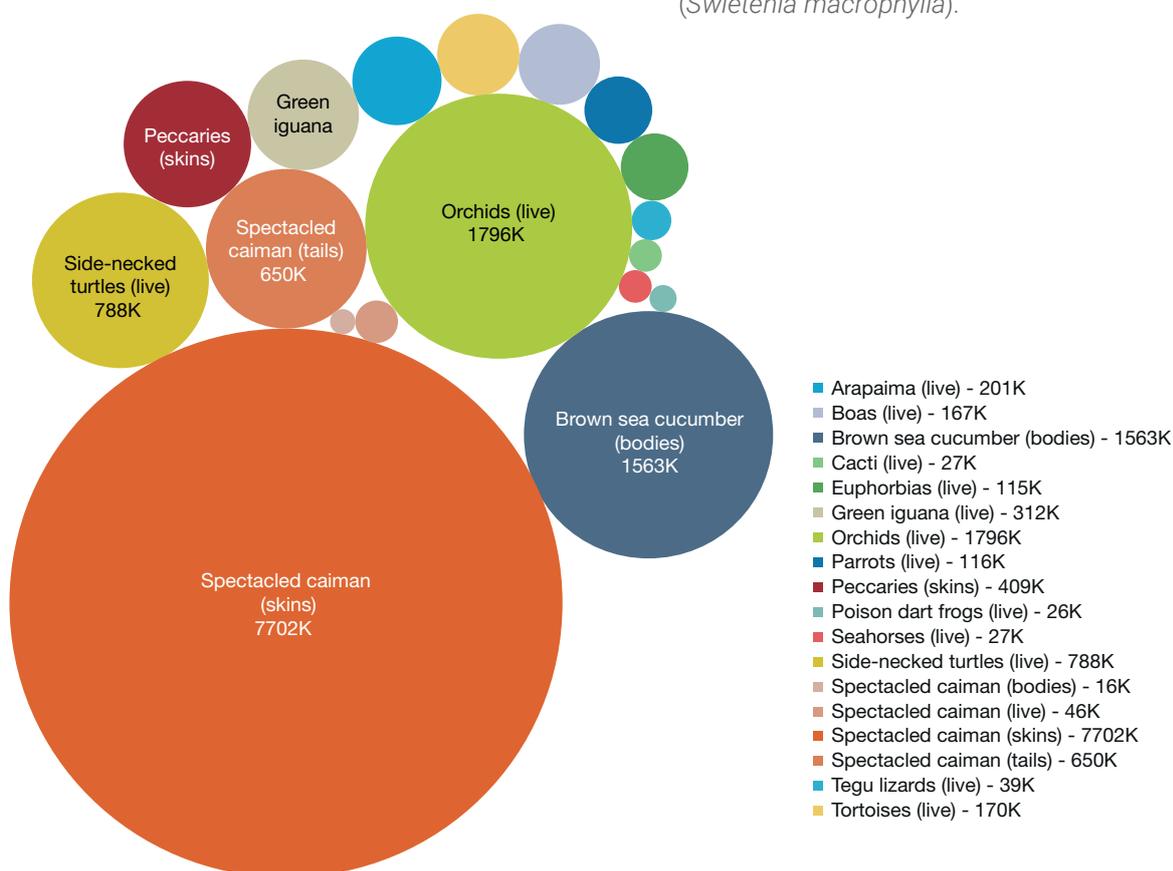


Figure 2.2: Main groups exported as number of individuals (live, skins, bodies or tails) 2005-2014. Total = 14 million individuals. Species traded at levels over 15K individuals is included (plotted data represents 93.5% of trade as individuals).

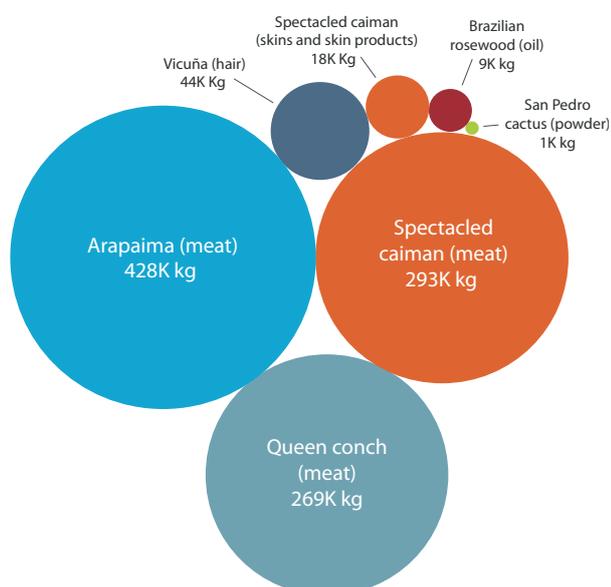


Figure 2.3: Main groups exported by weight (in kilograms) 2005-2014. Total = approximately 1 million kg. Trade over 500 kg is included (plotted data represents 99.5% of trade in kg).

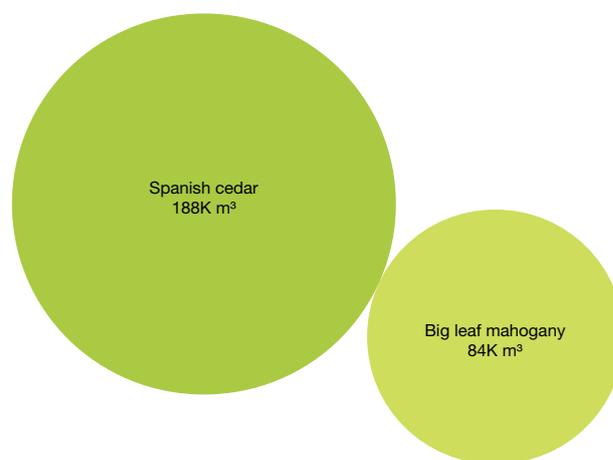


Figure 2.4: CITES timber species exported by volume (in cubic meters) 2005-2014. Total = 270K m³.

Colombia was the main country of export within the region (Figure 2.5) both by number of individuals (mainly spectacled caiman skins) and for trade reported by weight (predominantly queen conch and

spectacled caiman meat). Peru was the main country of export of timber by volume, followed by Bolivia (mainly Spanish cedar).

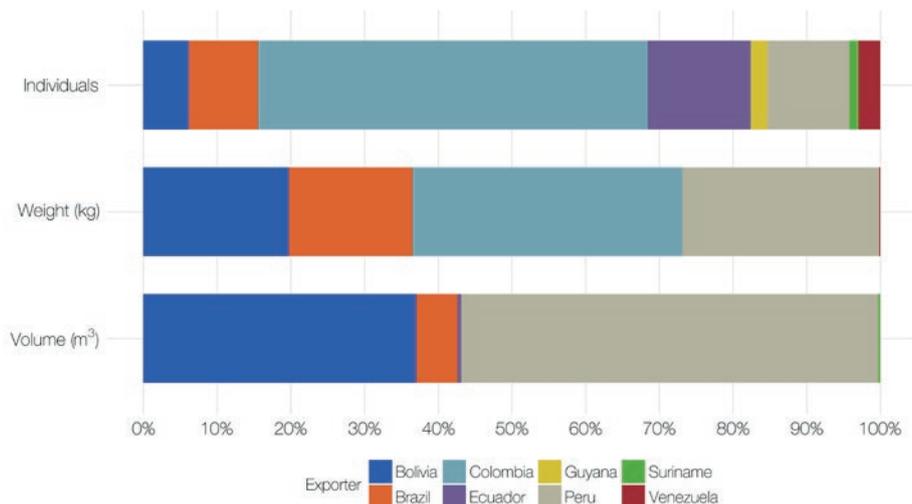


Figure 2.5: Proportion of export volume by country of export by category (individuals, weight and volume) 2005-2014.

The main commodities exported from each country and their chief import markets are summarised in Table 2.1. Wild-sourced caimans were the top commodity exported by Bolivia, Guyana and Venezuela, while captive-bred caimans were the top commodity from Colombia. Peru’s top exports were wild-sourced yellow-spotted river turtle from community-led management plans and peccaries from subsistence hunting by native communities, while artificially propagated orchids were notable exports from Brazil, Ecuador and Venezuela. Wild-sourced parrots from Guyana and Suriname, and wild-sourced green iguanas from Suriname were also noteworthy exports from the region. The United States, Germany, Netherlands, Italy, Singapore and Hong Kong (SAR) were some of the main importers of key commodities from the region.

Figure 2.6 highlights the main trade routes for key commodities from Amazonian countries using a regional approach globally.

- Peccary skins are destined primarily to Europe.
- North America is the main importing region of arapaima meat, timber and green iguanas.
- Most sea cucumbers, live arapaima and freshwater turtles go to Asia.
- Timber and queen conch are significant imports within the Central and South America and the Caribbean region.

Exporter	Taxon	Top Importer(s)
Bolivia		Italy
		USA
Brazil		Netherlands
		Mexico & USA
Colombia		Singapore
		USA
Ecuador		China
		Germany & USA
Guyana		Mexico
		Singapore & Thailand
Peru		Hong Kong, SAR
		Italy
Suriname		USA
		Russia
Venezuela		Germany
		USA

	Spectacled caiman		Queen conch		Peccaries
	Mahogany and cedar		Brown sea cucumber		Green iguana
	Orchids		Parrots		Yellow-spotted river turtle

Table 2.1: The two main groups exported and major importers, by country of export, 2005-2014. The colour of the icons indicate the predominant source (black: >95% wild; dark grey: between 5% and 95% wild; light grey: <5% wild).

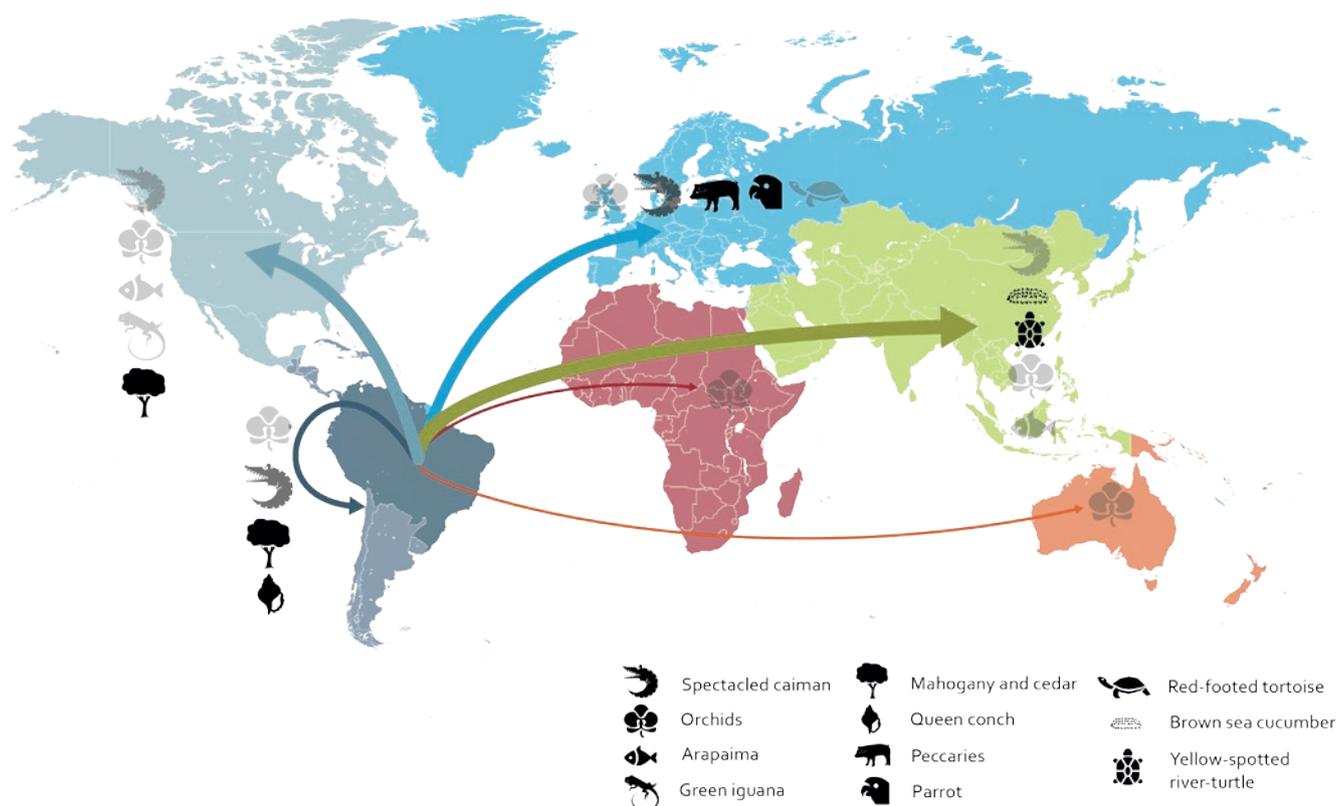


Figure 2.6: Main groups exported from Amazonian countries to each of the six CITES regions². Groups are ordered by trade volume and shaded by source (black: >75% wild; dark grey: 25-75% wild; light grey: <25% wild). Arrow width denoted relative volumes.

Estimated financial value of trade

An overview of the estimated financial value of exports from the region is provided here, with additional details included in each of the case studies. Estimates of the financial value of the trade were calculated by multiplying reported trade volumes by median prices gathered from global retail websites (for plants), and prices reported to customs at the point of import into the United States between 2006 and 2014 (for animals). The resulting value figures are estimates and should be treated with caution as the accuracy of all prices cannot be confirmed, and some combinations of traded taxa, terms or units could not be valued at the species level (see methodology in Annex B for more details).

While not all taxa and products in trade could be assigned a financial value, using only those that could

be, the total financial value of exports from the region is estimated to be, on average, USD128 million per year during the 2005-2014 period. The value of those groups explored in more detail as case studies is estimated at USD113.6 million per year over the ten-year period. Amongst the case study group, caiman skin and timber exports had the highest estimated value of all of the case studies, followed by mammal skins and live reptiles (Figure 2.7).

It is important to note that the socio-economic relevance of the trade will be determined not only by its monetary value in international markets, but also by the distribution of income, its relative importance to local livelihoods, and the generation of additional related benefits, amongst other.

¹ The CITES regions are: Africa, Asia, Europe, Central and South America and the Caribbean, North America and Oceania. The countries of the Amazonian region are highlighted in a darker shade within the Central and South America and the Caribbean region.

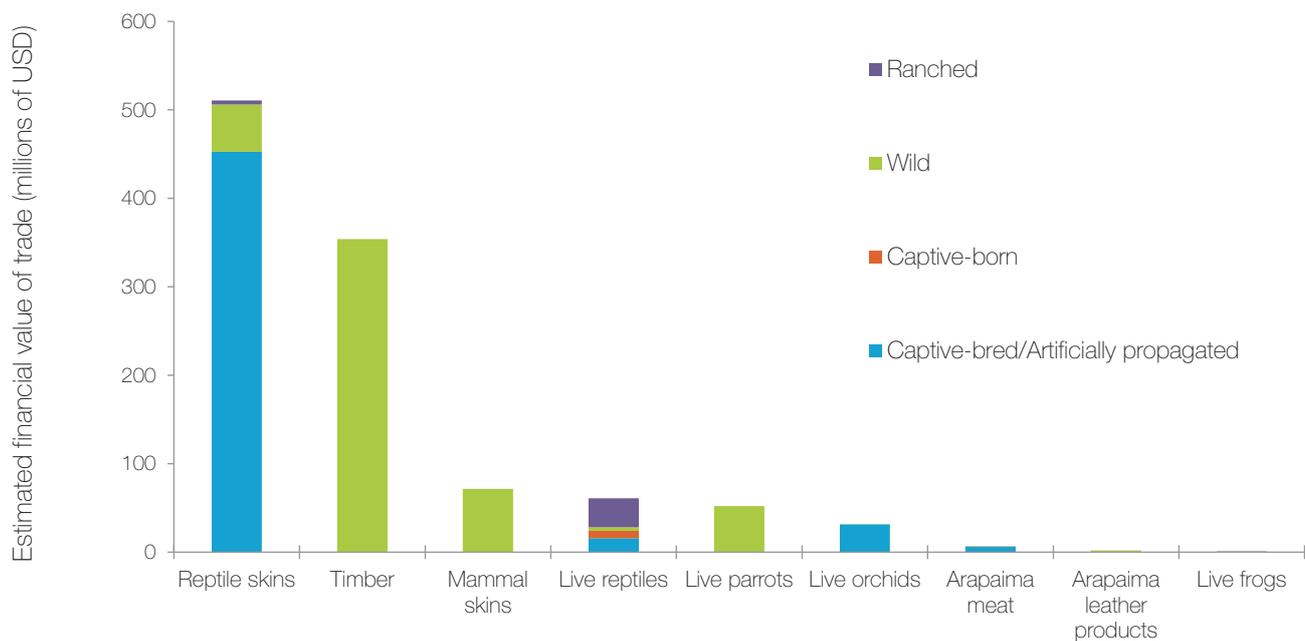


Figure 2.7: Estimated financial value of trade 2005-2014.

Re-exports

Compared to direct exports, very low volumes of trade were reported as re-exports by Amazonian countries. The most highly traded commodity re-exported by countries in the Amazonian region was reptile small leather products, with on average approximately 32 500 products re-exported per year 2005-2014, mainly from captive-bred caiman

(*Caiman crocodilus*) originating in Panama and Colombia and wild-sourced reticulated python (*Python reticulatus*) originating in Indonesia and Malaysia. The United States was the main import market of these items, the majority of which were re-exported via Brazil.

2.2. IMPORTS

Compared with exports from the region, imports³ were less diverse and lower volume. Artificially propagated live orchids represent the commodity imported in the highest volumes by the countries in the region during 2005-2014, with an average of over 960 000 live orchids imported per year in this period,

mostly by Brazil from Thailand⁴ (Table 2.2). Nearly 80% of live orchids comprised hybrids of the following four genera: *Dendrobium*, *Phalaenopsis*, *Vanda* and *Oncidium*.

³ Data on imports into the region as reported by Amazonian countries appears to be incomplete. As such, data reported by countries reporting exports to the region has been used in this chapter to provide a more complete overview of imports.

⁴ It should be noted that Thailand, a key exporter of orchids to the region, does not appear to have submitted data on flora exports for a number of years in the 2005-2014 period.

Table 2.2: Direct and indirect imports of commodities by Amazonian countries in quantities greater than 100 000 units 2005-2014, by group (all sources excluding I), as reported by countries of export. Source code A = artificially propagated; C = captive-bred; W = wild-sourced.

Group	Commodity (unit)	Quantity	Main source (%)	Top (re-) exporter (%)	Top importer (%)	Main taxa (%)
Plants	live	9 727 771	A (>99%)	Thailand (93%)	Brazil (84%)	<i>Dendrobium hybrid</i> (37%)
Reptiles	skins	613 613	W (48%); C (47%)	Singapore (36%)	Colombia (48%); Brazil (47%)	<i>Caiman crocodilus</i> (51%)
Reptiles	skin pieces	270 505	C (58%)	Panama (94%)	Brazil (93%)	<i>Caiman crocodilus</i> (67%)
Plants	wax (kg)	203 953	W (99%)	Mexico (37%)	Brazil (57%)	<i>Euphorbia antisyphilitica</i> (100%)
Reptiles	leather products (small)	142 276	W (69%)	Switzerland (49%)	Brazil (61%)	<i>Alligator mississippiensis</i> (56%)
Corals	live	122 697	W (64%)	Indonesia (71%)	Brazil (92%)	<i>Acropora spp.</i> (14%)

Brazil was the principal importer in the region in terms of items equating to individuals (predominantly live orchids) and by imports reported by weight (mainly *Euphorbia antisyphilitica* wax). Colombia and Venezuela were the main importers of timber, primarily ramin (*Gonystylus bancanus*) in the case of Colombia and *Cedrela odorata* and *Swietenia* spp. in the case of Venezuela (Figure 2.8).

Artificially propagated live orchids were the main commodity imported by Brazil, Ecuador, Guyana, Suriname and Venezuela, with the vast majority imported from Thailand. Captive-bred and ranched *Caiman crocodilus* skins and skin pieces were

imported by Bolivia (mainly from Brazil), Brazil (mainly from Panama and Bolivia) and Colombia (mainly re-exports of skins originating in Colombia from Singapore and the United States). It is possible that Colombia imports skins that have been sent abroad for tanning, that some of Bolivia's imports may be return of seizures and that Brazil imports skins for their domestic leather industry (J. Caldwell, IUCN CSG, *pers. comm.* 2017). Artificially propagated live moon cacti (*Gymnocalycium mihanovichii*) from the Republic of Korea (in 2009 only) and wild-sourced *Isostichopus fuscus* bodies from Ecuador (in 2007 only) were also notable imports for Peru.

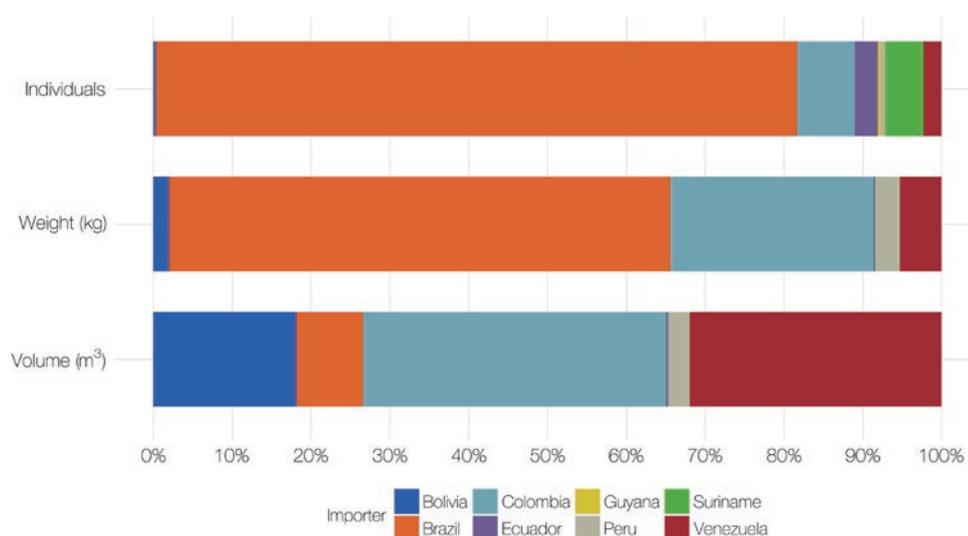


Figure 2.8: Proportion of import volume by country of import by category (individuals, weight and volume) 2005-2014. Data reported by countries of export.

Artificially propagated live orchids were the main commodity imported by Brazil, Ecuador, Guyana, Suriname and Venezuela, with the vast majority imported from Thailand. Captive-bred and ranched *Caiman crocodilus* skins and skin pieces were imported by Bolivia (mainly from Brazil), Brazil (mainly from Panama and Bolivia) and Colombia (mainly re-exports of skins originating in Colombia from Singapore and the United States). It is possible that Colombia imports skins that have been sent abroad for tanning, that some of Bolivia's imports may be return of seizures and that Brazil imports skins for their domestic leather industry (J. Caldwell, IUCN CSG, *pers. comm.* 2017). Artificially propagated live moon cacti (*Gymnocalycium mihanovichii*) from the Republic of Korea (in 2009 only) and wild-sourced

Isoetichopus fuscus bodies from Ecuador (in 2007 only) were also notable imports for Peru.

Although the majority of the trade in CITES species is for commercial purposes, there is also trade reported for other reasons, for instance for scientific purposes. Trade for scientific purposes may be final or part of loans or exchanges. The exported samples may include blood, serum, feathers, dry plant samples and leave or flower fragments, amongst other. See box 2, related to trade for scientific purposes from Colombia, as illustration. It is important to note that the export of CITES wildlife for scientific purposes does not imply access to genetic resources for applied uses, such as bioprospecting or commercial use, as in these cases the relevant national legislation on access to genetic resources needs to be complied with as well.

Box 2. Trade for scientific purposes: example from Colombia

Antonio José Gómez Hoyos, CITES Management Authority of Colombia (Ministry of Environment and Sustainable Development – Forests, Biodiversity and Ecosystem Services Directorate) and Maria Piedad Baptiste Espinosa, CITES Scientific Authority of Colombia (Coordination) (Alexander von Humboldt Biological Resources Research Institute)

According to the most up-to-date figures in the Biodiversity Information System (SiB 2017), Colombia holds the first position globally in number of species of birds (1921 species) and orchids (4270 species), second in amphibians (803 species), plants (approximately 25 000 species) and freshwater fish (1435 species), and third in palms (289 species) and reptiles (537 species). Out of these, 6358 species are listed in CITES⁵, with reptiles (*Caiman crocodilus*, *Crocodylus acutus*, *Iguana iguana*, *Boa constrictor*, *Tupinambis nigropunctatus* and *Chelonoidis carbonarius*), amphibians (Dendrobatidae), *Strombus gigas* and orchids being subject to use and international trade.

According to the information in the CITES Trade Database, during 2004-2005 Colombia exported over 4000 scientific specimens, nearly all of species in CITES Appendix II. Most were exported as derivatives or as scientific specimens (e.g. blood, tissue samples, etc.), mainly from mammals and corals (see figure).

Colombia possesses a regulatory framework for the use of renewable natural resources, biodiversity research, import and export of biodiversity samples, access to genetic resources, commercial property rights, and protection of threatened species or species in trade, amongst other.

Exports for scientific purposes aim to inform research in a variety of fields including systematics, ecology, evolution and biogeography. They are therefore an essential tool, for the advancement of scientific research and ecological modelling and for decision making with regard to land management and conservation strategies⁶. Such research is also useful to inform international cases such as the CITES proposal to transfer certain populations of *Crocodylus acutus* (American crocodile) from Appendix I to Appendix II. This species was categorised as Critically Endangered (CR), but thanks to conservation measures, population research and the discovery of new populations, it was



recategorised as Endangered (EN). Following adoption of the CITES proposal in 2016, it will be subject to trade in the Integrated Management District region of Cispatá bay, Tinajones, La Balsa and surrounding areas. This strategy considers information on the populations of species, but also prioritises the sustainable livelihoods of rural communities

Colombia aims to develop more integrated initiatives that connect scientific knowledge with decision makers.

Figure. CITES exports by Colombia for scientific purposes during 2005-2014, according to data reported by Colombia.

⁵ See Species+: www.speciesplus.net

⁶ Decree 1375 of 2013, compiled in decree 1076 of 2015.

3. COUNTRY PROFILES

This chapter provides an overview of exports from each Amazonian country, including estimated financial valuations⁷. Each country profile contains a map showing the main commodities exported in 2005-2014 and the top importing countries for each (with arrows of three sizes representing the first, second and third biggest importers of each commodity). Charts are also included for each

country, presenting an overview of direct exports, 2005-2014. These charts represent trade that could be equated to one individual, trade reported by weight or trade reported by volume, grouped by source, commodity and taxa, for those combinations that made up at least 1% of the total trade (see Figure 3.1 for an example).

Key to Country Profile Summary Figures

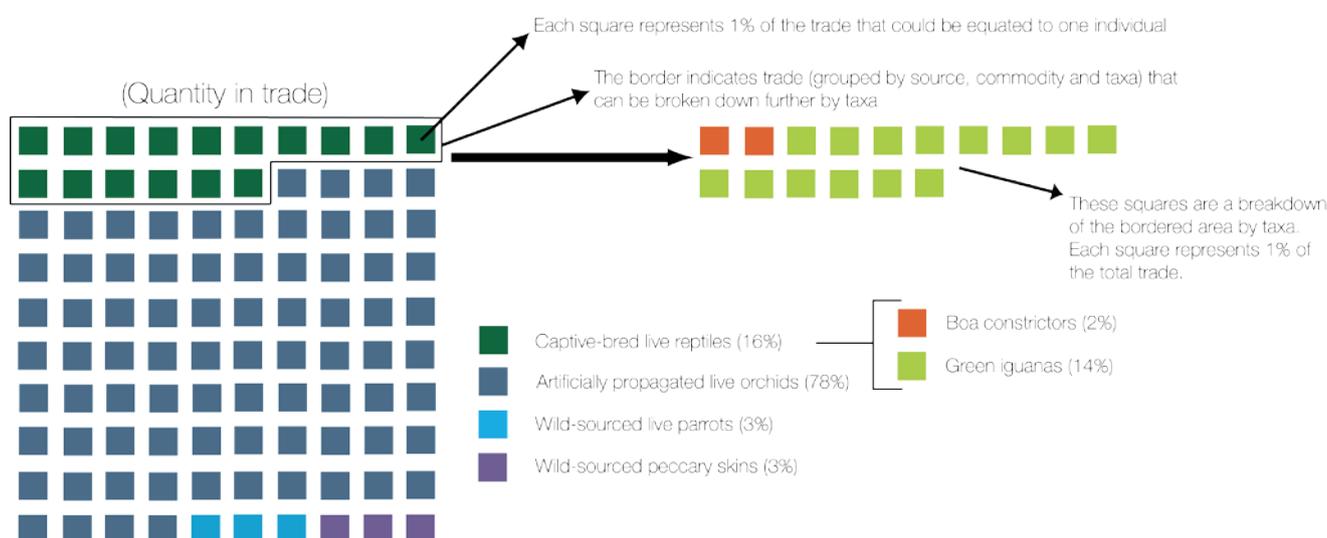


Figure 3.1: Example of direct exports by an Amazonian country 2005-2014, of commodities that could be equated to one individual. Note that the colours used in charts do not follow a specific pattern.

⁷ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.

PLURINATIONAL STATE OF BOLIVIA

The most highly traded commodity from Bolivia was *Caiman crocodilus yacare* skins, of which the majority were wild-sourced. Italy was the main import market, followed by Spain and Mexico (Figure 3.2). Other key commodities derived from *Caiman crocodilus yacare*, including tails, meat (reported by weight) and skin pieces were exported at notable volumes (Figure 3.3). Wild-sourced timber, comprising *Cedrela odorata* (Spanish cedar) and *Swietenia macrophylla* (big-leaf mahogany) was also a key export of the country (Figure 3.3); the United States accounted for over half of all imports of this

commodity. *Vicugna vicugna* (vicuña) fiber was also an important export from Bolivia. It is important to highlight that there have been no reported exports of caiman or arapaima meat since 2007, of peccaries since 2008 and of mahogany since 2012.

The estimated average annual value of Bolivia's CITES exports between 2005 and 2014 was USD20.5 million⁸. The products with the highest total estimated value were timber of *Swietenia macrophylla* (USD7.9 million per year) and *Cedrela odorata* (USD6 million per year).

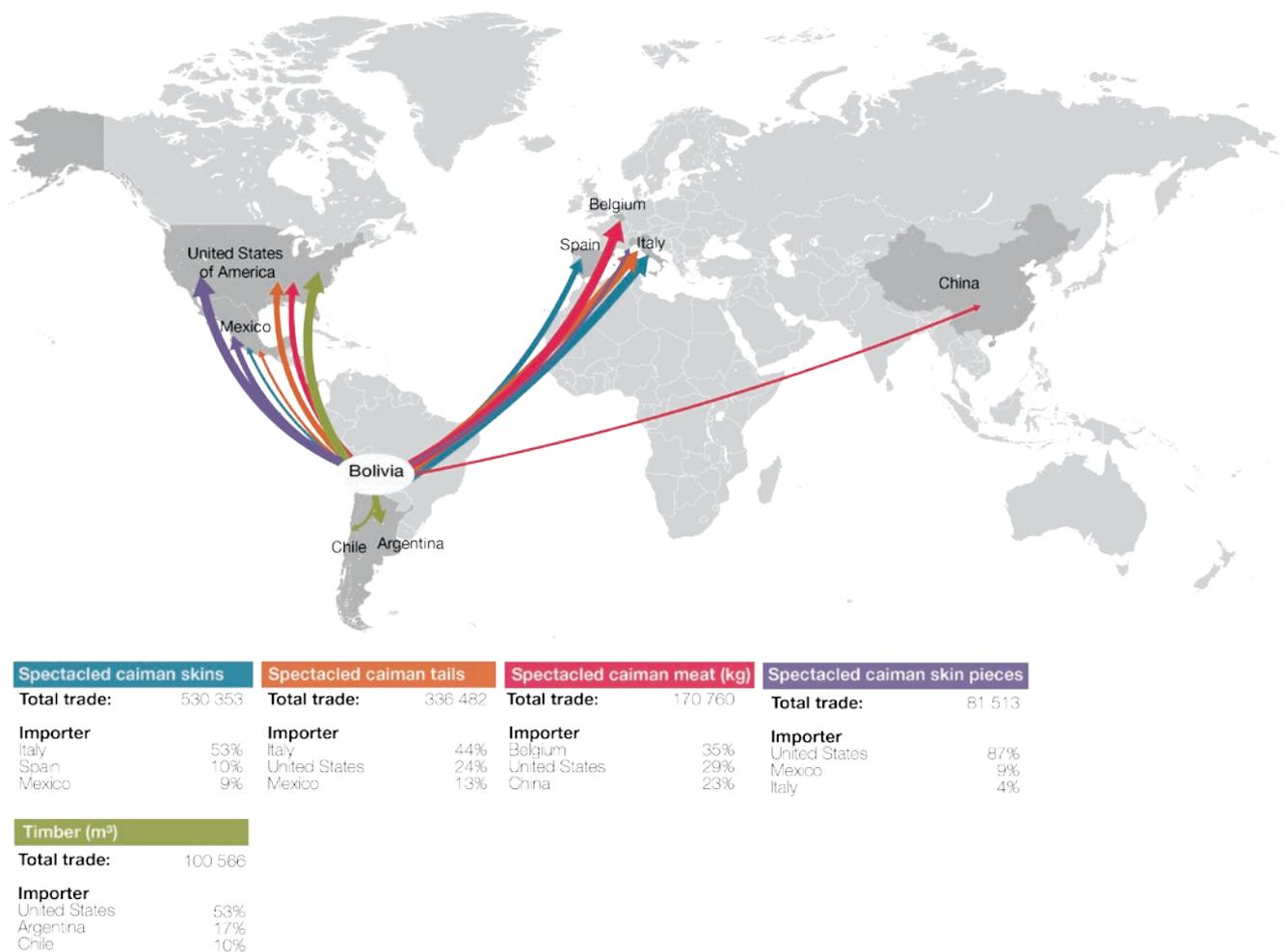


Figure 3.2: Main destination countries of key commodities exported by Bolivia 2005-2014.

