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United Nations Office on Drugs and Crime

World Wildlife Crime Report

Trafficking in protected species

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Trafficking in protected species

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Preface

The heedless exploitation of nature by humans has led to unprecedented biodiversity loss and a worsening climate crisis. It is also a threat to human health, as highlighted by the COVID-19 pandemic. Three-quarters of all emerging infectious diseases are zoonotic, according to the United Nations Environment Programme, transferred from animals to humans, facilitated by environmental destruction and wildlife crime.

Links between the global health crisis and the illegal exploitation of wildlife have been in the spotlight since it was suggested that wet markets selling wildlife, in this case pangolins, could have facilitated the transfer of COVID-19 to humans. The spike in public awareness of this connection has led to a push for new bans on the sale of wild animals for consumption.

It is against this backdrop that the second edition of the World Wildlife Crime Report is published by the United Nations Office on Drugs and Crime (UNODC).

The report shows wildlife crime to be a business that is global; lucrative, with high demand driving high prices; and extremely widespread. Nearly 6,000 different species of fauna and flora have been seized between 1999 and 2018, with nearly every country in the world playing a role in the illicit wildlife trade.

The need to stop wildlife trafficking has gained an increasingly prominent place on the political agenda over the past years. Since the publication of UNODC's first World Wildlife Crime Report in 2016, regulation has increased for several wildlife markets, including that for pangolin products.

International trade in all pangolin species is now banned. Despite this, growing volumes are being seized each year. The present edition of the World Wildlife Crime Report shows that between 2014 and 2018, seizures of pangolin scales increased tenfold.

Such developments point to the many challenges which Governments face in preventing and countering wildlife and forest crime.

The present report shows that regulations on wildlife crime can trigger replacement effects, for example, geographic displacement of trade exploiting legislative gaps between countries, or a shift from protected to alternative species. Robust research and analysis, as well as consistent legislation within countries and across regions are essential to eliminate loopholes. Identifying and addressing the vulnerabilities of legal markets to infiltration by the illicit trade is also key to strengthening the global regulatory system. Public awareness of the scale and impact of the threats posed by wildlife crime can help reduce demand for products of the illegal wildlife trade and increase support for action.

Building upon UNODC's research and analysis work, the Office's Global Programme for Combating Wildlife and Forest Crime provides policy guidance and technical assistance to requesting countries. UNODC draws upon its role as guardian of the United Nations Convention against Transnational Organized Crime and the United Nations Convention against Corruption to build the capacities of law enforcement and criminal justice institutions, and support the communities impacted by wildlife crime.

Putting an end to wildlife crime is an essential part of building back better from the COVID-19 crisis. As we prepare the road to recovery, we have the chance to reset our relationship with nature and lay the foundations of a more just and more resilient world – working together to eliminate wildlife trafficking, prevent future pandemics and put us back on track towards the Sustainable Development Goals. I hope that the second edition of the UNODC World Wildlife Crime Report will be a useful resource to all our stakeholders, contributing to new and sustained action that can close gaps in awareness, knowledge, legislation, and resources - for the sake of people and planet.

Ghada Waly
Executive Director

United Nations
Office on Drugs and Crime

Table of contents

Acknowledgements

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Glossary

CEN	Customs Enforcement Network of the World Customs Organisation
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora. Also sometimes used to describe the international legal order that flows from the Convention, or as shorthand for governance mechanisms or the Secretariat of the Convention
CITES Parties	States that have joined CITES and agreed to be bound by the Convention
ICCWC	International Consortium on Combatting Wildlife Crime (includes CITES, INTERPOL, UNODC, World Bank, WCO)
IUCN	International Union for the Conservation of Nature
IUCN/SSC/AfESG	IUCN Species Survival Commission African Elephant Specialist Group
Genus (plural, Genera)	A collection of species distinguished through common characteristics
Kosso	*Pterocarpus erinaceus*, a fragrant hardwood marketed as "rosewood"
MIKE	Monitoring the Illegal Killing of Elephants programme
Pangolin	Several species of scaly anteater found in Africa and Asia
PIKE	Proportion of Illegally Killed Elephants
Range state	A country in the natural range of a species
Rosewood	Several species of trees with richly-hued hardwoods suitable for furniture manufacture
Species	The basic taxonomic unit by which different types of wildlife are distinguished
Taxon (plural, Taxa)	A scientific grouping of organisms based on common characteristics. For example, the designation "species" is a taxon, as are the designations "class", "order", and "genus"
Timber	Wood prepared in some way for human use
TRIDOM	Tri-National Dja-Odzala-Minkébé trans-border forest, the juncture between Cameroon, the Republic of Congo and Gabon
UNODC	United Nations Office on Drugs and Crime
USFWS-LEMIS	United States Forest and Wildlife Service Law Enforcement Management Information System
WCO	World Customs Organization
World WISE	UNODC World Wildlife Seizure database

SUMMARY AND OVERVIEW

Four years have passed since the first *World Wildlife Crime Report* was published in 2016. In the interim, there have been significant changes in both the policy environment and the illicit markets. If anything, trafficking of wild fauna and flora has grown in importance in the public consciousness and has risen on the political agenda, as it becomes clear that wildlife crime has negative implications for the climate change, preservation of biodiversity, security and public health. In response, controls have tightened in a number of wildlife markets since the first publication, including those on the markets for rosewood, ivory, and pangolins.

As in the previous Report, this edition draws heavily on the seizure data compiled in UNODC's World WISE database. This database has grown, currently containing just under 180,000 seizures from 149 countries and territories.[1] Contributing to this growth is the new CITES illegal trade reporting requirement. Each October since 2017, CITES Parties have been required to submit data on all seizures of wildlife made in the previous year. As an ICCWC partner, UNODC has been maintaining these data and analysing them when permitted to do so by the relevant CITES Party.[2] Thanks to this process, the UNODC World WISE database now has strong coverage for seizures that took place in 2016 and 2017. Seizure data for 2018 have also been included for some countries, after their review.[3] There are inherent limitations on the uses of seizure data, and not all seizure data are of equal quality. With these limitations in mind, World WISE is used cautiously in this report.

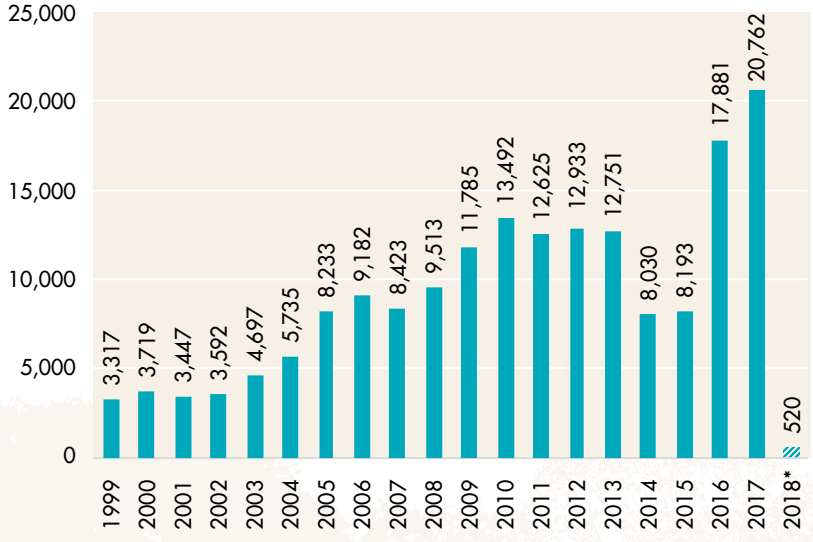
The nature of this CITES-oriented data source affects the scope of this report. CITES lays out rules for trade in over 35,000 protected species, and it requires its parties to penalise trade in violation of these rules. But there are many crimes affecting wildlife that have nothing to do with these species. For example:

- the millions of species that are **not listed by CITES** may be illegally harvested and traded internationally, as is frequently the case in timber and fish trafficking;
- CITES is limited to regulating international trade, so the illegal harvesting of wildlife, such as the **poaching** of protected species, does not fall within its scope if the product is not transported internationally;
- **domestic markets** for wildlife are also beyond its jurisdiction, whatever the source of the wildlife, so long as the products concerned cannot be proven to have crossed borders in contravention of CITES rules.

Thus, by focusing on CITES-related seizures, the core data used in this report do not cover all aspects of wildlife crime. To better understand markets where illegal materials are feeding legal industries, legal trade data are used. In addition to these core data, additional research was performed for this report for a range of species. Making use of this additional research, other forms of illegal harvest and trade are considered where this activity is relevant to the markets examined. Consequently, for the purposes of this report, the term "wildlife crime" refers to *harvesting and trade contrary to national law*, particularly, but not exclusively, the national laws implemented in fulfilment of CITES obligations. This includes offences that might not attract criminal sanctions in some parts of the world.

The World WISE Database illustrates the diversity of wildlife crime. Nearly 6,000 species have been seized between 1999-2018, including not only mammals but reptiles, corals, birds, and fish. No single species is responsible for more than 5% of the seizure incidents. Virtually every country in the world plays a role, and no single country is identified as the

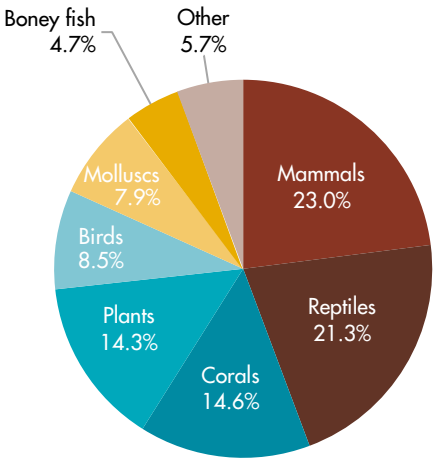
Fig. 1 Number of seizures in World WISE by year



Source: UNODC World WISE Database

* At the time the data processing for this report was finalized, the data collection for seizures made in 2018 was not yet complete.

Fig. 2 Share of all seizure incidents in World WISE by taxonomic category, aggregated 1999-2018



Source: UNODC World WISE Database

source of more than 9% of the total number of seized shipments captured in the database. Suspected traffickers of some 150 nationalities have been identified, illustrating the fact that wildlife crime is truly a global issue.

A review of the data indicates that illegal wildlife markets do not correspond neatly to biological categories. Some markets make use of multiple species. For example, there are many tree species that are classified as "rosewood", and collectors of rare reptiles intentionally seek out multiple species. In contrast, some species feed multiple distinct markets. For example, pythons are illegally taken for their use live as pets, for their skins to make handbags and shoes, for their meat as a food, and for their organs as a traditional medicine. As a result, the markets referred to in this report may be comprised of multiple species or just part of one particular species. For the purposes of clarity and focus, they may also be limited geographically.

Using the relative valuation approach (see Box 2), changes can be seen over time in the shares of the total seizures that some key markets occupy. Between 2009 and 2013, rosewood was clearly dominant, rhino horns and pangolins represented only 5.5% and 4% of the total respectively, and agar wood also stood at 4%. But between 2014 and 2018, rosewood's dominance declined as the market shifted to new species. Both rhinos and pangolins took a much larger share of the total seizures than in the past, and agar wood seizures experienced a sharp relative decline.

Box 1: Seizures as part of the evidence

Seizure data comprise an important part of the evidence presented in this Report. Seizure data, though, can be difficult to interpret in isolation and can lead to misleading conclusions because they are a mixed indicator, demonstrating both the presence of a problem and the initiative of the relevant authorities in addressing it. On their own, they cannot be used to demonstrate the magnitude and trend of the trafficking or shed much light on law enforcement capacity.

The value of seizure data comes not from what they say about the country making the seizure, but what they say about the whole supply chain. Whether transported by sea freight, air freight, personal courier, or post, it is often possible to determine where the contraband originated, transited, and was destined. Each seizure incident, therefore, has the potential to reflect on the entire trafficking chain, including the countries where the contraband went undetected.

In addition, a seizure allows a great deal of information to be harvested about the identity and methods of the traffickers when the confiscating authorities take the initiative to record these details. Aside from routes, the preferred methods of conveyance and concealment can be documented. The age, gender, and nationalities of those associated with the shipment can be recorded, as well as the laws used to charge them. Triangulated with other indicators such as price as well as qualitative research, they can provide a key data source for understanding the mechanics of wildlife crime.

The quality of seizure data recorded and reported by Member States, however, varies greatly in terms of completeness and coverage. Some seizure reports leave out key data, such as the source and destination of the shipment. The way products are classed and measured varies greatly between jurisdictions, and conversion ratios are needed to amalgamate the diverse products seized into comparable categories.

While seizures are an imperfect indicator, they have the potential to provide important insights when aggregated in sufficient volumes. They cannot be taken at face value or interpreted mechanically, but they represent concrete evidence of criminal activity that is otherwise obscured from view.

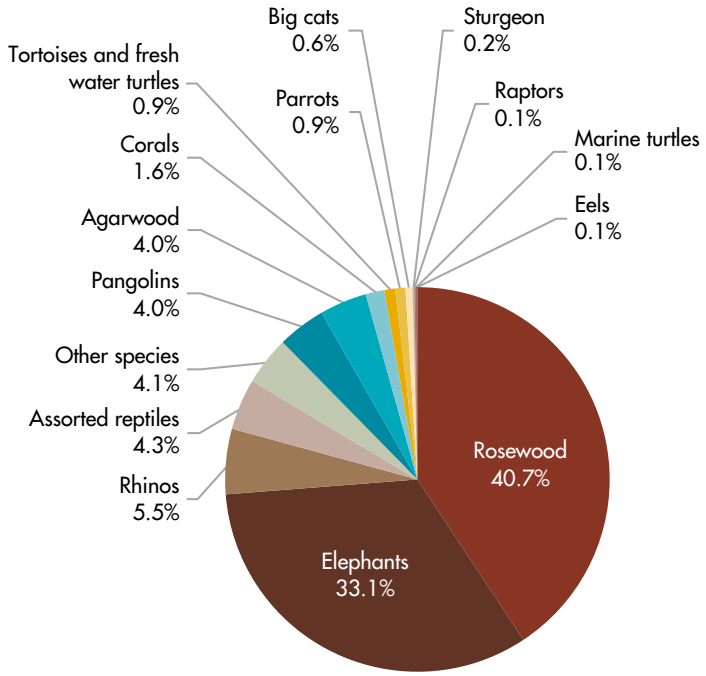
Role of transnational organized crime

Some wildlife trafficking flows primarily feed illicit retail markets, while others feed into the licit trade. Legal industries can be contaminated by the introduction of illegal supply, and this vulnerability must be assessed to understand the criminal market. Each case study presented in this report lends special insights into the way wildlife trafficking is perpetrated, suggesting the drivers and dynamics of the criminal trade.

Illicit wildlife markets, and the traffickers that feed them, can be highly specialised. With regard to destination markets, considerable attention has been given to open street markets where a wide range of protected species-products are often openly displayed. These markets are a reality, but they cannot account for the volumes of wildlife illegally harvested each year. Based on the locations of the largest seizures, border town bazars and back alleyways do not appear to be the venue where tons of fish, timber, and other wildlife products change hands. These volume commodities are usually marketed to specialists.

With regard to trafficking, there have also been seizures that suggest some groups are involved in smuggling multiple species. In just the last few years, detection of large quantities of ivory and pangolin scales in the same shipment indicate a clear confluence of these markets. But these are the exception rather than the rule, and, based on available information in World WISE, most shipments are of a single species. It is possible for the same trafficking group to move multiple commodities in separate shipments, of course, but the relative novelty of mixed shipments suggests that, as with dealers in destination markets, traffickers appear to specialise, trading in particular commodities where they know their buyers well.

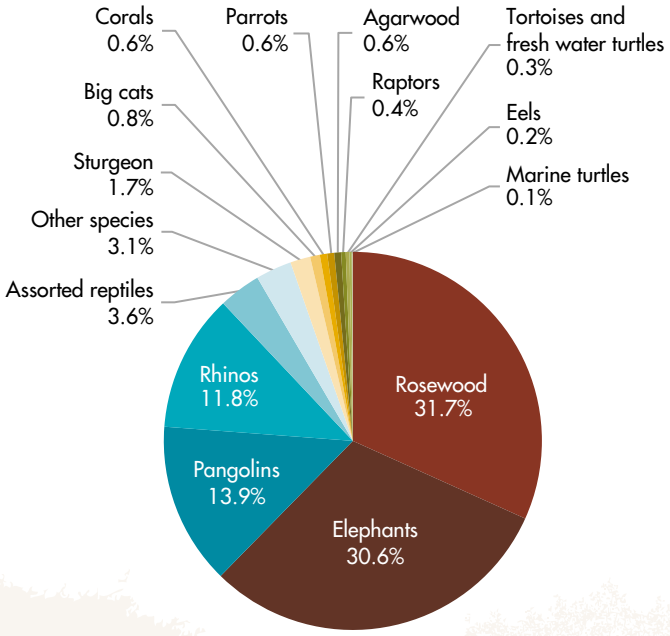
Fig. 3 Share of type of wildlife among total seizures (aggregated on the basis of standard value*), 2009-2013



Source: UNODC World WISE Database

* The distribution of seizures was calculated using a common metric based on the value of seizures. Over one million declared import values were statistically assessed and each seizure assigned a monetary value based on this dataset. See the methodological annex of the report for more details.

Fig. 4 Share of type of wildlife among total seizures (aggregated on the basis of standard value*), 2014-2018



Source: UNODC World WISE Database

* The distribution of seizures was calculated using a common metric based on the value of seizures. Over one million declared import values were statistically assessed and each seizure assigned a monetary value based on this dataset. See the methodological annex of the report for more details.

Information on the linkages between licit and illicit trade is important for targeting interventions to address the vulnerabilities of the licit trade and to strengthen the global regulatory system. In some case studies reviewed, it appears that the legal and illegal markets remain fairly distinct.

In other cases, the markets are entirely illegal. For example, rhino horns are product without a legal international market – zero trade is permitted for commercial purposes and there is no domestic market in range states. Similarly, there is no legal international market for pangolin products since all species were put on CITES Appendix I in 2017, yet growing volumes are seized each year.

In other cases, such as rosewood and European eels, a large share of the illegally acquired wildlife is ultimately processed and sold in a legal market. By introducing illegal products into licit markets, traffickers have access to a much broader pool of potential buyers. The commodities have access to legal demand, because the buyers may be unaware of the illegal origin of the product. People buying rosewood furniture or eels may have no way to ensure the origin of this product was legal. In these cases, supply-chain security is of the essence in protecting vulnerable species.

Organized crime groups are flexible and they can easily adapt to new restrictions, regulations and enforcement measures that may reduce opportunities to maximize profits. There may be many factors that make wildlife markets vulnerable to criminal infiltration. Policies, capacities and regulatory frameworks differ between countries, prompting criminals to turn to places where they can operate efficiently with low risk of punishment.

Illicit wildlife markets are like other illicit markets. With strong regulations and high demand, prices for the products go up, which can increase the profits of criminals. When efforts to curb the illicit trade do not impact both supply and demand, different types of replacement effects can be seen. Strong regulations in one place combined with high levels of demand can shift the criminal operations to less-regulated places or to the use of substitute species.

From one country to another: geographic displacement

Combating wildlife and forest crime has not usually been seen as a priority when addressing organized crime. Legislation may be weak and the level of detecting and addressing wildlife crime may be very low because of limited law enforcement capacity. Criminals tend to exploit legislative and enforcement gaps in countries that are less capable of addressing them, with the result that wildlife crime is displaced to these countries. This is the case, for example, with pangolin scale traders who chose to store their stock in the Democratic Republic of Congo as opposed to other source countries due to a perception of lesser capacity for interdiction.

Box 2: Valuation of wildlife seizures

To prioritise the use of limited resources, some quantification of the threats posed by the various wildlife trafficking flows is necessary. Looking at the number of times a particular species or region is implicated can give some general insights, but aggregating seizures is challenging because not all seizures are equal. Some comprise multiple container loads of illegal wildlife, while others involve a single item in the hand baggage of a traveller. Plumbing the depths of these data requires an additional element, something that takes into account the scale of the seizure. Once the relative significance of each seizure is weighed, a range of comparisons can be made. For example, the most significant species in trade, from a criminal markets perspective, can be identified. Together, just a few types of wildlife can account for just under 90% of the total.

Comparing and aggregating wildlife seizures is complicated, however, because of the variety of products involved. For example, the seizure of a box of 10,000 dried seahorses is very different in every respect from the seizure of a shipping container of illegally harvested rosewood logs, or a suitcase with three rhino horns. They cannot be treated as equivalent by simply counting the seizure incidents. The number of specimens cannot be counted: the wildlife is often processed before shipment, so the number of animals or plants involved is often unclear, and it would be unreasonable to equate a seahorse with a rhinoceros. They also cannot be compared on the basis of weight, since the crude mass of the wildlife in no way captures its significance.

The importance ascribed to a wildlife seizure depends on the purpose of the analysis. Organized crime is crime committed for material gain, and the extent of this gain is of great relevance for traffickers. Thus, to capture the criminal significance of a wildlife seizure, it makes sense to assign a monetary value to it. To provide this valuation, over one million declared import values were statistically assessed and each seizure assigned a monetary value based on this dataset. The valuation process is fully explained in the on-line methodological annex to this report. These values have been used not as a proxy for the true black-market price, but to act as a yardstick, giving a sense of the relative value of a seahorse to a rhino horn to a rosewood log.

From one species to another: wildlife product replacement

Criminals can shift from protected species to alternative species that have a similar value in destination markets. This sort of species replacement is very common in wood markets, where even experts can struggle to distinguish between timber of related species. The dominant rosewood species has changed many times over the years, shifting from Asian to African species. Similarly, African pangolin species were targeted after regulations tightened and populations were overexploited in Asia. Leopard, jaguar and lion bones have also emerged as substitutes in the tiger bone trade. At times, these substitutions are explicit, but often the buyers are not aware than a new species has been introduced.

From physical to online trade

Like many markets, trade in wildlife and wildlife products is moving online. For example, the illicit pet reptile trade increasingly involves the use of social media platforms. Criminals can be quick in switching online platforms whenever enforcement action is taken. This trade is particularly difficult to address due to its hidden nature, inconsistent regulatory frameworks, and limited specialised law enforcement capacities.

From wild to captive: captive breeding

When no viable wild population exists, captive breeding has been seen as an effective solution for the preservation of species threatened with extinction, but captive breeding can be exploited by organized crime groups. Several countries allow captive breeding for commercial purposes with the responsibility to ensure that these businesses operate in line with national regulations. There is evidence that criminals have used some licensed breeding facilities to illegally supply the illegal trade in exotic pets, luxury products and ingredients for traditional medicine. For example, detection of illegal tiger products in countries with little or no remaining wild tiger populations but large captive populations strongly suggests the illegal trade involves these tiger facilities.

Case study markets

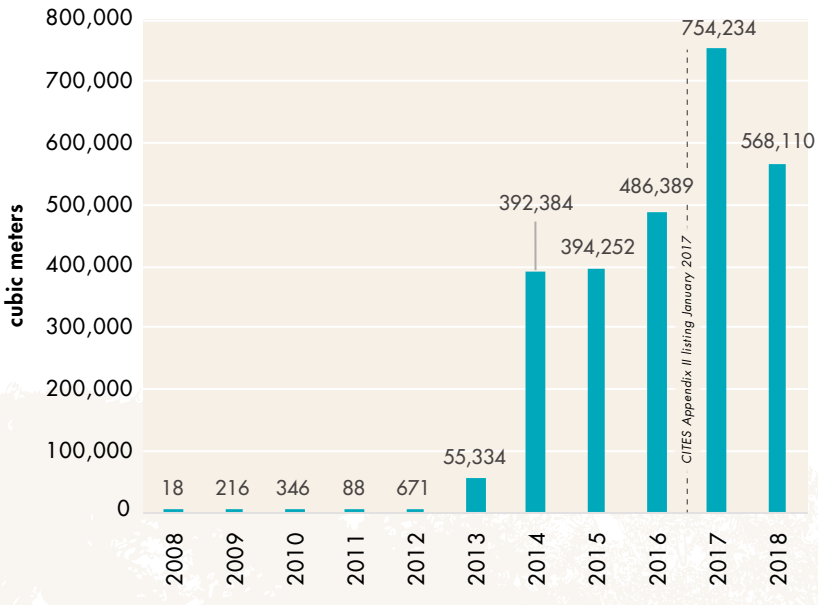
If the 2016 Report represented UNODC's first global assessment of the state of wildlife crime, this edition represents a first assessment of trends. In several instances, these trends have been dramatic. Several markets surveyed in the first report are also reviewed in this Report, namely markets for illicit rosewood, ivory, rhino horn, and pangolin scales. In addition, this report includes discussion on a few new markets, including those for live reptiles, big cats, and European eel. Some previously covered markets, such as reptile skins, live parrots and agarwood, are not continued in this report, due to a lack of available new data.

Rosewood

When traded internationally, timber is a commodity sold and used in bulk, and the seizure data are dominated by very large containerized shipments. Unlike illicit drugs, timber is not sold in acknowledged illegal markets, but rather fed into legal industries where its illegal origin is obscured. In fact, as the first Report highlighted, timber illegally harvested in one country may be legal to import into another. Countries are not bound to enforce the forestry laws of other countries. For this reason, both the legal trade data and the seizure data need to be considered in assessing the illicit flow.

Based on legal trade and seizure data, the largest flow of illicitly harvested rosewood in the past four years is coming out of Africa. The rosewood species featured in the last Report, *Pterocarpus erinaceus* (known in Nigeria as "kosso"), was listed on CITES Appendix II effective at the start of 2017. Remarkably, after this listing, more rosewood was exported from Africa than ever before, but this time with CITES documentation. Nigeria alone exported some 750,000 cubic meters of rosewood in 2017, which is equivalent to about four million trees, or over 30,000 shipping containers, an average of almost 100 container

Fig. 5 Volume of kosso logs (cubic meters) exported from Nigeria and imported by Asian countries, 2008-2018 (trade suspended October 2018)



Source: World Trade Atlas, UN Comtrade

loads exported per day. This continued apace in 2018. Because Nigeria was unable to produce a scientific non-detriment finding, a recommendation to suspend trade from the country was issued by CITES in October 2018.

With the imposition of controls on *Pterocarpus erinaceus,* a number of alternative African species suitable as rosewood substitutes have been exploited. Some of these substitutes were listed by CITES in 2019. *Pterocarpus erinaceus* itself has been exploited as an alternative to depleted Asian rosewoods. Even as CITES listed the entire *Dalbergia* genus in 2019, alternative genera were being targeted. Timber traders appear to be continually searching for substitute species to exploit internationally, working both within and outside the law.

Ivory and rhino horn

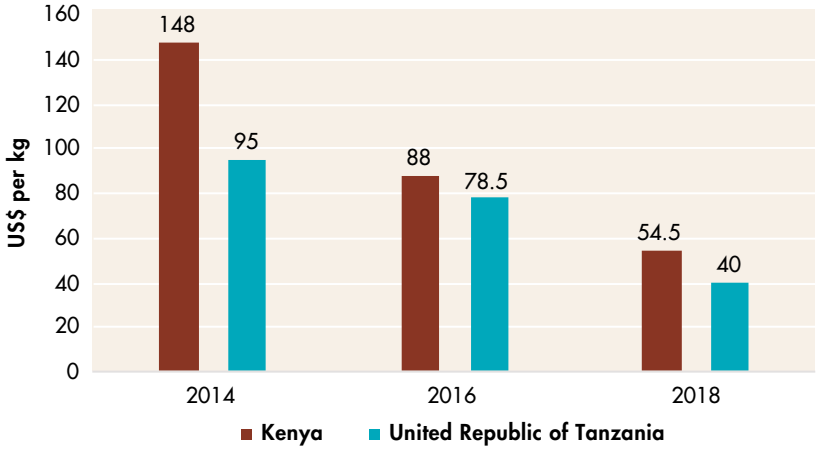
Perhaps the most revolutionary policy change in the past four years occurred in the trafficking of ivory, as several of the largest legal domestic markets were sharply restricted. Around the same time, several indicators suggested the illicit market went into sharp decline. The association of these two trends requires further investigation, but it is possible that the loss of the legal market undermined investor confidence, flooding the market with more ivory than required by retail demand.

Data on poaching and trafficking indicate that the ivory supply saw a resurgence around 2007 and grew steadily until around 2011, declining until 2016, and stabilizing at much lower levels in the following two years. Prices in both East Africa and Asia appeared to have risen from 2007, peaked around 2014, and to have declined dramatically in the following years. Similarly, rhino horn poaching appears to have risen from 2007, peaked in 2015, and declined every year since that time, with prices also declining during this period. Prices currently paid for rhino horn in Asian markets are a fraction of those cited in the popular press. It had been suggested that raw horn was worth US$65,000 or even US$100,000 per kilogram around 2014-2016, while field monitoring suggests the 2019 price was closer to US$16,000.

The simultaneous decline in poaching and prices suggests these illicit markets are contracting. It is possible that stockpiles are being tapped, reducing the need for poaching, but the associated decline in price indicates current supplies exceed demand. Some very large seizures of both ivory and rhino horn were made in 2019, which is likely to be a record year once all the data are in. Unless indicators emerge of renewed poaching, the source of this ivory was likely stockpiles, exported before prices decline further still.