⁸ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.



Caiman crocodilus yacare

Figure 3.3: Direct exports by Bolivia 2005-2014, of commodities that could be equated to one individual.

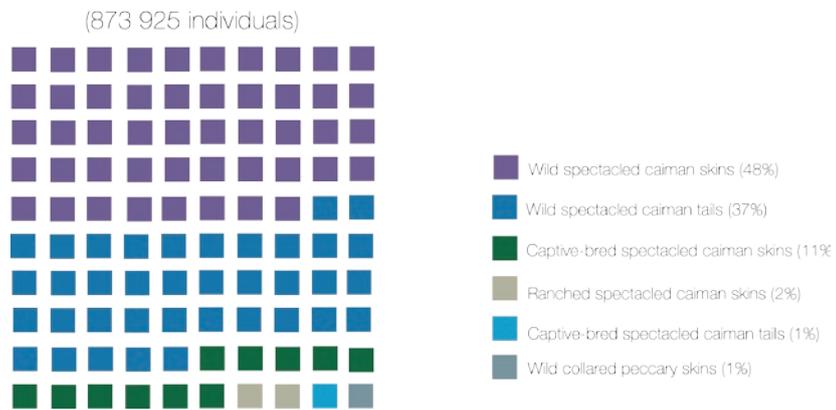
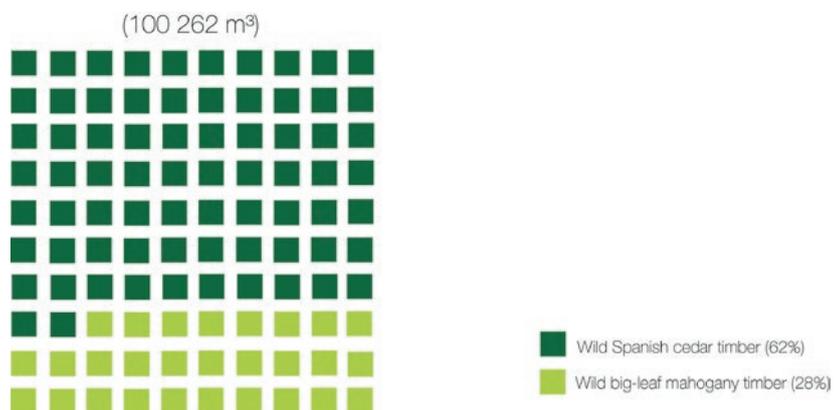


Figure 3.4: Direct exports by Bolivia 2005-2014, of commodities reported in kg.



Figure 3.5: Direct exports by Bolivia 2005-2014, of commodities reported in m³.





BRAZIL

Brazil's main export 2005-2014 was live plants, of which the majority were artificially propagated orchids (Figure 3.7). These were mainly destined for the Netherlands, Germany and the United States (Figure 3.6). The principal orchid species in trade was *Ludisia discolor*, accounting for 45% of live plant trade (Figure 3.7); all exports of this species, which is native to China and Southeast Asia (WCSP, 2016) were imported by the Netherlands 2005-2007. Captive-bred meat of the Amazonian endemic *Arapaima gigas* was exported in relatively high quantities (Figure 3.8) to the United States. Exports

of live *Chelonoidis carbonarius* were predominantly captive-bred and exported to China, El Salvador and Taiwan, Province of China (hereafter Taiwan, PoC).

The estimated average annual value of Brazil's CITES exports between 2005 and 2014 was USD13 million⁹. The products with the highest total estimated value were live orchids (USD1.8 million per year), particularly the species *Ludisia discolor* (USD 0.9 million per year), and timber of *Swietenia macrophylla* (USD1.6 million per year).

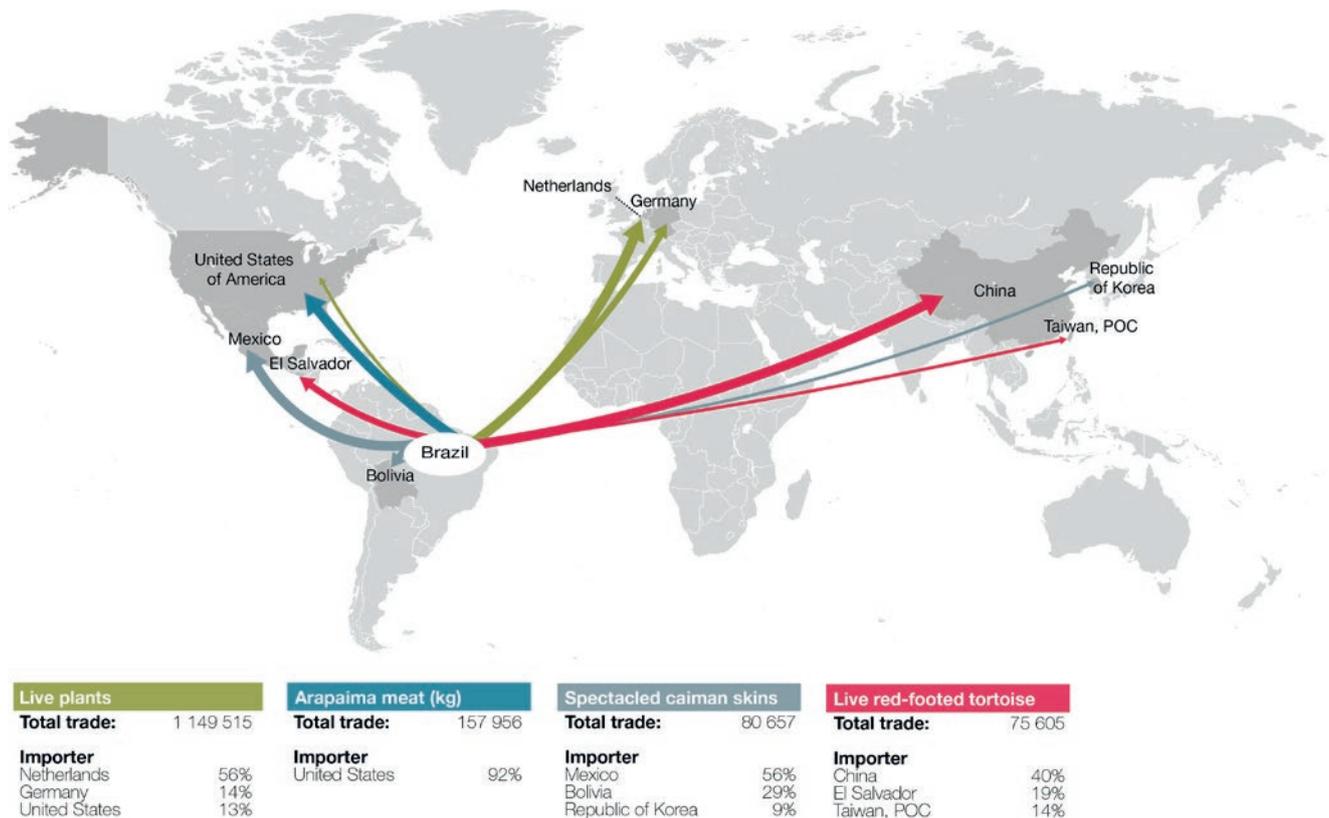


Figure 3.6: Main destination countries of key commodities exported by Brazil 2005-2014.

⁹ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.



Figure 3.7: Direct exports by Brazil 2005-2014, of commodities that could be equated to one individual.

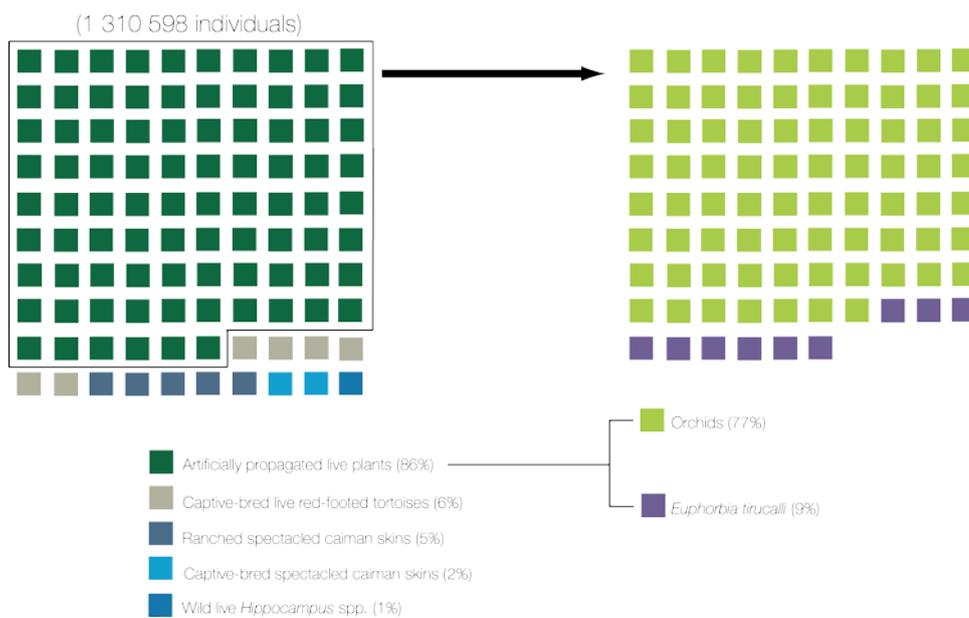
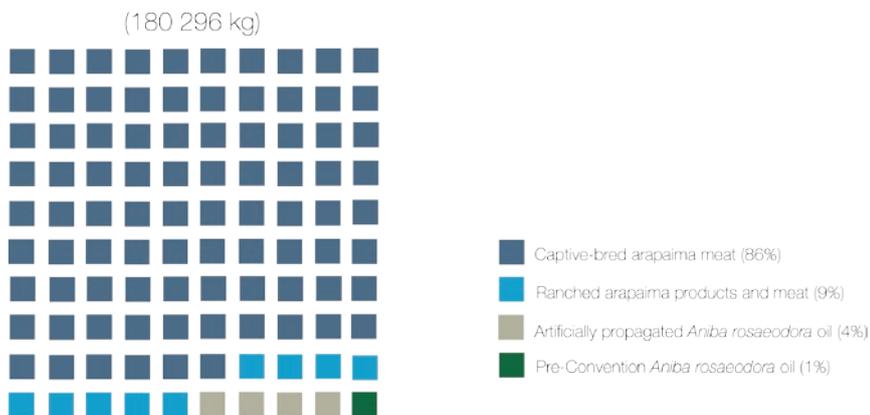


Figure 3.8: Direct exports by Brazil 2005-2014, of commodities reported in kg.

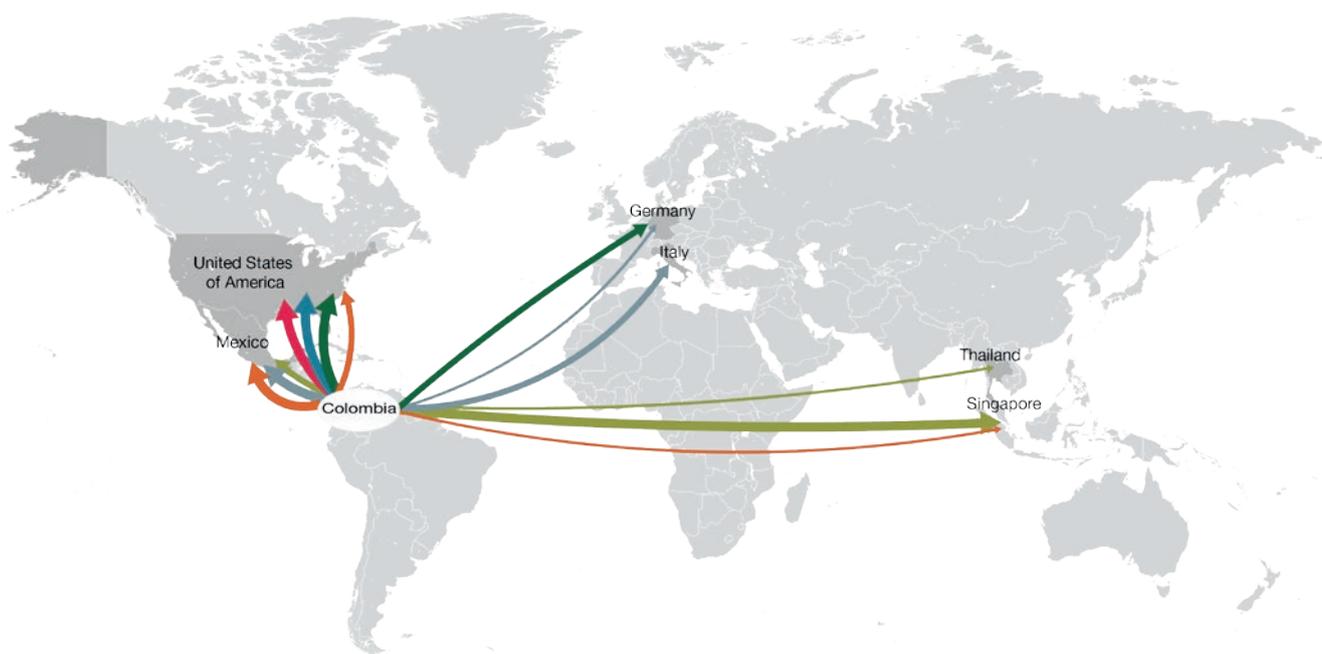


COLOMBIA

The main commodity exported by Colombia 2005-2014 were reptile skins, almost all of which were from *Caiman crocodilus* (exclusively bred in captivity, Figure 3.10). Singapore, Mexico and Thailand were the principal importers of this trade (Figure 3.9). Live reptiles were the second most highly traded commodity (Figure 3.10), mainly comprising captive-bred *Iguana iguana* and *Boa constrictor* destined for the United States. Wild-sourced *Strombus gigas* meat was also exported in relatively high quantities

compared with other countries in the region (Figure 3.11) to the United States.

The estimated average annual value of Colombia's CITES exports between 2005 and 2014 was USD50.2 million¹⁰. The majority of this estimated value was from caiman skins (USD44.1 million per year), while caiman leather products were the product with the second highest estimated value (USD2.1 million per year).



Spectacled caiman skins		Spectacled caiman tails		Spectacled caiman skin pieces	
Total trade:	6 699 994	Total trade:	259 708	Total trade:	139 066
Importer		Importer		Importer	
Singapore	35%	Mexico	44%	Mexico	69%
Mexico	23%	Italy	16%	United States	20%
Thailand	14%	Germany	14%	Singapore	9%

Live reptiles		Queen conch meat (kg)		Live plants	
Total trade:	391 184	Total trade:	269 483	Total trade:	121 564
Importer		Importer		Importer	
United States	96%	United States	77%	United States	43%
				Germany	33%

Figure 3.9: Main destination countries of key commodities exported by Colombia 2005-2014.

¹⁰ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.



Figure 3.10: Direct exports by Colombia 2005-2014, of commodities that could be equated to one individual.

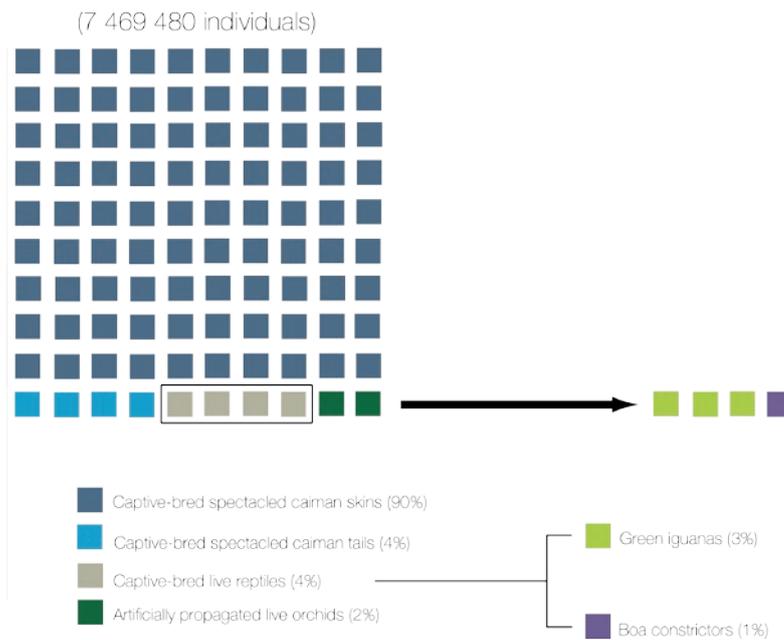
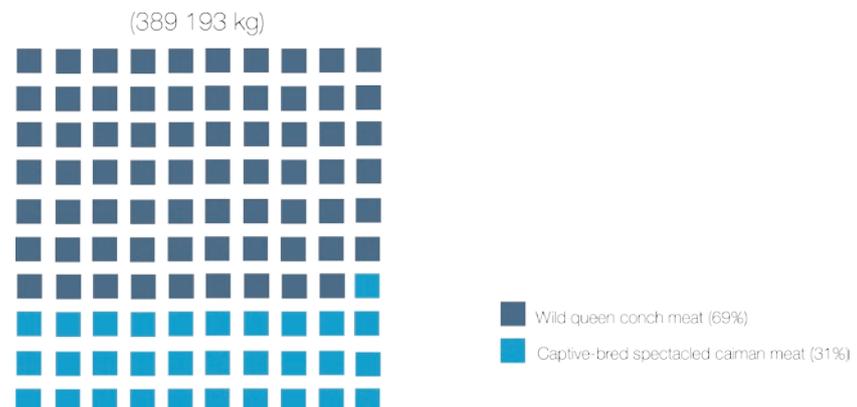


Figure 3.11: Direct exports by Colombia 2005-2014, of commodities reported in kg.





ECUADOR

The most highly traded commodity from Ecuador was wild-sourced brown sea cucumber (*Isostichopus fuscus*¹¹) bodies, almost all of which were imported by China and the remainder by the United States (Figure 3.12); all of this trade was reported in 2007 and 2008. Live artificially propagated orchids were also reported as direct exports in notable quantities (Figure 3.13), for which the main import markets were Germany and the United States.

The estimated average annual value of Ecuador's CITES exports between 2005 and 2014 was USD1.2 million¹²; live orchids had an estimated value of USD0.7 million per year while the value of *I. fuscus* bodies was estimated at USD0.2 million per year. The export of amphibians, although lower volume, is also of growing importance for Ecuador.

For a more detailed recent analysis of Ecuador's wildlife trade, including trade in CITES and non-CITES species, see Sinovas and Price (2015).

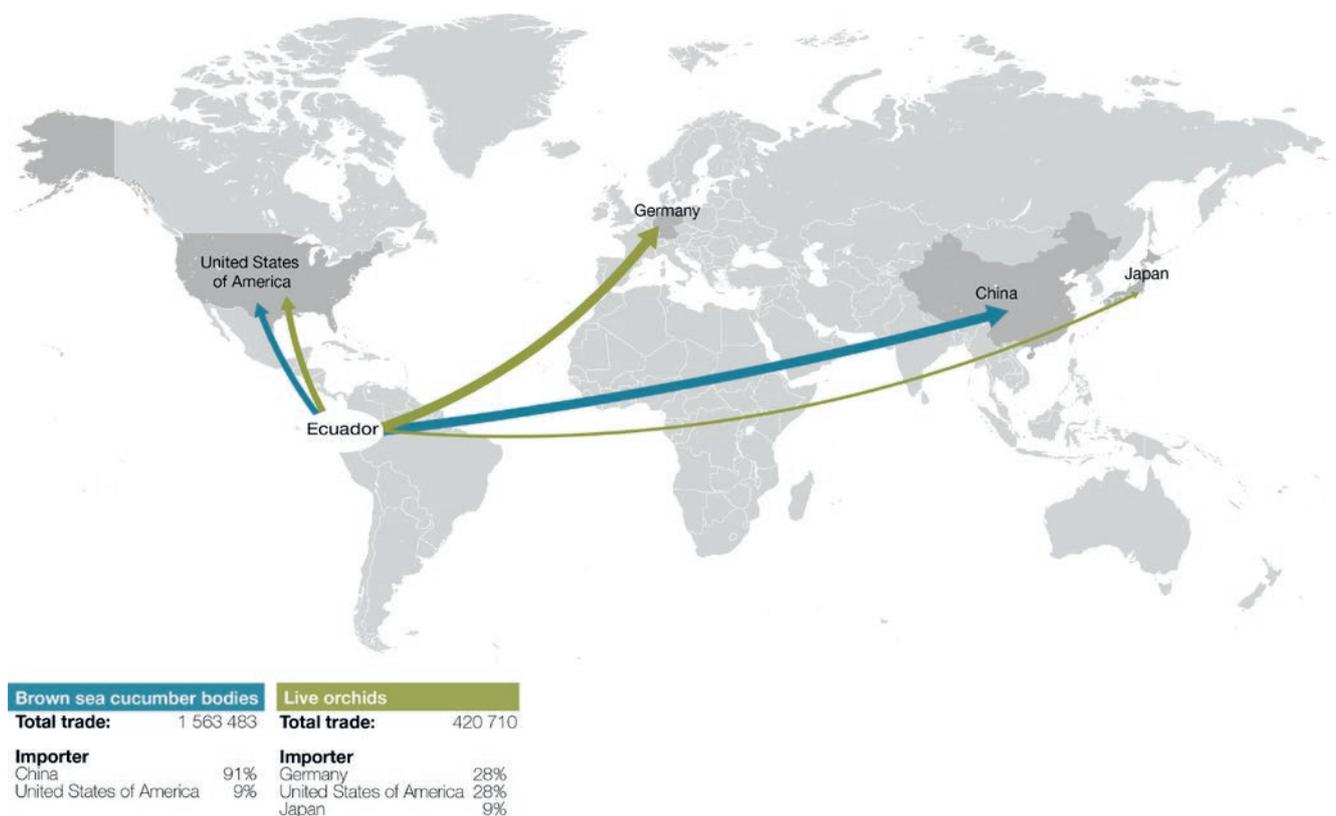


Figure 3.12: Main destination countries of key commodities exported by Ecuador 2005-2014.

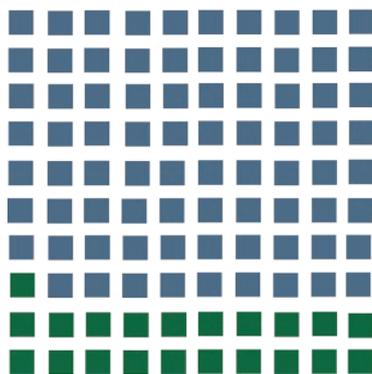
¹¹ Species included in CITES Appendix III by Ecuador in 2003.

¹² Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.



Figure 3.13: Direct exports by Ecuador 2005-2014, of commodities that could be equated to one individual.

(1 984 016 individuals)



- Wild brown sea cucumber bodies (78%)
- Live artificially propagated orchids (21%)

COOPERATIVE REPUBLIC OF GUYANA

Guyana’s main export 2005-2014 was *Caiman crocodilus* skins, all of which was wild sourced (Figure 3.15). This trade was predominantly destined for Mexico (Figure 3.14). Live reptiles represented the second-highest commodity in trade; caimans accounted for 30% of these exports. All live reptiles were wild-sourced, with the United States the principal import market.

The estimated average annual value of Guyana’s CITES exports between 2005 and 2014 was USD4.1 million¹³; the products with the highest total estimated value were *C. crocodilus* skins (USD0.9 million per year) and live *Ara ararauna* (USD0.6 million per year).

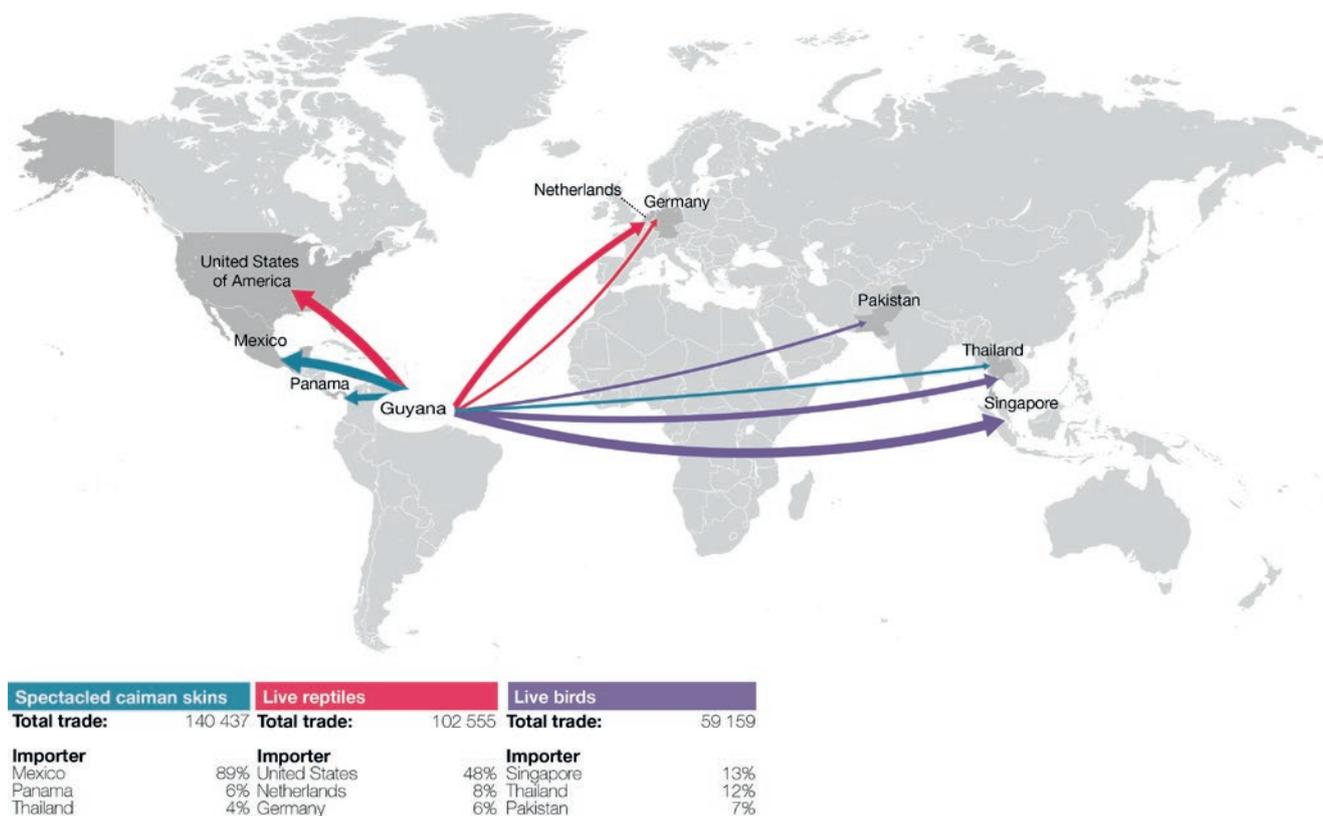
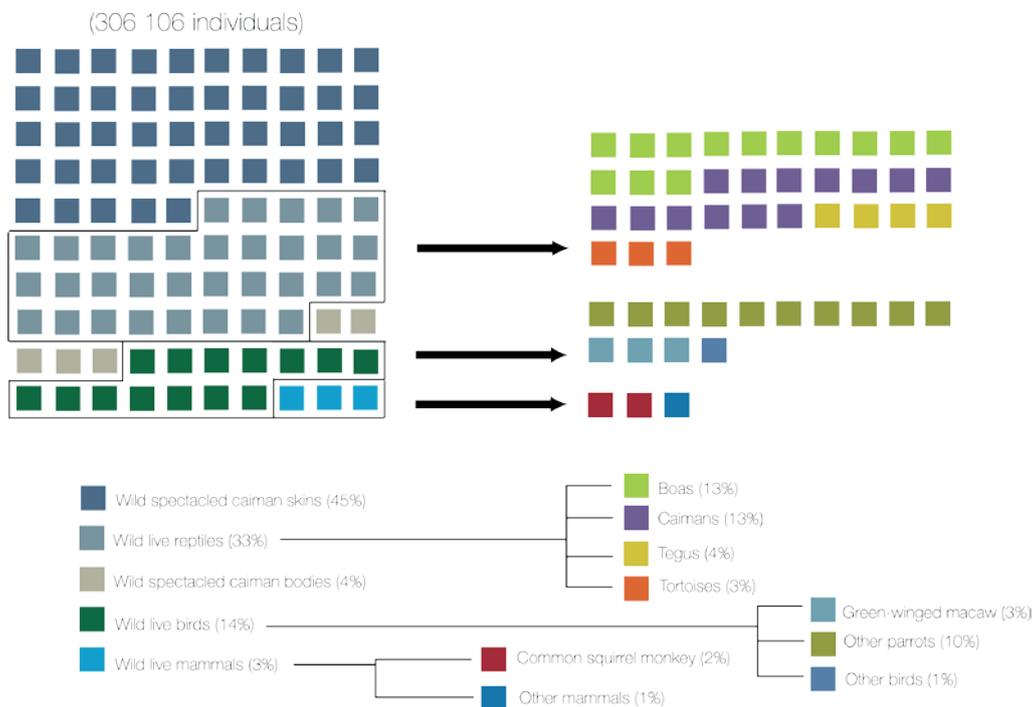


Figure 3.14: Main destination countries of key commodities exported by Guyana 2005-2014.

¹³ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.



Figure 3.15: Direct exports by Guyana 2005-2014, of commodities that could be equated to one individual.

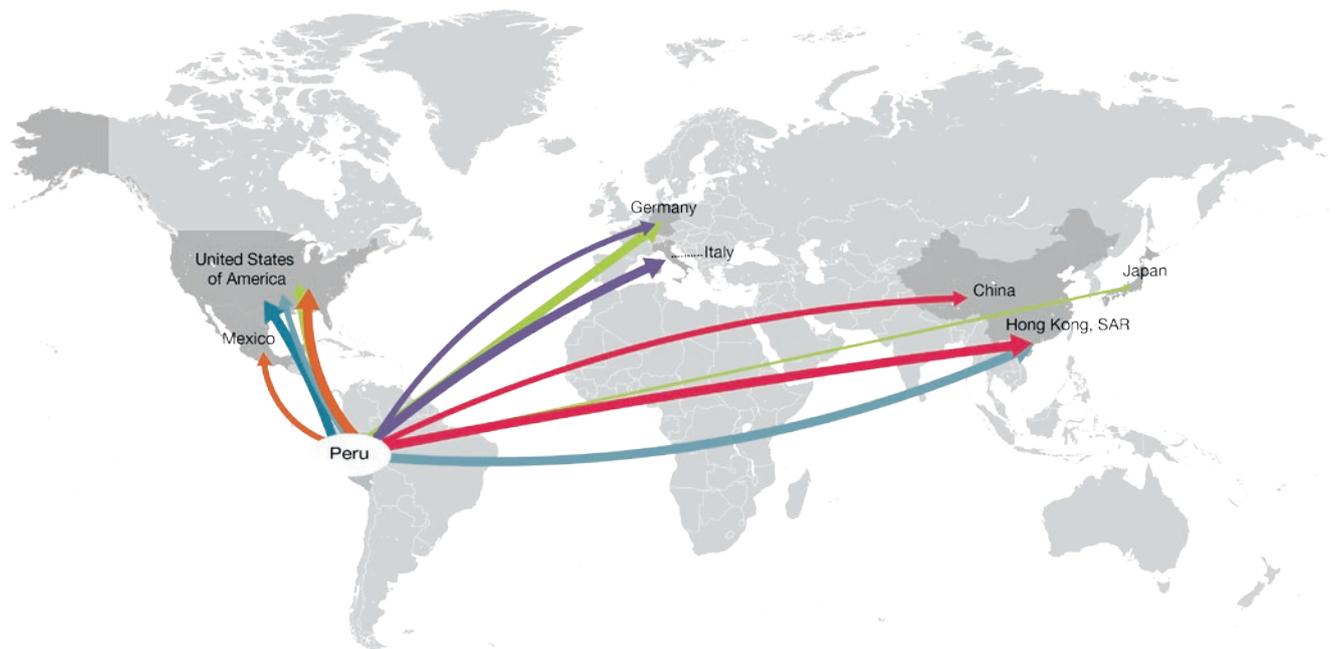


PERU

The main commodity exported by Peru 2005-2014 was live reptiles, the majority of which were ranched and the remainder captive-born (Figure 3.17). Almost all trade was in *Podocnemis unifilis*, destined for Hong Kong Special Administrative Region (hereafter Hong Kong, SAR) and China (Figure 3.16). The second most highly exported commodity were wild-sourced peccary skins (Figure 3.17), imported by Italy and Germany, while captive-bred *Arapaima gigas* meat (Figure 3.18) imported by the United States was the third. Wild sourced timber (Figure 3.19) comprised

Cedrela odorata and *Swietenia macrophylla*, and was mainly imported by the United States. *Vicugna vicugna* (vicuña) fibre and live orchids were also important exports from the country.