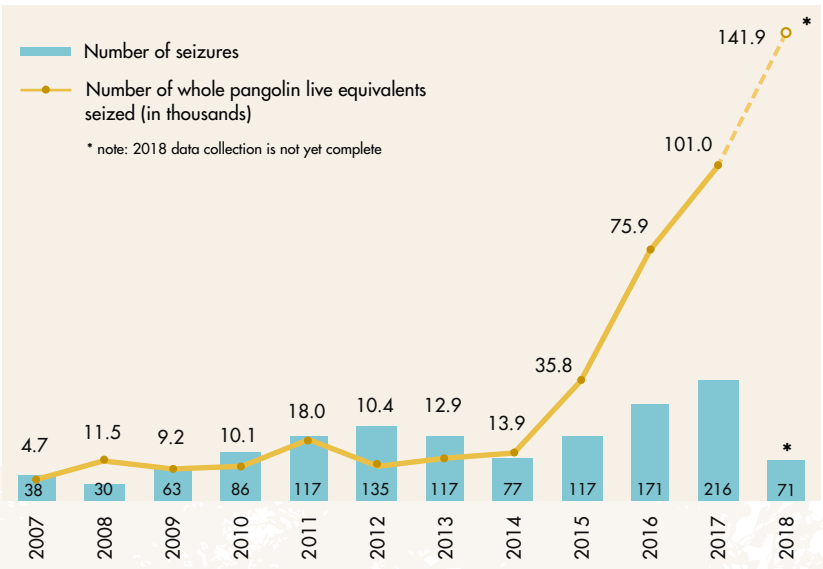
Seizure data also show a dramatic reorientation in the routing of ivory. While East Africa (particularly

Fig. 6 Ivory prices paid to poachers in Kenya and Tanzania, 2014-2018



Source: UNODC fieldwork

Fig. 7 Number of whole pangolin equivalents seized and number of seizures annually, 2007-2018*



Source: UNODC World WISE Database

* The specimen types included for this analysis are live, bodies, scales, meat, and trophies.

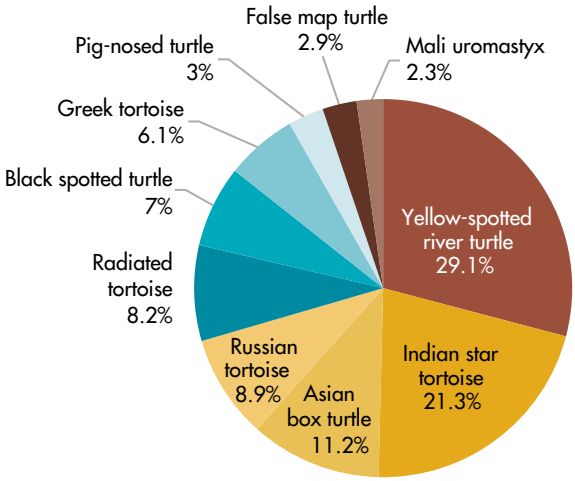
Mombasa, Kenya) was the primary source of illicit shipments in the past, Nigeria has become a dominant collection and transit point over the last four years. Similarly, while China dominated in the past, Viet Nam has emerged as the primary destination of these shipments. In addition, large mixed shipments of ivory and pangolin scales have risen in prominence, suggesting experienced ivory traffickers are using their expertise to move a rising illicit commodity

Pangolins

Between 2014 and 2018, seizures of pangolin scales increased tenfold. The reasons for this increase are unclear. All species of pangolins were elevated to CITES Appendix I in 2016, but there was very little legal trade before this time. While the main flow has always been illegal, greater awareness may have produced a higher rate of interdiction as a growing number of customs inspectors learn to recognise pangolin scales. Still, the sharp and consistent increase in seizures of scales year after year, as well as the growth in the size of the largest seizures, strongly suggest an increase in the illicit flow. Attempts to farm pangolins for commercial purposes have failed, and the loss of millions of wild pangolins to illicit markets cannot be sustained. Individual seizures made in recent years have been comprised of the scales of tens of thousands of pangolins, indicative of highly organized criminal operations.

There has also been a shift in the nature of pangolin seizures over time, away from live and meat seizures (mainly of Asian species) and towards African pangolin scale seizures. Significant meat seizures continue to be made in Asia, but most seizures in recent years were of scales exported from Africa (especially Nigeria and the Democratic Republic of the Congo) to Asia (especially Viet Nam). Looking at a broader range of time, China has been the primary destination of pangolin shipments, so it appears that, as with ivory, Viet Nam has become a conduit for this larger market.

Fig. 8 Share of top ten CITES-listed live reptiles seized, 2007-2017*



Source: UNODC World WISE Database**

* Includes bodies.
**The top 10 live reptile species seized represent 33% of all reptiles seized when looking only at bodies and live specimens.

Reptile pets

Reptile species are primarily traded for décor or fashion, for food, tonics, or medicine and for the pet trade and breeding. As the fashion industry has increased its support for conservation and sustainable use, live reptile seizures meant for the pet trade are becoming far more common than seizures of reptile skins. This is especially true for tortoises and freshwater turtles, which constitute nine out of the top 10 CITES-listed wild-sourced live reptile species seized in the last ten years. These species are sourced from a range of regions including South Asia, Central Asia, Southeast Asia, East Africa and West Africa. East and Southeast Asia, followed by the United States and Europe, are their main destinations.

Tortoise and freshwater turtle are primarily trafficked in small batches via air transport, in person or via post, to limit death in transit. The advent of social media and YouTube and other video sharing sites has resulted in an abundance of "how to" videos to catch species, encouraging people living in the range area to collect reptiles opportunistically for secondary income. Middlemen and sellers then work through private Facebook groups and other social media platforms to reach customers, with limited risk of being caught and easy opportunities to switch between platforms to dodge targeted law enforcement efforts. Large reptile shows and outdoor markets act as rallying points for collectors and dealers to build relationships and execute pre-arranged purchases.

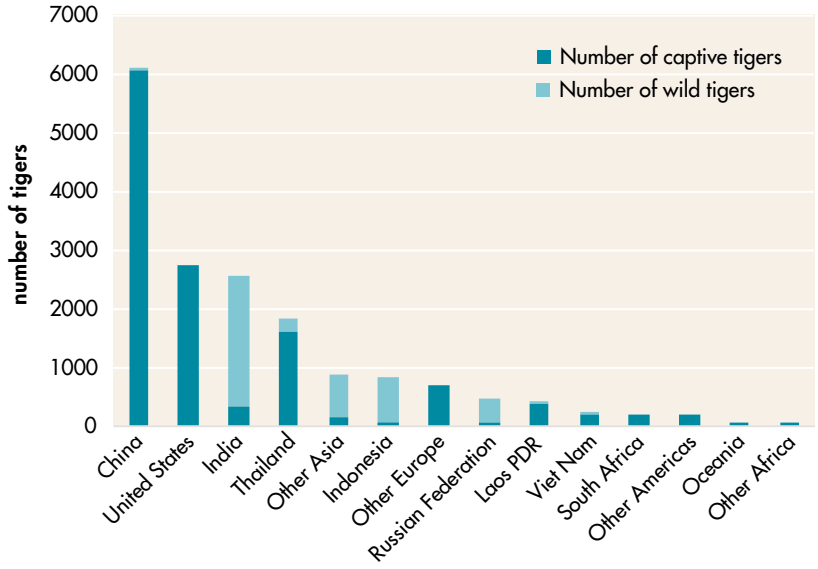
Big cats

All parts of the tiger are traded and used, for traditional medicine and for other purposes, but the bones are generally most sought after. Consumer demand has shifted in recent years with tiger product buyers purchasing these goods as a sign of wealth rather than for their health. The most popular bone-based products appear to be tiger wine and tiger glue/paste. A large part of the trade has shifted to online sales through social media and messaging apps.

While the number of seizures of tigers and their parts remains small, that number has risen from 2007 to 2018. Thailand and India are the main source countries for these seizures, although sourcing from Nepal, Bangladesh, and Bhutan is also ongoing. Given the large captive tiger population in Thailand, which has less than 200 wild specimens, most of these seizures likely involved farmed animals. In contrast, seizures from India, with the world's largest wild population, are likely from wild animals. Trafficking networks for tiger products involve Chinese, Vietnamese, Indian, and Indonesian traders who primarily sell the products to medicinal industries in China and manufacturers or consumers in Viet Nam and Thailand.

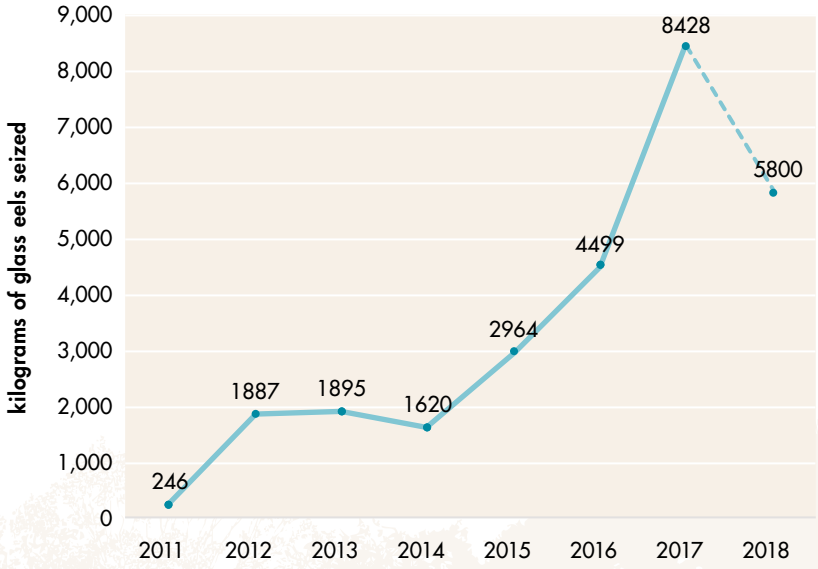
In addition to tiger products, products based on other big cat species have been seen in the illicit market, raising concern for those species. These include clouded leopard, snow leopard, jaguar, and lion parts, some passed off as tiger products. African lions appear to be the species of greatest concern, though, with current interest in the bone trade spurring a rise in the South African lion and tiger breeding industry.

Fig. 9 Estimated number of tigers (wild and captive) by selected country, 2016 or most recent data



Source: CITES

Fig. 10 Number of glass eels seized (in kilogram), 2011-2018*



Source: UNODC World WISE Database

* The specimen types included in this analysis are live and fingerlings from the family Anguillidae. Data from 2018 are preliminary.

European eel

Because eels have never been successfully bred in captivity, the production of eel meat is a multi-billion-dollar industry entirely reliant on wild-caught juveniles, known as "glass eels". Demand for eel meat is especially strong in Asia. As with other wild species consumed in growing Asian economies, local populations of eels have been overtaxed by growing demand, leading to a global search for alternate species. Eel meat is also consumed in Europe, but declines in European stocks, teamed with growing international demand, led to the prohibition of export of eel from the European Union in 2010.

Since this time, the European authorities have detected organized criminal operations trafficking European glass eels to Asian farms. Because live glass eels must be kept in controlled conditions, these operations typically purchase European glass eels at source and rapidly transport them by air courier or air freight to commercial growing ponds. Successful interdiction is likely to lead to the exploitation of eel populations in parts of the world where there is less capacity to respond effectively.

Box 3: The role of bribes in the illicit wildlife trade

A common theme in the illicit trade of ivory and rhino horn (and more generally with all illicit wildlife trade) is corruption in the form of bribes. Corruption has been found to be a critical enabler of the illicit wildlife trade, taking place at sourcing, transit and export stages, and involving public and private sector abuse of power and trust.[a] It can be ad hoc, involving smaller amounts of money and lower-level officials, or systemic, involving larger amounts of money, higher-level officers, and generally pre-planned.[b]

The case of the Shuidong connection[c], documented by the Environmental Investigation Agency, showed that bribes can make up 4 – 10 per cent of the final (wholesale) sales value of ivory in Asia. The overall bribes paid in that single case amounted to US$90,000-210,000. In 2012, along the Viet Nam-China border, there was an estimated US$18,000 to US$30,000 a day given out in bribes to border officials to allow ivory to cross borders illicitly.[d] Moreover, several member states reported to the Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG) cases of law enforcement officials involved in trafficking.

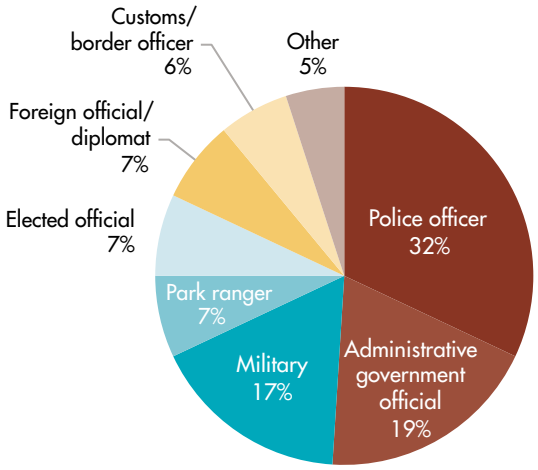
The Financial Intelligence Unit (FIU) of Namibia[e] documented a case in which 18 rhino horns weighing a total of 43 kilograms were found in the luggage of a passenger who arrived from Namibia in South Africa and was about to board a flight to Hong Kong, China. As a consequence, a Namibian police officer has been charged with defeating or obstructing the course of justice for failing or omitting to detect and stop the 18 rhino horns.

A court case, for example, documented that fraudulently acquired hunting permits were used to divert rhino horns to markets in the Lao People's Democratic Republic and Thailand.[f] ESAAMLG noted that the authorities issuing such hunting permits could be subjected to corruptive practices.[g]

Corruption can thus occur at any level of the supply chain and involve many different actors. In 2018, the Organisation for Economic Co-operation and Development (OECD, see note a) collected open source data from four selected countries (Kenya, Uganda, United Republic of Tanzania and Zambia) and identified the role of corrupt actors in reported cases, concluding that corruption may go far beyond lower-level police officers and park rangers. In the cases analysed, those involved in law enforcement operations (police, military, and customs) were the government officials most involved in corruptive practices. Officials responsible for administration were also involved but at a lower rate. Only a small portion of corrupted officials included park rangers (7 per cent).

An estimate of the overall volume of bribes paid is beyond the scope of this report and the data available does not permit it.

Fig. 11 Agency/Role of Corrupt Actors in available cases



Source: OECD[a] (based on the identifiable agency from open source data collection)

a Organisation for Economic Co-operation and Development (OECD), 'Strengthening Governance and Reducing Corruption Risks to Tackle Illegal Wildlife Trade: Lessons from East and Southern Africa', *Illicit Trade*, 2018.

b Ibid.

c Environmental Investigation Agency (EIA), *The Shuidong Connection: Exposing the global hub of the illegal ivory trade*, 2017. See: SHUIDONG CONNECTION BOX.

d Bennett, E. 'Legal ivory trade in a corrupt world and its impact in African elephant populations'. *Conservation Biology*, 29(1), 54–60, 2014.

e Republic of Namibia Financial Intelligence Centre, *Trends and typology report No 1 of 2017: Rhino and elephant poaching, illegal trade in related wildlife products and associated money laundering in Namibia*, 2017.

f UNODC, Sharing Electronic Resources and Laws on Crime (SHERLOC), Case Law Database, available at: sherloc.unodc.org. Case number ZAFx008.

g Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016.

Illicit financial flows

The oft-heard refrain "follow the money" has been raised with regard to wildlife crime, but there has been little systematic assessment of how much money is associated to illegal wildlife markets and how this money is distributed.

Countering illicit financial flows has been recognised in the Sustainable Development Goals under target 16.4.: "*[b]y 2030, significantly reduce illicit financial flows and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organised crime.*" The estimates presented in this report provide an indication of the potential flows arising from the illegal trade in rhino horn and ivory and highlight the importance of systematic collection of price and supply data to continuously monitor the situation and to provide insights on potential weaknesses that allow for disrupting illicit supply chains.

The annual illicit income generated from ivory and rhino horn trafficking between 2016 and 2018 was estimated at US$400 (310 – 570) million for ivory and US$230 (170 – 280) million for rhino horn trafficking. The largest shares of income are generated at the retail level, where rhino horn and ivory are processed and sold to end consumers. The emerging illicit financial flows (volume of cross-border transactions) could be – depending on how complex the supply chains are – almost twice as much, namely US$ 570 million for ivory and US$390 million for rhino horn. There is, however, a large range of possible scenarios.

Endnotes

1 Further details on World WISE can be found in Chapter 1. Introduction.

2 Certain parties have submitted illegal trade reports to the CITES Secretariat but refused to let their data be used for research purposes by UNODC.

3 The annual data collection on AITRs was still on-going when data processing for the present report had to be finalised. Therefore, data for 2018 should be used cautiously as they are not directly comparable with those of previous years.

POLICY IMPLICATIONS

Wildlife crime involving organized criminal groups is serious crime. No country is untouched by these crimes, which impact biodiversity, human health, national security and socio-economic development, and line the pockets of organized criminal groups. The illegal trade in wildlife, which by definition does not go through proper sanitary and phytosanitary controls, can potentially lead to the spread of zoonoses, such as SARS-CoV-2 that caused the COVID-19 pandemic. Addressing the biodiversity crisis and its cascading effects cannot be done without acknowledging the negative impact caused by transnational organized crime and corruption, across the entire wildlife trafficking chain. As each country may be a source, transit and/or destination country, each has a role to play in acting to prevent and address these crimes through disruption and deterrence. Wildlife crime, like other organized crimes, must be addressed through a balanced approach that targets the complementary pillars of supply, demand and livelihoods.

A significant portion of this report is based on seizure data collected from a wide range of countries. Poaching, trafficking and the illegal movement of large volumes of various protected species and their products across national, regional and international borders continues, to a large extent, unabated. In 2019 and in the first half of 2020, several major seizures of ivory, rhino horn, pangolin and rosewood have been recorded. There also appears to be geographic consolidation of trafficking routes across several markets, with Nigeria emerging as a key source/transit country for many of the shipments noted above. Similarly, Viet Nam has emerged as a key destination country for shipments of ivory and pangolin scales, although the domestic market for both commodities appears to be limited.

Also, the first clear and consistent linkages between two major illicit wildlife product markets – those for African elephant ivory and for African pangolin scales – have been documented, with a series of large-scale seizures containing both specimens in recent years.

Despite these large-scale seizures, the number of investigations that follow them remains disproportionately low. The news is not all bad, however: several African and Asian countries have secured a growing number of convictions for wildlife crimes. For this trend to continue, more political commitment must be provided, and increased cooperation must occur to disrupt criminal organizations.

The previous World Wildlife Crime Report flagged the importance of countries undertaking an in-depth assessment through the ICCWC Wildlife and Forest Crime Analytic Toolkit[1] process to better understand their criminal justice and preventive responses to wildlife and forest crime. To date, 12 countries have completed the Toolkit process, while 10 more are underway; seven countries have conducted the Indicator Framework.[2] Both mechanisms allow for assessment of gaps in the national response to these crimes and identify areas that would benefit from capacity building and technical assistance. Common insights from these processes include the importance of having criminal legislation that recognizes serious wildlife offences as crimes, and that capacity gaps in knowledge and resources, as well as a lack of mandate, can prevent enforcement from taking place. Interagency coordination and international cooperation are often cited as vital – but missing – keys to success.

Many tools to tackle serious and organized crimes already exist, including the international legal frameworks provided by UNTOC and UNCAC. The outstanding question is why more countries are not using such tools to address wildlife crime? The answer likely lies in a combination of a lack of understanding of the nature of these crimes and their broader impact, insufficient prioritization and/or a lack of capacity or resources. Since some countries may be at different stages of tackling the challenges of wildlife crimes and have different capacity to do so, the following chapter offers suggestions for consideration by Member States and the international community towards preventing and addressing wildlife crime, which can support their work towards achieving the Sustainable Development Agenda.

Wildlife crime is serious, organized crime

The objective of organized crime is to generate profit; organized criminal groups involve three or more people working together for a period of time, with the aim of committing one or more serious crimes in order to generate financial or material benefits, often by providing illicit goods and services. Transnational organized criminal groups operate across borders, launder the proceeds of their crimes, corrupt officials or engage in corrupt acts, and actively work to obstruct justice. Such groups make use of sophisticated, complex transportation and finance networks. This report underlines that most of these features are present in the most serious forms of wildlife crimes. The size of the illegal shipments documented in this report require complex logistics and strong networks, suggesting the organized nature of these crimes and a multitude of individual stakeholders involved in the trafficking.

Pursuant to the UNTOC, 'serious crime' refers to an offence punishable by a maximum penalty of at least four years of imprisonment. By increasing

the maximum penalties for the most serious types of wildlife offences, some countries have started to frame these offences as serious crimes in their national legislation; as such, these crimes fall under the scope of UNTOC, and therefore governments can benefit from the various tools for international cooperation contained in the Convention. Critically, countries should ensure that domestic legislation and procedures allow the use of alternate offences to pursue wildlife crimes, such as money laundering, corruption, fraud, etc., and enable wildlife crime to be considered a predicate offence for such crimes, to enable use of the various tools to address these.

In addition to making illicit trafficking in protected species of wild fauna and flora involving organized criminal groups a serious crime in national legislation, illegal trade could be more easily targeted if each country were to consider prohibiting, under national law, the entry, exit or in some cases, possession, of wildlife products that were illegally harvested in, or illegally traded from, anywhere else in the world.[3] Addressing vulnerabilities in legislation – both domestic and international - can help reduce opportunities for trafficking.

Further, consistency and harmonization of legislation within countries and across regions is critical to close loopholes and prevent displacement of crime to areas with lower penalties. This could also improve cross-border investigations and judicial cooperation.

Political will can be harnessed to generate action

Galvanizing political will around the issue of the seriousness of wildlife crime has led to a series of high-level international political events, like the London Conference of October 2018 and the first regional conference of the Americas on the illegal wildlife trade in October 2019. Commitments have been made by Member States to address wildlife crime and associated economic crime and corruption, as well as to engage key stakeholders and enhance international cooperation. The Sustainable Development Agenda includes a variety of targets associated with reducing wildlife trafficking, notably 15.7[4], and the international community has resolved in a series of UN General Assembly resolutions on tackling illicit wildlife trade, in addition to those of the Commission on Crime Prevention and Criminal Justice, CITES and UNCAC, to work to end this scourge. Combined with several national and regional strategies for addressing wildlife crime, these statements and commitments lay the political foundation to end wildlife crime. Such commitments raise expectations for action, and also provide the necessary mandates for the international community to provide technical and financial support to address wildlife crime and it associated crimes.

Addressing corruption is foundational to preventing wildlife crime

This report indicates that corruption exists across all stages of the wildlife supply chain and can facilitate the illegal trade of wildlife. This corruption manifests itself in various ways, ranging from officials receiving bribes and colluding with criminals, to abuse of office and embezzlement of resources allocated to wildlife management and protection. Bribes paid to officials can make up a significant part of the overall costs of wildlife trafficking; for example, as noted in Chapter 8 on illicit financial flows, customs officers may receive 4-10 per cent of the final wholesale value of ivory.

Criminals engage in corruption to create the veneer of legitimacy; as a result, illegal enterprises can be presented as legitimate sources of wildlife. Corruption inhibits the ability of honest public officials to fulfil their mandates, whether those be managing and protecting wildlife resources, protecting borders, or managing and regulating markets for wildlife products. Corruption also interrupts the path towards criminal justice, as the absence of controls may result in evidence being lost or concealed, as well as leaving witnesses, prosecutors and other judicial officers vulnerable to corruption. Delays in expedient trial processes may increase opportunities for wrongdoing.

The international community has recognized the importance of the issue. In 2016, at the 17th meeting of the Conference of the Parties to CITES, a resolution[5] was passed calling on Parties to take a broad range of measures to prevent and combat corruption linked to the illegal wildlife trade. In 2019, the 8th Conference of the States Parties to the UN Convention against Corruption adopted a resolution,[6] the first of its kind, on preventing and addressing corruption linked to crimes that have an impact on the environment. The resolutions recognize that corruption underpins the illegal trade in natural resources, constitutes a growing source of profits for various criminal actors, and that addressing this connection is vital to target action to reduce illegal harvesting and trade and raise awareness of the detrimental effects of corruption.

These resolutions help create the policy environment in which to deepen and strengthen the much-needed practical work to combat and prevent corruption linked to wildlife management. Corruption prevention and risk mitigation work has commenced with wildlife, forest and fisheries management authorities across Africa, Southeast Asia and Latin America. These efforts need to be strengthened and prioritized by many more countries. To improve results, it is necessary to support leaders to put more transparent and accountable processes and systems in place, including oversight and auditing services and tools in government decision making, conducting

anti-corruption risk assessments[7] and strengthening integrity policies and frameworks across the entire crime prevention and criminal justice chain.

Many more instances of wildlife crime and trafficking warrant being investigated and prosecuted as crimes of corruption, and the number of associated financial investigations needs to be further increased. Such an approach not only provides investigators with a wider range of powers and techniques than may be available under wildlife legislation but may well also offer a more extensive range and severity of penalties. Investigating and prosecuting corruption and other economic crimes will help target more senior members of criminal groups and actual beneficiaries of wildlife crime and disrupt organized criminal groups.

Enforcement must go beyond seizures

As noted above, recognition of wildlife crime as 'serious crime' in relevant legislation is an important first step, but this must be reflected and reinforced throughout national criminal justice systems. Legislation can only have the desired impact if it is effectively implemented, however; in many states, such implementation is still lacking, and combating wildlife and forest crime has not been set as a priority for enforcement by policy- and decision-makers. Criminals will continue to exploit legislative and enforcement loopholes, and where weaknesses exist, the illegal trade will be displaced to states less capable of addressing them. Many law enforcement agencies in range, transit and destination states require additional technical and financial assistance to address capacity gaps, including help to better prevent, detect and investigate wildlife trafficking, and better training and protocols on how to secure and deal with specimens once seized or confiscated. The support and engagement of specialized bodies and investigative units, such as Financial Intelligence Units, customs, anti-corruption units, crime intelligence units, forensic investigators, crime analysts and others, seems to be the exception rather than the rule.[8]

Good risk management practices that enable profiling and targeting to detect and identify suspicious shipments and persons are crucial to effectively addressing crime, including wildlife crime. As noted above, however, detecting illegal wildlife shipments and the associated seizures should, to the fullest extent possible, be used as the starting point for further investigations. More must be done to go beyond seizures, to trace the ultimate beneficiaries of the trafficking through robust investigations, including parallel financial investigations, that lead to viable court cases. Capacity building from 'crime scene to court' is critical to this end.

- Targeted enforcement approaches may be required for different species. As detailed in Chapter 8 on illicit financial flows, there are distinct differences in supply chains for different products; for example, rhino horn poachers are more organized than ivory poachers. The differing degree of professionalization of these groups – when indeed, they are different groups – suggest that a more specialized law enforcement response is required against rhino poachers, while elephant poaching may be effectively targeted through, amongst others, community-based interventions.

- Specialized investigative techniques, such as controlled deliveries, can be used to disrupt and dismantle criminal organizations. Allowing a shipment to proceed to its final destination allows law enforcement authorities to identify and address role players across the entire trade chain, while also facilitating a better understanding of the methods being used by criminal networks. Controlled deliveries should increasingly, and whenever possible, be considered as part of wildlife crime investigations.

- Officials involved in building cases often have limited training on data management, intelligence analysis or other advanced investigation methods and techniques, which would greatly enhance strategic and tactical decision-making. Improving information analysis capacities can provide authorities with important data for cross-referencing information, identification of resource needs, and exchange of best practices at the national and international levels.

- Science must be leveraged. To this end, the use of forensic science is critical, not only to identify or verify species but to deliver admissible evidence that supports law enforcement investigations and prosecutions. Enhancing national laboratory capacity to operate to internationally accepted standards is an important goal. In the meantime, countries should consider drawing upon the services of suitable international forensic providers who are accredited and certified to carry out wildlife forensic analyses, mindful of issues of admissibility of evidence in certain jurisdictions. Portable labs could also be considered, as these could speed up turnaround time and provide short-term national solutions for some countries.

- Wildlife crime scenes can be located anywhere from remote areas, to urban centres and border posts. Responding to such incidents can be complex and first responders must be properly trained, as mistakes made at the beginning of an investigation can jeopardize evidence and prevent perpetrators from being brought to justice. Robust

chain-of-evidence/custody protocols for samples that are collected to be sent to forensic labs are vital to ensure that the results of analyses will be admissible in court.

- Wildlife is illegally traded in very complex supply chains, which can result in significant illicit financial flows. Understanding the business practices of criminal operations, and how licit businesses are exploited by criminal groups, is essential in combating the crimes committed by organized criminal groups and conducting parallel financial investigations can identify the ultimate beneficiaries of wildlife trafficking and disrupt illegal income streams. The money should be followed in every direction, not just towards profits and assets. Organized criminal groups spend money to commit crimes (i.e. by paying for harvesting equipment (chainsaws, firearms, ammunition, etc.)), for transportation (i.e. plane tickets for couriers), to establish front companies, etc., and these flows should also be used as indicators to detect potential illicit transactions and opportunities for disruption. To this end, basic information gleaned during law enforcement processes, such as details of the business structures and the financial transactions criminal groups enter into, must be collected, researched and built into typologies that could be used to classify and outline criminal operations and techniques. Such typologies should be frequently updated, to allow all relevant agencies with the potential to intervene in the money flow chain to understand the potential vulnerabilities and what to look for.

- Even when follow-up investigations to seizures may not take place, it is important that relevant agencies, at national, regional and international levels, receive and record the key facts related to all seizures, as these have significant value for risk-assessment and profiling purposes, as well as for intelligence analysis. Such dissemination of information/intelligence may also provide insights to other forms of crime and links to other organized criminal groups. For example, the World Customs Organization's Customs Enforcement Network database is a source of intelligence for risk-assessment. Several networks, both formal and informal, already exist to share information, such as INTERPOL's I 24/7, WCO Environet, Wildlife Enforcement Networks (WENs) and various "Trade in Wildlife Information eXchange (TWIX)" networks like EU-TWIX, SADC-TWIX and Africa-TWIX, but they are often underutilized.

- Law enforcement would also benefit from strong partnerships with private sector service providers whose infrastructure and processes are used to facilitate illegal trade, such as the transport and financial sectors, to help identify patterns, trends, and possible red flags that could facilitate coordinated action, combining forces to combat trafficking. Other public-private partnerships that can be beneficial include those that supply software solutions, such as to strengthen intelligence gathering to inform decision-making or provide various forensic services; all these mechanisms can build capacity, as such partnerships can put tools and information into the hands of those who can make a difference.