The estimated average financial value of Peru’s CITES exports between 2005 and 2014 was USD34.4 million per year¹⁴. The products with the highest total estimated value were *C. odorata* and *S. macrophylla* timber (USD11.4 million per year and USD7.4 million per year, respectively), and skins of *Pecari tajacu* (USD5.6 million per year).



Live yellow-spotted river turtle	Arapaima meat (kg)	Live arapaima
Total trade: 777 813	Total trade: 247 539	Total trade: 200 183
Importer Hong Kong, SAR 81% China 17%	Importer United States 96%	Importer Hong Kong, SAR 72% United States of America 9%
Peccary skins	Timber (m³)	Live plants
Total trade: 401 892	Total trade: 153 595	Total trade: 157 592
Importer Italy 60% Germany 32%	Importer United States 60% Mexico 32%	Importer Germany 28% United States 18%

Figure 3.16: Main destination countries of key commodities exported by Peru 2005-2014.

¹⁴ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.

Figure 3.17: Direct exports by Peru 2005-2014, of commodities that could be equated to one individual.

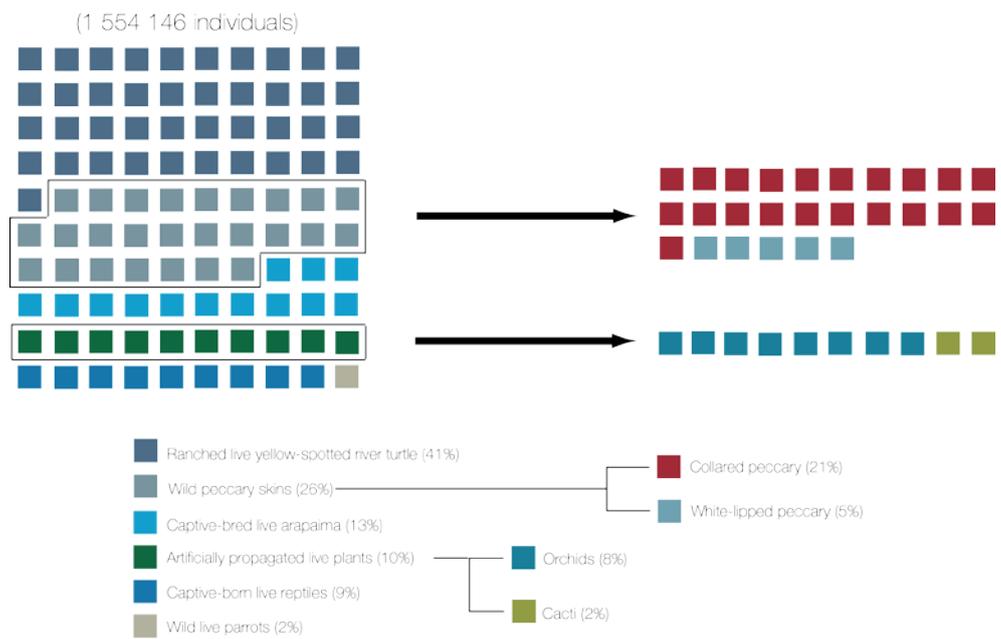


Figure 3.18: Direct exports by Peru 2005-2014, of commodities reported in kg.

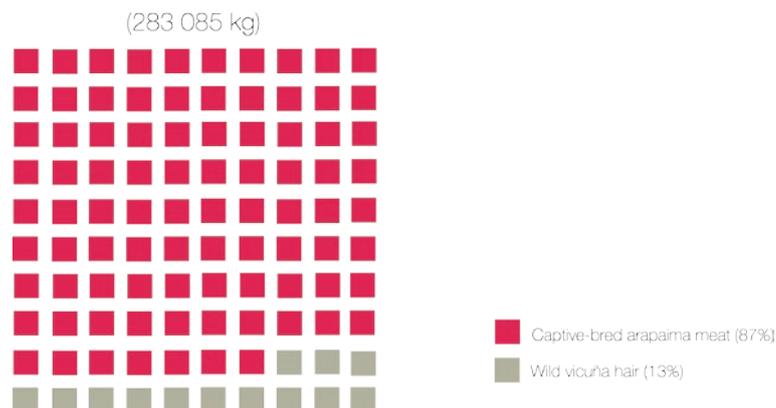
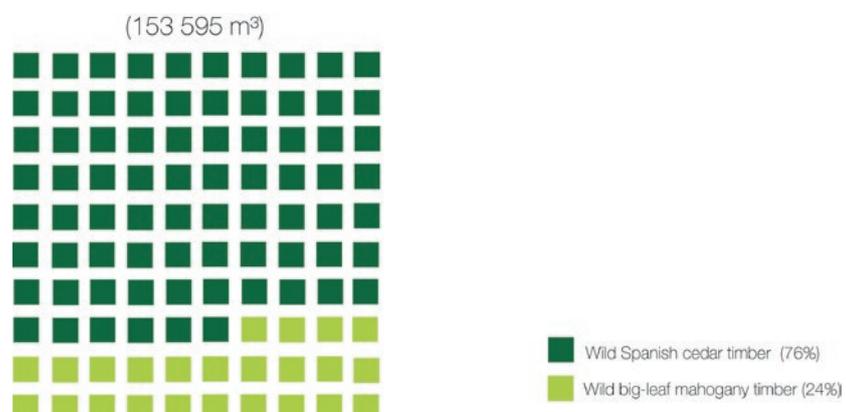


Figure 3.19: Direct exports by Peru 2005-2014, of commodities reported in m³.





SURINAME

Live reptiles, mainly iguanas, were the most highly exported commodity by Suriname 2005-2014, the vast majority of which were wild sourced (Figure 3.21). The United States was the main import market for this trade (Figure 3.20). Suriname also exported wild-sourced live birds, predominantly parrots, to Singapore, the Russian Federation and Thailand. Wild-sourced amphibians, exported mainly to the United States and Germany, were another main commodity exported by the country.

The estimated average financial value of Suriname's CITES exports between 2005 and 2014 was USD2.4 million per year¹⁵. Live birds had the highest total estimated value: *Pionites melanocephalus* (black-headed parrot, USD0.6 million per year), *Ara ararauna* (blue and yellow macaw, USD0.4 million per year) and *Amazona amazonica* (orange-winged amazon, USD0.3 million per year) were the most valuable species in trade.

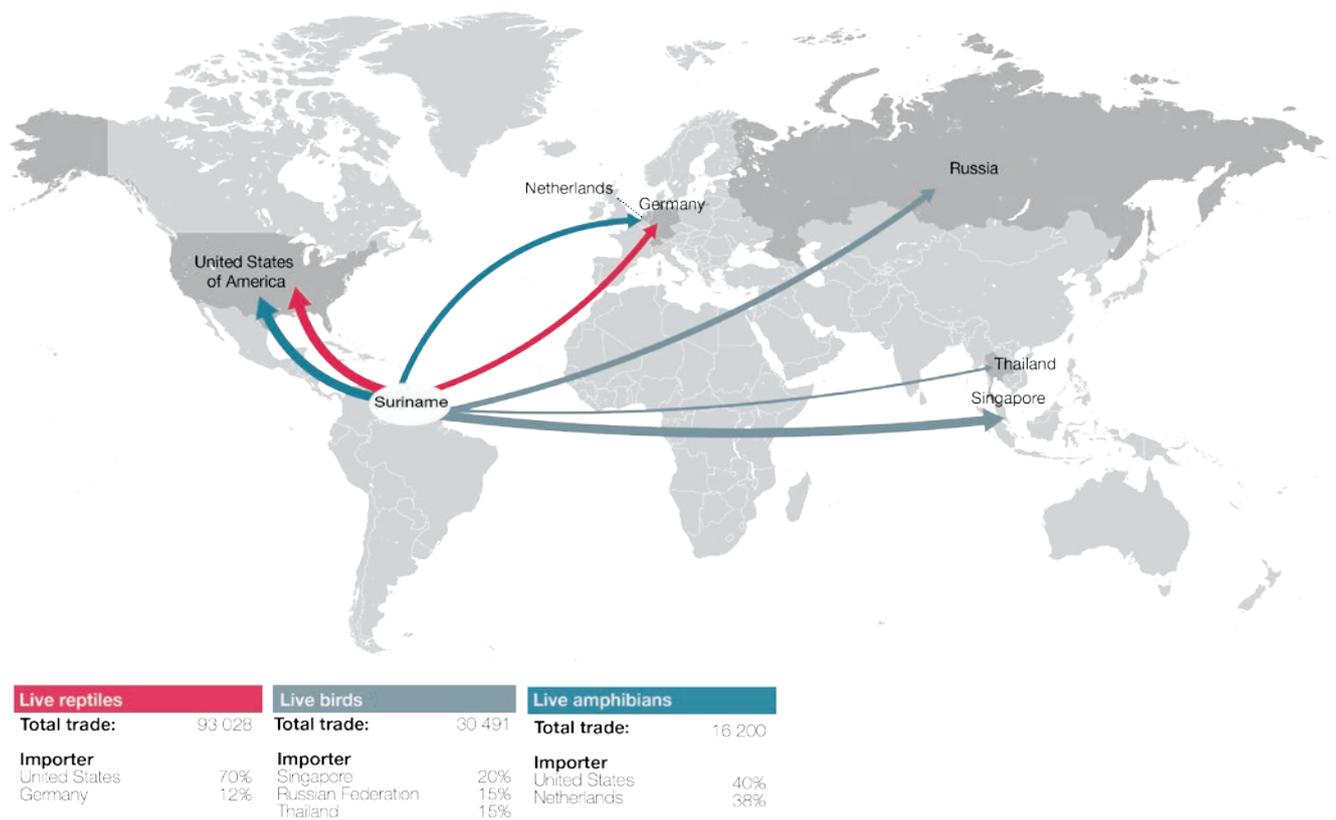
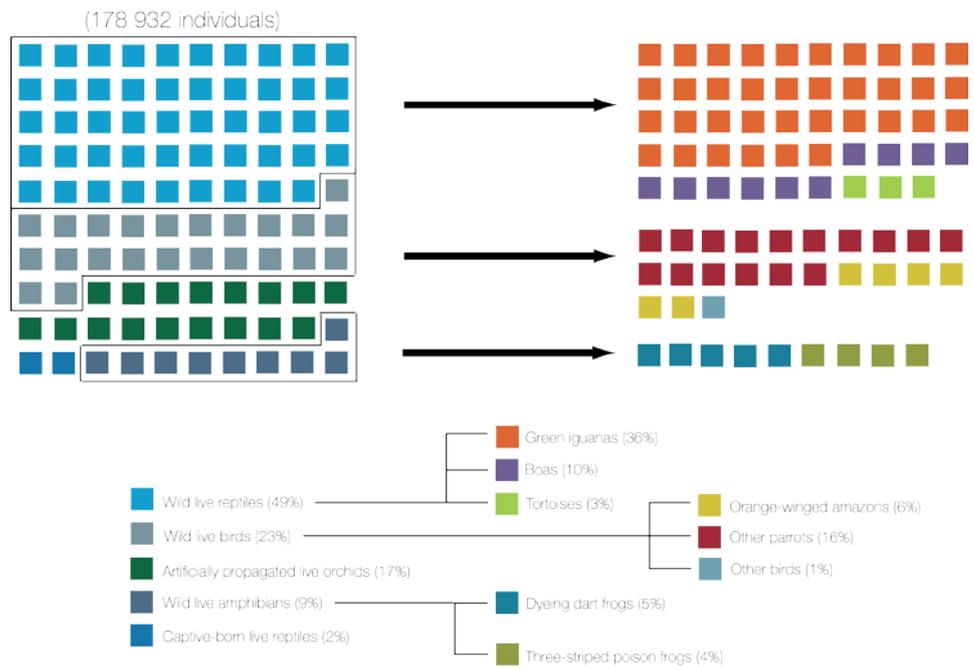


Figure 3.20: Main destination countries of key commodities exported by Suriname 2005-2014.

¹⁵ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.

Figure 3.21: Direct exports by Suriname 2005-2014, of commodities that could be equated to one individual.



Amazona amazonica

BOLIVARIAN REPUBLIC OF VENEZUELA

Venezuela's main export 2005-2014 was wild-sourced *Caiman crocodilus* skins (Figure 3.23), principally destined for Germany and Italy (Figure 3.22). Exports of live reptiles were predominantly captive-bred and mainly comprised *Chelonoidis carbonarius* (Figure 3.23). The United States and Taiwan, Province of China were the main importers. Orchids, mainly destined to the United States and Germany, were another important export product (Figure 3.22).

The estimated average annual value of Venezuela's CITES exports between 2005 and 2014 was USD2.5 million¹⁶. The products with the highest total estimated value were caiman skins (USD1.7 million per year) and live caimans (USD0.4 million per year).

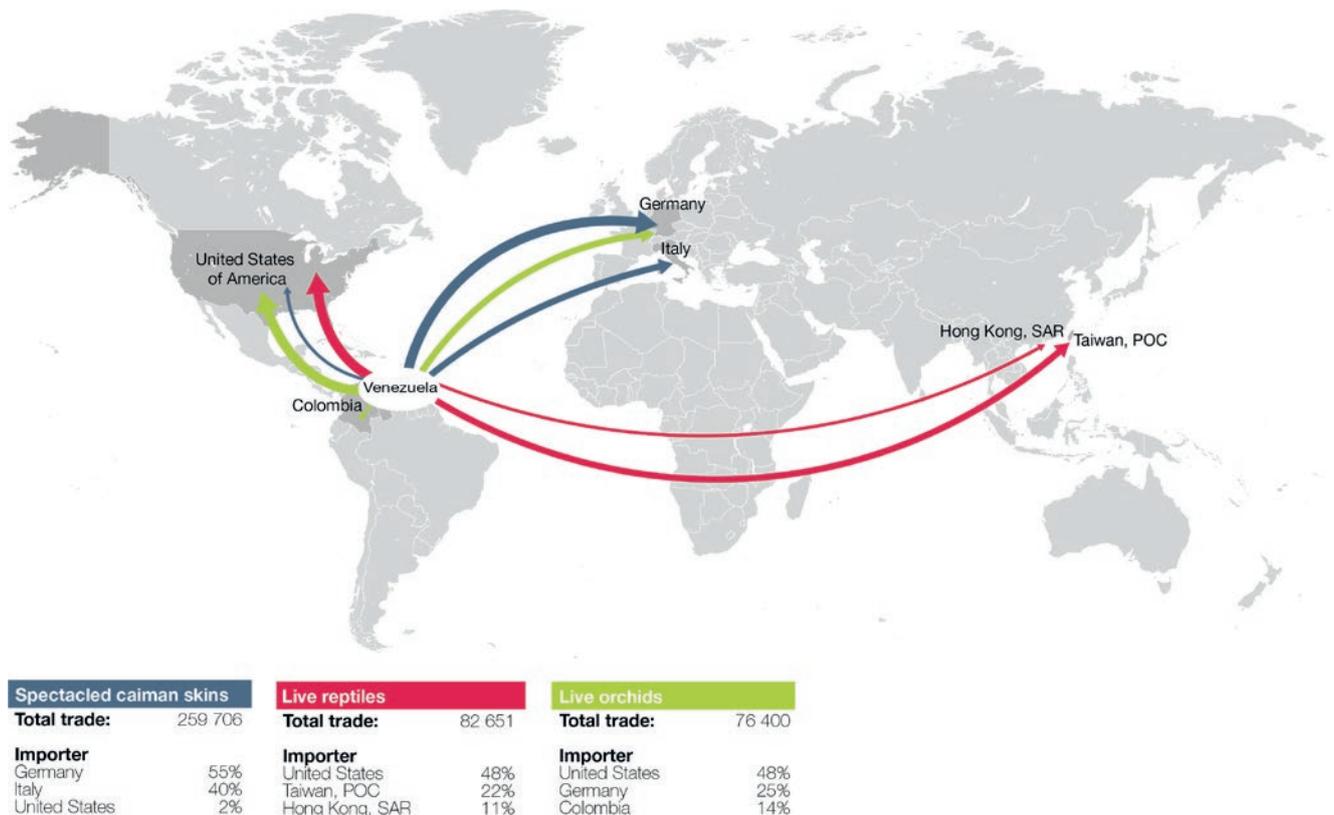


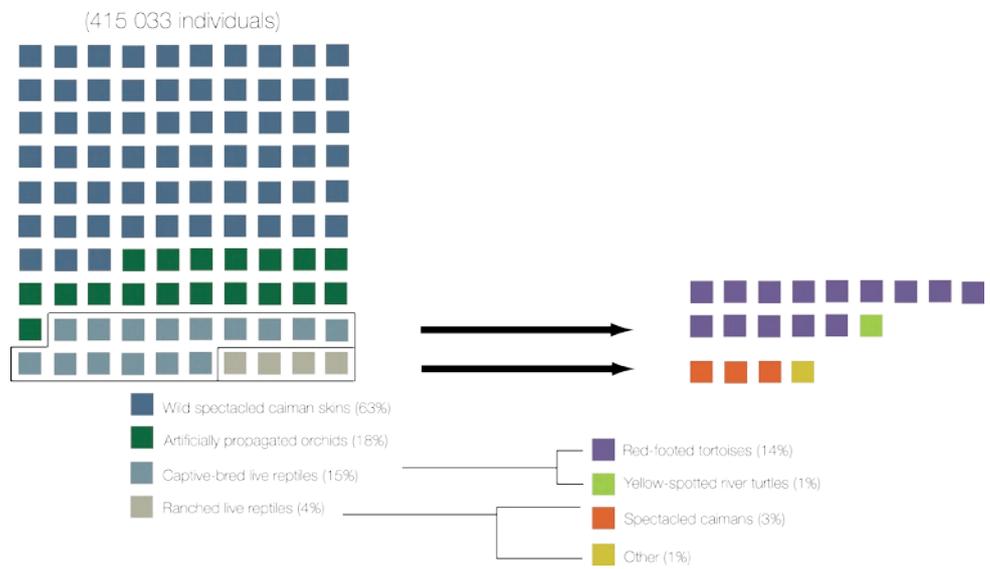
Figure 3.22: Main destination countries of key commodities exported by Venezuela 2005-2014.

¹⁶ Not all trade could be valued, so these figures are likely to be underestimates. Full details of methods and caveats can be found in Annex B.



Chelonia carbonarius

Figure 3.23: Direct exports by Venezuela 2005-2014, of commodities that could be equated to one individual.



4. CASE STUDIES

This section presents case studies that provide detailed trade analyses for the taxonomic groups of greatest relevance in the context of the Amazonian region's wildlife trade: mammals, birds (parrots), reptiles (caiman skins and meat and live reptiles), amphibians, fish (arapaima) and flora (orchids and timber).

The case studies present an overview of trade volumes, trends and the main species involved, as well as estimates of the economic value of the trade, and any other aspects of note, on the basis of available information, including information provided by national CITES Authorities and by other experts consulted.

4.1 MAMMALS

Fifteen CITES-listed mammal species native to Amazonian countries were in international trade during the period 2005-2014. The majority of mammal exports from the region consisted of peccary skins and vicugna (*Vicugna vicugna*) hair,

mainly from Peru to Italy. Live primates (primarily *Saimiri sciureus* and *Cebus apella* from Guyana to China and South Africa) were also recorded in trade; however this is not explored further in this chapter.

Peccaries

The Amazon region is home to three species of peccary, two of which are in trade: the white-lipped peccary (*Tayassu pecari*, classified as Vulnerable with a decreasing population trend) and the collared peccary (*Pecari tajacu*, classified as Least Concern with a stable population trend). Peccary leather is prized for its softness and durability and is used to produce gloves, shoes, belts and watch straps (Bodmer and Lozano, 2001).

The majority of trade in peccaries was in wild-sourced skins and garments, which were the most highly traded mammal commodities from the region over the period 2005-2014.

An average of 41 000 skins per year were exported during 2005-2014, 80% of which were *Pecari tajacu* and the remainder *Tayassu pecari*. Overall, exports of skins of both species declined over the 10 year period (Figure 4.1.1). The vast majority of peccary skins were exported by Peru (98%); the main importers were Italy (61%) and Germany (31%).

In addition to skins, Peru reported the export of an average of 5700 peccary garments per year, 85% of which were *Pecari tajacu*.

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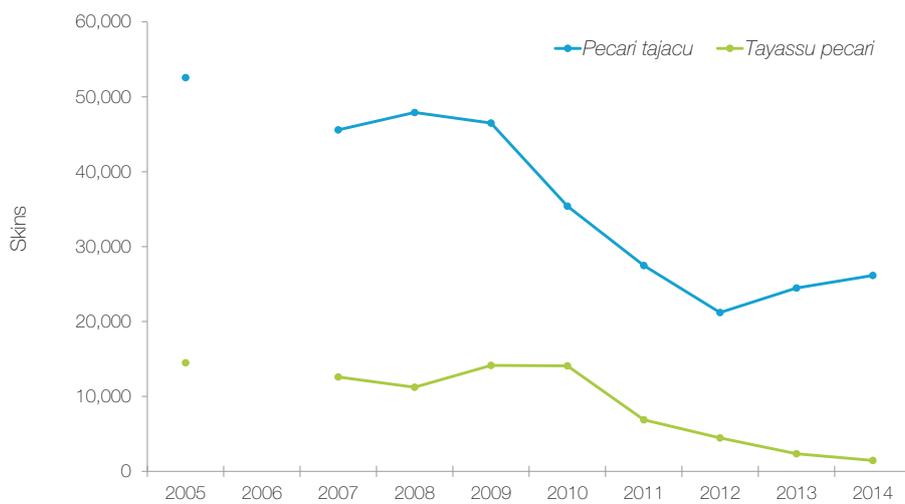


Figure 4.1.1: Exports of peccary skins (*Pecari tajacu* and *Tayassu pecari*) 2005-2014, as reported by exporters. Note: Peru's CITES annual report for 2006 was not available at the time of analysis.

Box 3. Management of peccaries in Peru

Yuri Beraun, Fabiola Núñez and José Álvarez, CITES Scientific Authority of Peru, Ministry of Environment

Peruvian legislation on wild fauna currently recognises four hunting modalities, in addition to culling for health reasons. One of them is subsistence hunting by rural communities, a traditional Amazonian activity that, in Peru, is practised exclusively by native and rural communities¹⁷, and that still represents one of the main livelihoods and sources of income (Álvarez, 2004; 2007).

It should be noted that, currently, the export of peccary skins as a byproduct of subsistence hunting has evolved to incorporate commercial elements, such as the industry around garments made of these skins¹⁸.

In recent times (1988-2016), Peruvian exports have in general not exceeded set annual quotas¹⁹. In addition, since 2015, the quotas established by the CITES Management Authority are based on NDFs prepared annually by the CITES Scientific Authority (MINAM). For 2016, the skin export quota was 49 129 *Pecari tajacu* and 10 091 *Tayassu pecari*.

It is also worth noting the decreasing trend in the export peccary skins over the last decade, particularly for the white-lipped peccary (*Tayassu pecari*), for which exports have been as low as 5% of the quota (e.g. in 2014). This reduction in exports could be explained by a number of factors, but mainly that there is no evidence of commercial hunting targeting skins exclusively, as was the case in the 1950s and 1960s. This is because the economic benefits derived from the sale of skins do not justify the necessary hunting effort and because commercial hunting of peccaries is not permitted in Peru (only skins that are a by-product of subsistence hunting can be traded). In addition, peccary populations, particularly the white-lipped peccary, appear to have suffered declines in the last few decades due to a combination of factors, including climate change, overhunting, habitat fragmentation and intrinsic population fluctuations.

The certification of peccary skins in the Amazon is an activity that has been promoted by research organisations and institutions; through this process, peccary management is independently verified to ensure that it is based on ecologic, economic and social criteria. The certification aims to improve the management of forest resources by native and rural communities through an approval or "green stamp". Researchers such as Dr. Bodmer and Fang have been promoting this certification to ensure the sustainability of this type of use (self-regulated subsistence hunting), in order to achieve better prices for the products and to differentiate them from parallel systems that may not meet the same standards. This process is still being improved.

¹⁷ 72nd and 73rd Articles of Supreme Decree No. 021-2015-MINAGRI.

¹⁸ Historically, the export of skins was an important industry between the decades of 1940 and 1970 and up to 1974, when a total ban was put in place for commercial hunting in the Peruvian Amazon. Statistics from those times indicate that approximately 3 million collared peccary skins and 1.3 million white-lipped peccary skins were exported in total during the period.

¹⁹ Trade quotas are the legal tools currently issued by the CITES Management Authority of Peru to establish the maximum levels that may be exported annually.

Vicuña

The vicuña (*Vicugna vicugna*) inhabits alpine regions in the Andes, from Ecuador (where populations have been introduced) and Peru to Chile (Lichtenstein *et al.*, 2008). Although it is not an Amazonian species, it is discussed in this report as it is present in three Amazonian countries: Bolivia, Ecuador and Peru. In the 1960s, the vicuña was one of the most threatened species in South America; however, in 2008, it was classified as Least Concern by the IUCN with an estimated population of 350 000 individuals and increasing (Lichtenstein *et al.*, 2008). This conservation success story is thanks to conservation programmes focusing on management and sustainable use of the species. The populations of vicuña in Amazonian countries are listed in CITES Appendix II for the exclusive purpose of allowing international trade in fibre sheared from live vicuñas and items made thereof, such items must bear a stamp stating the country of origin. All other populations are in Appendix I. Recovery of vicuña populations has allowed the textile industry to produce sustainable products from vicuña hair (Gordon, 2009) such as luxury fabric and clothing (Sahley *et al.*, 2007).

Bolivia and Peru are signatories of the Convention for the Conservation and Management of the Vicuña which requires animals to be sheared alive and returned to the wild to ensure sustainable use and provision of benefits to local communities (Bonacic and Gimpel, 2003). Wild management is considered preferable over

captive management (Lichtenstein and Vilá, 2003).

Vicuña hair was one of the most highly traded mammal commodities over the period 2005-2014, with exporters reporting an average of 4400 kg per year. Overall, the quantities of hair in trade increased between 2008 and 2014, with a peak in trade in 2010 (Figure 4.1.2). Eighty per cent of hair reported by weight was exported by Peru with the remainder from Bolivia; 83% of hair exports were destined for Italy, with most of the remainder (particularly since 2009) going to Argentina.

Vicuña fibre is exported as dirty fibre, pre-dehaired, dehaired or washed fiber or as products (threads, cloths and garments). Pre-dehaired fibre is the type exported in greatest volumes to Italy (I. Arce Castañeda, CITES Management Authority of Peru, *pers. comm.*, 2017).

Vicuña fibre products are positioned in very specific and exclusive market niches, due to their specific fineness and origin characteristics and to the very high prices that consumers are willing to pay for such exclusivity. Exported garments include cravats, stoles, blankets, jumpers, shawls, cardigans and coats, with export demand for shawls and stoles being the greatest, mainly in the United States, Japan and Switzerland (I. Arce Castañeda, CITES Management Authority of Peru, *pers. comm.*, 2017).

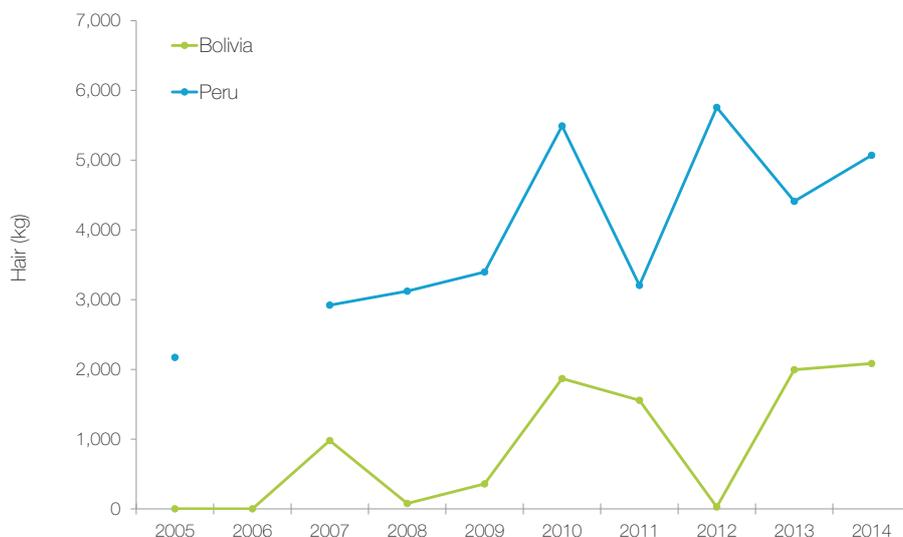


Figure 4.1.2: Exports of *Vicugna vicugna* hair (in kilograms) 2005-2014, as reported by exporters.

Estimated financial value of trade in mammals

Between 2005 and 2014 the average financial value of exports²⁰ of mammals was estimated to be USD11.2 million per year, with skins the most valuable product (USD7.2 million per year). In particular, skins of *Pecari tajacu* (USD5.7 million per year) and *Tayassu pecari* (USD1.4 million per year) had the highest total estimated value. In addition, exports of vicuña hair was valued at an estimated USD1.6 million per year²¹, and garments of *P. tajacu* and *V. vicugna* were estimated at USD0.7 million and USD0.6 million per year, respectively.

Peru exported 96% of mammal skin, hair and garment by value (USD10 million per year) and 97% of exports in these products by volume.

Based on FOB prices recorded by Peru during 2005-2014 for CITES animal exports, the country generated, on average, the following economic values annually: USD1.1 million per year from *Pecari tajacu* exports, USD230 thousand per year from *Tayasu pecari* and USD2.1 million per year from *Vicugna vicugna*. Discrepancies between FOB prices at the point of export in Peru and the estimates based on declared prices at the point of import into the United States, in particular for peccaries, highlight the need to take estimates of the economic value of wildlife trade with caution, and to take into account the changes in the value of products along the trade chain.



²⁰ See methodology in Annex B for more details

²¹ Prices for *V. vicugna* hair were unavailable so were derived from estimates in Lakshmanan *et al.* (2016)

4.2 PARROTS

Live parrots are in high demand globally as exotic pets, especially neo-tropical parrots (Bush *et al.*, 2014; Poole and Shepherd, 2016); this demand has led to high levels of illegal trade in parrots in the region (Pires, 2012; Pires and Clarke, 2012; Regueira and Bernard, 2012; Nóbrega Alves *et al.*, 2012; Tella and Hiraldo, 2014; Pires, 2014). There are over 120 species of parrot native to the Amazonian countries, of which approximately one-third are globally threatened, with 20 assessed as Endangered or Critically Endangered by the IUCN.

An average of around 12 000 live parrots were exported per year 2005-2014, nearly all of which were from Suriname, Guyana and Peru (99% of exports; Figure 4.2.1). Virtually all exports of live parrots were wild-sourced. While the majority of exports were for commercial purposes, a significant proportion (7%) were for breeding purposes. Parrots for breeding purposes were mainly imported by Singapore, Thailand and the Philippines.

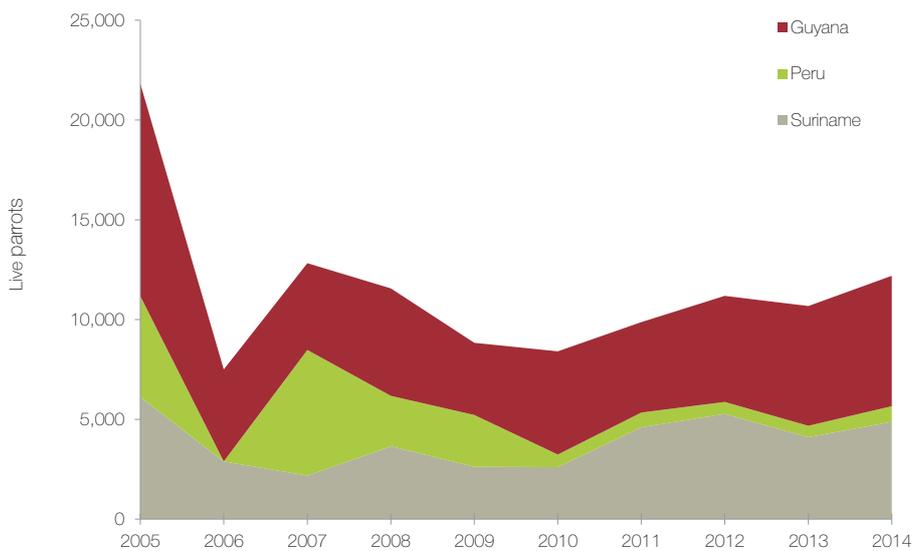


Figure 4.2.1: Exports of live parrots 2005-2014, as reported by exporters. Note: Peru's 2006 CITES annual report was not available at the time of analysis.