Prosecutorial support and engagement are critical

Prosecutors are the gatekeepers of the criminal justice system, and for complex cases should be involved in the process as early as possible. If investigations lead to prosecution and cases going to court, prosecutors need to charge all possible infractions linked to the case. For this to happen it is necessary that the investigating officials correctly identify points to prove at the outset of an investigation and collect the necessary evidence to build a strong case. At the same time, prosecutors need to be aware of the multi-faceted nature of wildlife crimes, which can touch upon many different pieces of legislation. Although there is growing awareness of the importance of having a strong legal framework under which to lay charges, there are still deficiencies in applying all relevant provisions of the law and understanding the importance of selecting the right charge to use. For this, prosecutorial services should be provided a continuum of capacity building focusing on the codification of the decision to charge, the practice of written and continuous review, and the use of ancillary legislation. This would have an added benefit of mitigating corruption risk, by making the decisions taken during a prosecution transparent and accountable.

Many cases end in dismissal or acquittal because the initial charging decision was made without enough evidence present to successfully prove the charge and, in the absence of continuous review by the prosecutor, difficulties such as witness attendance or questions over admissibility of evidence are not identified in time. Support to the prosecution services to navigate existing law, such as using tailored reference guides for charges to levy and points to prove that reflect the broad range of criminal statutes and customs laws relevant to wildlife crime, would be beneficial. Support should also be provided to prosecution services to identify areas that would benefit from legislative change, such as the power to appeal lenient sentences.

Equally important is the need for prosecutors to have effective case management systems, preferably electronic, enabling early engagement with investigators and thus enabling prosecution-guided investigations and enough time for prosecutors to review cases before and after the charge. Prosecutors require access to all documents relevant to the case in order to facilitate efficient court proceedings. The number of cases that are dismissed as a result of basic case management deficiencies are unacceptably high. This not only demotivates the prosecutor and frustrates the judiciary, but also undermines the prosecutor/investigator relationship and damages public confidence in the criminal justice system.

In addition to the benefit of electronic case management systems, prosecutors and judges often do not have access to a centralized database of previous wildlife crime cases to help guide their decisions, which can result in lenient or inconsistent sentencing. A further benefit of technology can be harnessed to facilitate expert testimony, notably in cases where expertise may be limited. Using technology as such would render the court process more efficient and effective, notably when there is a need to explain complexities and the impact of these crimes.

Inter-agency coordination on wildlife crime is necessary at the national level

There is often a lack of clarity concerning the roles, obligations and mandates of national agencies as to where wildlife crime "fits" in the national context. Increasingly, wildlife crime impacts on a variety of sectors and increasingly, cases of convergence with the trafficking of other commodities are coming to light. As such, national agencies should cooperate, work collectively and share information, but full integration and cooperation at all levels is not the norm in many countries. There continue to be structural and political challenges in many countries to establishing inter-agency platforms to apply a whole-of-government approach. The need to clarify the roles and responsibilities of the various agencies mandated with wildlife law enforcement continues to exist in many countries; such clarification would improve not only efficiency but would better position entities to allow for improved inter-agency coordination. There is an urgent need for a trans-disciplinary approach that ties together law enforcement, wildlife management authorities and other relevant authorities such as financial intelligence units, public health and safety agencies, administrative and local authorities. Countries could benefit from transnational organized crime units or other agency coordination/technical working mechanisms, including interagency platforms that promote an integrated and multidisciplinary response between decision makers and technical officials at the federal and local levels.

International cooperation on criminal matters related to illegal wildlife trade can then support national efforts

There is often a long chain of criminality between the site where an animal or plant was illegally harvested or killed, and its final destination. As detailed throughout this report, wildlife crime stretches over national borders and across continents. While decades of negotiations under CITES have contributed to reduce the grey areas between legal and illegal trade of wildlife, cooperation to tackle the blackest end of the spectrum is still, however, in its infancy, as highlighted by the rarity of prosecutions and convictions that follow a seizure.

As noted above, as more and more countries move towards punishing the illegal trade of wildlife with maximum penalties of at least four years imprisonment, this type of serious crime falls under the scope of the UNTOC and enables Member States to deploy the tools available in it against wildlife crime. Parties should look more regularly at the UNTOC as the legal basis for international cooperation, including for mutual legal assistance (MLA), extradition, joint investigations and use of specialized investigative techniques such as controlled deliveries and undercover operations for the most serious forms of wildlife crime.

UNTOC is a strong foundation for MLA, which is a principle mechanism used for international cooperation towards investigating and prosecuting serious crime types. Despite its importance to successful investigations and prosecutions, MLA is seldom used in the wildlife crime arena, and the international community needs to better understand the challenges in using MLA and increase its efforts to build capacity to promote this tool. Outside the UNTOC, States could also look to use, if preferable, bi-lateral or regional mechanisms/agreements to exchange information and facilitate international cooperation on criminal matters, including through the networks and information-sharing platforms such as those noted above.

Partnerships and other initiatives and networks play an important role in supporting the law enforcement community and in strengthening efforts to address transnational crimes like wildlife crime. For example, the International Consortium on Combating Wildlife Crime (ICCWC) is a collaborative effort between the CITES Secretariat, INTERPOL, UNODC, the World Bank and World Customs Organization (WCO). Coordinated capacity building and support at national, regional and international level and strengthened criminal justice systems help to ensure that perpetrators of serious wildlife crimes face a formidable law enforcement response.

Various networks to support different elements of the criminal justice response also exist and can be the basis for cooperation and joint investigations, such as WENs, anti-money laundering and anti-corruption networks and working groups, and forensics networks like the African Wildlife Forensics Network and species identification databases, like RhODIS[9]. Such regional and inter-regional mechanisms are platforms for cooperation and aim to combine forces to disrupt and dismantle transnational organized criminal groups and work to bring them to justice.

Research, Data and Monitoring require ongoing funding and improvements

Data and evidence on criminal groups, prices, modus operandi and the criminal justice response, and commensurate analysis, are the foundation of evidence-based policy making and programme development. Continuing to conduct and provide financial support for international research and analysis on wildlife crime, especially global analyses like the World Wildlife Crime Report, is therefore vital to reducing illegal wildlife trafficking.

The lack of data on criminal groups, prices, modus operandi, and criminal justice response severely hampers understanding of market dynamics and renders the interpretation of trends in seizure data quite difficult. There are significant gaps in research and data on wildlife crime in many countries; for example, the dearth of wildlife crime data in Latin America leaves a vacuum in understanding the situation of wildlife trafficking to and from the region. While officials in that region have taken steps to protect endangered species like the jaguar, through their commitments to address the trafficking, they need solid research, based on empirical data, to guide their well-intentioned and commendable steps.

Of particular importance to improve data and fill in the gaps is improved submission and quality of submissions of Annual Illegal Trade Reports (AITRs) by CITES Parties to the CITES Secretariat. The requirement for AITRs to be submitted was agreed at the 17th meeting of the Conference of the Parties to CITES in 2016, and the first reports were due in 2017. While this is a new requirement, submission rates are still relatively low and there remains significant room for improvement in the submission of AITRs. Only 78 countries submitted AITRs at least once between 2017 and June 2020[10] and, while these countries represent some of the main source and destination countries for illegal wildlife trade, it is important to obtain data from all Parties to identify emerging trends, species or regions of concern. Building the capacity of countries to identify the species of seized specimens and creating the infrastructure to report the seizures in a standardized format is vital for monitoring and research on the illegal trade.

While there is a gap in country-related data, the data historically collected often focused on charismatic species like elephants, while other trafficked species like birds, reptiles, spiders and aquatic species have tended to go under-documented, thus hampering proper enforcement efforts. Without an even representation of the scope of the data – geographic and species - there is a risk of targeting enforcement efforts in the wrong place or at the wrong species. Further, there is a need for additional analysis on the use of alternative species in some markets, such as leopard, jaguar and lion as substitutes for the tiger bone trade, or whether helmeted hornbill ivory is a replacement product for elephant ivory. A strong set of data to make such insights is critical, as there may be different responses required depending on the market trend. Another data element that is required to consistently measure the illegal trade is systematic reporting on price data for a variety of illegal wildlife products, notably for less well-researched species. Some of these data needs could be met through partnerships and information exchanges with other conservation and law enforcement stakeholders, some of which manage other wildlife crime databases, as well as through web scraping methodologies to supplement existing official data sources with open data.

Currently, the AITRs request some basic criminal justice data from enforcement agencies, but these data could be expanded to include the collection of more detailed data that would allow tracking cases through the criminal justice system to provide a basis from which to measure successes in tackling the illegal trade. Such data could also point to good practices that could be applied or expanded upon in other contexts.

It is worth noting that the AITR does not collect data on gender-related matters: very little is known about the specific roles of women and men in wildlife crime, and more research efforts should be placed on understanding the gender dynamics of the illegal wildlife trade. If enforcement agents are making assumptions about gendered aspects of wildlife crime, they could be missing opportunities for seizures and arrests, and the policy and programming communities could be missing opportunities to design tailored interventions that would foster sustainable success.

Lastly, while global research on wildlife crime has mainly focused on internationally protected species, little comparative analysis is available on wildlife crime affecting nationally protected species, including illegal domestic trade. With criminals taking advantage of any loophole, there is a need to better understand the trafficking of non-CITES listed species within and across borders to support law enforcement and criminal justice practitioners to define national and

international tools that can protect the biodiversity of each country from criminal threats.

Addressing wildlife crime as it moves to the Internet

Like many markets, trade in wildlife and wildlife products is moving online. Organized criminal groups are increasingly using a range of online platforms and technologies to facilitate the transnational trafficking of wildlife products. Member States should develop the capacity of law enforcement agencies to investigate online sales of illegal wildlife, infiltrate existing online markets, collect relevant evidence including using digital forensics, and develop enforcement countermeasures. Monitoring of online trade, and using available technology to track key hubs, patterns and players involved in the illegal trade, is critical to disrupting the organizations exploiting online platforms. These efforts must be flexible to enable law enforcement to react quickly when, for example, reptile traders switch to other online platforms after one platform cracks down on illegal trade.

As both legal and illegal trade increasingly use virtual means, partnerships between law enforcement and technology platform partners like Facebook, WhatsApp, Alibaba and WeChat, amongst others, will be an important mechanism to prevent and disrupt illegal trade, and should support efforts to regularly monitor specialist social media groups and other online sales channels for illegally-traded wildlife.

Improving local community engagement and sustainable livelihoods

Communities that live close to wildlife are key partners in tackling wildlife and forest crime. They can play an essential role in preventing crime at source and form the so-called 'first line of defense.' Community-led patrols and community-based crime prevention initiatives can be vital extensions of national law enforcement networks. As a matter of policy, countries and their enforcement agencies must ensure that their strategies, tactics and activities do not alienate such communities, but that these communities are included as partners who can support and protect the habitat they share with wildlife.

Beyond enforcement, investing in and engaging local communities as partners has been effective in several areas, and success achieved as a result of tailored frameworks to fit the nature of the challenges and opportunities, and of fostering active participation of the local community members to become guardians of wildlife. Successful initiatives have commonalities like shared management rights and fair and equitable benefit-sharing, such as in conservancies that are managed directly by local communities. Crucial is the empowerment of those in the community, with support to build skills, provide resources and incentives to engage in stewardship or disincentives for illegal behaviour.

Communities living in close proximity to wildlife have been exploited by organized criminal groups, often as a result of a lack of legitimate income earning opportunities. Building resilient and sustainable communities is key to incorporating them into national efforts to end wildlife crime. This requires both establishing trust and confidence and ensuring that communities benefit from the natural resources. An inequitable distribution of gains tends to generate marginalization and a lack of trust, and a low valuation of wildlife by communities. Governments should ensure that private sector entities, which often manage and operate tourism and related industries, share the benefits and income derived from such operations and respect the rights and voices of community partners.

Providing licit income generating opportunities for communities living in, or adjacent to, areas of wildlife is critical. Governments and the international community must look to foster small business enterprises and to promote various forms of sustainable livelihoods. National agricultural and rural development strategies must include communities vulnerable to the temptation to poach and take wildlife in an illegal and unsustainable manner. There are numerous best practices that can be taken from alternative development programmes aimed at reducing the illicit cultivation of drug crops.

Several forms of legal and sustainable wildlife use can be important sources of income for families who live close to global biodiversity hotspots. Sustainable livelihood initiatives must go beyond eco-tourism, which has proven to be vulnerable in the face of travel restrictions associated with the COVID-19 pandemic. Instead, future-proofing livelihoods that focus on resiliency and can withstand the myriad challenges posed by the impact of climate change, pandemics and criminal exploitation must be considered as part of any national strategy for tackling wildlife crime.

Demand reduction is essential to preventing wildlife crime

As reflected throughout this report, illicit markets for wildlife are not that different from other illicit markets. If there are strong regulations in place, and high levels of demand, prices for the products go up. This, in turn, increases the profits lining the pockets of criminals offering these products illegally. If efforts to curb the trafficking do not impact the overall market – both supply and demand - there is often a replacement or 'balloon' effect, which displaces the trafficking to other products or locations. This phenomenon also exists in wildlife markets, both geographically and in terms of species. With strong regulations in one place and the existence of

high levels of demand, illicit markets to supply that demand will move to less-regulated places and/or towards substitute species.

Recent changes in the ivory market show that efforts to impose strong regulations, such as bans, to control supply, while also tackling demand through demand reduction campaigns, can be effective. Looking at the various bans on ivory that have been implemented in recent years, these bans would not have had the impact they had on the decline in poaching for elephants had other, commensurate, demand reduction efforts not taken place. If demand for ivory had stayed high because demand reduction efforts had not been successful, the decline in poaching post-ban would probably not have occurred. Similar measures should be considered for any wildlife products where there is no legal international market.

Recognizing that demand could be an important driver of wildlife trafficking, addressing it is a core component of reducing wildlife and forest crime. There is no 'one size fits all' approach, and demand reduction initiatives should be evidence-based, species-specific and country/community-specific. Civil society plays an important role in demand reduction efforts, and many organizations have worked tirelessly to raise awareness of wildlife crime and conservation issues and fundamentally change behavior in consumer markets. Demand reduction actions must be undertaken in parallel to supply and law enforcement efforts, as well as livelihoods initiatives, as success in preventing wildlife crime can only be achieved when all three areas are addressed in parallel. Lessons learned from research and previous campaigns have demonstrated the importance of demand reduction initiatives founded on culturally-sensitive, evidence-based insights – rather than assumptions – into motivations for consumption to provide targeted, effective interventions. Behavioral science has many lessons that can be drawn upon, and it is important to mainstream demand reduction messages in culturally appropriate communications targeting specific audiences and to reinforce these messages over time. A strategic approach needs to be developed to target specific populations, notably youth.

Addressing criminal exploitation of captive breeding facilities

Captive-breeding is being exploited by both criminals and unscrupulous traders, and relevant countries need to do much more by way of enforcement or enactment of new laws to effectively regulate captive breeding facilities and ensure the legality of their operations. While some of these activities may be 'legal', in terms of national legislation or CITES, if they also support, prop up, permeate or otherwise aggravate wildlife crime and trafficking, this must be addressed.

All countries that allow the breeding of CITES Appendix I species in privately-owned facilities for commercial purposes bear the responsibility to ensure that such businesses operate in line with CITES provisions and implement high standards of animal welfare, public health safety and legality. This report indicates that some licensed breeding facilities have been used to illegally supply demand for exotic pets, luxury products and ingredients for traditional medicine. This is partly caused by conflicting and deficient legislation that reduces the effectiveness of the inspection/regulatory mechanisms. The delegation of licensing authority to sub-national administrative structures also increases the opacity of the processes and the risk of corruption. To address this, the following should be considered:

- Countries should adopt comprehensive provisions at national and/or federal level to ensure that laws and regulations on possession, breeding and trading are regularly updated, disseminated and consistently applied throughout the territory.
- There is a need for greater scrutiny of the risks and opportunities that are exploited by criminal enterprises and criminal networks to profit from these facilities.
- The process of issuing licenses for these types of facilities should be subject to multi-stakeholder approval involving different government departments, and anti-corruption protocols.
- Inspections of existing facilities should be conducted by teams focusing on a range of factors including risks for human health, sanitary compliance, environmental/ecosystem implications, integrity of the supply chain, integrity of the business model and animal welfare.
- Mechanisms should be developed to complement regulatory inspections with law enforcement investigations that allow for both civil and criminal justice oversight and stricter regulation
- Additional focus should be put on traceability and proof of valid captive-breeding documentation throughout the supply chain.

Strengthening supply chain integrity

Organized criminal groups have demonstrated their ability to exploit weaknesses in complex supply chains. As noted in the first World Wildlife Crime Report, significant opportunities continue to exist for criminals to launder illegally sourced wildlife through the legal supply chain. Supply chain integrity could benefit from making some parts of the trade transaction process electronic, thereby reducing opportunities for corruption,

which may also include exploring new technologies like blockchain. More needs to be done to ensure efficient controls are set in place to prevent illegal trade without disrupting the legal trade. The CITES community has made strides towards strengthening the permits system, but the slow uptake by countries of an electronic permit system due to the high installation and maintenance costs means gaps remain in which falsified documents and unscrupulous actors can undermine the trade chain, making poorer countries particularly vulnerable. CITES has supported its Parties that expressed interest in implementing the e-CITES permit[11] system and has worked to ensure the national systems remain robust and interoperable. The integrity of the CITES permit system is inherent to preventing illegal trade, and as mentioned above, reducing corruption risk is critical.

DNA tests could also be used at various points in the supply chain to ensure that species are accurately declared. Regular audits can be conducted to monitor sources of supply, and there are clear benefits to reducing the gaps in collaboration between actors at all stages of the supply chain, including the private sector.

Preventing displacement

This report has shown that offenders involved in wildlife crime, similar to those involved in other crimes, adapt their modus operandi to enforcement responses to avoid detection and to continue to operate. Offenders respond to increased enforcement in certain areas by shifting their operations to other geographic locations where enforcement is less stringent. For example, as noted at the opening of this chapter, since the last report, Nigeria has emerged as a key source/transit country for shipments of ivory, rosewood and pangolin scales, and Viet Nam has become a major destination country for ivory and pangolin. These patterns may be the result of increased enforcement in previous source/transit/destination hubs, and traffickers have sought weaker links to exploit. Similarly, pangolin traffickers take advantage of weak border controls in northern Uganda, Democratic Republic of the Congo and South Sudan to meet buyers and stockpile scales in countries where the rule of law is weaker.

A similar form of displacement occurs for the types of species trafficked. If enforcement efforts target a particular species as a high priority, poachers may adapt to traffic other species, notably those of similar value at destination markets, for which the risk of being caught is lower. Some of these shifts are also the result of changes in consumer preferences or reductions in consumption because of strong enforcement. Recent seizures of combined shipments of ivory and pangolin scales, as well as data gathered from poachers in Cameroon and Uganda, suggested that ivory traffickers are shifting to the pangolin scale trade in response to the decline in the ivory market.

Available information further suggests that authorities in some countries treat crimes involving some species, such as pangolins, as less serious than other forms of poaching, such as elephant poaching for ivory. This results in the lack of enforcement action when some species are involved, which can be a driver for those species to be specifically targeted by organized criminal groups. Given these displacement effects, law enforcement responses to wildlife crime should anticipate and mitigate shifts at both ends of the trafficking chain, for changes in geographical and in species trends. Law enforcement efforts should also be as versatile as possible to allow for rapid changes in strategy as displacement occurs.

Preventing and addressing risks to human health

The COVID-19 pandemic has highlighted that wildlife crime is a threat not only to the environment and biodiversity, but also to human health, economic development and security. Zoonotic diseases – those caused by pathogens that spread from animals to humans - represent up to 75% of all emerging infectious diseases. Trafficked wild species - pangolins, birds, turtles, tigers, bears and many more – and the resulting products offered for human consumption, by definition, escape any hygiene or sanitary control, and therefore pose even greater risks of infection. When wild animals are poached from their natural habitat, butchered and sold illegally, the potential for transmission of zoonotic diseases is increased. The One Health[12] approach needs to be at the centre of any informed policy involving the relationship between humans and wildlife species. Use, consumption and trade of wildlife species by humans need to be evaluated on the basis of scientific and fact-based information that puts safety and prosperity for the planet above the economic or commercial value of these species. Stopping the trafficking in wildlife species is a critical step not just to protect biodiversity and the rule of law in line with the Sustainable Development Goals, but to help prevent future public health emergencies.

Endnotes

1 https://www.unodc.org/unodc/en/wildlife-and-forest-crime/wildlife-and-forest-crime-analytic-toolkit.html

2 https://www.unodc.org/documents/Wildlife/Indicator_Framework_e.pdf

3 Examples of legislation can be found in the UNODC Guide on Drafting Legislation to Combat Wildlife Crime. https://www.unodc.org/documents/Wildlife/Legislative_Guide.pdf, pg. 26.

4 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.

5 Resolution Conf. 117.6 Prohibiting, preventing, detecting and countering corruption, which facilitates activities conducted in violation of the Convention. https://cites.org/sites/default/files/document/E-Res-17-06_0.pdf

6 https://www.unodc.org/documents/treaties/UNCAC/COSP/session8/Advance_unedited_resolutions_final.pdf

7 See, for example, UNODC (2019). "Scaling Back Corruption: A guide on addressing corruption for wildlife management authorities." Available: https://www.unodc.org/documents/Wildlife/19-08373_Scaling_Back_Corruption_ebook.pdf

8 See, for example, OECD (2019). "The Illegal Wildlife Trade in Southeast Asia." Available from: http://www.oecd.org/publications/the-illegal-wildlife-trade-in-southeast-asia-14fe3297-en.htm.

9 https://erhodis.org/

10 The reported number refers to CITES Parties that allowed the CITES Secretariat to transmit AITRs to UNODC for the purpose of updating the WorldWISE Database and to conduct research on wildlife crime

11 https://cites.org/eng/prog/eCITES

12 https://www.who.int/news-room/q-a-detail/one-health

INTRODUCTION

1

The second edition of the *World Wildlife Crime Report* takes stock of the present wildlife crime situation with a focus on illicit trafficking of protected species of wild fauna and flora and provides a broad assessment of the nature and extent of the problem at the global level. It includes a quantitative market assessment and a series of in-depth illicit trade case studies. In addition, a discussion of the value chains and illicit financial flows from the trade in ivory and rhino horn is included. The report was conducted in cooperation with ICCWC partners.

This research was conducted in response to the United Nations General Assembly Resolution on Tackling Illicit Trafficking in Wildlife, adopted in 2019. This resolution requested the United Nations Office on Drugs and Crime, in close cooperation and collaboration with Member States, to continue the collection of information on patterns and flows of illicit trafficking in wildlife and to report thereon biennially.[1]

If the 2016 World Wildlife Crime Report represented UNODC's first global assessment of the state of wildlife crime, the 2020 edition of this report represents a first assessment of trends. In several instances, these trends have been dramatic. The poaching of both elephants and rhinoceroses has declined since 2011 and 2015 respectively, as have the prices paid for tusks and horns. In contrast, the amount of pangolin scales seized has increased 10-fold in just five years, and new markets, such as the trafficking of European glass eels, have emerged. For the first time, a consistent pattern of large shipments of unrelated wildlife products – elephant ivory and pangolin scales – has emerged. In addition, organized criminal groups in broker countries, neither the source nor the destination of the wildlife, have consolidated control of multiple markets. The 2020 World Wildlife Crime Report tracks and summarizes these trends.

The quantitative analysis is based on the updated World Wildlife Seizure database (World WISE), including the latest seizure data provided to the CITES Secretariat by its Parties through the CITES annual illegal trade reports. These data were circulated to Member States by UNODC for verification. While this database alone is not sufficient to describe the nature and scope of illicit trafficking in wildlife on a global scale, it provides key indicators and a potential early warning mechanism. When maintained and supplemented with a broader programme of research and longitudinal assessments, it provides the international community with the means to better understand and address the state of wildlife crime in the world.

What is wildlife crime?

Providing a global assessment of wildlife crime is challenging, because every country manages and protects its wild terrestrial animals, fish, trees, and other flora in different ways and wildlife, fisheries and forestry regulations evolve as new risks and priorities for countries emerge. There is no universal treaty defining wildlife crime, therefore there is no universally accepted definition of the term. For the purposes of this report, the term "wildlife crime" refers to *harvesting and trade contrary to national law*, particularly, but not exclusively, the national laws implemented in fulfilment of CITES obligations. This includes offences that might not attract criminal sanctions in some parts of the world.

Wildlife is protected internationally by the *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, known as CITES, which provides a framework to protect certain species against over-exploitation through international trade. It does not define wildlife crime as such, but it strongly influences national legislation on wildlife crime, and provides a means for international cooperation against trafficking. Parties to CITES are required to "penalise" illegal trade, which may include the criminalization of serious offenses. It is an agreement of remarkable power and scope.

CITES is so important because wildlife protection laws are usually situated in broader national environmental legislation. As a result, these laws focus on native species, and they do so in a wide variety of ways. Since wildlife populations are dynamic, most wildlife related legislation leaves it to the executive branch of the government to issue regulations determining when and how wildlife can be harvested. Species can be added and removed from protected species lists, licenses issued allowing the legal taking of wildlife, and quotas established to ensure sustainability. As a result, the domestic legality of any given wildlife product is a matter of considerable complexity.

The national lists of protected species may be limited to native species and there may be no basis in national law to challenge the import or sale of questionable wildlife products that are not covered by national legislation. Even if the law allows the seizure of wildlife taken or exported contrary

to the laws and regulations of other countries, proving this illegality can be challenging. Few countries have the capacity to keep track of the complex and changing world of foreign wildlife regulation, or to gather evidence on offences committed on the other side of the world.

CITES allows countries to reciprocally protect one another's species against overexploitation according to a common set of rules. The system works through a series of permits and certificates relating to three international protected species lists, the CITES Appendices. International trade in CITES-listed wildlife without the appropriate permits and certificates appears to be the most commonly detected transnational violation of the Convention, sometimes involving organized crime and serious wildlife offences.

As mentioned, CITES requires Parties to "penalise" violations of the agreement.[2] CITES violations are punished in different ways and degrees depending the seriousness of the infraction and the different national legal systems. Some countries are more inclined to sanction with a fine, while in others, offenders can be sentenced to more than four years in prison.

CITES is an agreement that regulates international trade in specimens of species of wild fauna and flora, with conservation aims. CITES defines the international rules that wildlife traffickers seek to circumvent. While certain species may be afforded different levels of regulation even within the borders of a single country, the CITES appendices contain a list of species for which the international community has agreed common rules and standards to regulate their trade and transboundary movement. CITES does not address all aspects of wildlife crime, but it is the single most coherent approach to a topic of considerable international complexity.

Furthermore, as a multilateral agreement combining trade and wildlife provisions, CITES has a powerful compliance mechanism: compliance measures may be recommended against non-compliant Parties. Depending on the nature of the compliance measures agreed by the governing body of CITES, all other CITES Parties may agree not to trade with the non-compliant Party, either in particular species, or in any CITES-listed species. Since many CITES listings are broad (to cover look-alike species), such trade suspensions can have serious economic consequences.

The scope of CITES is limited to international trade, and purely domestic behaviour is the responsibility of the Parties. States have the sovereign right to manage CITES-listed species within their borders in accordance with the principles of international law, so long as the specimen does not move internationally. This effectively means that access, sourcing, acquisition, possession, transport, poaching and domestic trade (legal or illegal) are matters for national governments to regulate under their national legislation. Because CITES addresses international trade, most CITES-related enforcement takes place at ports of entry, and not in domestic markets. The origin of non-indigenous wildlife sold domestically could always be queried, but proving it was illegally imported would be difficult in some legal systems, especially for species in Appendices II and III for which

The CITES Appendices

CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need.

Appendices I and II

Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

The Conference of the Parties (CoP), which is the supreme decision-making body of the Convention and comprises all its Parties, has agreed in Resolution Conf. 9.24 (Rev. CoP17) on a set of biological and trade criteria to determine whether a species should be included in Appendix I or II. At each regular meeting of the CoP, Parties submit proposals based on those criteria to amend these two Appendices. Those amendment proposals are discussed and if no consensus can be found, submitted to a vote. The Convention also allows for amendments by a postal procedure between meetings of the CoP (see Article XV, paragraph 2, of the Convention), but this procedure is rarely used.

Appendix III

This Appendix contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade. Changes to Appendix III follow a distinct procedure from changes to Appendices I and II, as each Party is entitled to submit unilateral requests to include or withdraw species to it.[a]

a https://cites.org/eng/disc/how.php.

trade is allowed. The upshot of all this is that most CITES enforcement occurs when the wildlife is moving between countries, which means that an important part of CITES enforcement is conducted by national customs agents responsible for controlling trade at borders. However, the police, rangers, prosecutors, judiciary and wildlife authorities have a significant role to play before and after the detection of any alleged infraction.

Domestic wildlife law enforcement is conducted by a wider range of national and local agencies. The topics of logging and fishing in particular are often regulated by distinct bodies of law, with their own enforcement bodies. Environment, health, agriculture, development, and commerce ministries may be involved in regulating use of land and the marketing of wild species products. Responsibility for many forms of environmental enforcement may be devolved to provincial or even municipal authorities. Even on a national basis, communication between these actors may be limited. Finally, many wildlife crimes may be prosecuted under non-specialised legislation, such as laws pertaining to fraud or perjury. Given the diverse ways that the crime can be approached and prosecuted, few countries have the capacity to comprehensively add up all detected wildlife offences.

Thus, CITES provides another useful function: it defines a meaningful sub-set of wildlife offences for analytic purposes. It captures on a global list the species about which, based on international agreement, there is reason to be concerned. Without this agreement, it is impossible to reconcile the national categorisations of protected species.

For these reasons, this report focuses on CITES listed species, although other species are discussed where relevant. As will be explained below, the seminal data source on which it is based are the seizures of wildlife contraband including those officially reported by CITES Parties in fulfilment of their reporting obligations. Reference is made to other violations of domestic law in specific case studies where appropriate. Although this approach does not encompass all that could be defined as "wildlife crime", it does highlight those aspects most likely to constitute transnational organized crime, and the areas where international cooperation is most vital.