Singapore, Mexico, the Russian Federation and Thailand were the largest single importers over the period, importing nearly half of live parrots. Singapore is known to be a trade hub for live birds (Poole and Shepherd, 2016). The regional distribution of imports shifted over the 10-year period (Figure 4.2.2). This shift was, at least in part, due to a wild-sourced bird import ban by the European Union (EU) in place since October 2005: the EU imported 61% of live parrots from the region in 2005, but less than 2% each year 2006-2014. Total export quantities remained lower than in 2005, but other regions emerged as notable importers, especially Eastern and South-eastern Asia and Western Asia.

The single most exported species was the orange-winged parrot (*Amazona amazonica*), but 55 other species were also recorded in trade (Figure 4.2.3). The genera *Amazona*, *Ara* and *Aratinga* together accounted for 72% of exports. Nearly all exported species have been assessed as Least Concern (IUCN, 2016).

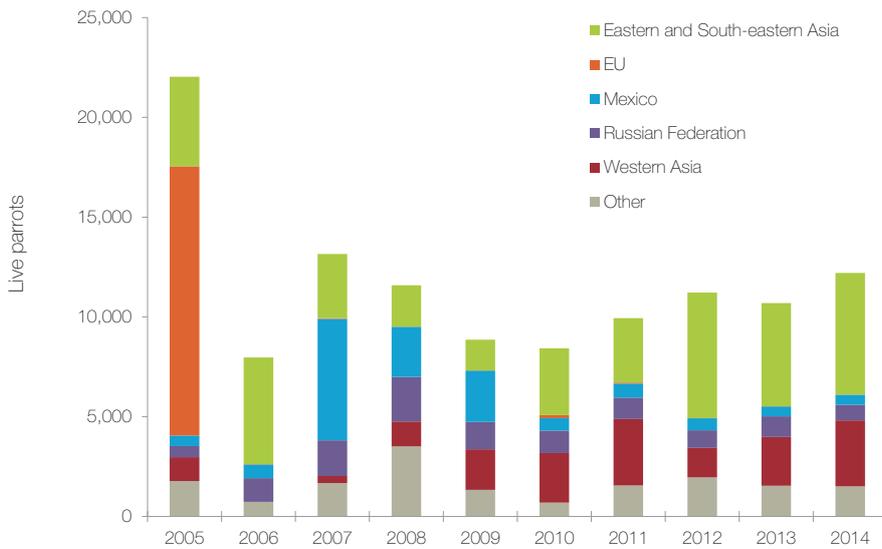


Figure 4.2.2: Direct exports of live parrots over the period 2005-2014 by import region.

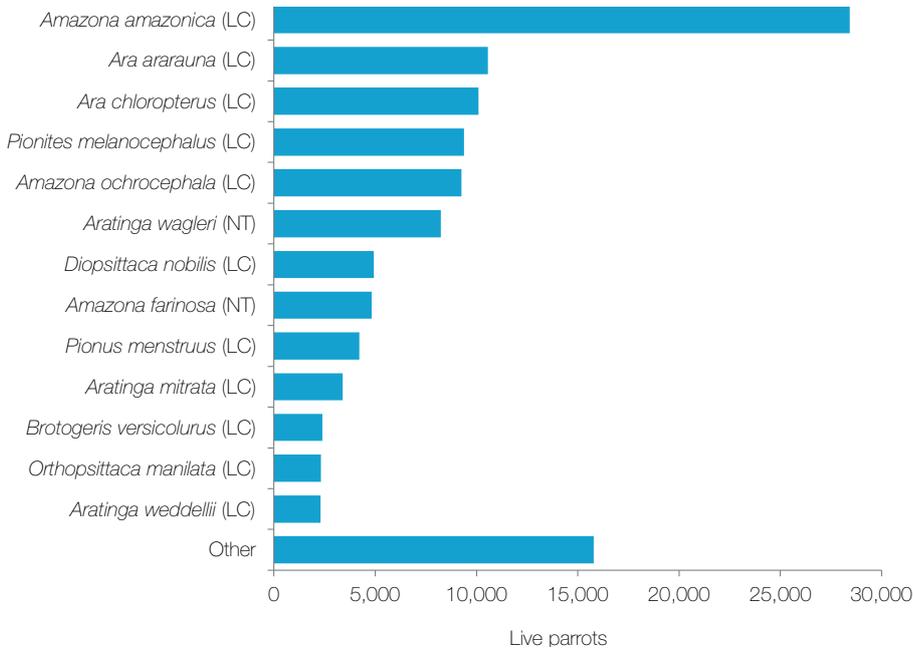


Figure 4.2.3: Top parrot species directly exported from the Amazon region as live birds. IUCN Red List status is indicated in brackets (LC=Least Concern, NT=Near Threatened, NE=Not Evaluated). All named species are native to the Amazon region.



Amazona amazonica



Ara ararauna

Box 4. Trade and management of parrots in Suriname (by Romeo Lala, CITES Management Authority of Suriname, Suriname Forest Service)

The trade and management of parrots from Suriname has a national and an international component.

National trade is regulated by the Game Law 1954 and the Game Act 2002, which categorise most parrot species as 'cage species' and require the establishment of bag limits. Most of these species are for sale domestically in pet shops during the open hunting seasons; no permit is required to keep pet parrots for species in the 'game' or 'cage' categories.

The international trade is regulated through a quota system, with quotas being set by the Head of the Suriname Forest Service based on the advice of the CITES Scientific Authorities. Export data from the most recent five years show that the quotas for *Ara* species, as well as for *Amazona ochrocephala* and *Pionites melanocephala* are used, while demand for other species appears to be lower.

Current quotas were set several years ago through consultation with hunters, forest workers, and tribal and local communities, as well as on the basis of parrot inventories. No more than 25% of a quota can be utilised in each region of the country, and the total national quota for each species must not exceed 120% of the quota set. Suriname is considering a revision of the quotas, but a lack of funding is delaying this proposed revision, as currently most funds from donors are provided to undertake work on communities and protected areas.

Export quotas are assigned to registered wildlife exporters. In addition, a proportion of the quotas is set aside and given as a reward to the exporters who use their quota.

Exporters have their own trappers, mainly members of the tribal communities in the interior, who are licensed by the Suriname Forest Service (Suriname's CITES Management Authority). Exporters are responsible for transporting the collected species to their facilities, which consist of an isolation room, infirmary and export-ready hall. Veterinarians from the Veterinary Service undertake frequent inspections on these facilities; however, undertaking the health checks necessary to meet veterinary requirements imposed by importing countries is challenging due to a scarcity of the necessary testing kits in the country. An additional obstacle faced by exporters is that one of the main international airlines serving Suriname only allows animal cargo for breeding purposes.

The entire process, from trapping to export, is managed by the Suriname Forest Service, who undertakes an inventory after the closing of hunting seasons. Trappers, exporters and transporters must log all species collected at field stations run by game wardens, who also undertake patrols.

In 2016, the Suriname Forest Service issued a license to a Surinamese company to breed parrots in captivity. Building of the necessary infrastructure is underway, but the government foresees issuing additional licenses if this experience is successful.



Pionites melanocephalus

Estimated financial value of parrot trade

Between 2005 and 2014 the total financial value²² of exports in parrots was estimated to be USD5.2 million per year. The taxa with the highest total value are shown in Table 4.2.1.

The country with the highest value live parrot exports was Guyana (43%: USD2.2 million per year), followed by Suriname (37%: USD1.9 million per year). In terms of volume, Guyana exported 48% and Suriname 34%, suggesting that Suriname exported lower volumes of higher value live parrots.



Aratinga wagleri

Table 4.2.1: Estimated USD value of the top five parrot species exported as live from the Amazon region 2005-2014, as reported by exporters.

Species	Price per live bird by source (USD)		Total estimated value (USD)
<i>Ara ararauna</i>	1140	Captive	10,900,000
	1040	Wild	
<i>Pionites melanocephalus</i>	1018*	No source	500,000
<i>Amazona amazonica</i>	615	Captive	8,300,000
	293	Wild	
<i>Aratinga wagleri</i>	569*	Wild	600,000
<i>Ara chloropterus</i>	508	Captive	350,000
	353	Wild	

*Genus price proxy used as no price data at the species level could be found



Ara chloropterus

²² See methodology in Annex B for more details.

4.3 CAIMAN SKINS AND MEAT



Caiman crocodilus

The spectacled caiman (*Caiman crocodilus*) is the most highly traded reptile globally. It is also the CITES-listed species exported in largest numbers from the Amazon region, with an average of around 800 000 individual caimans being exported annually, mainly as skins. Virtually all reptile skins exported by Amazonian countries are caiman skins.

Although caiman skins are considered to be of inferior commercial quality than those of crocodiles (Crocodylidae) and the American alligator (*Alligator mississippiensis*), they have been exported in large numbers since the 1950s, when populations of crocodiles dwindled due to overexploitation (Velasco and Ayarzagüena, 2010). Despite high levels of international trade, *Caiman crocodilus* populations have not declined overall, as the species is relatively resilient to harvest pressure, mainly as a result of its short reproductive cycle and ecological adaptability (Velasco and Ayarzagüena, 2010). The species was categorised as Lower Risk/least concern by IUCN globally in 1996 (CSG, 1996).

The taxonomy of the *Caiman crocodilus* complex is not fully settled. While many authors regard yacare as a separate species and consider *chiapasius* a distinct subspecies (e.g. Trutnau and Sommerlad, 2006; Venegas-Anaya et al., 2008; Escobedo-Galván et al., 2011), CITES does not, as it currently follows the nomenclature by Wermuth & Mertens (1996), who recognised the following four subspecies: *C. c. apaporiensis*, *C. c. crocodilus*, *C. c. fuscus* and *C. c. yacare*. With the exception of *C. c. apaporiensis* (which has a restricted distribution in south-eastern Colombia and is listed in CITES Appendix I), the species is listed in Appendix II.

Caiman exports from the region during 2005-2014 mainly consisted of skins (c. 7.7 million) and smaller quantities of skin pieces and tails, as well as meat (c. 290 000 kg).

Skins

An annual average of approximately 770 000 skins were exported from the region over the period 2005-2014, with the majority (87%) reported as captive-bred *C. c. fuscus* from Colombia (Figure 4.3.1). Most of the remainder of the trade from the region was in wild-sourced *C. c. yacare* from Bolivia

and wild-sourced *C. c. crocodilus* from Venezuela and Guyana (Figure 4.3.2). Exports from the region experienced a dip during 2008-2009, potentially due to reduced demand during the 2008-2009 global financial crisis.

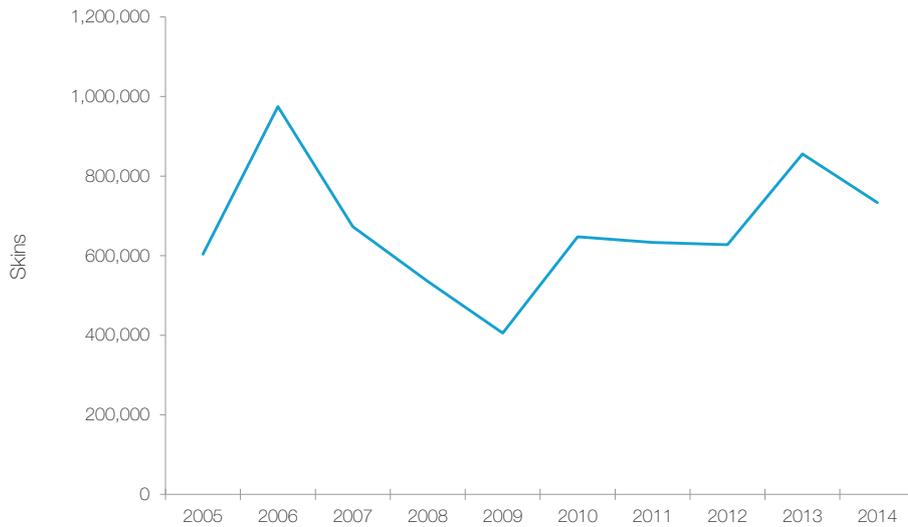


Figure 4.3.1: Exports of *Caiman crocodilus* skins from Colombia 2005-2014, as reported by Colombia. The vast majority were captive-bred *C. c. fuscus*.

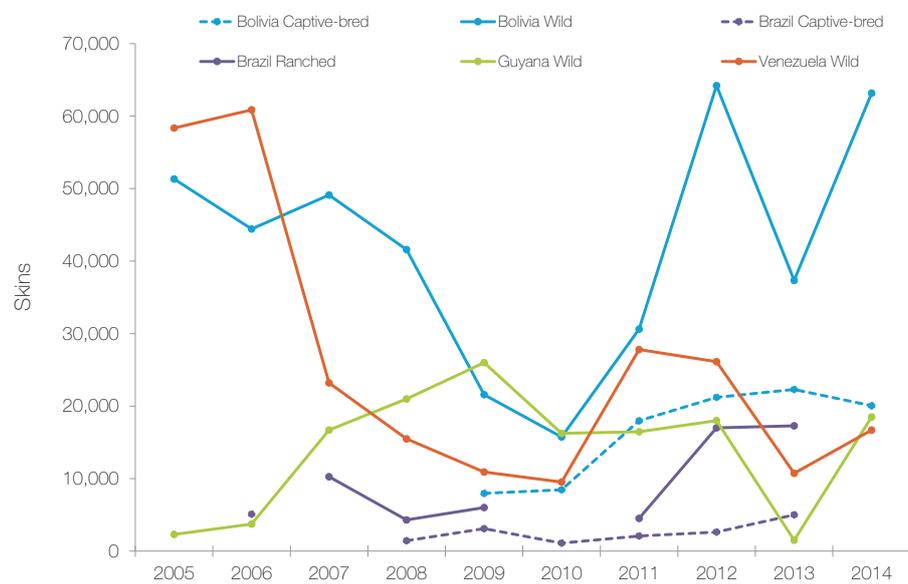


Figure 4.3.2: Exports of *Caiman crocodilus* skins from Amazonian countries other than Colombia, by source, 2005-2014 as reported by exporters. Exports from Bolivia and Brazil related to *C. c. yacare* and those from Guyana and Venezuela to *C. c. crocodilus*.

The main importers of caiman skins from the Amazonian countries were Singapore, Mexico and Thailand, followed by the United States and Italy. Over the 2005-2014 period, exports to Singapore have declined, whereas exports to Mexico and Thailand have increased (Figure 4.3.3). Although Singapore was the main importer of skins from Colombia, exports from Bolivia and Venezuela went primarily to Europe (Italy, Germany and Spain) and exports from Guyana and Brazil went mainly to Mexico.

Caiman skin pieces and tails, which are usually offcuts of skin from the reptile hide production process, and are often used for production of smaller leather goods (Brazaitis, 1987), were exported in much lower quantities than skins. On average, 65 000 tails (mostly of captive origin) and 23 000 skin pieces (both wild-sourced and captive-bred), as well as 42 000 leather products, were exported annually by Amazonian countries during 2005-2014 (Figure 4.3.4). The majority of this trade went from Bolivia and Colombia to Mexico, the United States and Italy.

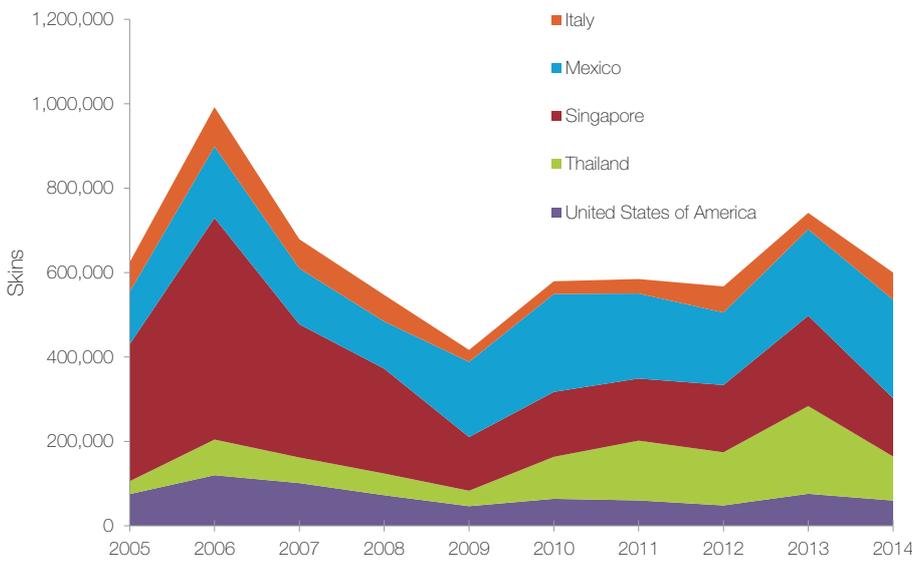


Figure 4.3.3: Exports of *C. crocodilus* skins, by country of import (main countries of import only), 2005-2014 as reported by exporters.

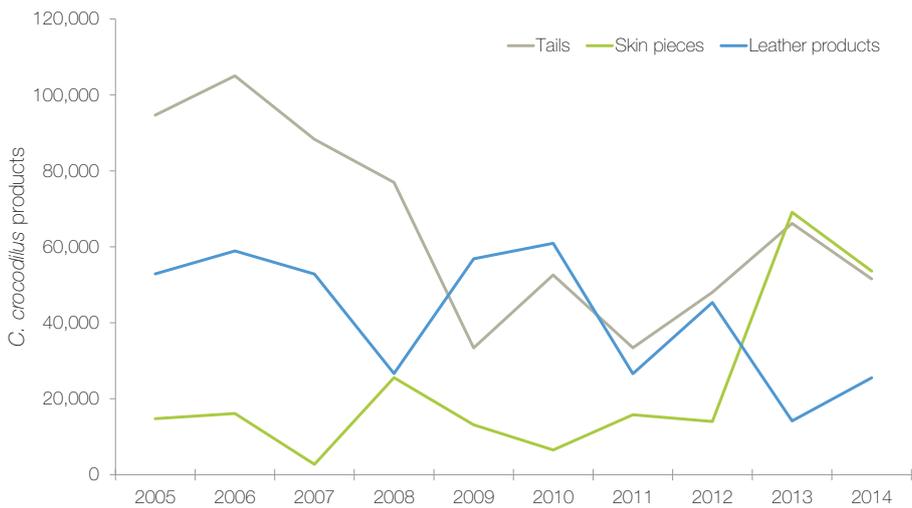


Figure 4.3.4: Exports of *C. crocodilus* tails, skin pieces and leather products, 2005-2014 as reported by exporters.

Meat

Caiman meat is often a by-product of the caiman skin industry (Cawthorn and Hoffman, 2016); however, spectacled caiman is often hunted in its own right as bushmeat (Júnior *et al.*, 2010; Alves *et al.*, 2012; Marioni *et al.*, 2013) and crocodilian meat is also in growing demand in countries such as China (Deng *et al.*, 2011).

Over 99% of the 290 000 kg of meat exported from the region during the period 2005-2014 were reported in 2005-2007, and switched from being all wild-sourced to mainly captive-bred (Figure 4.3.5). Approximately 59% of this meat was exported as wild-sourced from Bolivia, and the remainder as captive-bred from Colombia. Caiman meat exports from Bolivia were mainly destined to Belgium, the United States, China

and the Netherlands, whereas almost all exports from Colombia went to Taiwan, Province of China. The short period of time over which caiman meat was exported from the region appears to be related to an initial attempt to meet the international demand for crocodilian meat, hampered by insufficient infrastructure to ensure a supply change that could meet the strict food hygiene requirements imposed by importing countries (such as ensuring an appropriate cold storage chain) (A. Mollo, Bolivia CITES management official, *pers. comm.*, 2017). Food export hygiene requirements imposed by Colombia, as well as the unprofitable prices paid by importers also contributed to the halt in exports from this country (A. Gómez, CITES Management Authority of Colombia, *pers. comm.* 2017).

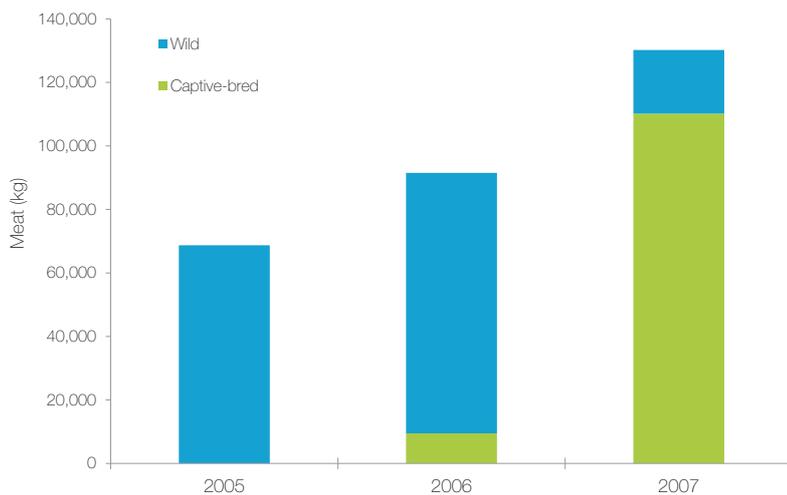


Figure 4.3.5: Direct exports of *Caiman crocodilus* (spectacled caiman) meat (kg) 2005-2014 by source.



Box 5. Sustainable use of *Caiman crocodilus* in Venezuela

Edis Solórzano, CITES Management Authority of Venezuela, Ministry of Popular Power for Ecosocialism and Waters (MINEA) and Ricardo Babarro, General Directorate for Biological Diversity, MINEAnt Authority of Venezuela, Ministry of Popular Power for Ecosocialism and Waters

The *Caiman crocodilus* sustainable use programme in Venezuela is regulated by Ministerial Resolution 195, published in the Official Bulletin No. 38.421 of 21 April 2006. This Resolution establishes the legal, procedural and technical rules for the commercial harvest of this resource.

Harvest quotas are assigned on the basis of a methodology that divides the harvest area into seven ecological regions within the core distribution area of the species in the country, assessing the average density and size distribution in each of those areas. The number of harvestable individuals is established on the basis of the population density, the percentage of specimens in size Class IV (adult males with a ventral length >89.9cm) in each ecological region, the management plan and the area of the land where harvest is authorised. The authorised harvest can be up to a maximum of 20% of individuals in Class IV.

In order to determine the maximum sustainable yield, regular population monitoring has been undertaken in the ecological regions (1992; 1995-96; 1999-2000; 2002-03 y 2006). The most recent population status update (year 2006) estimated a total population of 1 111 929 individuals, with a harvestable segment of 287 665 individuals and a maximum potential harvest of 57 534 per year.

Once the harvest has taken place in the authorised lands through a hunting licence for commercial purposes, a security tag is attached to each skin and a transport permit is issued to move the skins from the field to collection centres, where another transport permit is issued for the onward transport to storage warehouses or tanneries. Prior to export, skins (raw, semi-tanned or tanned) must be labelled with CITES-authorised tags and have a CITES export permit.

Estimated value of trade in caiman meat and skins

Between 2005 and 2014 the total financial value²³ of exports in reptile skins as reported by exporters was estimated to be USD51.1 million per year, the vast majority of which can be attributed to caiman skins. In addition, the estimated value of caiman meat was USD0.4 million per year. The species with the highest

estimated value traded as reptile skins are shown in Table 4.3.1.

The country with the highest value reptile skin exports was Colombia (87%: USD44.4 million per year), followed by Bolivia (7%: USD3.5 million per year).

Table 4.3.1: Estimated USD value of top three reptile species exported as skins from the Amazon region 2005-2014, all sources except I, as reported by exporters.

Species	Price per unit by source (USD)		Total estimated value (USD)
<i>Caiman crocodilus</i>	70	Captive	508,000,000
	64	Wild	
<i>Crocodylus acutus</i>	250*	Captive	2,100,000
<i>Melanosuchus niger</i>	280+	Wild	180,000

*Genus and +family price proxy used as no price data at the species level could be found

²³ See methodology in Annex B for details.

4.4 LIVE REPTILES



Boa constrictor

Trade in live reptiles from Amazonian countries consisted primarily of exports of side-necked turtles (Podocnemididae) from Peru, iguanas (Iguanidae) and boas (Boidae) from Colombia and Suriname, and tortoises (Testudinidae) from Brazil and Venezuela, with smaller quantities of caimans (Alligatoridae) from Guyana and tegu lizards (Teiidae) from Colombia and Guyana (Figure 4.4.1).

The source of the exports varied largely by country, with Peru exporting mainly live reptiles of ranched and first-generation captive sources; Brazil, Colombia and Venezuela exporting mainly captive-bred reptiles; and Guyana and Suriname exporting wild-sourced individuals (Figure 4.4.2).

Exports of live reptiles during the 2005-2014 period increased, driven largely by the substantial growth in the export of ranched yellow-spotted Amazon river turtle *Podocnemis unifilis* (Figure 4.4.3).

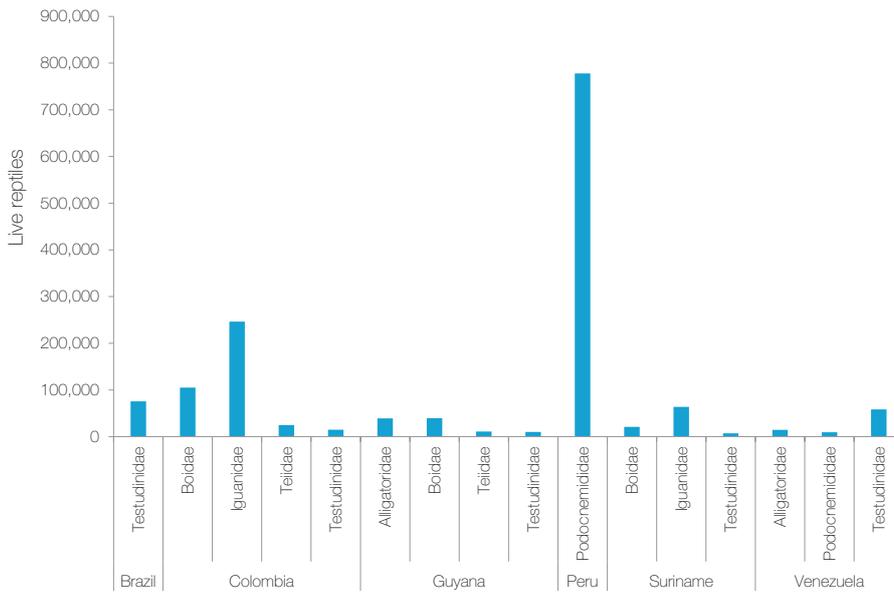


Figure 4.4.1: Exports of live reptiles by country and family 2005-2014, as reported by exporters. Trade under 5000 reptiles has been excluded.

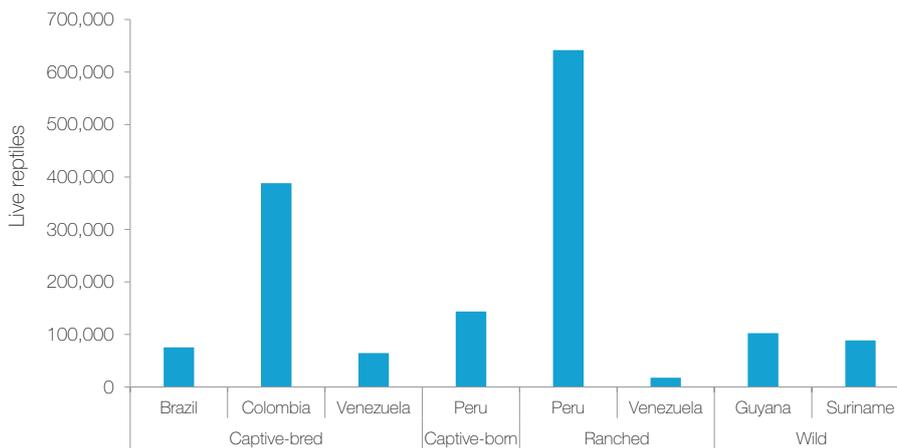


Figure 4.4.2: Exports of live reptiles by source and country 2005-2014, as reported by exporters. Trade under 5000 reptiles has been excluded.



Figure 4.4.3: Exports of live reptiles by source over time 2005-2014, as reported by exporters.

Lizards (Order: Sauria)

An average of approximately 35 000 lizards per year were exported from the region during 2005-2014, with just over three-quarters being reported as captive-bred and the rest as wild-sourced. The vast majority of lizard exports between 2005 and 2014 were live *Iguana iguana* (green iguana) and, to a lesser extent, *Tupinambis teguixin* (golden tegu) for the pet trade.

Virtually all trade in captive-bred lizards was from Colombia, while exports of wild-sourced lizards were from Suriname (*Iguana iguana*) and Guyana (*Tupinambis teguixin*). Small numbers of captive-born (source F) *Dracaena guianensis* (northern caiman lizard) were also exported by Peru.

Overall, exports of live lizards from the region declined over the ten-year period, mainly due to a marked reduction in the volumes of captive-bred green iguanas exported, from 100 000 in 2005 to zero in 2013 and 2014 (see Figure 4.4.4). The decline

in the export of green iguanas reflects a global trend that has been attributed to a reduction in demand for green iguanas for the pet trade (Stephen et al., 2012). This reduction in demand may have been primarily driven by the growth in popularity of alternative species that are easier to keep than iguanas, such as bearded dragons (*Pogona vitticeps*, a species native to Australia), or leopard geckos (*Eublepharis macularius*, a species native to southern Asia) (B. Weissgold, USFWS, pers. comm., 2017). A shift in the United States reptile pet trade from imports to domestic captive breeding (Collis and Fenili, 2011) may have also contributed to the decline in iguana exports from the region.

The single main importer of lizards from the region was the United States, which accounted for 93% of all imports. Germany, Canada and the Netherlands were the next most important importers, particularly for wild-sourced lizards.

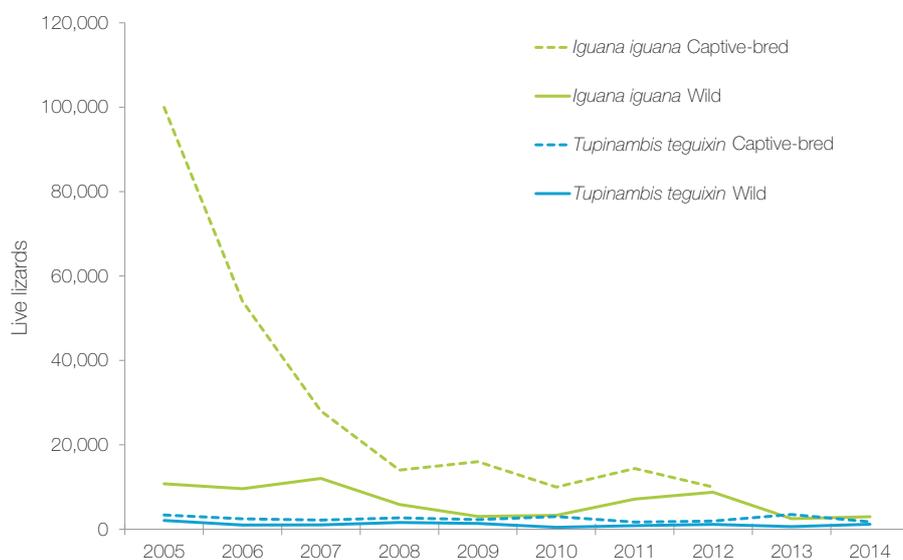


Figure 4.4.4: Exports of live lizards (Order: Sauria) by source and species 2005-2014, as reported by exporters. Species averaging less than 300 individuals per year have been excluded.



Snakes (Order: Serpentes)

Most live snake exports from the region were captive-bred *Boa constrictor* (average of 10 500 individuals per year, with a decreasing trend during 2005-2014, see Figure 4.4.5). All exports of captive-bred *Boa constrictor* were from Colombia, primarily to the United States. The decreasing export trend

may be the result of reduced demand as a result of an increasing domestic production of captive-bred boas (including sought-after colour morphs) in the United States (Collis and Fenili, 2011; B. Weissgold, USFWS, pers. comm., 2017).



Figure 4.4.5: Exports of live *Boa constrictor* 2005-2014, as reported by exporters.

Exports of wild-sourced snakes comprised a wider variety of Boid species, and accounted for an average of 5700 individuals per year during the ten-year period, with a decreasing trend (Figure 4.4.6) that may be explained by reduced demand in the United States, as discussed for *B. constrictor*. *Corallus hortulanus* (Amazon tree boa), *Corallus caninus*

(emerald tree boa), *Boa constrictor* and *Eunectes murinus* (green anaconda) were the main species in trade. Guyana and Suriname were the only exporters of wild-sourced snakes during this period, with the United States accounting for two-thirds of imports. Germany, the Netherlands, the UK and Canada were the other main importers of wild-sourced snakes.

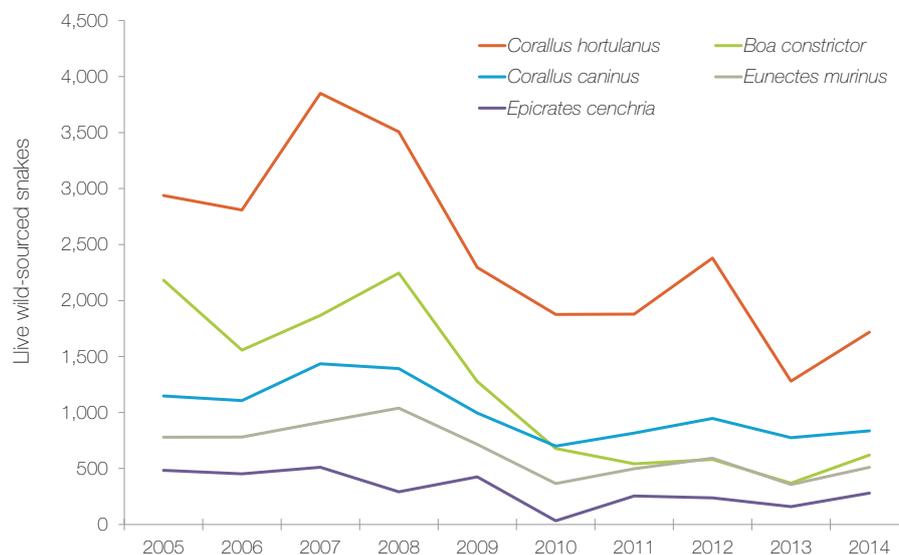


Figure 4.4.6: Exports of live wild-sourced snakes (Order: Serpentes) by species 2005-2014, as reported by exporters. Species averaging less than 100 individuals per year have been excluded. All exports were reported by Guyana and Suriname.



Corallus hortulanus



Corallus caninus

Box 6. Trade and management of reptiles in Guyana

Calvin Bernard, University of Guyana and former Chair, Wildlife Scientific Authority Board, Guyana

Guyana records trade in live specimens of 51 species of reptiles: 13 lizards, 22 snakes, 12 turtles, three caimans and one amphisbaena. Approximately 29% of the traded species are listed on Appendix II of CITES and 2% are on Appendix III. Over two thirds (69%) of the species traded, however, are not CITES-listed. An overwhelming majority (92%) of reptile species in trade have performed below 75% of the allotted quota over that last five years. Over half (55%) of the species were traded at levels below 50% of the allotted quota, and 25% of the species were virtually not traded at all. Only four species were traded at levels above 75% of the quota, including the rainbow boa (*Epicrates cenchria*), red-footed tortoise (*Chelonoidis carbonarius*) and the non-CITES listed mata-mata turtle (*Chelus fimbriatus*), with the top performer being the spectacled caiman (*Caiman crocodilus*), traded at 85% of the quota.

With the exceptions being much of the inhabited coastland and areas affected by mining, Guyana boast largely intact fully functional ecosystems with low levels of human pressures. These ecosystems provide excellent habitats for the abovementioned reptile species. For reptiles such as the spectacled caiman, human-influenced systems also provide suitable habitats where they flourish in high numbers. Apart from a few species (e.g. tortoises and green iguana) which are used locally for food, the reptiles traded internationally are under no additional harvest pressures. Quotas for all reptile species traded as live specimens have been stable for over a decade. Annual reviews take into consideration the portion of prior quotas utilised and factors such as reports on harvest effort, captive care and trade demand. Trade in caiman has received particular attention to determine population size and dynamics in order to guide export quotas. There are currently no species-specific management systems in place.

Recently passed legislation will integrate the harvest and local and international trade in all species of wildlife as well as overall species conservation. Preparations are underway for the establishment of the Wildlife Conservation and Management Commission under the new law. Guyana is committed to the establishment of a national system based on science and social, economic and environmental justice.

Tortoises and Freshwater Turtles (Order: Testudines)



Podocnemis unifilis

Two species (*Podocnemis unifilis* and *Chelonoidis carbonarius*) make up over 99% of live exports of tortoises from the region. The yellow-spotted river turtle (*Podocnemis unifilis*), categorised as Vulnerable globally by IUCN in 1996 (TFTSG, 1996), experienced a 190-fold increase in exports, from around 1500 live individuals in 2005 to over 280 000 in 2014. The vast majority of this trade was reported by Peru as

ranchered (source R) and captive born (source F) individuals (approximately 80% and 20% of exports, respectively). The increase in exports reflects an increase in populations through ranching (harvesting of eggs and release back into the wild of a proportion of hatchlings) of turtle populations through local community-led management programmes, which has taken place in Peru since the mid-1990s with positive results. For example, releases of managed *P. unifilis* in the Peruvian Amazon increased from around 40 000 in 2005 to over 500 000 in 2014. Trade increased particularly after the first management plan was approved in 2008 for the most important region of Peru for the harvesting of the species, the Pacaya basin (UNEP-WCMC, 2014; MINAM, 2016a; see also box 6).

Trade in the red-footed tortoise (*Chelonoidis carbonarius*) showed a more stable trend, averaging 16 000 individuals per year, reported primarily as captive-bred from Brazil, Venezuela and Colombia, with smaller numbers (c. 5% of all trade in the species) reported as wild-sourced from Guyana and Suriname.

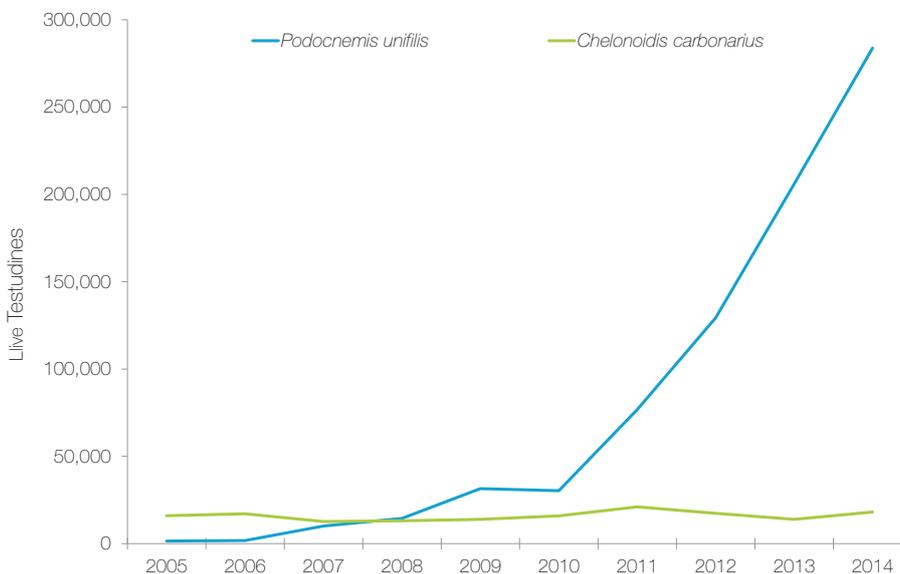


Figure 4.4.7: Main exports of live Testudines by species 2005-2014, as reported by exporters.

In contrast to live reptile trade for other groups (which are mainly exported to the United States and Europe), the vast majority (97%) of *Podocnemis unifilis* exports went to Hong Kong (SAR) and China. These importers also accounted for approximately a third of *Chelonoidis carbonarius* imports. The United States and El Salvador were the other main importing countries of this species. Although markets in China sell tortoises not only as pets, but also for food and traditional medicine, market

surveys in the country indicate that the pet turtle trade has increased markedly (Gong et al., 2009) and *Podocnemis* turtles, as well as *Chelonoidis carbonarius* were reported to be primarily traded as pets (Cheung & Dudgeon, 2006). It is possible that some of the imported *P. unifilis* individuals will also go into aquaculture and eventually enter the consumption trade (P.P. van Dijk, IUCN TFTSG, pers. comm., 2017).

Box 7. Sustainable use of *Podocnemis unifilis* in Peru

Yuri Beraun, Fabiola Núñez and José Álvarez, CITES Scientific Authority of Peru, Ministry of Environment

The yellow-spotted Amazon river turtle (*Podocnemis unifilis*), widely distributed in the Orinoco and Amazon basins, has been utilised since ancient times by different indigenous groups as a source of protein. The species has also played an important cultural role. Chroniclers and travellers who visited these vast territories between the XVIII and early XX centuries reported the species' abundance, traditional uses, harvest methods, changes in the type and level of use, and its important role in the sociocultural and socioeconomic transformation of the region (Castro *et al.*, 2013).

In Peru, the yellow-spotted Amazon river turtle occurs in most of the ten regions of the Peruvian Amazon, and it is present in at least 12 of the 76 national protected areas. However, it is in the Pacaya Samiria National Reserve (PSNR) where the management of the species has become one of the most important examples of threatened fauna recovery in the continent. When the reserve (one of the largest in the country) was created, *Podocnemis unifilis* was close to extinction and it was not one of the resources to be managed and consumed by native communities.

Currently, the species is considered abundant in places where management programmes have been implemented, some of which started in 1979. Peruvian CITES experts agree that there is a positive correlation between the management of *P. unifilis* populations and its abundance (Álvarez, 2012; Gagliardi, 2016; Gálvez, 2017; Vásquez & Tovar, 2017). It is worth noting that it is thanks to the efforts by SERNANP and other organisations that worked for years on the productive conservation of the species, that today it has not only recovered in its historic distribution range, but it also generates revenues for local communities, thus promoting development (Pulgar-Vidal, 2013).



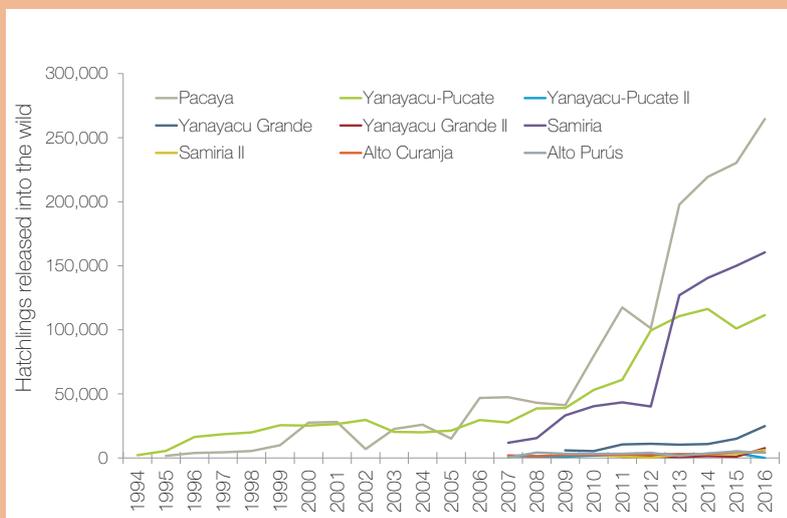
This project is recognised internationally and taken as a successful example of wildlife management plan in the Amazon. Not only because of its biological success, but also because of its social impacts, as it directly involves and benefits local communities (Gagliardi, 2015). This experience has been also recognised as a management model at the 28th meeting of the CITES Animals Committee (F. Núñez, CITES Scientific Authority of Peru, *pers. comm.* 2017) and at the 66th meeting of the CITES Standing Committee (M. Epiquién, CITES Management Authority of Peru, *pers. comm.* 2017).

Box 7. Sustainable use of *Podocnemis unifilis* in Peru (cont.)

Yuri Beraun, Fabiola Núñez and José Álvarez, CITES Scientific Authority of Peru, Ministry of Environment

In 2006, for the first time in a protected area, organised management groups traded 6757 *P. unifilis* specimens for export. This was achieved following 12 years of nest management (with no short-term benefits) through ranching (transfer of eggs to artificial beaches). Since the beginning of these efforts in 1994, close to three and a half million (3 466 971) hatchlings have been released back to the wild in PSNR, with 2 873 226 released since the approval of management plans. In addition, nearly 2 million *P. unifilis* hatchlings have been approved for export during this time.

The revenue generated from the trade has been, without doubt, the best incentive for the people undertaking these management and conservation activities for over 22 years, as demonstrated by the notable increase in the number of turtles released back to the wild since then (see figure 1). These numbers are correlated with the marked increase in laying females in the wild. This experience is now being replicated in other protected areas and also outside protected areas (MINAM, 2017).



Release of *P. unifilis* through management programmes in protected areas in Peru.



Podocnemis unifilis ranching in Peru

Caimans and crocodiles (Order: Crocodylia)



Paleosuchus trigonatus

Taiwan (PoC), the Netherlands and China were the main importers of live caimans from the region. As these countries were also some of the main importers of *Caiman crocodilus* meat from the region (although virtually no meat exports were recorded after 2007), it is possible that live caimans are destined at least in part to the food markets. However, imports into the Netherlands may also be for pet purposes, with the country potentially serving as an entry port for markets in Europe (P. Joop, CITES Scientific Authority of the Netherlands, *pers. comm.*, 2017).

In addition to *Caiman crocodilus*, live *Paleosuchus trigonatus* and *Paleosuchus palpebrosus* were also exported from the region, at an average of approximately 430 individuals per year for each species, all wild-sourced from Guyana.

The majority of live Crocodylia exported from the region during 2005-2014 were *Caiman crocodilus*. Exports of live *C. crocodilus* decreased overall during this period, from over 6000 per year during 2005-2009 to under 3000 per year during 2010-2014. Two-thirds of this trade was in wild-sourced individuals exported by Guyana throughout the ten-year period, with most of the remainder being ranched caimans exported by Venezuela up to 2009.

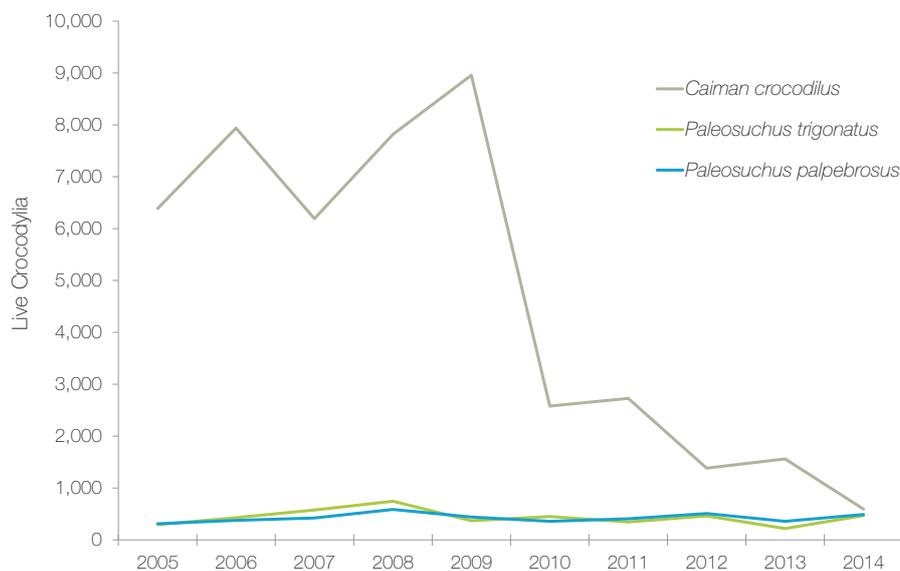


Figure 4.4.8: Main exports of live Crocodylia by species 2005-2014, as reported by exporters.

Estimated value of trade in live reptiles

Between 2005 and 2014 the total financial value²⁴ of live reptile exports was estimated to be USD6 million per year. The species with the highest estimated value traded as reptiles are shown in Table 4.4.1.

The country with the highest value live reptile exports was Peru (66%: USD3.9 million per year), followed by Colombia (16%: USD1 million per year). In terms of export volume, Peru exported 51% and Colombia accounted for 26% of total trade.

Table 4.4.1: Estimated USD value of top five live reptile taxa exported from the Amazon region 2005-2014, as reported by exporters.

Species	Price per unit (USD)		Total estimated value (USD)
<i>Podocnemis unifilis</i>	50	Captive	39,300,000
	50*	Ranched	
	11**	Wild	
<i>Boa constrictor</i>	73	Captive	8,500,000
	55	Wild	
	88	Ranched	
<i>Caiman crocodilus</i>	68	Captive	4,900,000
	66	Wild	
<i>Chelonoidis carbonarius</i>	18	Captive	2,900,000
	33	Wild	
<i>Iguana iguana</i>	5	Captive	1,500,000
	3	Wild	

*The price of captive-bred *P. unifilis* was used as a proxy for ranched *P. unifilis* as no price data was available at the species level for this source.

**Genus price proxy used as no price data at the species level could be found

Based on FOB prices recorded by Peru during 2005-2014 for CITES animal exports, the country generated, on average, USD285 thousand per year from *Podocnemis unifilis* exports. Discrepancies between FOB prices at the point of export in Peru and the

estimates based on declared prices at the point of import into the United States highlight the need to take estimates of the economic value of wildlife trade with caution, and to take into account the changes in the value of products along the trade chain..



Caiman crocodilus

²⁴ See methodology in Annex B for details

4.5 AMPHIBIANS



The Amazon region is home to one of the highest amphibian diversities globally. Brazil and Colombia (with around 800 species of amphibians recorded in each) and Ecuador and Peru (with over 400 species

each) are the countries with the largest number of amphibian species in the world (Stuart et al., 2008; Acosta-Galvis & Cuentas, 2016). Venezuela and Bolivia are also amongst the most diverse countries in terms of amphibian species (Stuart et al., 2008). Approximately 100 species native to the region are listed in CITES; the majority are poison dart frogs (Dendrobatidae), a family endemic to the Neotropics and highly valued in the pet markets.

The vast majority of the trade in CITES-listed amphibians from the region was in live Dendrobatidae frogs. An average of approximately 2500 live frogs were exported from the region per year during 2005-2014 (Figure 4.5.1). The source of exports varied according to the exporting country: most frogs exported from the region were sourced from the wild in Suriname and Guyana; the remainder of the trade comprised primarily captive-produced frogs from Colombia and Peru and ranched frogs from Ecuador (Figure 4.5.2). The vast majority went to Europe and North America.

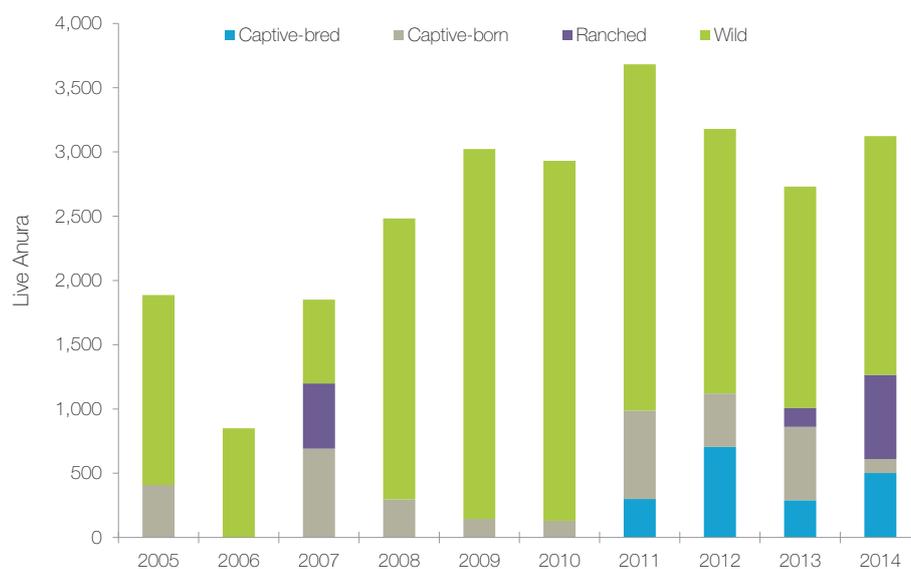


Figure 4.5.1: Exports of live Dendrobatidae by source, 2005-2014 as reported by exporters.

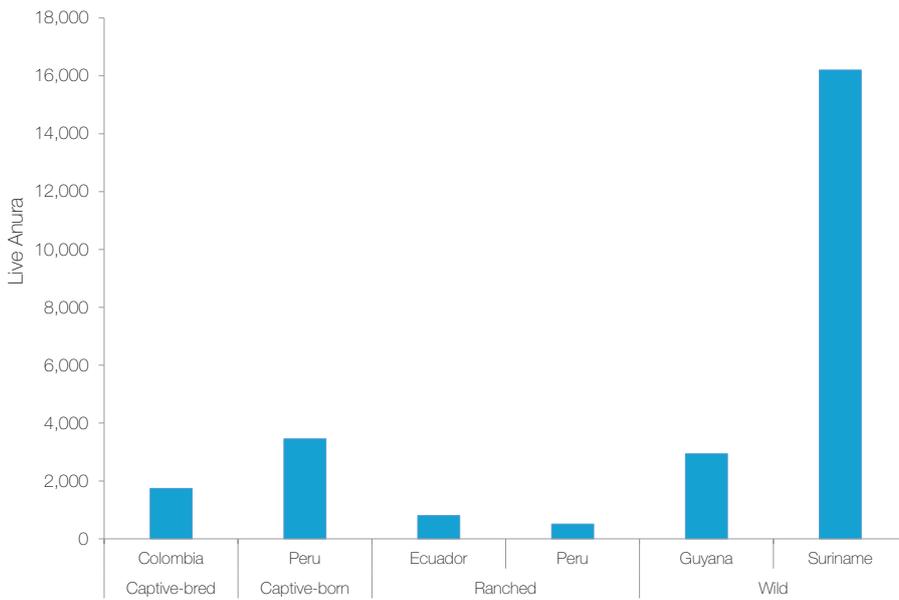


Figure 4.5.2: Exports of live Dendrobatidae by source and country, 2005-2014, as reported by exporters.

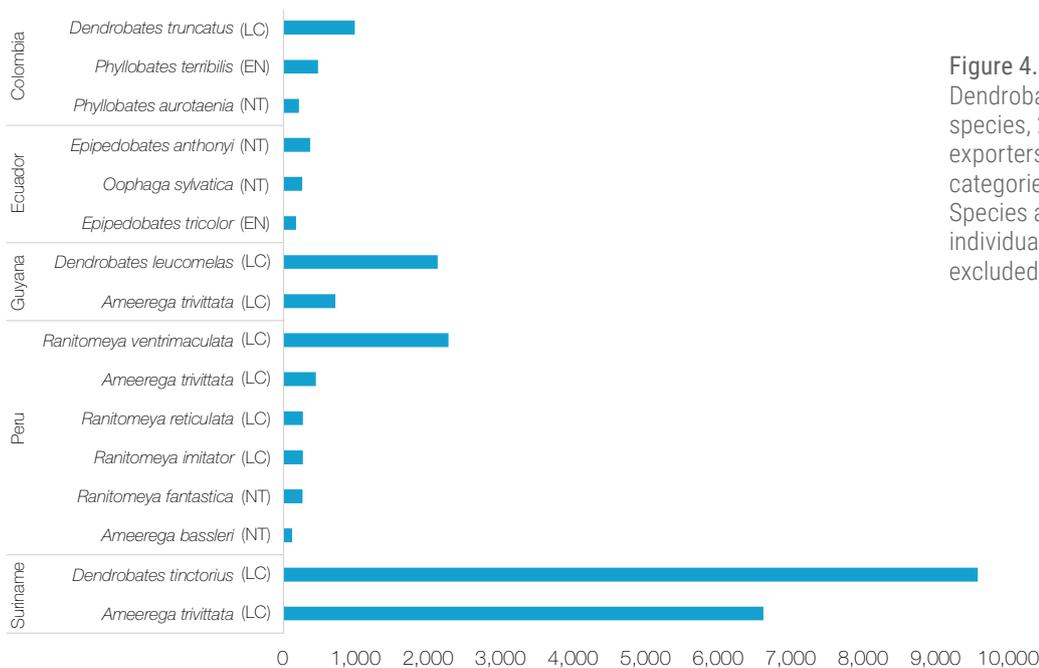


Figure 4.5.3: Exports of live Dendrobatidae by country and species, 2005-2014, as reported by exporters. The IUCN Red List global categories are indicated in brackets. Species averaging less than 10 individuals per year have been excluded.



Phyllobates terribilis

The species composition of exports varied by exporting country (see Figure 4.5.3). Eighty-five percent of all trade in CITES-listed amphibians from the region related to live individuals of four species of poison dart frogs: the dyeing dart frog (*Dendrobates tinctorius*), three-striped poison frog (*Ameerega trivittata*), reticulated poison frog (*Ranitomeya ventrimaculata*) and yellow-banded poison dart frog (*Dendrobates leucomelas*) (Figures 4.5.3 and 4.5.4).

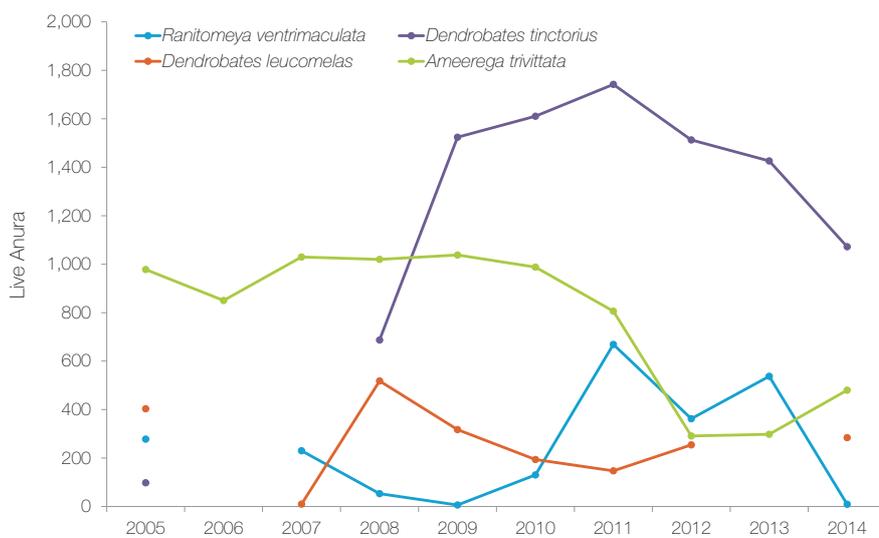


Figure 4.5.4: Exports of live Dendrobatidae by species, 2005-2014, as reported by exporters. Species averaging less than 100 individuals per year have been excluded.

Estimated financial value of trade in live frogs

Between 2005 and 2014 the total financial value²⁵ of exports in live frogs as reported by exporters was estimated to be USD90 000 per year. The taxa with the highest total value are shown in Table 4.5.1.

The country with the highest value live frog exports

was Suriname (47%: USD0.4 million per year) followed by Peru (38%: USD0.3 million per year). In terms of volume, Suriname exported 63% and Peru 15%, suggesting that Peru exported smaller volumes of higher value live frogs.

Table 4.5.1: Estimated USD value of the top five live frog species exported from the Amazon region 2005-2014 as reported by exporters.

Species	Price per live frog (USD)	Source	Total estimated value (USD)
<i>Dendrobates tinctorius</i>	30	Wild	290 000
<i>Ranitomeya ventrimaculata</i>	105	Captive	220 000
<i>Ameerega trivittata</i>	18	Wild	150 000
<i>Dendrobates truncatus</i>	60	Captive	59 000
<i>Phyllobates terribilis</i>	65	Captive	31 000



Ameerega trivittata



Ranitomeya ventrimaculata

²⁵ See methodology in Annex B for details

Box 8. Sustainable management of amphibians in Ecuador

David Veintimilla Yáñez, CITES Management Authority of Ecuador, Ministry of Environment

Ecuador has the third highest diversity of amphibians globally (580 species); however, sustainable use of those species was only started in 2011 by a private company, with the aim of turning amphibians into a sustainable forest resource and an economic strategy to support their conservation through ranching and captive breeding programmes.

Ranching is undertaken through habitat enrichment to achieve *in situ* breeding within semi-open square-shaped enclosures. The enclosures are surrounded by synthetic mesh walls and watering is automatic through micro-sprinklers. Each enclosure is positioned to maximise sunlight; in addition, plants (bromeliads) are planted and logs, branches and abundant dead leaves are placed around each bromeliad. This increases the availability of food, shelter and places for frogs to lay eggs and for tadpoles to be raised. No frogs are released back into the wild due to the risk of amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) transmission.



Ranching of amphibians in Ecuador

Captive production is undertaken in laboratories kitted with terraria, individual containers and an open water sprinkle system activated four times a day, with durations adjusted by species. Terraria are enriched with plants and dead leaves to provide gripping surfaces and shelter. Alongside the labs, there are ex situ semi-natural enclosures with natural vegetation and water containers for tadpoles.

Some of the frogs are bred in captivity according to Resolution Conf. 10.16 (i.e. source code C), while others are born and raised in captivity from wild parents (i.e. source code F).



Captive breeding of amphibians in Ecuador

Management of amphibians through ranching and captive breeding represents some advantages over direct capture from the wild, as the impact of harvest and trade on wild populations is minimal, and control and traceability measures can be implemented effectively at the points of origin and final destination of the product.

The involvement of local communities in the management process, as well as the sharing of benefits derived from the use of this biological resource, and the ecological and economic effects derived from captive breeding, are areas that require further discussion.

4.6 ARAPAIMA



Arapaima (*Arapaima gigas*) occurs within the Amazon basin. It was assessed by the IUCN Red List as Data Deficient in 1996 and has not been assessed since (World Conservation Monitoring Centre, 1996). It was categorised nationally as Vulnerable (VU) in Colombia in 2012 (Mojica *et al.*, 2012). Castello and Stewart, (2009) considered it impossible to estimate the population size of arapaima in its entire range but believed that the population was likely to be declining. Over-fishing is considered to be a major threat to *A. gigas*, with habitat degradation and by-catch also threats (Castello and Stewart, 2009).

Meat

In total, 416 000 kg of *A. gigas* meat were exported from the region 2005-2014, the majority after 2010 and as captive-bred (Figure 4.6.1).

During 2005-2014, meat was predominantly exported from Peru (59%) and Brazil (38%) (Figure 4.6.2). Peru only exported captive produced meat for commercial purposes which was first exported in 2010; the volume of exports steadily increased 2010-2013 but

The majority of *A. gigas* exports from the region during 2005-2014 consisted of meat and live individuals (for ornamental purposes), with lower-volume trade in leather products. The meat has an appealing colour and texture and is easily processed (Schaefer *et al.*, 2012). It is considered to be for the gourmet market (FAO, 2015). The skin is used to produce exotic leather, scales are used for arts and crafts and there is a demand for juveniles as ornamental fish (Schaefer *et al.*, 2012).

then decreased by 78% in 2014 compared to 2013. Brazil first exported captive bred *A. gigas* meat in 2013 and the volume increased by 65% between 2013 and 2014 (Figure 4.6.2).

The main market for *A. gigas* meat 2005-2014 was the United States (92% of exports), with most of the rest exported to European countries.

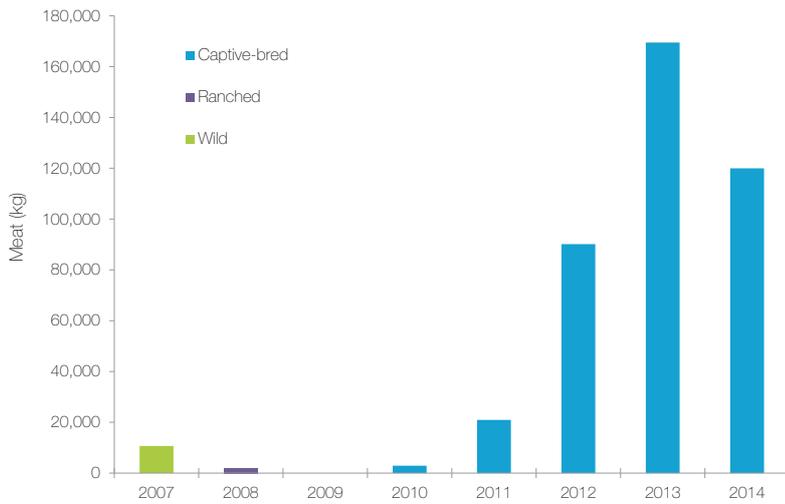


Figure 4.6.1: Exports of meat (kg) over the period 2005-2014, as reported by exporters.

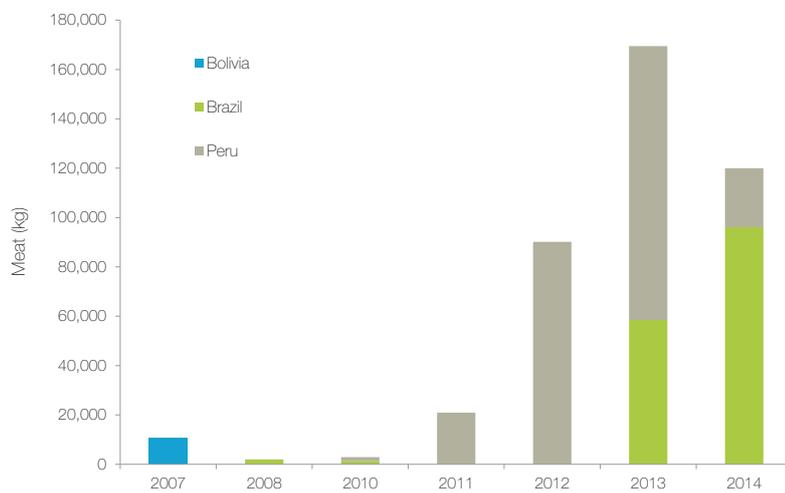


Figure 4.6.2: Exports of meat (kg) over the period 2005-2014, as reported by exporters.