Wildlife crime as transnational organized crime

In some cases, illegal wildlife trade can be seen as a form of organized crime and the involvement of organized criminal groups in transnational organized wildlife trafficking is evident.[3] The United Nations Convention against Transnational Organized Crime defines an "organized criminal group" as:

… a structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes or offences established in accordance with this Convention, in order to obtain, directly or indirectly, a financial or other material benefit…

The Convention goes on to explain that a "serious crime" is a crime punishable by four years or more in prison and that a "structured group" need not have "formally defined roles for its members, continuity of its membership or a developed structure."

In other words, organized crime is not just about rigid mafia-type groups. Any pattern of profit-motivated, serious criminal activity is considered organized crime, and nearly all transnational wildlife trafficking fulfils these criteria, provided the penalties in the relevant countries are sufficiently high (that is, in excess of four or more years in prison).

In contrast to markets on which there is a complete prohibition, wildlife trafficking may involve goods that can be legal or illegal, depending on when, where, and how they were acquired. Like firearms, pharmaceuticals, or antiquities, the legality of this acquisition is demonstrated through a licensing system. Since an official document can transform millions of dollars of suspected contraband into millions of dollars of legitimate merchandise, a proportion of the "trafficking" of these goods may be laundered and proceed through the front door, with documents provided through fraud, forgery, or corruption.

Aside from evading interdiction, illegally sourced goods laundered using fraudulent documents can be introduced into legitimate commercial channels, availing themselves of legal demand. In this way, illegally sourced timber, fish, and other wildlife products find their way into mainstream retail outlets, and consumers who would never knowingly purchase contraband may nonetheless do so. Transnational trade has grown at a rate greater than the ability of the international community to regulate it, allowing a wide range of illicit merchandise to be laundered through a series of holding companies and offshore accounts. Wildlife products are no different, and the need for strict regulation and supply chain security is key to protecting threatened species.

The World Wildlife Seizures (World WISE) database[4]

To better understand wildlife crime, UNODC established the World WISE Database - a global data repository of wildlife seizure incidents – on the occasion of the first World Wildlife Crime Report. At the time, it was partly based on the existing international mechanism for reporting wildlife seizure data that already existed: the Annual and Biennial Reports submitted by CITES parties.

As member of the International Consortium on Combating Wildlife Crime (ICCWC), UNODC received these data from the CITES Secretariat to create the World WISE database and to use for research purposes.[5]

In 2016, CITES passed Resolution Conf. 11.17 (Rev. CoP18) on *National Reports* urging "all Parties to submit their annual reports required under the provisions of Article VIII, paragraph 7 (a), by 31 October following the year for which they are due and in accordance with the most recent version of the Guidelines for the preparation and submission of CITES annual reports distributed by the Secretariat, as may be amended with the concurrence of the Standing Committee."[6]

Since 2016, the Annual Illegal Trade Reports (AITRs) are a crucial source of data for the database.[7] As ICCWC partners, UNODC has been maintaining these data and including them in the World WISE analysis, when permitted to do so by the relevant CITES Party. For reporting years 2016-2018, UNODC received over 42,600 seizure records[8] from the Annual Illegal Trade Reports,[9] involving around 1,500 species in various product formats, from live animals to medicinal products containing animal parts.

The current release of the World WISE Database – which is the basis of this report – includes nearly 180,000 seizures from 149 countries with almost 6,000 species represented in the illegal trade, with seizures dating from 1999 to 2018.[10] Most of the analysis in this report is based on data from 2005 to 2018. The database holds almost 155,000 seizures from 146 countries for this period. Apart from the AITRs, a number of additional data sources (including, among other sources, WCO-CEN, EU-TWIX and USFWS-LEMIS) were used to create a unique collection of data on the illegal wildlife trade.

World WISE's annual coverage of wildlife seizures is not consistent, however. The first report, launched in May 2016, was based on data through 2014. After the completion of the Report, work on World WISE was suspended until early 2017. At the same time, the CITES Biennial Report had been discontinued and the new Illegal Trade Report, inaugurated in 2016, had not yet been initiated. As a result, the years 2014 and 2015 are relatively data deficient.

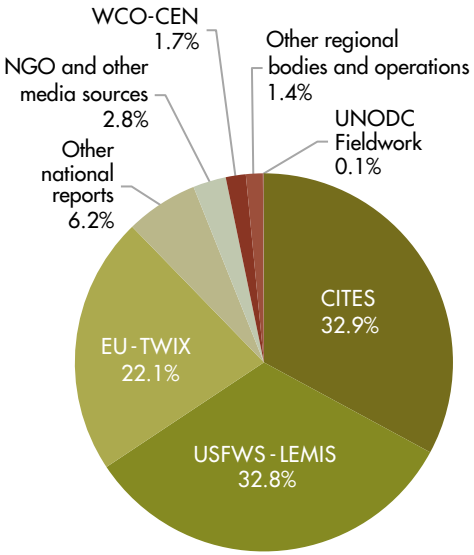
Currently, the seizures included in the database come from the following sources as portrayed in the figure below. Where necessary, seizure data from NGO sources, reviewed by Member States, has been added to World WISE to provide a more complete picture. Further information can be found in the methodological annex on the individual data sources for each species.

The data reporting countries represent most of the main source and destination countries for the most valuable and commonly trafficked wildlife, and therefore provide a robust and representative picture of global wildlife trafficking trends. A number of source regions, though, are weak, particularly South America and Africa. The data recruitment effort required to produce World WISE suggested that many countries lack the capacity to collect national wildlife seizure data, either due to legal issues, lack of communication between government agencies, or federal/state conflicts. These counties may require future technical assistance to fulfil their CITES reporting obligations.

World WISE remains one of the largest official seizure databases available on wildlife crime and the main tool for the Secretariat of the Convention for the International Trade in Endangered Species (CITES) to review the illegal wildlife trade patterns at the global level.

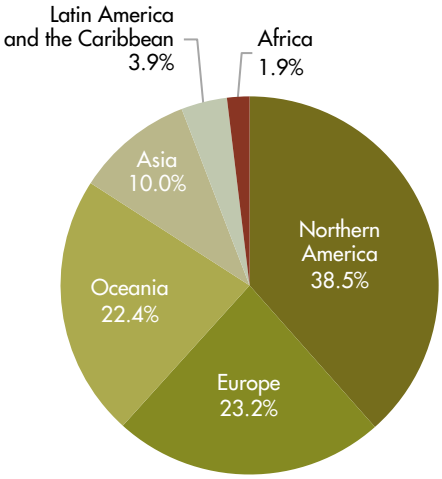
In addition to this quantitative data, the report also relies on qualitative data from fieldwork to put those numbers in context based on the situation on the ground where these poaching and seizure incidents are taking place. This sort of "on the ground" research is key to helping law enforcement respond to wildlife threats in real-time and adjust their approach as new wildlife crime trends that emerge and are sometimes yet to be seen in the larger-scale seizure

Fig. 1 Share of data sources in World WISE, 2008-2018



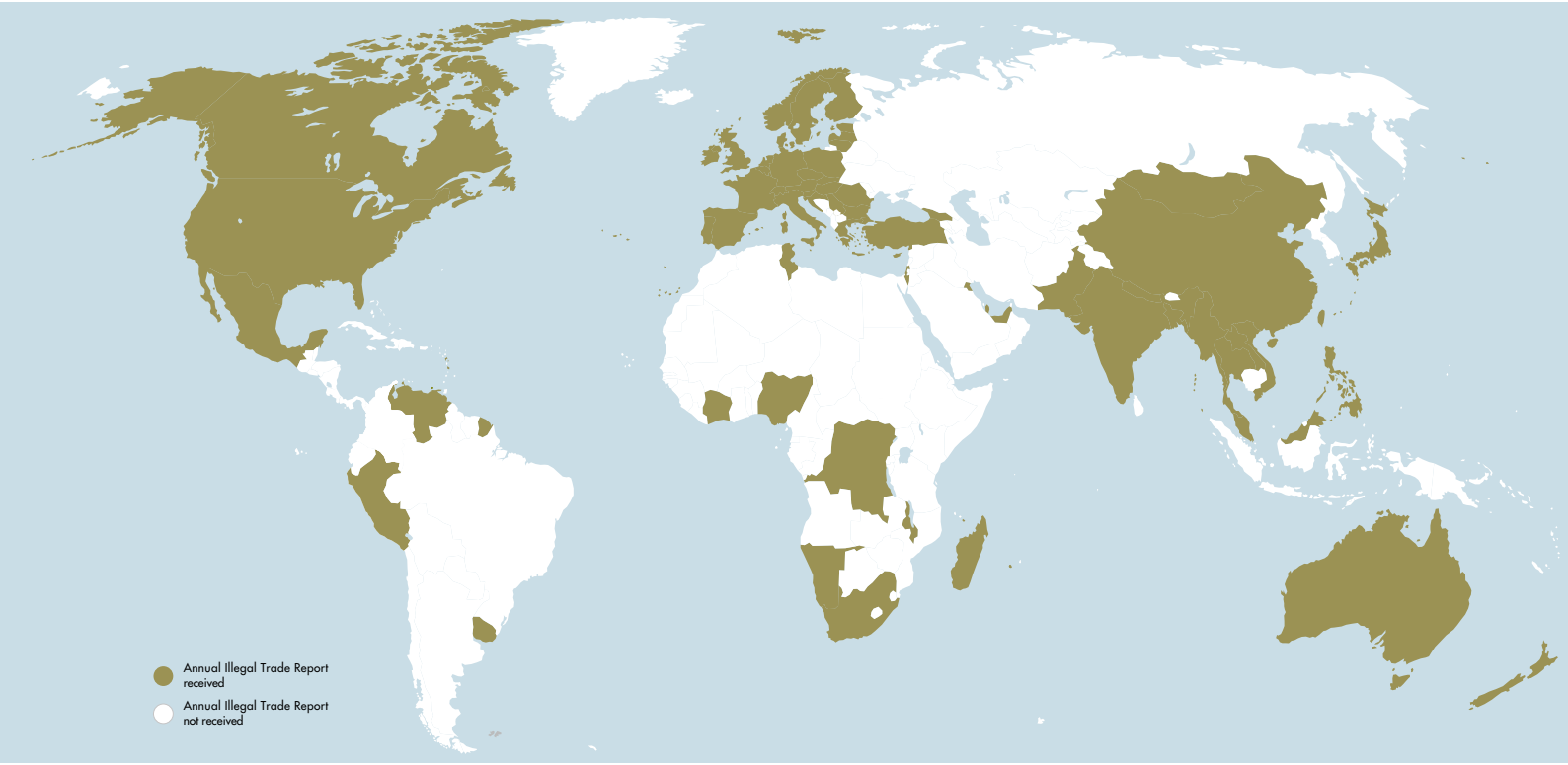
Source: UNODC World WISE Database

Fig. 2 Share of regional sources of seizures in World WISE



Source: UNODC World WISE Database

Map 1 Countries for which AITRs have been received by UNODC from CITES (2016-2018)*

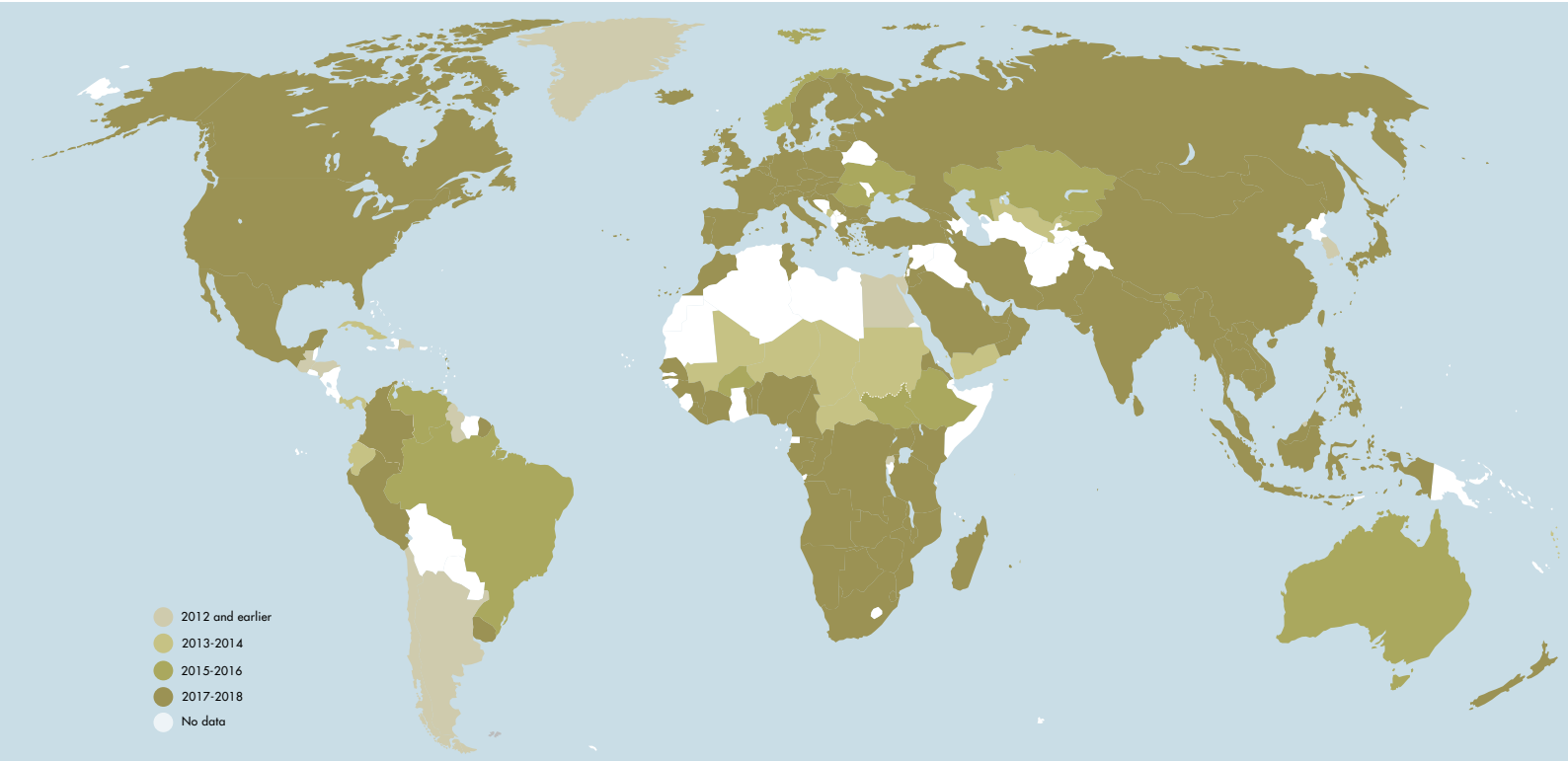


Source: UNODC World WISE Database

* Includes only countries for which Annual Illegal Trade Report (AITR) data have been received and included in the database by October 2019. The year 2018 is based on partial data.

The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

Map 2 Country coverage in the World WISE Database by latest available year – all available data sources*



Source: UNODC World WISE Database

* The World WISE Database also includes some seizures from 2019, but this year is not shown here given the very limited amount of 2019 data included. The year 2018 is based on partial data.