Live

An annual average of 20 000 live captive-bred *A. gigas* were exported almost exclusively by Peru, with an overall increasing trend during 2005-2014 (Figure 4.6.3). Approximately 90% of live *A. gigas* were exported to Asia, with Hong Kong, SAR alone

accounting for nearly three quarters of exports from Peru. The United States, Japan, Indonesia and China were the other main importing countries. Fish are imported to Asia for their ornamental appeal and are associated with prosperity (BTFF/UNCTAD, 2005).

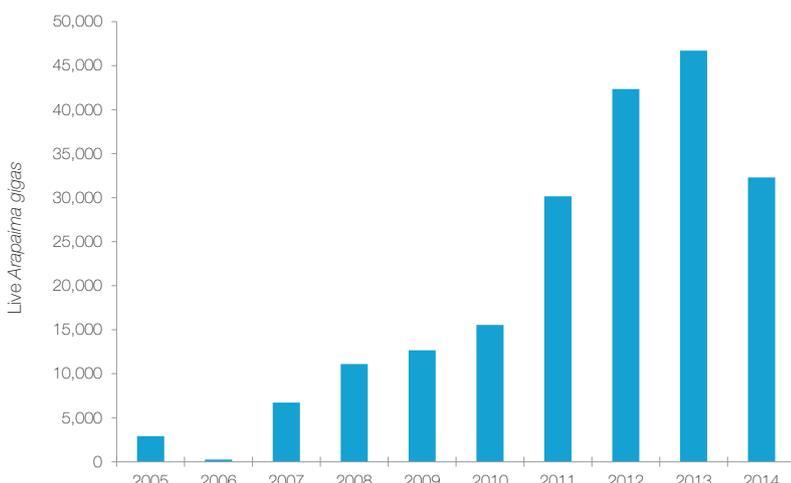


Figure 4.6.3: Exports of live *A. gigas* over the period 2005-2014, as reported by exporters.

Leather products

A more recent trend of note was exports of large arapaima leather products (6582), 5177 of which were wild-sourced. Arapaima leather is sometimes used as an exotic skin in the manufacture of leather items. All of the exports of large leather products were reported 2012-2014 by Brazil and for commercial purposes. The majority of wild-sourced large leather products (64%) were exported to the United States and the majority of captive-bred were exported to Italy (54%).

Estimated financial value of trade in Arapaima

Between 2005 and 2014 the total financial value²⁶ of exports in arapaima as reported by exporters was estimated to be USD1 million per year. The estimated values of arapaima products in trade are shown in Table 4.6.1.



Table 4.6.1: Estimated USD value of arapaima products exported from the Amazon region 2005-2014, all sources except I, as reported by exporters.

Product	Price per unit (USD)	Source	Total estimated value (USD)
Meat (kg)	15	Captive	6 200 000
Leather products (large)	294	Wild	1 900 000
Live	8	Captive	1 600 000
Garments	294	Wild	81 000
Leather products (small)	399	Wild	34 000

The country with the highest value arapaima exports was Peru (54%: USD 0.5 million per year), which exported only relatively low value live fish and meat. Brazil exported meat, but also higher value leather products; therefore Brazil accounted for 23% of export quantity but 45% of estimated value (USD0.4 million per year).

²⁶ See methodology in Annex B for details

Box 9. Management of arapaima in Brazil*Cristina Isis Buck Silva and Henrique Anatole Ramos, CITES Management Authority of Brazil, IBAMA*

Management of arapaima (*Arapaima gigas*) in Brazil is determined by state-level legislation and therefore varies between states. In some states, fishing arapaima requires prior studies and a local management plan. Although fisheries statistics are available for the management areas, this is not the case for other areas. Nonetheless, population increases have been observed in managed areas, and local extinctions have occurred in areas where harvest is not controlled.

Fisheries with management plans are controlled through a licence system that allows local communities in the management areas to capture a given number of adult arapaima. These harvest quotas are issued annually by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), and are up to 30% of the adult arapaima recorded in fishing areas, to ensure that most of population is not affected.

The first harvest quota was authorised in 1999 in the Mamirauá Development Reserve (State of Amazonas). In 2015, 23 permits were issued in 21 different areas, including protected areas (Conservation Units), Fishing Agreement areas and indigenous lands.

Management of the fisheries has allowed the recovery of arapaima populations in the wild, and it has contributed to improving the quality of life of more than 300 local communities that take part in the management. In 2015, in the State of Amazonas alone, close to half million individuals were caught in 21 arapaima management areas, and gross sales of these fish resulted in revenues exceeding USD 2.8 million. Such practices help protect not only the managed fish, but also the ecosystems where they live.

IBAMA participates in the management of arapaima at the pre-harvest, harvest monitoring and post-harvest stages, including through analysis of fishing reports from previous years, participation in meetings with local communities, establishment of catch quotas, monitoring population counts and fishing activities, and controlling trade through a system of transportation licences for fish caught as part of management plans.

Since arapaima fishing is only considered to be non-detrimental when it is undertaken in management areas, the Brazilian government only authorises the export of arapaima when it originates in management areas or when it has been bred in captivity according to CITES requirements.

Fishing by communities in management areas does not result in meat exports, as domestic demand is very high and the prices paid nationally are good; therefore only skins and scales tend to be exported. The meat that is exported is from aquaculture, but there have only been exports in recent years as that is when fish breeders were able to meet CITES requirements for captive breeding. Brazil does not export live (juvenile) arapaima specimens because of minimum size fishing restrictions and because the domestic market is able to absorb more than what is produced through aquaculture.

4.7 ORCHIDS

All species of the family Orchidaceae are listed in CITES Appendix II, with the exception of two genera and six species listed on Appendix I. These Appendix I taxa include one genus and three species from the Amazon region: *Phragmipedium* spp., *Laelia jongheana*, *Laelia lobata* and *Peristeria elata*. In addition, seeds, seedpods, seedlings in sterile flasks, cut flowers of artificially propagated plants, and artificially propagated hybrids of the genera *Cymbidium*, *Dendrobium*, *Phalaenopsis* and *Vanda* that meet certain conditions are exempted from the provisions of the Convention²⁷.

Due in part to the exemptions for several orchid products, 99% of commercial CITES exports in orchids from the Amazon region between 2005 and 2014 were of live plants. The majority (98%) of live commercial orchid exports were of Appendix II taxa, with a steady increase over time in the proportion of Appendix I trade from less than 1% of total exports in 2005 to over 4% in 2014. More than 99% of commercial live orchid exports were from artificially propagated sources (Source A and D), with less than 1% reported as wild-sourced.

Six countries exported live orchids, with the majority from Brazil (57%) and Ecuador (23%), and smaller amounts from Peru (7%), Colombia (7%), Venezuela (4%) and Suriname (2%). Between 2005 and 2014, the most notable trend in live orchid exports was a peak in 2006 of exports from Brazil, with an overall decreasing trend in exported volume throughout the period. Between 2011 and 2014 Ecuador overtook Brazil as the country with the highest export volume (Figure 4.7.1).



²⁷ Note that, despite this exemption, various countries report trade in artificially propagated orchid hybrids in their CITES annual reports. This information has not been excluded from the analysis as it is based on what has been reported in CITES annual reports and as insufficient information was available on the conditions met by each case, but it is likely that this analysis includes in part trade in orchids that is not regulated by CITES.

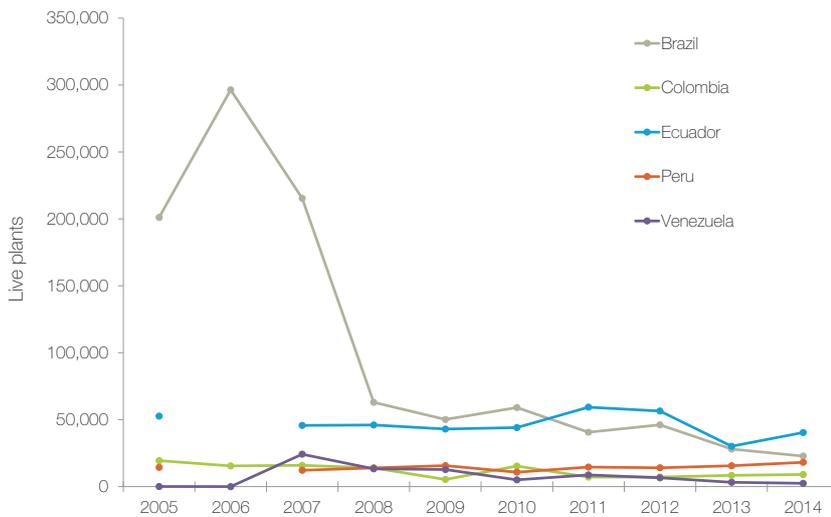


Figure 4.7.1: Exports of live artificially propagated orchids from the main Amazonian exporters, 2005-2014 as reported by exporters. N.B: Ecuador’s 2006 CITES annual report was not available at the time of analysis.

The peak in exports from Brazil shown in Fig. 4.7.1 was predominantly due to the export of very high volumes to the Netherlands between 2005 and 2007 of the jewel orchid *Ludisia discolor*, a species native to China and Southeast Asia (WCSP, 2016), which is one of the few species of orchid traded for its ornamental leaves rather than its flowers. This may be the result of European nurseries exporting seedlings of tropical orchid species from Europe to countries with more suitable climates, to be grown to retail size before the plants are exported back to Europe for sale (A. Hinsley, IUCN Orchid Specialist Group, pers. comm., 2017).

A total of 60 countries imported orchids from the Amazonian countries 2005-2014. The main importers of orchids from the region between 2005 and 2014 are shown in Fig. 4.7.2. After importing very high volumes of *L. discolor* plants from Brazil in 2005-2007, import volumes from the Netherlands decreased, and Germany and the United States became the highest volume importers.



Cattleya walkeri

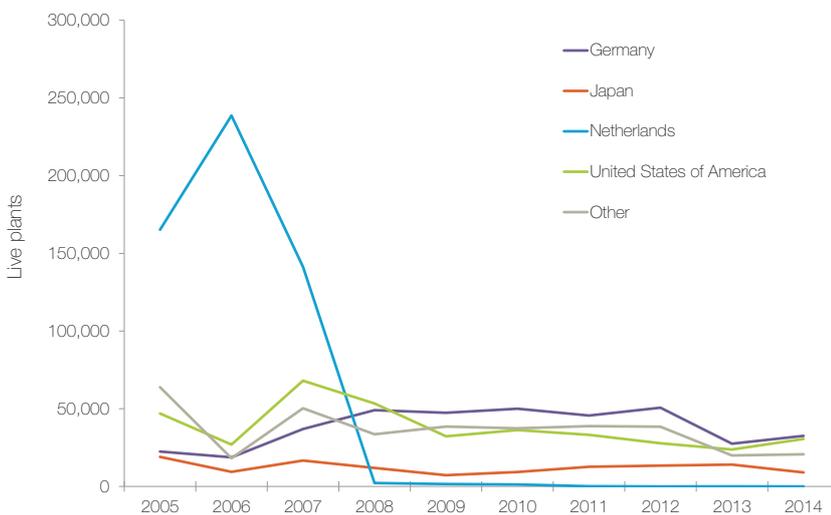


Figure 4.7.2: Imports of live artificially propagated orchids from Amazonian countries 2005-2014, as reported by exporters.

During this period, a total of 2244 orchid taxa were exported from the region at the species level, with a further 281 different taxa and 60 hybrids reported at the genus or family level. The 2005-2007 exports of *L. discolor* noted in previous figures represented 29% of all live orchids between 2005 and 2014. With this

very large amount of trade in *L. discolor* removed, the taxa with the highest volume of exports identified to species level are shown in Fig. 4.7.3 and the genera with the highest reported export volume (both reported at genus and species level) are shown in Fig. 4.7.4.

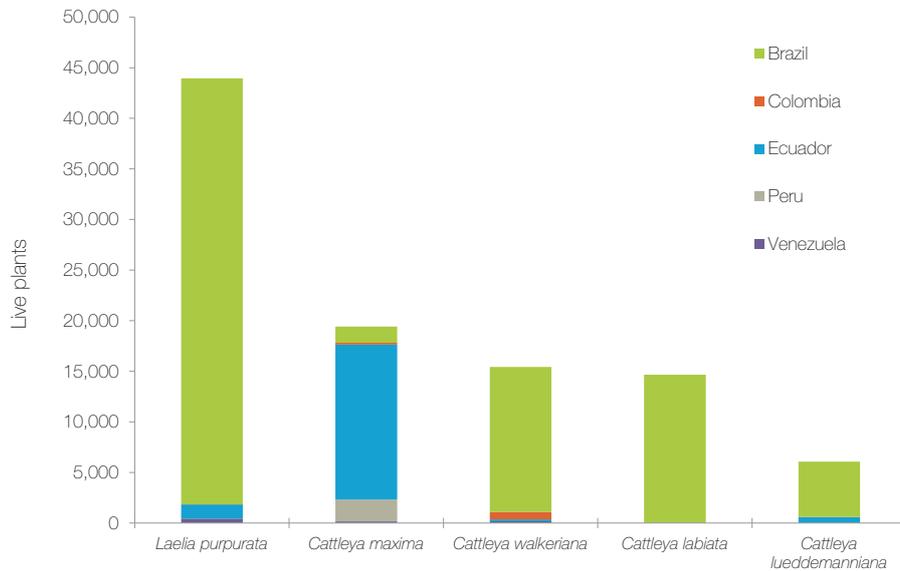


Figure 4.7.3: Top five orchid taxa (with the exception of *Ludisia discolor*) reported at the species level and exported as live artificially propagated orchids from the main Amazonian exporters, 2005-2014 as reported by exporters.

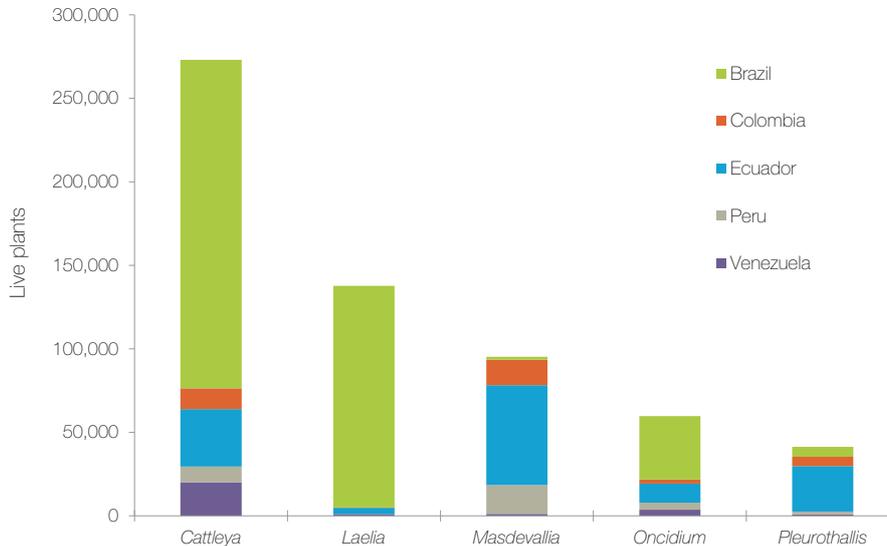


Figure 4.7.4: Top five orchid genera (with the exception of *Ludisia*) reported at the species and genus level and exported as live artificially propagated orchids from the main Amazonian exporters, 2005-2014 as reported by exporters.

Box 10. Orchid trade in Brazil

Claudia Maria Correia de Mello, CITES Management Authority of Brazil, IBAMA

Orchids exported by Brazil are artificially propagated. The first orchid nurseries in the country started collecting Brazilian species and plants from collectors a long time ago with the aim of propagating them, thus contributing to the *ex situ* conservation of species threatened by deforestation and habitat loss. In addition, artificial propagation for commercial trade can lessen the harvesting pressure in the wild, as specimens can be acquired without having to go to the field.

Orchid nurseries in Brazil have *in vitro* laboratories where they are propagated from seed or through meristem. Facilities that do not have propagation labs can purchase orchids and present the corresponding official invoice to IBAMA to demonstrate the origin of the plants.

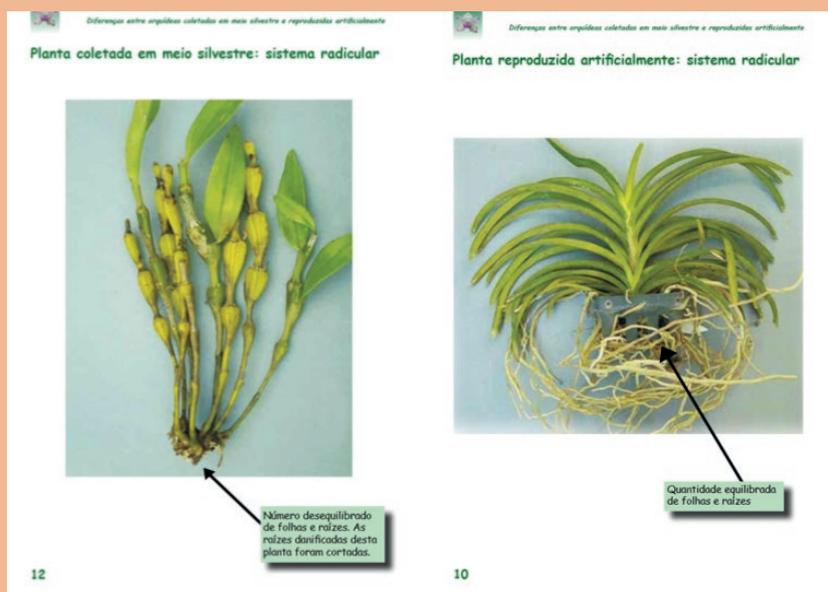
IBAMA technicians visit exporting facilities regularly to certify that everything is according to CITES requirements. Verification is mainly based on the morphological characteristics of the plants, which can help identify wild-sourced specimens that might have been introduced in the supply chain. This work is facilitated by the pictorial guide “differentiation of wild collected and artificial propagation of orchids” (Manit, 2009), translated into Portuguese with permission from the government of Thailand.

There are also inspections at the point of boarding, to ensure that the orchids to be exported are truly artificially propagated.



Sandra Altenburg

In vitro propagation and artificially propagated orchids in Brazilian orchid nursery



Example pages from the pictorial guide on differentiation of wild collected and artificial propagation of orchids (Manit, 2009).

Estimated value of the trade in live orchids

Between 2005 and 2014 the total value of exports in live orchids as reported by exporters was estimated²⁸ to be USD3.1 million per year. The taxa with the highest total value are shown in Table 4.7.1.

The country with the highest value live orchid exports was Brazil (56%: USD1.8 million per year) followed by Ecuador (24%: USD0.7 million per year).

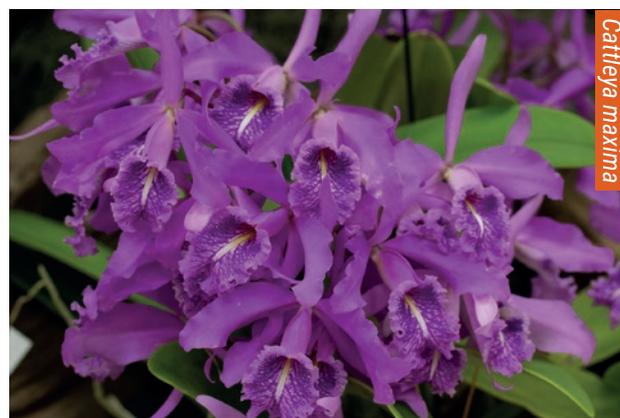


Table 4.7.1: Estimated USD value of the top five live orchid species exported from the Amazon region 2005-2014, as reported by exporters.

Species	Price per live plant (USD)	Total estimated value (USD)
<i>Ludisia discolor</i>	17.33+	9,900,000
<i>Laelia purpurata</i>	20	880,000
<i>Cattleya maxima</i>	38	700,000
<i>Cattleya walkeriana</i>	20.8*	300,000
<i>Cattleya labiata</i>	20.8*	300,000

*Genus and +Family price proxy used as no price data at the species level could be found.

²⁸ See methodology in Annex B for details

4.8 TIMBER



Over 40 species of CITES listed timber trees are native to the Amazon region, eight of which have been assessed as globally threatened (the remainder have not been assessed (IUCN, 2015).

The majority of CITES-listed tree species native to the region were only listed in CITES Appendix II in 2016 (CITES CoP17) as part of a genus-level listing of rosewoods (*Dalbergia*) that entered into force in January 2017 and therefore no CITES trade data is currently available for those species.

CITES-listed tree species for which data are available were nearly all exported from the Amazon region as timber during 2005-2014: approximately 271 000 m³ of timber were exported during this period, as reported by exporters, comprising almost exclusively wild-sourced *Cedrela odorata* (Spanish cedar, 187 000 m³) and *Swietenia macrophylla* (big-leaf

mahogany, 83 500 m³). Lower quantities of veneer (408 m³) and oil (approx. 8500 kg) were also exported. Very low quantities of timber products were re-exported; only direct exports are discussed in this case study.

Big-leaf mahogany and Spanish cedar are used, *inter alia*, to make furniture, paneling and musical instruments, with Spanish cedar utilised for its aromatic and insect resistant wood. Both species are globally Vulnerable and threatened by overexploitation (WCMC, 1998; Americas Regional Workshop, 1998). Both species were assessed as nationally Vulnerable in Brazil (Martinelli and Moraes, 2013) and Peru (Salazar, 2011). *S. macrophylla* was categorised nationally as Critically Endangered in Colombia, and *C. odorata* as Endangered (Cárdenas López and Salinas, 2006).

Peru was the largest exporter of CITES timber 2005-2014, followed by Bolivia (Figures 4.8.1 and 4.8.2), which together accounted for 94% of exports from the region. Brazil was the third main exporter of timber from the region, and Suriname reported the export of smaller quantities of *C. odorata* in recent years. The United States and Mexico were the largest importers, accounting for approximately 75% of timber imports. An average of 27 000 m³ of timber was exported annually 2005-2014, although exports reached a peak of 74 000 m³ in 2007 from exports of Spanish cedar (Figure 4.8.1). It should be noted that Peru's 2006 annual report had not been received at the time of writing; as a main exporter, this may explain the apparent reduction in exports in 2006. Big

leaf mahogany was subject to the CITES Significant Review process 2009-2014, and was reviewed in 2010 (PC19 Doc. 12.3). Trade of the species is banned in Colombia and Venezuela (PC19 Doc. 12.3) and in Ecuador (Sinovas and Price, 2015). In the case of *S. macrophylla*, CITES export quotas have been in place for Peru since 2005, based on a Non-Detriment Finding (NDF) and on complete verification that the trees to be harvested exist, and zero export quotas have been in place for Bolivia since 2011. It is also important to highlight that most *S. macrophylla* timber exported by Brazil in the last decade was harvested from the wild prior to 2001 and exported through CITES permits issued under judicial order.

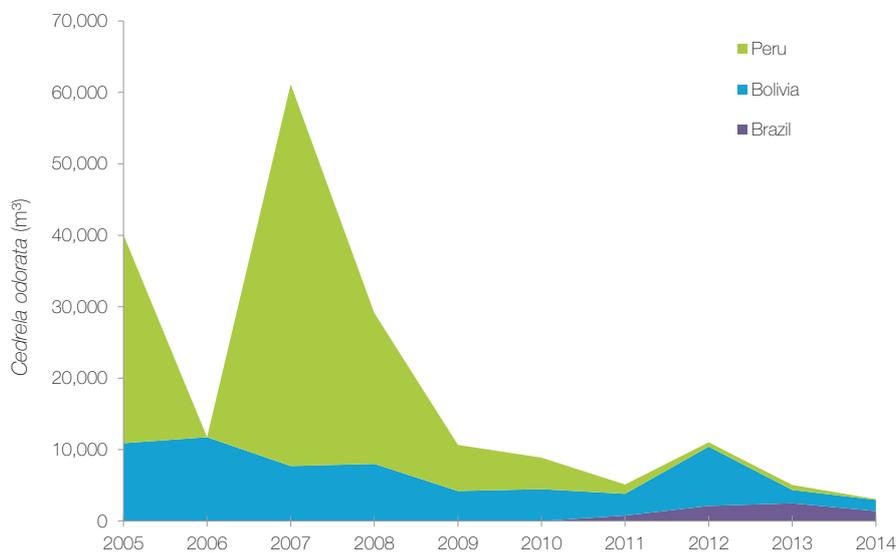


Figure 4.8.1: Direct exports of wild-sourced Spanish cedar (*Cedrela odorata*) timber in m³ exported for commercial purposes over the period 2005-2014, as reported by exporters.

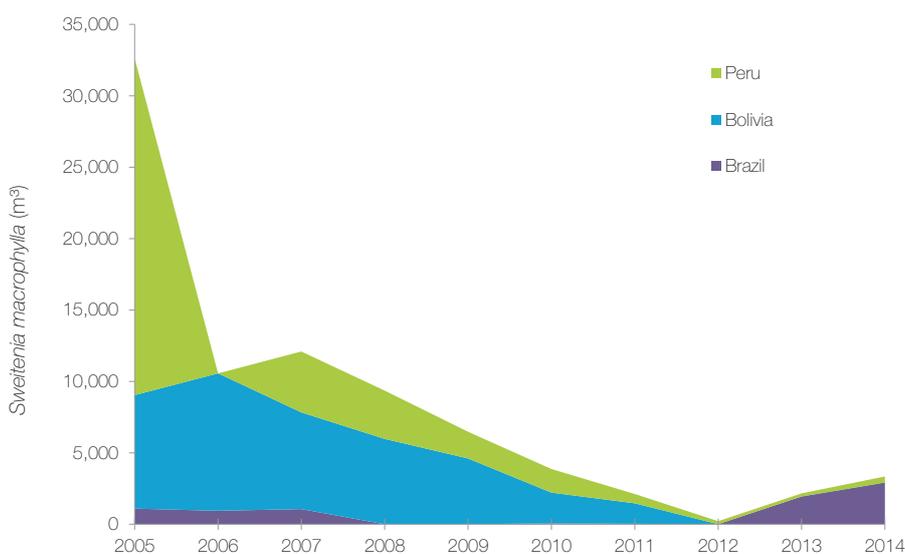


Figure 4.8.2: Direct exports of wild-sourced mahogany (*Swietenia macrophylla*) timber in m³ exported for commercial purposes over the period 2005-2014, as reported by exporters.

Veneer exports were mainly comprised of wild-sourced Spanish cedar and big-leaf mahogany, with smaller quantities of cedro misionero *Cedrela fissilis*, categorised globally as Endangered (EN) (Americas Regional Workshop, 1998); the majority of exports were from Bolivia and Brazil, and imported by the United States, Italy and the Netherlands.

Oil exports were all from *Aniba rosaeodora* (Brazilian rosewood) and exported from Brazil for commercial purposes. *Aniba rosaeodora* is categorised as Endangered (EN) both globally (Varty, 1998) and in Brazil (Martinelli and Moraes, 2013). As Brazil does

not allow trade in native species with an IUCN Red List assessment of Critically Endangered (CR) or Endangered (CR), no trade in wild-sourced *A. rosaeodora* should be permitted (Groves and Rutherford, 2015). The majority of exports (6 300 kg) were therefore artificially propagated or pre-convention, and imported by the United States. Brazilian rosewood oil is used in perfumes and is a source of natural linalool (Coppen, 1995). Brazilian rosewood was listed on the CITES Appendices in 2010, and as such no exports were reported prior to this; in 2010, 97 kg of oil was reported as exported, compared to an average of 1 700 kg for 2010-2014.

Estimated financial value of the trade in timber

Between 2005 and 2014 the total financial value²⁹ of exports of timber was estimated to be USD35.5 million per year. Almost all of the value came from trade in the timber of *Cedrela odorata* (USD18.3 million per year) and *Swietenia macrophylla* (USD17.2 million per year), with *S. macrophylla* representing 30% of trade volume but 48% of trade value. It should be noted that these values will be underestimates as no prices were available for veneer, which was a significant product in terms of trade volume.

During 2005-2014, the country with the highest value timber species exports was Peru (53%: USD18.9 million per year), followed by Bolivia (39%: USD14 million per year).



Swietenia macrophylla

²⁹ See methodology in Annex B for details

Box 11. Management of CITES timber species in Bolivia

Antonietta Dora Mollo, CITES Management Officer, Ministry of Environment and Water

The legislation regulating the conservation and management of natural resources in the Plurinational State of Bolivia include Supreme Decree 22641 of 1990, which establishes a general indefinite ban, and its amendment through Supreme Decree 25458 of 1999. The use of natural resources is regulated by Forest Law 1700 of 1996, whose regulations were approved through Supreme Decree 24453 of 1996.

The technical instrument governing the harvest of CITES species in Bolivia is the 'management plan'. This document describes the environmental characteristics of the area, defines the harvest objectives, provides information on population status, how much can be sustainably harvested, how the harvest can take place, and it defines production and protection areas, as well as the profitability of forest management. In the case of mahogany (*Swietenia macrophylla*), a zero quota has been in place since September 2011, preventing exports in order to safeguard the survival of the species and to allow population recovery.

The institutions responsible for forest management in the country are: the Ministry of Environment and Water as CITES Management Authority (MMAyA); the Forests and Lands Inspection and Social Control Authority (ABT), an autonomous entity under MMAyA that approves management plans and assigns forest harvest quotas; and the National Forestry and Farming Innovation Institute (INIAF) as CITES Scientific Authority.

The main stakeholders involved in the timber supply chain are: the indigenous, intercultural and peasant communities; chainsaw operators; intermediaries; and large timber companies, who normally export.

Regarding timber exports, Bolivia currently exports two species of cedar included in CITES appendix II (*Cedrela fissilis* and *C. odorata*), mahogany (*Swietenia macrophylla*, in appendix II), and holy wood (*Bulnesia sarmientoi*, in appendix II). In general, populations of these tree species are affected by regeneration problems in some ecosystems due to anthropic pressure and to overharvest of reproductive adult trees, while the conservation status is more favourable in protected areas. *Cedrela odorata* populations in Bolivia occur at high densities in humid to subhumid zones. *Cedrela fissilis* is associated with degraded and secondary forests. *Swietenia macrophylla* populations are much reduced in most ecosystems where it occurs, due to variable harvesting pressure across time and space. There are no official population data for *Bulnesia sarmientoi*, but harvesting of the species is regulated according to management plans.

Bolivia is working on a non-detriment finding for *S. macrophylla*, but this work is hindered by personnel changes in relevant institutions.

5. SPECIES SHOWING NOTEWORTHY TRADE TRENDS IN AMAZONIAN COUNTRIES

This chapter assesses trends in the trade of CITES Appendix II species for the period 2005-2014, and puts the trade in species native to the Amazon region into the global context. This analysis is based on methodology developed for the CITES Review of Significant Trade in order to identify species of potential concern, but the current analysis does not intend to influence the Review of Significant Trade process. As the CITES Review of Significant Trade process is of relevance to all range States of species selected, the aim of this chapter is to support Amazonian countries by identifying species native to the region that may be selected as part of the CITES Review of Significant Trade process on the basis of global trade levels and trends.

Global trade data for species from wild, ranched or unknown/unspecified sources were analysed for the period 2005-2014. Patterns were identified according to one or more of the following criteria, derived from the CITES Review of Significant Trade methodology:

- **Endangered species:** trade in Critically Endangered (CR) and Endangered (EN) taxa (as assessed globally by IUCN), where mean trade was more than one item per year for 2010-2014.
- **High volume or High volume (globally threatened):** high volume trade over the previous five years weighted according to IUCN threat status.
- **Sharp increase or Sharp increase (in country):** substantially higher trade in most recent year in comparison to a five year average of the preceding five years at the global level ("Sharp increase") or the range State level ("Sharp increase (in country)")



Dendrobates tinctorius



Amazona farinosa

Details on the process of selection according to these criteria are summarised in Annex B.

A summary of the species directly exported from Amazonian countries that were selected according to the criteria outlined above, along with key information on the criteria met, the top global exporter, and the top term (e.g. live, skins etc.) reported in trade, is provided in Table 5.1.

One or more of the criteria for selection was met by 41 species native to, and exported from, the Amazonian region. Of these species, birds were identified as the group with the highest number of species showing noteworthy trends, with 15 species meeting the selection criteria. This was followed by reptiles (8), mammals (6), plants (4), amphibians (3), fish (2), and invertebrates, corals and timber, each of which had 1. Amongst Amazonian countries, Guyana and Suriname were the top exporters of taxa meeting the selection criteria; both countries exported 17 species each during 2005-2014, Guyana was also the top global exporter for 12 of its exported species and Suriname was the top global exporter for 5 of its exported species. This was followed by Brazil (11 taxa exported that met at least one of the criteria/7 selected taxa where Brazil was the top exporter³⁰), Peru (11/6), Colombia (5/2), Bolivia (3/2), and Ecuador (3/2).

³⁰ Numbers in parentheses refer to (a) the total number of species fulfilling one or more of the criteria that were exported by that country, and (b) the number of species for which the country was the top global exporter. Used as rainsticks manufactured from dead plants.

Of the species exported by Amazonian countries, 30 species met the selection criteria on the basis of high volume, with 12 of these considered globally threatened. Five species showed sharp increases across their global range, of which one also met the criterion for high volume (globally threatened). In addition, nine species exported by Amazonian countries showed sharp increases based on country-level trade within one or more of their native Amazon range states. Of the species showing sharp increases within one or more Amazonian country (based on country-level trade) during 2005-2014, four did not show sharp increases when global exports were combined.

Some of the species highlighted in Table 5.1. may need more detailed consideration regarding the basis for non-detrimental harvest; including: several parrot and reptile species from Guyana and Suriname, the common squirrel monkey (*Saimiri sciureus*) from Guyana, the dyeing poison from (*Dendrobates tinctorius*) from Suriname, two parrot species (*Aratinga wagleri* and *Brotogeris sanctithomae*) and the *Corryocactus brevistylus cactus*³¹ from Peru, and longsnout seahorse (*Hippocampus reidi*) from Brazil.

Several other species presented in the table, however, are unlikely to be of concern currently. For example, the hybrid spider monkey (*Ateles hybridus*) and the blond capuchin (*Cebus flavius*), the Amazonian river dolphin (*Inia geoffrensis*), the Magdalena river turtle (*Podocnemis lewyana*), the Brazilian Starlet Coral (*Siderastrea stellata*) or the pernambuco wood (*Caesalpinia echinata*) are traded in low volumes and for scientific purposes; the yacare caiman (*Caiman crocodilus yacare*) from Bolivia and the peccaries (*Pecari tajacu* and *Tayassu pecari*) and yellow-spotted side-neck turtles (*Podocnemis unifilis*) from Peru are generally recognized to be well-managed and able to sustain current harvest levels; and the frogs (*Epipedobates tricolor* and *Oophaga sylvatica*) from Ecuador are part of a recent conservation programme.



Ramphastos vitellinus



Saimiri sciureus



Chelonoideis denticulatus

³¹ Used as rainsticks manufactured from dead plants.

Table 5.1: Species native to Amazonian countries meeting the noteworthy trends criteria for the period 2005-2014. Quantities have been rounded to the nearest whole number, where applicable. As per the CITES Review of Significant Trade methodology, quantities refer to “gross trade” (which tends to overestimate trade levels, as it presents the larger quantity after comparing quantities reported by exporters and importers).

Taxon	Endemic to Amazon countries	IUCN Red List*	Top term ³² and corresponding quantity ³³	Top global exporter	Selection criteria ³⁴	All Amazonian exporters	Main purpose of trade
MAMMALS							
<i>Ateles hybridus</i> (Hybrid Spider Monkey)		CR	260 derivatives	Colombia	Endangered species; High volume (GT)	Colombia	Scientific
<i>Cebus flavius</i> (Blond Capuchin)	Brazil	CR	15 bodies	Brazil	Endangered species	Brazil	Scientific
<i>Inia geoffrensis</i> (Amazon River Dolphin)		DD	540 skin pieces	Brazil	High volume (GT)	Brazil	Scientific
<i>Pecari tajacu</i> (Collared Peccary)		LC	371 115 skins	Peru	High volume	Peru	Commercial
<i>Saimiri sciureus</i> (Common Squirrel Monkey)		LC	8 223 live	Guyana	High volume	Guyana; Suriname	Commercial
<i>Tayassu pecari</i> (White-lipped Peccary)		VU	98 653 skins	Peru	High volume (GT)	Peru	Commercial
BIRDS							
<i>Amazona amazonica</i> (Orange-winged Parrot)		LC	30 859 live	Guyana	High volume	Guyana; Suriname	Commercial
<i>Amazona dufresniana</i> (Blue-cheeked Parrot)		NT	1 421 live	Guyana	High volume (GT)	Guyana	Commercial
<i>Amazona farinosa</i> (Mealy Parrot)		NT	5 379 live	Guyana	High volume (GT)	Guyana; Suriname	Commercial
<i>Amazona festiva</i> (Festive Parrot)		NT	1 187 live	Guyana	High volume (GT)	Guyana	Commercial
<i>Amazona ochrocephala</i> (Yellow-crowned Parrot)		LC	10 968 live	Guyana	High volume	Guyana; Suriname	Commercial
<i>Ara ararauna</i> (Blue-and-gold Macaw)		LC	12 118 live	Suriname	High volume	Guyana; Suriname	Commercial
<i>Ara chloropterus</i> (Green-winged Macaw)		LC	10 968 live	Guyana	High volume	Guyana; Suriname	Commercial
<i>Aratinga mitrata</i> (Mitre Parakeet)		LC	13 448 live	Argentina	High volume	Peru	Commercial
<i>Aratinga wagleri</i> (Scarlet-fronted Parakeet)		NT	9 366 live	Peru	High volume (GT)	Peru	Commercial
<i>Brotogeris sanctithomae</i> (Tui Parakeet)		LC	1 945 live	Peru	Sharp increase; sharp increase (Peru)	Peru	Commercial
<i>Diopsittaca nobilis</i> (Noble Macaw)		LC	6 264 live	Guyana	High volume	Guyana; Suriname	Commercial

Taxon	Endemic to Amazon countries	IUCN Red List*	Top term ³² and corresponding quantity ³³	Top global exporter	Selection criteria ³⁴	All Amazonian exporters	Main purpose of trade
BIRDS							
<i>Pionites melanocephalus</i> (Black-headed Parrot)		LC	10 847 live	Suriname	High volume	Guyana; Suriname	Commercial
<i>Pionus menstruus</i> (Blue-headed Parrot)		LC	5 656 live	Guyana	High volume	Guyana; Suriname	Commercial
<i>Pteroglossus viridis</i> (Green Aracari)		LC	933 live	Suriname	Sharp increase (Suriname)	Guyana; Suriname	Commercial
<i>Ramphastos vitellinus</i> (Channel-billed Toucan)		VU	1 696 live	Suriname	High volume (GT)	Guyana; Suriname	Commercial
REPTILES							
<i>Caiman crocodilus</i> (Spectacled Caiman)		LR/lc	358 858 skins	Bolivia	High volume	Brazil; Colombia; Guyana; Suriname; Bolivia	Commercial
<i>Caiman crocodilus yacare</i> (Yacare Caiman)		LR/lc	42 572 skins	Bolivia	Sharp increase (in country: not Amazonian)	Brazil; Bolivia	Commercial
<i>Chelonoidis denticulatus</i> (Forest Tortoise)		VU	7 438 live	Guyana	High volume (GT); Sharp increase (Guyana; Suriname)	Guyana; Suriname	Commercial
<i>Corallus hortulanus</i> (Amazon Tree Boa)		LC	25 996 live	Guyana	High volume	Guyana; Suriname	Commercial
<i>Iguana iguana</i> (Green Iguana)			94 324 live	Suriname	High volume	Colombia; Guyana; Suriname	Commercial
<i>Melanosuchus niger</i> (Black Caiman)		NT	646 skins	Brazil	Sharp Increase; Sharp increase (Brazil)	Brazil	Commercial
<i>Podocnemis lewyana</i> (Magdalena River Turtle)		EN	32 eggs	Colombia	Endangered species	Colombia	Scientific
<i>Podocnemis unifilis</i> (Yellow-spotted Sideneck Turtle)		VU	645 620 live	Peru	High volume (GT); Sharp Increase; Sharp increase (Peru)	Brazil; Peru	Commercial

Taxon	Endemic to Amazon countries	IUCN Red List*	Top term ³² and corresponding quantity ³³	Top global exporter	Selection criteria ³⁴	All Amazonian exporters	Main purpose of trade
AMPHIBIANS							
<i>Dendrobates tinctorius</i> (Dyeing Poison Frog)		LC	10 896 live	Suriname	High volume	Suriname	Commercial
<i>Epipedobates tricolor</i> (Phantasmal Poison Frog)	Ecuador	EN	174 live	Ecuador	Endangered species	Ecuador	Commercial
<i>Oophaga sylvatica</i> (Diablito)		NT	205 live	Ecuador	Sharp increase (Ecuador)	Ecuador	Commercial
FISH							
<i>Arapaima gigas</i> (Giant Arapaima)		DD	21 898 kg meat	Brazil	High volume (GT)	Brazil; Peru	Commercial
<i>Hippocampus reidi</i> (Longsnout Seahorse)		DD	17 919 live	Brazil	High volume (GT)	Brazil	Commercial
MOLLUSCS							
<i>Strombus gigas</i> (Queen Conch)			20 693 603 kg meat	Bahamas	High volume	Colombia	Commercial
CORALS							
<i>Siderastrea stellata</i> (Brazilian Starlet Coral)		DD	1 618 raw corals	Brazil	Sharp Increase; Sharp increase (Brazil)	Brazil	Scientific
PLANTS							
<i>Caesalpinia echinata</i> (Pernambuco Wood)	Brazil	EN	9 leaves	Brazil	Endangered species	Brazil	Scientific
<i>Corryocactus brevistylus</i>		LC	17 600 stems	Peru	Sharp Increase; Sharp increase (Peru)	Peru	Commercial
Cyathea spp.			1 029 767 kg chips	Indonesia	High volume	Peru	Commercial
Orchidaceae spp.			39 055 live	Madagascar	High volume; Sharp increase (in country: not Amazonian)	Ecuador; Peru	Commercial
TIMBER							
<i>Swietenia macrophylla</i> (Brazilian mahogany)		VU	435 162 m ³ timber	Honduras	High volume (GT); Sharp increase (Brazil)	Bolivia; Brazil; Peru	Commercial

*'CR' = Critically Endangered, 'EN' = Endangered, 'VU' = Vulnerable, 'NT' = Near Threatened, 'LC' = Least Concern, LR/lc = Lower Risk/least concern, 'DD' = Data Deficient, '-' = not yet assessed for the IUCN Red List.

** 'GT' = globally threatened. Under this methodology, species were considered "globally threatened" if they were classified as CR, EN, VU, NT or DD on the IUCN Red List.

³² Term is as reported by the highest trading partner (according to "gross exports" in Annex B).

³³ Summed by term and unit across the period 2005-2014.

³⁴ Where sharp within-country increases were recorded, only Amazonian countries are individually listed.

6. TRADE BY OTHER COUNTRIES IN SPECIES NATIVE TO AMAZONIAN COUNTRIES

This chapter examines direct exports of species native to Amazonian countries from countries outside the region over the ten year period 2005-2014.

Trade in species native to the Amazonian region by other exporting Parties can be of relevance to Amazonian countries for a number of reasons, including:

- To ensure that utilisation of these species in other areas of their range is not detrimental to their survival in the wild. For example, foxes or tegu lizards exported by Argentina but native also to Bolivia and Brazil, or queen conch native to the region but exported by various Central America and Caribbean countries (see section 6.1).
- To inform discussions on access and benefit sharing of biological resources, particularly with respect to single-country endemics. For example, endemic amphibians exported as captive-bred by the Netherlands and Canada, or endemic cacti exported as artificially-propagated by Kenya and other countries (see sections 6.2 and 6.3).
- To highlight cases where the sharing of relevant conservation and captive-production information by non-range States that are breeding the species may be of benefit to Amazonian countries. For example, captive-breeding of various native parrot species by South Africa and of arapaima by Singapore, or artificial propagation of cacti by Kenya (see section 6.2).

- To help identify global demand and existing sustainable use systems already in place in other countries, to help inform the potential establishment of similar use programmes in Amazonian countries where appropriate. Sustainable use of species has the potential to provide positive incentives for the conservation of the species concerned and their habitats, as well as result in economic benefits to the region. For example, existing sustainable use programmes for tegu lizards or yellow anaconda in Argentina (e.g. Bolkovic and Ramadori, 2006).

The chapter focuses first on wild-sourced trade and second on captive-produced or artificially-propagated trade. It then examines notable trade in species endemic to single Amazonian countries by countries outside the Amazon region. The chapter focuses on the most highly traded species and commodities, based on thresholds specified in each section.



Agalychnis callidryas

6.1 WILD-SOURCED TRADE BY NON-AMAZONIAN COUNTRIES

Over 500 CITES-listed species native to Amazonian countries were reported as wild-sourced direct exports from other countries during 2005-2014. Tables 6.1.1 and 6.1.2 present the details of top exported animal and plant commodities respectively.

Bulnesia sarmientoi (holy wood) timber, *Strombus gigas* (queen conch) meat and shells, *Balaenoptera physalus* (fin whale) meat, and *Tupinambis merianae* (black and white tegu) and *T. rufescens* (red tegu) skins and skin pieces were the most highly traded commodities; lower quantities of live Critically Endangered *Acropora palmata* (elkhorn coral) were also exported. Trade was predominantly for commercial purposes, with the exception of live elkhorn coral and sei whale bones (all exported for scientific purposes), *Physeter macrocephalus* (sperm whale) teeth (61% for personal purposes) and

Carcharodon carcharias (great white shark) teeth (52% for circus or travelling exhibitions). Key exporters included Argentina, Mexico, Indonesia and Paraguay, while the United States was a key importer for a variety of products including reptile skin products, live seahorses, brown sea cucumber, big-leaf mahogany timber and holy wood extract.

The Amazonian countries account for very high proportions of global exports of *Caiman crocodilus* skins, live *Hippocampus erectus*, *Isostichopus fuscus* bodies and *Swietenia macrophylla* timber, as well as large quantities of *Strombus gigas* meat (but a low percentage share of total global exports), but do not export significant quantities of any of the other top exported species in Tables 6.1.1 and 6.1.2.



Strombus gigas



Tupinambis merianae

Table 6.1.1: Top commodities of animal species native to the Amazonian region exported as wild-sourced by the rest of the world during 2005-2014 at levels above 10 000 units, and commodities of globally threatened animal species (i.e. Vulnerable, Endangered and Critically Endangered) native to the Amazonian region exported at levels above 1 000 units, according to exporter-reported data. The Table is ordered taxonomically by Class and in descending order by quantity within each Class. Source: CITES Trade Database, UNEP-WCMC; IUCN Red List; Species+.

Taxon (Appendix)	IUCN Red List Assessment+	Amazonian country range States*	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main purpose† (%)
MAMMALS							
<i>Balaenoptera physalus (I)</i> Fin whale	EN	BR, CO, EC, GY, PE, SR, VE	meat (kg)	4 881 000	Iceland (100%)	Japan (>99%)	T (100%)
<i>Balaenoptera acutorostrata (I/II)</i> Minke whale	LC	BR, CO, EC, GY, PE, SR, VE	meat (kg)	267 301	Norway (60%)	Japan (91%)	T (98%)
<i>Lycalopex gymnocercus (II)</i> Pampas fox	LC	BO, BR	skins skin pieces	235 393 68 367	Argentina (>99%) Argentina (100%)	Turkey (53%) Turkey (74%)	T (100%) T (100%)
<i>Lama guanicoe (II)</i> Guanicoe	LC	BO, PE	meat (kg)	190 400	Chile (100%)	Netherlands (100%)	T (100%)
<i>Lycalopex culpaeus (II)</i> Andean wolf	LC	BO, CO, EC, PE	skins	33 768	Argentina (100%)	Italy (30%)	T (100%)
<i>Physeter macrocephalus (I)</i> Sperm whale	VU	BR, CO, EC, GY, PE, SR, VE	teeth	1 204	Fiji (90%)	Australia (36%)	P (61%)
<i>Balaenoptera borealis (I)</i> Sei whale	EN	BR, CO, EC, GY, PE, SR, VE	bones (kg)	1 001	Japan (100%)	Republic of Korea (100%)	S (100%)
BIRDS							
<i>Myiopsitta monachus (II)</i> Monk parakeet	LC	BO, BR	live	483 782	Uruguay (96%)	Mexico (97%)	T (98%)
<i>Crax rubra (III)</i> Great curassow	VU	CO, EC	feathers	1 000	Mexico (100%)	United States (100%)	T (100%)
REPTILES							
			skins	1 140 408	Argentina (100%)	Mexico (45%)	T (100%)
<i>Tupinambis merianae (II)</i> Argentine black and white tegu	LC	BR	skin pieces	919 552	Argentina (100%)	United States (85%)	T (100%)
			small leather products	27 865	Argentina (100%)	United States (56%)	T (100%)

Taxon (Appendix)	IUCN Red List Assessment+	Amazonian country range States*	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main purpose† (%)
REPTILES							
<i>Tupinambis rufescens</i> (II) Red tegu	NE	BO	skin pieces	1 115 749	Argentina (100%)	United States (85%)	T (100%)
			skins	916 104	Argentina (100%)	Mexico (48%)	T (100%)
			small leather products	19 790	Argentina (100%)	United States (77%)	T (100%)
<i>Eunectes notaeus</i> (II) Yellow anaconda	NE	BO, BR	skins	43 338	Argentina (94%)	Germany (75%)	T (100%)
<i>Caiman crocodilus</i> (I/II) Spectacled caiman	LR/lc	BO, BR, CO, EC, GY, PE, SR, VE	skins	15 224	Paraguay (97%)	Mexico (54%)	T (100%)
FISH							
<i>Sphyrna lewini</i> (II) Scalloped hammerhead shark	EN	BR, CO, EC, GY, SR, VE	fins (kg)	4 404	Mexico (96%)	China (96%)	T (100%)
<i>Cetorhinus maximus</i> (II) Basking shark	VU	BR, EC, PE	meat (kg)	3 555	Norway (100%)	Hong Kong, SAR (80%)	T (100%)
<i>Hippocampus ingens</i> (II) Giant seahorse	VU	CO, EC, PE	live	3 216	Mexico (100%)	United States (100%)	T (>99%)
<i>Carcharodon carcharias</i> (II) Great white shark	VU	BR, CO, EC, PE	teeth	1 576	Australia (52%)	United States (66%)	Q (52%)
MOLLUSCS							
<i>Strombus gigas</i> (Queen Conch)	NE	BR, CO, VE	meat (kg)	15 714 648	Jamaica (23%)	United States (70%)	T (97%)
			shells	1 971 478	Bahamas (89%)	United States (67%)	T (>99%)
			shells (kg)	297 412	Honduras (62%)	United States (78%)	T (95%)
			skins (kg)	126 844	Nicaragua (100%)	United States (99%)	T (100%)
			bodies (kg)	15 211	Belize (>99%)	United States (100%)	T (>99%)
SEA CUCUMBERS							
<i>Isostichopus fuscus</i> (III) Brown sea cucumber	EN	CO, EC, PE	bodies	226 510	Mexico (100%)	United States (92%)	T (100%)
			bodies (kg)	121 103	Mexico (99%)	United States (53%)	T (>99%)

Taxon (Appendix)	IUCN Red List Assessment ⁺	Amazonian country range States*	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main purpose [†] (%)
CORALS							
<i>Tubastraea coccinea (II)</i> Orange cup coral	NE	BR, CO, EC	live	34 734	Indonesia (93%)	United States (63%)	T (>99%)
<i>Pocillopora damicornis (II)</i> Cauliflower coral	LC	CO, EC	live	17 713	Indonesia (93%)	United States (33%)	T (95%)
<i>Pocillopora verrucosa (II)</i> Rasp coral	LC	CO, EC	live	15 617	Indonesia (98%)	United States (35%)	T (>99%)
<i>Acropora palmata (II)</i> Elkhorn coral	CR	CO, VE	live	10 365	United States (99%)	Netherlands (99%)	S (100%)

Key

IUCN Red List: NE = Not Evaluated, LC = Least Concern, NT = Near Threatened, LC/lc = Lower Risk/least concern, VU = Vulnerable, EN = Endangered, CR = Critically Endangered

*Range States: Definitions of ISO-2 codes used can be found in Annex A.

†Purpose codes: T = Commercial, P = Personal, Q = Circuses and travelling exhibitions, S = Scientific.

Table 6.1.2: Top commodities of plant species native to the Amazonian region exported as wild-sourced by the rest of the world during 2005-2014 at levels above 100 000 units and commodities of globally threatened plant species (i.e. Vulnerable, Endangered and Critically Endangered) native to the Amazonian region exported at levels above 10 000 units, according to exporter-reported data. All exporters were range states for the relevant taxon. The Table is ordered taxonomically by Class and in descending order by quantity within each Class. Source: CITES Trade Database, UNEP-WCMC; IUCN Red List; Species+.

Taxon (Appendix)	IUCN Red List Assessment	Amazonian country range States	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main Purpose
<i>Bulnesia sarmientoi</i> (II) Holy wood	LR/cd	BO, BR	timber (kg)	52 198 204	Argentina (97%)	China (96%)	T (98%)
			oil (kg)	701 542	Paraguay (100%)	India (21%)	T (55%)
			extract (kg)	651 560	Paraguay (100%)	United States (12%)	T (100%)
			carvings (kg)	573 730	Paraguay (100%)	China (62%)	T (95%)
			timber (m ³)	133 266	Paraguay (96%)	Taiwan, Province of China (96%)	T (100%)
<i>Swietenia macrophylla</i> (II) Big leaf mahogany	VU	BO, BR, CO, EC, GY, PE, VE	timber (m ³)	123 084	Guatemala (43%)	United States (80%)	T (100%)
<i>Cedrela odorata</i> (III) Spanish cedar	VU	BO, BR, CO, EC, GY, PE, SR, VE	veneer (m ²)	101 912	Mexico (100%)	Cuba (100%)	T (100%)
			plywood (m ²)	35 000	Mexico (100%)	Cuba (100%)	T (100%)

Key

IUCN Red List: LC/cd = Lower Risk/conservation dependent, VU = Vulnerable

Range States: See Annex A.

Purpose codes: Full details on Purpose codes are available in Annex C.

6.2 CAPTIVE-PRODUCED AND ARTIFICIALLY-PROPAGATED TRADE BY NON-AMAZONIAN COUNTRIES



Aratinga solstitialis



Rhipsalis baccifera

Over 1200 CITES-listed species native to Amazonian countries were exported as captive-produced (sources C, D, F) or artificially-propagated (sources A, D) by other countries during 2005-2014. Tables 6.2.1 and 6.2.2 present the details of top exported animal and plant commodities respectively.

Captive-produced animals exported in high quantities were mainly comprised of live birds, reptiles,

amphibians, fish and corals (Table 6.2.1). The top exported animal commodity was live *Iguana iguana* (green iguana), with more than 12 times as many exported than the next most exported animal commodity. South Africa was the main exporter of top exported birds, while Argentina, Nicaragua and El Salvador were the main exporters of live reptiles and amphibians. Half of the exporters of the top exported animal commodities were non-range states. The United States and Japan were the main import markets for live reptiles, amphibians and fish. Trade was nearly all for commercial purposes (82% or more).

Top exported artificially propagated plant species native to Amazonian countries were exported from other countries in much higher quantities than animals, and were all cacti species exported as live plants, flowers and stems (Table 6.2.2). Kenya was the main exporter of *Rhipsalis* spp., while *Parodia* spp. were mainly exported by Canada, the Republic of Korea and Turkey. All exporters of the top exported plant commodities were non-range state countries. The Netherlands was the main import market for cacti products, followed by the United States. Artificially propagated cacti were nearly all exported for commercial purposes (93% or more).

The Amazonian countries account for very high proportions of global exports of captive-produced live *Iguana iguana*, *Boa constrictor*, *Chelonoidis carbonarius*, *Hippocampus reidi*, *Arapaima gigas*, *Hippocampus erectus* and *Strombus gigas* meat. While Amazonian countries accounted for very low proportions of the global exports of captive-produced native parrots, they did export high proportions of live, wild-sourced *Ara ararauna*, *Amazona ochrocephala* and *Ara chloropterus*. Amazonian countries export very low quantities, if any, of artificially propagated plants highly exported by other countries (Table 6.2.2).

Table 6.2.1: Animal species native to the Amazonian region exported as captive-produced by the rest of the world during 2005-2014 at levels above 10 000 units and commodities of globally threatened animal species (i.e. Vulnerable, Endangered and Critically Endangered) native to the Amazonian region exported at levels above 1 000 units, according to exporter-reported data. The Table is ordered taxonomically by Class and in descending order by quantity. Exporting countries that are not range States are marked with an asterisk (*). Source: CITES Trade Database, UNEP-WCMC; IUCN Red List; Species+.

Taxon (Appendix)	IUCN Red List Assessment+	Amazonian country range States*	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main purpose† (%)
BIRDS							
<i>Aratinga solstitialis</i> (II) Sun parakeet	EN	BR, GY, SR, VE	live	94 486	South Africa* (94%)	Singapore (12%)	T (99%)
<i>Myiopsitta monachus</i> (II) Monk parakeet	LC	BO, BR	live	91 117	Uruguay (77%)	Mexico (76%)	T (98%)
<i>Pyrhura molinae</i> (II) Green-cheeked parakeet	LC	BO, BR	live	40 789	South Africa* (78%)	Oman (18%)	T (99%)
<i>Amazona aestiva</i> (II) Turquoise-fronted amazon	LC	BO, BR	live	39 306	South Africa* (86%)	Oman (23%)	T (98%)
<i>Ara ararauna</i> (II) Blue and yellow macaw	LC	BO, BR, CO, EC, GY, PE, SR, VE	live	34 044	South Africa* (92%)	Oman (24%)	T (98%)
<i>Aratinga jandaya</i> (II) Jandaya parakeet	LC	BR (endemic)	live	29 750	South Africa* (97%)	Oman (27%)	T (>99%)
<i>Amazona ochrocephala</i> (II) Yellow-crowned amazon	LC	BO, BR, CO, EC, GY, PE, SR, VE	live	19 297	South Africa* (78%)	Oman (22%)	T (97%)
<i>Ramphastos sulfuratus</i> (II) Keel-billed toucan	LC	CO, VE	feathers	18 000	Mexico (100%)	United States (100%)	T (100%)
<i>Rhea americana</i> (II) Greater rhea	NT	BO, BR	meat (kg)	14 739	Uruguay (100%)	United Kingdom (42%)	T (100%)
			skin pieces	14 658	Uruguay (100%)	Brazil (96%)	T (100%)
<i>Bolborhynchus lineola</i> (II) Barred parakeet	LC	BO, CO, EC, PE, VE	live	13 637	Belgium* (50%)	Japan (18%)	T (99%)
<i>Ara chloropterus</i> (II) Red and green macaw	LC	BO, BR, CO, EC, GY, PE, SR, VE	live	13 152	South Africa* (90%)	Oman (22%)	T (98%)
<i>Forpus coelestis</i> (II) Pacific parrotlet	LC	EC, PE	live	10 999	Belgium* (40%)	Taiwan, Province of China (19%)	T (99%)
<i>Pyrhura perlata</i> (II) Crimson-bellied parakeet	VU	BO, BR	live	10 368	South Africa* (87%)	Oman (59%)	T (>99%)
<i>Pionites leucogaster</i> (II) Green-thighed parrot	EN	BO, EC, PE	live	6 934	South Africa* (47%)	Taiwan, Province of China (21%)	T (97%)
<i>Pauxi pauxi</i> (III) Helmeted curassow	EN	CO, VE	feathers	1 000	Mexico* (100%)	United States (100%)	T (100%)

Taxon (Appendix)	IUCN Red List Assessment+	Amazonian country range States*	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main purpose† (%)
REPTILES							
<i>Iguana iguana</i> (II) Green iguana	NE	BO, BR, CO, EC, GY, PE, SR, VE	live	2 851 125	El Salvador (97%)	United States (38%)	T (>99%)
<i>Boa constrictor</i> (II)	NE	BO, BR, CO, EC, GY, PE, SR, VE	live	66 552	Nicaragua (54%)	United States (48%)	T (99%)
<i>Tupinambis rufescens</i> (II) Red tegu	NE	BO	skin pieces	20 400	Argentina (100%)	Mexico (64%)	T (100%)
<i>Chelonoidis carbonaria</i> (II) Red-footed tortoise	NE	BO, BR, CO, GY, SR, VE	live	19 056	El Salvador* (53%)	Hong Kong, SAR (46%)	T (99%)
<i>Tupinambis merianae</i> (II) Argentine black and white tegu	LC	BR	live	12 956	Argentina (76%)	United States (37%)	T (>99%)
<i>Chelonoidis chilensis</i> (II) Chaco tortoise	VU	BO	live	1 612	Argentina (63%)	United States (37%)	T (100%)
AMPHIBIANS							
<i>Agalychnis callidryas</i> (II) Red-eyed tree frog	LC	CO	live	148 224	Nicaragua (>99%)	United States (82%)	T (>99%)
<i>Dendrobates auratus</i> (II) Green and black poison frog	LC	CO	live	61 906	Panama (87%)	United States (61%)	T (82%)
<i>Phyllobates terribilis</i> (II) Golden poison frog	EN	CO (endemic)	live	1 203	Netherlands* (25%)	Japan (42%)	T (88%)
<i>Epipedobates tricolor</i> (II) Phantasmal poison frog	EN	EC (endemic)	live	1 122	Canada* (56%)	Japan (28%)	T (92%)
FISH							
<i>Hippocampus reidi</i> (II) Long-snout seahorse	DD	BR, CO, SR, VE	live	229 246	Sri Lanka* (>99%)	United States (31%)	T (>99%)
<i>Arapaima gigas</i> (II) Arapaima	DD	BR, CO, EC, GY, PE	live	12 982	Singapore* (96%)	Japan (63%)	T (>99%)
<i>Hippocampus ingens</i> (II) Giant seahorse	VU	CO, EC, PE	live	6 410	Mexico (100%)	United States (83%)	T (100%)
<i>Hippocampus erectus</i> (II) Lined seahorse	VU	BR, CO, GY, SR, VE	live	1 976	United States (99%)	Canada (40%)	T (99%)
MOLLUSCS							
<i>Strombus gigas</i> (II) Queen conch	NE	BR, CO, VE	meat (kg)	85 363	Honduras (67%)	United States (100%)	T (>99%)

Taxon (Appendix)	IUCN Red List Assessment ⁺	Amazonian country range States*	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main purpose [†] (%)
CORALS							
<i>Pocillopora verrucosa (II)</i> Rasp coral	LC	CO, EC	live	86 523	Indonesia (100%)	United States (24%)	T (100%)
<i>Pocillopora damicornis (II)</i> Cauliflower coral	LC	CO, EC	live	63 001	Indonesia (99%)	United States (27%)	T (>99%)
<i>Acropora valida (II)</i> Bush coral	LC	CO	live	10 106	Indonesia (>99%)	United States (42%)	T (>99%)

*Main exporter is not a range State.

Key

IUCN Red List: DD = Data Deficient, LC = Least Concern, VU = Vulnerable, EN = Endangered, CR = Critically Endangered

Range States: See Annex A.

Purpose codes: Full details on Purpose codes are available in Annex C.

Table 6.2.2: Plant species native to the Amazonian region exported as artificially-propagated by the rest of the world during 2005-2014 at levels above 1 000 000 units and commodities of globally threatened plant species (i.e. Vulnerable, Endangered and Critically Endangered) native to the Amazonian region exported at levels above 100 000 units, according to exporter-reported data. The Table is ordered taxonomically by Class and in descending order by quantity. Exporting countries that are not range States are marked with an asterisk (*). Source: CITES Trade Database, UNEP-WCMC; IUCN Red List; Species+ for Amazonian country range states.

Taxon (Appendix)	IUCN Red List Assessment	Amazonian country range States	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main Purpose
<i>Rhipsalis baccifera</i> (II) Mistletoe cactus	LC	BO, BR, CO, EC, GY, PE, SR, VE	stems	2 072 000	Kenya* (100%)	Netherlands (94%)	T (98%)
			flowers	1 203 643	Tanzania* (100%)	Netherlands (91%)	T (100%)
<i>Rhipsalis cereuscula</i> (II)	LC	BO, BR	stems	1 712 000	Kenya* (100%)	Netherlands (93%)	T (100%)
			stems	1 711 000	Kenya* (100%)	Netherlands (96%)	T (>99%)
<i>Rhipsalis pilocarpa</i> (II)	VU	BR (endemic)	flowers	286 334	Tanzania* (100%)	Netherlands (92%)	T (100%)
			live	227 356	South Africa* (54%)	Netherlands (91%)	T (93%)
<i>Cleistocactus winteri</i> (II)	EN	BO (endemic)	live	1 628 608	China* (90%)	Netherlands (62%)	T (100%)
<i>Parodia leninghausii</i> (II)	EN	BR	live	1 455 594	China* (67%)	Netherlands (45%)	T (>99%)
<i>Hatiora salicornioides</i> (II)	LC	BR (endemic)	stems	1 295 000	Kenya* (100%)	Netherlands (87%)	T (>99%)
<i>Rhipsalis mesembryanthemoides</i> (II)	CR	BR (endemic)	stems	1 276 100	Kenya* (100%)	Netherlands (97%)	T (96%)
<i>Rhipsalis teres</i> (II)	LC	BR (endemic)	stems	1 208 000	Kenya* (100%)	Netherlands (97%)	T (100%)
			stems	1 185 000	Kenya* (100%)	Netherlands (97%)	T (100%)
<i>Rhipsalis ewaldiana</i> (II)	DD	BR (endemic)	flowers	186 465	Tanzania* (100%)	Netherlands (84%)	T (100%)
			live	159 004	South Africa* (81%)	Netherlands (94%)	T (100%)
<i>Rhipsalis neves-armondii</i> (II)	LC	BR (endemic)	stems	1 141 000	Kenya* (100%)	Netherlands (97%)	T (>99%)
<i>Rhipsalis burchellii</i> (II)	LC	BR (endemic)	stems	1 086 500	Kenya* (100%)	Netherlands (98%)	T (100%)
<i>Cereus hildmannianus</i> (II)	LC	BR	live	1 002 553	Dominican Republic* (51%)	United States (48%)	T (95%)
<i>Parodia magnifica</i> (II)	EN	BR	live	467 272	Canada* (53%)	United States (53%)	T (99%)
<i>Schlumbergera truncata</i> (II)	VU	BR (endemic)	live	424 996	Republic of Korea* (94%)	Japan (94%)	T (99%)

Taxon (Appendix)	IUCN Red List Assessment	Amazonian country range States	Term (unit)	Quantity exported by Parties other than Amazonian countries	Main exporter (%) other than Amazonian countries	Main importer (%)	Main Purpose
<i>Parodia herteri</i> (II)	CR	BR	live	390 836	Republic of Korea* (99%)	France (52%)	T (100%)
<i>Parodia scopa</i> (II)	VU	BR	live	254 725	Turkey* (47%)	Netherlands (62%)	T (>99%)
<i>Melocactus azureus</i> (II)	EN	BR (endemic)	live	194 667	Canada* (52%)	United States (52%)	T (>99%)
<i>Parodia warasii</i> (II)	EN	BR (endemic)	live	160 644	Canada* (95%)	United States (95%)	T (97%)
<i>Parodia ottonis</i> (II)	VU	BR	live	137 029	Republic of Korea* (81%)	France (39%)	T (>99%)
<i>Parodia oxycostata</i> (II)	VU	BR (endemic)	live	108 337	Turkey* (96%)	Netherlands (96%)	T (100%)

*Main exporter is not a range State.

Key

IUCN Red List: DD = Data Deficient, LC = Least Concern, VU = Vulnerable, EN = Endangered, CR = Critically Endangered

Range States: See Annex A.

Purpose codes: Full details on Purpose codes are available in Annex C.

6.3 SPECIES ENDEMIC TO AMAZONIAN COUNTRIES TRADED BY NON-AMAZONIAN COUNTRIES

Over 700 Amazonian single-country endemic species were exported by non-Amazonian countries as captive-produced (Source C, D or F) or artificially-propagated (Source A or D) in the period 2005-2014. Of these, 150 (20%) were categorised as globally threatened (Vulnerable, Endangered, Critically Endangered and Extinct in the Wild). Endemic species traded in high volumes by non-range countries are indicated in Tables 6.2.1 and 6.2.2.

Amazonian country endemic animal species traded in high volumes were endemic to Brazil, Colombia and Ecuador (Table 6.2.1). Two of the four top exported captive-bred amphibian species were Amazonian country endemics (Table 6.2.1). Nearly all endemic plant species traded in high volumes by non-Amazonian countries were cacti species endemic to Brazil, except for the Bolivian endemic *Cleistocactus winteri* (Table 6.2.2). There were no clear main exporters of the top exported Amazonian country endemic commodities. The main import markets included the Netherlands for live cacti and the United States for live reptile and amphibians. Trade was mainly for commercial purposes (82% or greater). All Amazonian country endemics were exported in higher quantities by non-native countries than range states.



Cleistocactus winteri



Hattoria salicornioides



Rhipsalis phlocarpa



Epipedobates tricolor

7. RECOMMENDATIONS

Based on the results of the analysis, recommendations are provided below for consideration by CITES Authorities from the countries in the Amazon region. These

recommendations are grouped in three broad categories: reporting of CITES trade data, management and conservation measures, and further work.

7.1 REPORTING OF TRADE IN CITES LISTED SPECIES

Reporting of CITES trade data by Amazonian countries has improved over the period 2005-2014 and it is in general of good quality. For example, submission of reports has progressively shifted to Excel or Word formats (from PDF or paper permits), standardised term codes are increasingly used, and in general the format of annual reports follows recommended guidelines. Countries are encouraged to continue referring to the most up-to-date version of the *Guidelines for the preparation and submission of CITES annual reports* (see CITES Notification 2017/006) when preparing their data for submission. These data provide the basis for monitoring the implementation of CITES and support key decision making, including the making of non-detriment findings. Accurate reporting is therefore key in ensuring that international trade in wildlife is sustainable. Specific recommendations aimed at continued improving of reporting are presented below.

Electronic permitting: CITES authorities in the region could consider the continued development of CITES electronic permitting systems to facilitate reporting of data. In addition, countries with electronic CITES permitting systems may wish to consider the use of the CITES Checklist Application Programming Interface (API)³⁵ to facilitate the automatic transfer of up-to-date taxonomic and legal information from the CITES Checklist directly to national CITES Checklist systems or e-permitting systems.

Basis of reporting: The majority of countries in the region currently report on the basis of permits issued. Annual reports should, whenever possible, be compiled on the basis of actual trade rather than on the basis of permits and certificates issued, to avoid overestimation of trade volumes. The basis of reporting should be clearly specified in the CITES annual report.

³⁵ <http://api.speciesplus.net/>

Use of thousand and decimal separators:

Inconsistent use of thousand and decimal separators can lead to the misinterpretation of trade volumes, potentially resulting in substantial over or underestimates of trade volumes. As such, Parties are encouraged to be consistent with the use of points ‘.’ or commas ‘,’ as a decimal separator and to not to include thousand separators in their annual reports, in line with CITES Notification 2015/028 on the *Submission of annual reports in electronic format*.

Use of preferred term and unit combinations:

Wherever possible the recommended term and unit combinations, as described in the *Guidelines for the preparation and submission of CITES annual reports*, should be used on permits and within annual reports. This standardizes the data and allows for more meaningful analysis of trade. Frequently misreported units within trade include skin pieces, meat and timber reported without a unit.

Reporting of imports:

In order to provide a more complete picture of the role of the region as an importer, Parties may wish to consider ways to capture information on their imports of CITES Appendix II and III listed species, for example by adjusting national or regional custom codes for greater CITES relevance, or developing legislation to require the issuance of import permits for species included in Appendices II and III.

Adoption of standard nomenclature for orchid species:

At present, CITES standard references have been adopted for only some Orchidaceae genera in trade. The lack of standard references for most orchids makes the standardization of taxonomies used across Parties difficult, with implications for monitoring the impact of trade on species. Given the importance of orchid trade to the region, Amazonian countries are encouraged to provide input into CITES plant nomenclature discussions relating to orchid nomenclature, including the possible adoption of further standard references.

7.2 MANAGEMENT AND CONSERVATION MEASURES

Conservation incentives and benefit sharing:

International wildlife trade has the potential to generate substantial revenues that can serve as incentives to conservation. However, for these conservation benefits to be maximised, it is widely recognised that a number of conditions need to be met, including the equitable sharing of benefits with local communities and investment in ensuring adequate monitoring of populations. Considering the relevance to the region of the trade in a number of key commodities, such as caimans and peccaries for the fashion industry, or reptiles, amphibians and fish

for the pet trade, as outlined in this report, it will be important to document adequate management practices that result in positive livelihood and conservation impacts. This could be done, for example, as part of the CITES Working Group on CITES and Livelihoods (see CITES Resolution Conf. 16.6 Rev. CoP17), as well as through the development of indicators (to assess, for instance, the number of links in the trade chain, the number of people involved in the trade, or the percentage of the livelihoods that is derived from the trade).

Making of non-detriment findings: Ensuring that the use of biodiversity is sustainable is an essential part of wildlife trade management. Non-Detriment Findings (NDFs) in particular are a cornerstone of CITES implementation. Amazonian countries are therefore encouraged to ensure that: robust NDFs are in place for species in trade, monitoring measures are in place to track the effects of the trade, and that exporting countries collaborate with importing partners to address any concerns. Countries in the region could consider organizing a regional workshop on NDFs for fauna, as well as sharing successful experiences: for instance, yellow-spotted Amazon river turtles, peccaries or mahogany in Peru (MINAM, 2016a,b,c), amphibians in Ecuador (Amador, 2014) and mahogany in Brazil.

Taxa of potential concern: Taxa showing high volumes in wild-sourced trade, threatened taxa or taxa showing sharp increases in trade could warrant further research (on populations and sustainability)

to ensure that trade is not detrimental to the wild populations. Potential areas for further scrutiny include the reptile and parrot trade from Guyana and Suriname.

Implementation of recent listings: At CITES CoP17 in 2016, a number of new listings for species of interest to the region were adopted, including several species of sharks and rays, as well as all rosewoods (*Dalbergia* spp.). Parties are encouraged to continue to exchange knowledge and experiences at a regional level on the implementation of the listings (including making of NDFs, development of management plans, identification and traceability), building on efforts following the listing of sharks and rays at CITES CoP16³⁶. Parties may also wish to collect data to monitor the medium- and long-term effects of the implementation of the CITES listings on the fisheries and logging trends and on the status of these species.

7.3 FURTHER WORK

Additional species that may need monitoring under CITES: While this analysis focuses on CITES-listed species, it is likely that species from the region that are traded internationally but that are not covered by the CITES Convention may also benefit from additional protection and monitoring. It is therefore suggested that efforts are made to identify which additional taxa may merit listing in the CITES appendices at CITES CoP18 or subsequent meetings, such as reptiles, amphibians, ornamental fish and timber trees. This may involve, *inter alia*, assessment of trade data recorded through customs codes or other means, research of online trade and expert workshops.

Traceability: Considering the relatively high volumes of trade in artificially-propagated orchids and captive-bred animals (including reptiles, amphibians and arapaima), as well as the increasingly recognized threat from illegal wildlife trade, and recognizing that in 2017 the region begins implementation of a KfW-supported project that includes a trade traceability component, Amazonian countries are encouraged to continue the development and implementation of traceability systems to ensure supply chain integrity and minimise the risk of laundering, including the laundering of wild-sourced specimens as artificially-propagated or captive-bred, and to generate better data for use in the making of non-detriment findings.

³⁶ See for example: <https://cites.org/eng/prog/shark>

Estimate of the financial value of wildlife trade:

While this report provides an estimated financial value of the items traded internationally at one point in the trade chain (import), additional work to estimate the value of wildlife in trade at different levels in the trade chain (note potential synergies with efforts to implement traceability systems), including to assess benefits to communities and to better understand additional values associated with the trade would be merited. This would be of relevance to inform, for example, the prioritization and financing of wildlife trade management and monitoring efforts.

Conservation benefits of captive-breeding/artificially-propagated trade:

The analysis highlights that CITES trade in certain commodities from the region is in artificially-propagated plants or captive-bred animals. While trade from these sources is likely to reduce pressure on wild populations, it might also remove incentives for local communities to manage wild populations sustainably. There are good examples from the region where well-managed collection from the wild and/or ranching has led to positive conservation outcomes, such as peccaries from Peru, vicuña from Bolivia and Peru, side-necked turtles from Peru and red-footed tortoises from Venezuela. Other countries in the region, such as Brazil and Ecuador, do not generally allow the export of wild-sourced terrestrial wildlife. Colombia is considering a partial shift from caiman captive-breeding to a mixed model that also includes ranching; this is in addition to a recent down-listing of some Colombian *Crocodylus acutus* populations from CITES Appendix I to Appendix II for the purposes of ranching (see e.g. SC66 Inf. 13 and CITES Notification 2016/053). An assessment should be undertaken of the benefits of captive or artificial production to conservation, as well as of the potential for sustainable use management programmes that could deliver conservation benefits through ranching or wild harvest in the region

Access and benefit sharing: Several species native to the region, including single-country endemics, are being bred/propagated in other countries, either to satisfy domestic demand or to commercially export offspring or both, in some cases leading to a decline in demand from range States. For example, live reptiles in the United States, parrots in South Africa, amphibians in Canada and the Netherlands, or cacti in Kenya. Amazonian countries may wish to consider the implications, as well as opportunities that may arise from this scenario, including within the context of access and benefit sharing, but also regarding the repatriation of knowledge on breeding techniques or biology that may have been developed abroad.

Information collection and sharing on captive

production: A large proportion of the trade in wildlife from the region is in captive-bred or captive-born animals and in artificially-propagated plants. Adequate management practices and control measures in breeding facilities are important to ensure that wild populations are not being negatively impacted and that national legislation is complied with. Countries may therefore wish to share their experience of best practice, e.g. captive breeding of red-footed tortoises in Venezuela, where 10% of reared specimens are released back into the wild when they reach a size that increases their chances of survival. Countries could also consider maintaining a secure repository of relevant information.

Knowledge sharing across the region: The analysis demonstrates that, while there are notable differences in the species in trade in different countries, there are also marked similarities. ACTO provides an umbrella for regional cooperation, including in relation to wildlife trade issues, and the region is encouraged to continue collaborating and sharing information and knowledge across countries, including on shared populations, management experiences and enforcement issues, to continue to strengthen wildlife trade management in the region. This could also apply to neighbouring countries with shared resources, such as queen conch or timber species exported by Central America and Caribbean countries (as done currently for example as part of the CITES working group on Neotropical timber trees), or foxes and tegu lizards exported by Argentina, for instance. Such efforts could be supported by thematic expert workshops, as well as through a regional information sharing platform (e.g. by thematically expanding the Amazon Observatory on Protected Areas and Climate³⁷ to include relevant species and sustainable use information).

Species complexes: Taxonomic experts for groups in trade could be engaged to assess whether traded taxa that are recognised as accepted species under CITES, may in fact comprise species complexes encompassing distinct taxa that may be more vulnerable to trade. Identified cases where accepted nomenclature can have an impact on conservation, should be tabled for consideration by the CITES Animals or Plants Committees.

Combined harvest pressure: CITES trade data can provide a good indication of harvest pressure for the legal international trade. However, harvest pressure may in some cases include additional components, such as illegal trade and collection for the domestic trade or local consumption. An understanding of the combined harvest pressure will provide the best basis for decision-making and robust NDFs, ensuring that management of international as well as domestic trade is sustainable. Studies of domestic markets and local consumption, where appropriate, would be valuable in this regard. While accurate information on illicit markets is difficult to obtain, the use of intelligence, including at the regional level through cross-border cooperation, combined with analytical/modelling work (e.g. based on legal trade data, on any available illegal trade information, on enforcement effort and on other proxies) can shed valuable light on the extent of illegal trade.

Combined threats: Overharvesting, including for trade, is one of multiple threats affecting certain species. In some cases, trade may act synergically with other threats to further imperil the status of species, while in others it may have the opposite effect (e.g. through the generation of incentives to protect habitats). It is therefore suggested that a holistic approach is taken where possible, to inform management on the basis of the multiple threats faced by biodiversity.

³⁷ <http://amazonprotectedareas.org>



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Table A.2: Countries and territories included in each region grouping. Source: Europa.eu, UN Statistics Division. Western Asia excludes Cyprus as it is an EU Member State.

EU	Western Asia	Eastern and South-eastern Asia
Austria	Armenia	Brunei Darussalam
Belgium	Azerbaijan	Cambodia
Bulgaria	Bahrain	China
Croatia	Georgia	Hong-Kong, SAR
Cyprus	Iraq	Indonesia
Czech Republic	Israel	Japan
Denmark	Jordan	Lao, People's Democratic Republic
Estonia	Kuwait	Macau, SAR
Finland	Lebanon	Malaysia
France	Oman	Myanmar
Germany	Qatar	Philippines
Greece	Saudi Arabia	Republic of Korea
Hungary	State of Palestine	Singapore
Ireland	Syrian Arab Republic	Thailand
Italy	Turkey	Timor-Leste
Latvia	United Arab Emirates	Viet Nam
Lithuania	Yemen	
Luxembourg		
Malta		
Netherlands		
Poland		
Portugal		
Romania		
Slovakia		
Slovenia		
Spain		
Sweden		
United Kingdom of Great Britain and Northern Ireland		

ANNEX B: METHODOLOGY

Valuation methodology – Chapters 3 & 4

Data collection: Animals

Financial values for animal products were obtained using species-specific values in United States dollars (USD) that are included in the United States annual report to CITES (as transmitted by the United States Fish and Wildlife Service). All annual reports from 2006 to 2014 were used to compile price data for the analysis, and prices were corrected for inflation.

Data collection: Plants

The United States annual reports do not report prices for most plant imports so data for plants were collected from retail and wholesale websites from around the world. Google searches for the names of the main plant groups in trade (e.g. orchids, timber) plus the phrases 'for sale', and 'buy' were carried out to find plants and plant products for sale. In addition, eBay searches for the main plant groups and genera plus terms were carried out. The process was repeated using the names of some of the key genera, species and trade terms that lacked price data after the first phase. All prices were converted to USD.

Analysis

The two datasets were used to calculate the median value for each combination of taxa/term/unit/source for animals, and taxa/term/unit for plants, as the source could not be determined for the majority of

retail products. These medians were then multiplied by the reported trade volume of that combination to obtain total values for CITES-listed exports from the region. Only medians for which at least five prices were found were used in the final calculations. In cases where there was an insufficient sample size, a suitable proxy was used. For example, where the sample size at the species level was not large enough, a proxy of the next lowest taxonomic level for which there was a large enough sample size was used (up to order). In cases where no suitable proxy could be found, the data were excluded.

Limitations

The exclusion of some trade records will reduce the overall estimated value of trade from Amazonian countries, and this exclusion is likely to be biased towards taxa/term/unit/source combinations that are infrequently traded. In addition, the use of proxies at the family or order level may underestimate trade values at the species level, especially for particularly high value species.

In addition, retail and wholesale prices for plants and import values for animals may not be comparable, due to the different sources of these data. Overall figures should therefore be interpreted with some caution.

Noteworthy trends methodology – Chapter 5

The process of selection of species for inclusion in Chapter 4 is based on revisions to the methodology for selecting species under the 'extended analyses' of the CITES Review of Significant Trade process made by the CITES Advisory Working Group on the Evaluation of the Review of Significant Trade (UNEP-WCMC, 2015).

Data selection

In line with the CITES Review of Significant Trade process, only direct trade in CITES Appendix II species from wild, ranched, unknown, and unreported sources were included in this analysis. Data were extracted from the CITES Trade Database on 4 May 2016, and encompassed trade data from

the most recent ten-year period for which near-complete data were available (2005-2014).

Only trade reported under the following terms (i.e. types of specimens in trade) were included in the analysis:

Animals: baleen, bodies, bones, carapaces, carvings, cloth, eggs, egg (live), fins, gall and gall bladders, horns and horn pieces, live, meat, plates, raw corals, scales, shells, skin pieces, skins, skeletons, skulls, teeth, trophies, and tusks.

Plants: bark, carvings, chips, cultures, derivatives, dried plants, extract, flowers, flower pots, fruit, furniture, leaves, live, logs, plywood, powder, roots, sawn wood, seeds, stems, timber, timber carvings, timber pieces, veneer, and wax.

Following the precautionary principle, gross export levels of trade were used for each combination of taxon, country, term, unit and year. "Gross exports" reflects the highest level of trade reported, irrespective of whether this is reported by the country of export or the country of import. It therefore represents the maximum level of trade on which a non-detriment finding, implemented under Article IV of the Convention, would be required by the relevant range State. Using the higher of the two reported values also accommodates for cases where the data from one of the trading partners are incomplete (e.g. in the case of non-submission of annual reports).

Prior to analysis, any taxa subject to very low levels of trade (averaging <20 items per year over the past five years, or <1 item per year over the past five years) if categorised as Endangered or Critically

Endangered) were removed. Data were also excluded where species were reported as "introduced" to a range State, as these do not represent native wildlife.

Following the methodology for the extended Review of Significant Trade (UNEP-WCMC, 2015), the ACTO analysis of noteworthy trends used five main criteria for the selection of species:

- **Endangered species:** Trade in Critically Endangered (CR) and Endangered (EN) taxa, where mean trade was ≥ 1 item per year for 2010-2014.
- **High volume or High volume (globally threatened):** high volume trade over the previous five years weighted according to IUCN threat status.
- **Sharp increase or Sharp increase (in country):** substantially higher trade in most recent year in comparison to a five year average of the preceding five years at the global level ("Sharp increase") or the range State level ("Sharp increase (in country)").

High volume and high volume (globally threatened)

To determine taxa traded at high volume, the top third of taxa within each order were selected as "High volume" (based on the average of the most recent five years of direct trade levels).

Order level thresholds (all terms combined, and all standardised units treated as equal) were assigned as the average trade volume for the species at the cut-off point (the last of the top one-third within the

order, with the remaining two-thirds of species in the order traded at lower trade volumes). The threshold for 'globally threatened' species (DD, NT, VU, EN, CR³⁸) of each order was calculated as 10% of this order level threshold, these species were classified as "High volume (globally threatened)".

Where only one or two taxa within an order was represented, all were selected.

Sharp increase and sharp increase (in country)

To determine taxa exhibiting a sharp increase in trade, two criteria had to be met:

- Total trade over the ten year period was greater than 100
- The most recent year of trade (2014) was at least three times higher than the average trade over the previous five years (2009-2013)

Because combined global trade may mask crucial within-country trends, this criterion was also run at the country level for finer resolution. This means that taxa could be listed as exhibiting both a "Sharp increase" (i.e. at the global scale), and a "Sharp increase (in country)" for one or more range states. Because, in most cases, country-level trade will be lower than global trade in a taxon, the criterion (a) for sharp increase (total trade > 100) did not have to be met, instead the most recent year of trade had to be at least 10.

³⁸ DD: Data Deficient; NT: Near Threatened; VU: Vulnerable; EN: Endangered; CR: Critically Endangered according to the 2016 IUCN Red List of threatened species (IUCN, 2015). Note that DD and NT are not considered to be 'threatened' categories by IUCN, but they are considered together here for the purposes of this particular analysis, as per the CITES Review of Significant Trade methodology.

ANNEX C: SOURCE AND PURPOSE CODES

Table C.1: Codes for source of trade. Source: Conf. 12.3 (Rev. CoP16).

Code	Description
A	Plants that are artificially-propagated in accordance with Resolution Conf. 11.11 (Rev. CoP15), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5 (specimens of species included in Appendix I that have been propagated artificially for non-commercial purposes and specimens of species included in Appendices II and III)
C	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
D	Appendix-I animals bred in captivity for commercial purposes in operations included in the Secretariat's Register, in accordance with Resolution Conf. 12.10 (Rev. CoP15), and Appendix-I plants artificially-propagated for commercial purposes, as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 4, of the Convention
F	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
I	Confiscated or seized specimens
O	Pre-Convention specimens
R	Ranched specimens: specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood
U	Source unknown (must be justified)
X	Specimens taken in "the marine environment not under the jurisdiction of any State"
W	Specimens taken from the wild

Table B.2: Codes for purpose of trade. Source: Conf. 12.3 (Rev. CoP16).

Code	Description	Code	Description
B	Breeding in captivity or artificial propagation	N	Reintroduction or introduction into the wild
E	Educational	P	Personal
G	Botanical gardens	Q	Circuses and travelling exhibitions
H	Hunting trophies	S	Scientific
L	Law enforcement/judicial/forensic	T	Commercial / Trade
M	Medical (including biomedical research)	Z	Zoos

ANNEX D: POTENTIAL DISCREPANCIES IN REGIONAL TRADE DATA

Highlighting potential discrepancies between importer and exporter reported data is an essential part of continuing to improve the accuracy and completeness of CITES annual reporting. It can also provide the opportunity to better understand and interpret the nuances in the CITES trade data and improve the analysis of this data and its application to the conservation of species in global trade. In addition, scrutinizing exporter and importer reported figures can also identify potentially erroneous records that Parties may wish to further investigate.

In this section, for exclusive use by CITES Authorities from ACTO member countries, trade reported by these countries and by their trading partners has been examined for the period 2010-2014, to identify potential discrepancies between the two. Trade reported as source I (seizures/confiscations) was excluded (as in the rest of the report) and purpose code was not considered in the identification of discrepancies as purpose codes are often reported using different, but equally valid codes.

There are a number of reasons why importer and exporter reported data may differ. For example, exporter reported data may be higher than that reported by importers in cases where exporters are reporting on permits issued while importers report on actual trade and that actually the permit issued was used to export fewer specimens or not used at all. Discrepancies can also arise from permits issued in one year being used in the subsequent year, which can lead to exporters reporting the permit in the annual report of the year when it was issued and importers reporting it for the year in which it was used. Further details on general reasons for discrepancies between importer and exporter reported data in the CITES Trade Database can be found in the **Guide to using the CITES Trade Database**.

While it is not possible to suggest a reason for all of the potential discrepancies evident in the aforementioned dataset, key discrepancies those which can be explained are discussed below.

Trading partners not reporting Appendix II imports:

Article VIII of the Convention requires Parties to 'maintain records of trade in specimens included in Appendices I, II and III which shall cover (...) the number and type of permits and certificates granted...' As such, some Parties who do not have stricter domestic measures that require the issuing of an import permit for Appendix II specimens do not include information on Appendix II imports in their annual reports to CITES. Possible examples of this includes exports to Russia of live Appendix-II listed birds from Suriname and Guyana, live orchids from Brazil, Ecuador and Peru and live reptiles from Guyana, all of which were reported by exporters but not by Russia, who only provide data on Appendix I imports.

Trade reported with differing term and unit codes:

Many of the potential discrepancies between data reported by Amazonian countries and importers related to trade in skins and other skin products of *Caiman crocodilus* and its Appendix-II listed subspecies. While this is in part due to these products being some of the most highly traded from the region, permit analyses suggest that it can in part be explained by importers and exporters using different term codes to describe the items in trade. Common cases include exporters reporting skins while importers report skin pieces and exporters reporting skin pieces while importers report manufactured leather products. In addition, for commodities which can be reported by number or by weight discrepancies exist where trading partners report using different units. For further details on specific examples please see Table 1.

Trade reported at differing taxonomic levels: This particularly applies to trade in artificially-propagated Appendix II plants that are listed in the CITES Appendices at the family level, in particular cacti and orchids. While Amazonian countries often report trade in artificially propagated live orchids at the species level, some importers report either that the genus or the family level, including the United States and Japan.

Discrepancy in the reported trading partner: Some of the apparent discrepancies between importer and exporter reported data can be explained by different trading partners being reported. For example, between 2010 and 2014, Brazil reported the export of over 22 000 live captive-bred *Chelonoidis carbonarius* to China, who do not report any imports of this species from Brazil. Closer scrutiny of this data indicates that this trade may actually have been imported by Hong Kong, Special Administrative Region of China (SAR), according to the annual report data submitted by China on behalf of Hong Kong, SAR.

Trade with a non-CITES Party: Countries that are not a Party to CITES are not required to submit trade data for inclusion in the CITES Trade Database. As such, trade with non-CITES Parties can appear as a discrepancy. For example, in the period 2005-2014 Guyana and Suriname reported the export of over 3900 live birds to Bahrain and over 2700 live wild sourced birds to Lebanon. Both Bahrain and Lebanon were not Parties to CITES prior to 2012.

ANNEX E: SCIENTIFIC AND COMMON NAMES OF THE MAIN SPECIES MENTIONED

Scientific name	English names	Spanish names
MAMMALIA		
<i>Ateles hybridus</i>	Hybrid spider monkey, brown spider monkey	Mono araña, marimonda del magdalena
<i>Cebus apella</i>	Tufted capuchin, brown capuchin monkey	Capuchino de cabeza dura, mono maicero, machín negro, mono machín, mico
<i>Cebus flavius</i>	Blond capuchin	Capuchino rubio
<i>Inia geoffrensis</i>	Amazonian river dolphin, boto, pink river dolphin	Delfín del Amazonas, boto, delfín rosado
<i>Pecari tajacu</i>	Collared peccary	Pecarí de collar, sajino, tatabra
<i>Saimiri sciureus</i>	Common squirrel monkey	Mono ardilla común, barizo
<i>Tayassu pecari</i>	White-lipped peccary	Pecarí de labio blanco, huangana, pecarí labiado, sahino
<i>Vicugna vicugna</i>	Vicuña	Vicuña
AVES		
<i>Amazona amazonica</i>	Orange-winged amazon	Amazona alinaranja, loro de ala naranja
<i>Amazona farinosa</i>	Mealy parrot	Loro cabeza azul, loro harinoso, amazona harinosa
<i>Amazona ochrocephala</i>	Yellow-crowned parrot or yellow-crowned amazon	Loro real, loro real amazónico, loro de corona amarilla, amazona coroniamarilla
<i>Ara ararauna</i>	Blue and gold macaw, blue and yellow macaw	Guacamayo azul y amarillo, guacamayo azulamarillo
<i>Ara chloropterus</i>	Green-winged macaw or red and green macaw	Guacamayo rojo, guacamayo aliverde, guacamayo rojo y verde
<i>Aratinga mitrata</i>	Mitred parakeet	Cotorra cabecirroja, cotorra mitrada
<i>Aratinga wagleri</i>	Scarlet-fronted parakeet	Aratinga de Wagler, cotorra de frente escarlata, perico frentiescarlata
<i>Brotogeris versicolurus</i>	White-winged parakeet	Catita versicolor, periquito aliblanco, perico de ala amarilla
<i>Brotogeris sanctithomae</i>	Tui parakeet	Perico tui

Scientific name	English names	Spanish names
AVES		
<i>Diopsittaca nobilis</i>	Noble macaw	Guacamayo noble, guacamayo enano
<i>Pionites melanocephalus</i>	Black-headed parrot	Perico calzoncito, loro de cabeza negra, loro coroninegro
<i>Pionus menstruus</i>	Blue-headed parrot	Cotorra cabeciazul, loro de cabeza azul, loro cabeciazul
<i>Ramphastos vitellinus</i>	Channel-billed toucan	Tucán picoacanalado, tucán de pico acanalado, tucán piquiacanalado
REPTILIA		
<i>Caiman crocodilus</i>	Spectacled caiman	Caimán de anteojos, caimán, babilla, baba, lagarto, yacaré, caimán blanco
<i>Chelonoidis carbonarius</i>	Red-footed tortoise	Tortuga terrestre de patas rojas, morrocoy, motelo de patas rojas
<i>Chelonoidis denticulatus</i>	Forest tortoise	Tortuga de patas amarillas, motelo, tortuga motelo
<i>Corallus caninus</i>	Emerald tree boa	Boa esmeralda
<i>Corallus hortulanus</i>	Amazon tree boa	Boa arborícola amazónica, boa arborícola de jardín, boa de los jardines
<i>Crocodylus acutus</i>	American crocodile	Cocodrilo americano, cocodrilo de Tumbes, caimán, cocodrilo de la costa
<i>Dracaena guianensis</i>	Northern caiman lizard	Lagarto caimán, dracaena, camaleón rojo
<i>Epicrates maurus</i>	Rainbow boa	Boa arcoiris
<i>Eunectes murinus</i>	Green anaconda	Anaconda común, anaconda verde, yacumama
<i>Eunectes notaeus</i>	Yellow anaconda	Anaconda amarilla
<i>Iguana iguana</i>	Green iguana	Iguana verde, pacaso
<i>Melanosuchus niger</i>	Black caiman	Caimán negro
<i>Podocnemis unifilis</i>	Yellow-spotted Amazon river turtles or Yellow-spotted sideneck turtle	Taricaya, terecay, charapa pequeña
<i>Tupinambis merianae</i>	Black and white tegu or Argentine black and white tegu	Tegu blanquinegro, lagarto overo
<i>Tupinambis rufescens</i>	Red tegu	Iguana colorada, tegu colorado
<i>Tupinambis teguixin</i>	Golden tegu	Tegu dorado, iguana negra

Scientific name	English names	Spanish names
AMPHIBIA		
<i>Agalychnis callidryas</i>	Red-eyed tree frog	Rana verde de ojos rojos
<i>Ameerega trivittata</i>	Three-striped poison frog	Sapito dardo trillistado
<i>Dendrobates auratus</i>	Green and black poison frog	Rana de flecha verde y negra
<i>Dendrobates leucomelas</i>	Yellow-banded poison dart frog	Sapito minero
<i>Dendrobates tinctorius</i>	Dyeing dart frog	Rana venenosa de tinte
<i>Epipedobates tricolor</i>	Phantasmal poison frog	Rana de punta de flecha tricolor, rana flecha tricolor, rana nodriza tricolor ecuatoriana
<i>Oophaga sylvatica</i>	Diablito	Rana diablito, kiki
<i>Phyllobates terribilis</i>	Golden poison frog	Rana dorada venenosa
<i>Ranitomeya ventrimaculata</i>	Reticulated poison frog	Rana venenosa reticulada, rana venenosa amazónica, ranita venenosa de Sarayacu
ACTINOPTERYGII		
<i>Arapaima gigas</i>	Arapaima, giant arapaima	Paiche, pirarucu, arapaima
<i>Hippocampus reidi</i>	Longsnout seahorse	Caballito de mar amarillo, caballito de mar de hocico largo
GASTROPODA		
<i>Strombus gigas</i>	Queen conch	Caracol pala, concha reina
HOLOTHUROIDEA		
<i>Isostichopus fuscus</i>	Brown sea cucumber	Pepino de mar, cohombro de mar, holoturia
FLORA		
<i>Aniba rosaeodora</i>	Brazilian rosewood	Palo de rosa, palo rosa
<i>Bulnesia sarmientoi</i>	Holy wood	Palo santo
<i>Cedrela odorata</i>	Spanish cedar	Cedro rojo
<i>Swietenia macrophylla</i>	Big-leaf mahogany or Brazilian mahogany	Caoba, caoba de hoja ancha, mara, ahuano

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