The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

Wildlife Trafficking and COVID-19

Given the extensive impact of the COVID-19 pandemic on human health, the global economy and national security, understanding the nature of zoonotic diseases and the risks they pose – and how to prevent them - has become one of the most critical questions facing governments today. The data collection and analysis for this report was completed prior to COVID-19 pandemic. While the patterns and trends depicted in the report reflect only those pre-pandemic, they offer an overview of the seriousness of wildlife crime and suggest implications for policy and programmatic response that reflect the importance of addressing and preventing wildlife trafficking as important avenues to reducing the risk of future zoonotic pandemics.

The COVID-19 pandemic and the vast subsequent harms to human and economic well-being have starkly illustrated the potential global impact of zoonotic diseases, for which wildlife trade – both legal and illegal - is a potential vector. UNODC and its partners are dedicated to understanding the nexus between wildlife trafficking and risks associated with zoonotic diseases, while recognizing that there remain substantial uncertainties relating to this area.

According to the World Health Organization, around 75% of new or emerging infectious diseases that have affected humans over the past three decades originate in animals.[11] While the understanding of both the disease and the origin of the virus that causes it are evolving rapidly, COVID-19 is likely linked to a pathogen found in wild bats that is suspected to have passed to humans, possibly via an intermediary.

While there are many factors that have contributed to the spread of zoonotic diseases, including social, environmental and economic developments such as urbanization, increasing human population density, climate change, and the increase in speed of trade and travel, large-scale wildlife trafficking and deforestation are among these key factors. More frequent human-wildlife interactions increase the probability of transmission of animal-borne pathogens to human beings, and illegally sourced wildlife, traded in a clandestine way, escapes any sanitary control and exposes humans to the transmission of new viruses and other pathogens. Without human interference through capturing, slaughtering, selling, trafficking, trading and consuming of wildlife, the evolution and transmission of the coronavirus that causes COVID-19 would have been highly unlikely.

The impacts of the COVID-19 pandemic on practices of poaching, wildlife trafficking and wildlife consumption are not yet clear. While global travel restrictions and other factors will have an impact on the scale, transportation methods and overall mode of operations of organized criminal groups plying this trade, it is highly likely that wildlife trafficking will not have substantially decreased. While there may be some short-term disruptions, buyers and sellers will likely reorganize and increase focus on online trade channels and related mechanisms. In addition, increased poaching due to declines in tourism and its associated revenue and increases in subsistence poaching are realistic risks. Park and protected area closures and a decrease in patrols by rangers have already contributed to increased poaching activities in some countries. Further, wildlife products may be touted as 'cures' for COVID-19, notably bear bile[12] and various plant species[13] used in Traditional Chinese Medicine.

It is still too early to observe clear trends and changes related to wildlife trafficking due to the pandemic, but lockdown measures taken by governments have forced organized criminal groups to adapt and quickly change their dynamics. Those changes might result in illicit markets going even deeper underground, additional risks for corruption, and shifts in market and transportation methodologies in the longer term.

UNODC, alongside its partners, will focus on analysing trends in wildlife trafficking and providing Member States with tools to address demand; to strengthen their law enforcement and judicial response to address wildlife forest and fisheries crime; and to create sustainable alternative livelihoods for those involved in poaching and the illegal trade.

data. Further details on the specific fieldwork conducted and the data qualitative data collected can be found in the species chapters as well as in the methodological annex.

Combining national reports and other data sources from 149 countries and territories presented a number of methodological challenges, which are discussed in the on-line methodological supplement to this report. One issue that deserves discussion is the need to convert seizures to common units, at least within specific markets. For example, timber seizures may be reported in terms of log or container counts, weight, or volume. They may also involve different sorts of commodities, including logs, sawn wood, and other products. For each species, the academic and trade literature were consulted to provide conversion formulas. These conversions are discussed further in the case study chapters that comprise the bulk of this report.

By analysing the records submitted, it is possible to determine the sorts of information parties gather in the normal course of business. For example, most of the seizures reported contained information about the source of the shipment (71%) and the destination of the shipment (76%). Much less often, however, did the seizure data include information on the countries transited before the seizure (3%). Many countries gave more detailed information as to the exact location where the seizure was made – this information could be used to create maps of vulnerable locations – but since this information was available for less than half the seizures, it is not fully utilised in this report.

For further information on the World WISE database, please refer to the first edition of the World Wildlife Crime Report published by UNODC in 2016.

Endnotes

1 A/RES/73/343.

2 The CITES agreement requires (Article VIII, Section 1) "The Parties shall take appropriate measures to enforce the provisions of the present Convention and to prohibit trade in specimens in violation thereof. These shall include measures: (a) to penalize trade in, or possession of, such specimens, or both; and (b) to provide for the confiscation or return to the State of export of such specimens." https://www.cites.org/eng/disc/text.php.

3 See the cases on wildlife, forest and fisheries crime combined with participation in an organized criminal group in the UNODC SHERLOC Case Law Database, https://sherloc.unodc.org/cld/v3/sherloc/cldb/#/crime-type.

4 For a complete description of the database and its creation, please refer to the first edition of the World Wildlife Crime Report published in 2016 (https://www.unodc.org/unodc/en/data-and-analysis/wildlife.html).

5 This cooperation is in line with the ICCWC Strategic Mission 2014-2016 and the ICCWC Strategic Programme 2016-2020. See https://cites.org/eng/prog/iccwc.php/Strategy.

6 Conf. 11.17 (Rev. CoP18).

7 The AITR requirement was introduced at CoP17, and to date reports covering data for 2016-2018 were due. Some Parties however also provided data from previous years in their submissions so AITR data included in World WISE covers years 2013-2018 depending on the country.

8 In order to produce a comprehensive and valid database, data collected from different sources have been processed to avoid the inclusion of duplicate records. When the same seizure event was reported by more than one source, only one iteration has been retained in World WISE. For this reason, not all AITR seizure records have been incorporated in the World WISE Database and for some countries (for example EU Member States), alternative official data sources (like EU-TWIX) have been used.

9 This release of World WISE does not include all 2018 AITRs received because the data collection for 2018 was not complete when the data processing for the World WISE dataset had to be closed to complete the analysis for the current report.

10 As of November 2019, the time at which analysis for this report was initiated.

11 http://www.emro.who.int/about-who/rc61/zoonotic-diseases.html

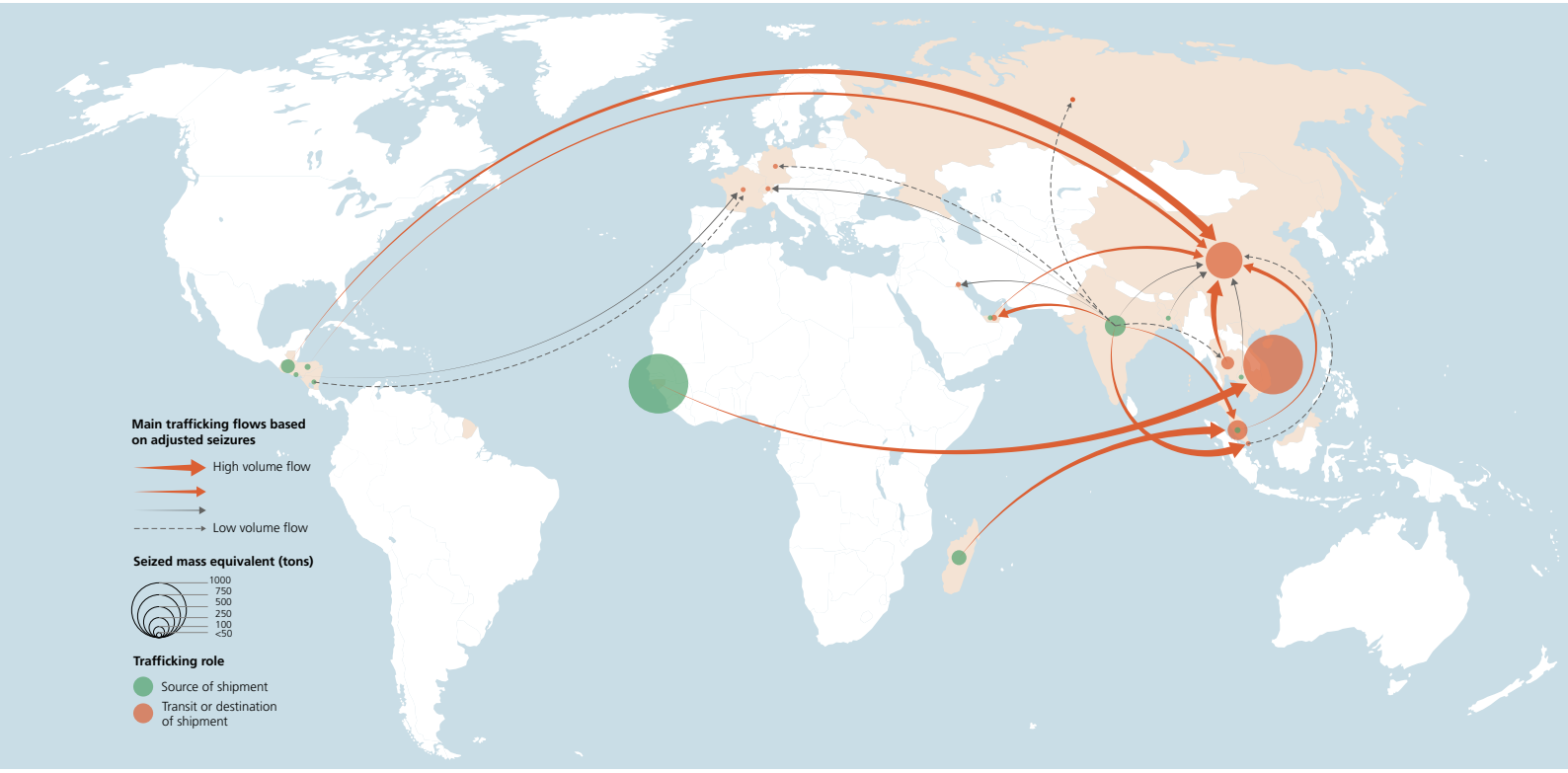
12 https://www.nationalgeographic.com/animals/2020/03/chinese-government-promotes-bear-bile-as-coronavirus-covid19-treatment/

13 https://www.traffic.org/news/covid-19-the-role-of-wild-plants-in-health-treatment/

ROSEWOOD TIMBER

2

Map 1 Trafficking flow map - Rosewood (2015-2018)



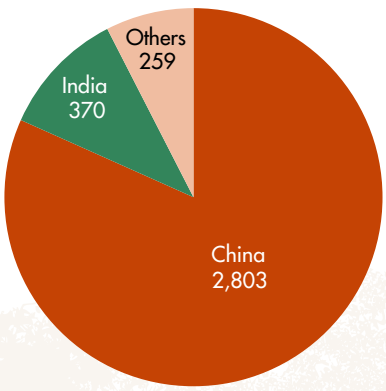
Source: UNODC World WISE Database

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The year 2018 is based on partial data.

"Rosewood" is a trade term for a wide range of tropical hardwoods, not a botanical category. It appears that illegal rosewood and other tropical hardwood timber is entering some legal industry supply chains, including the international wood furniture trade. Demand for tropical hardwood timber has grown greatly in the last two decades, and where trade associated with this demand is not well regulated, it can be incompatible with the survival of these species and the forests that contain them. Both local and international controls have been gradually put in place to counter over-exploitation, yet key operators constantly adapt their tactics to circumvent these controls.

In order to understand the illegal trade in rosewood and associated fraudulent practices, it is important to understand the legal market and value chain. The following description of legal trade does not imply that all this trade is illegal. Global imports of tropical hardwood logs totalled 18 million cubic meters in 2018, valued at over three billion US dollars.[1] Some 82% of the value of this import demand came from industries based in China, which currently lead the world in furniture manufacture.[2] Up to one-fifth of these imports include timber species described as "rosewood".[3]

Fig. 1 Imports of "tropical wood in the rough" (US$ millions) in 2018

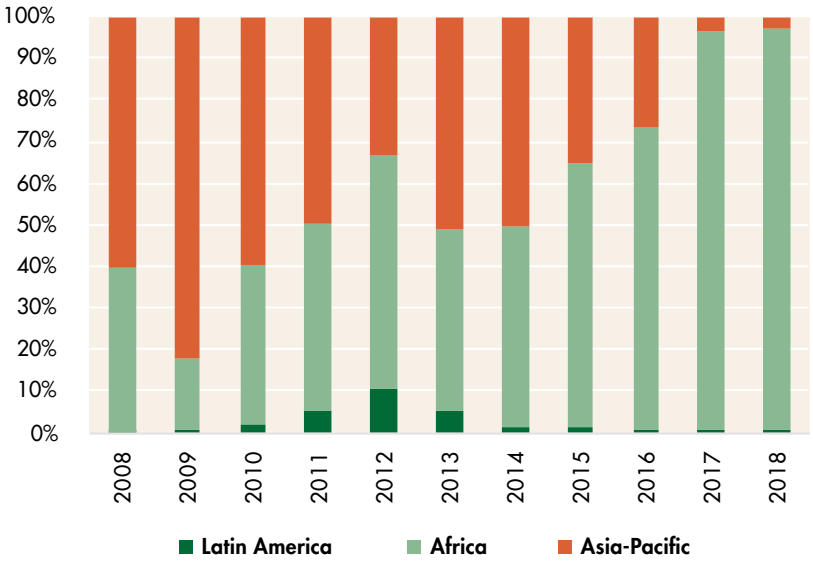


Source: ITC Trade Map

Because there is no universal definition of "rosewood", there are no global statistics on the rosewood market – in most national systems, and imports are typically registered as tropical hardwood "not elsewhere specified". While traditional rosewoods have many uses,[4] as a practical matter today most of the trade refers to tropical hardwoods suitable for making traditional furniture in the Asian style, typically referred to as *hongmu*.[5] Most of these rosewood species used for *hongmu* come from the *Dalbergia* and *Pterocarpus* genera,[6] but a growing number of species, including those from other genera, appear to have become integrated into the trade. In the past, CITES Parties have acknowledged that "rosewood timber species" is a common commercial name that encompasses hundreds of species within around nine genera of tree species in trade.[7] Table 1 shows rosewood species currently listed in CITES Appendices.

Traditionally, *hongmu* furniture was constructed from species found in countries of Eastern and Southern Asia. Economic and population growth in the region led to greater demand for these products relative to the natural supply. Over time, Asian species of rosewood became overexploited.[8] This pushed rosewood traders to look farther afield for supplies of *Dalbergia* and *Pterocarpus* species, to places where the species were not yet protected by national or international legislation.

Fig. 2 Share of the volume of rosewood log imports to China by regional source, 2008-2018



Source: World Trade Atlas

Over the last decade, the share of total rosewood imports to China coming from Africa has steadily increased (Figure 2), with a portion of this share suspected to have been illegally sourced in or exported from Africa. As this demand has grown, many source countries have taken measures to ensure their exports are sustainable, including restrictions on harvesting or exporting rosewood species and bans on log exports (roundwood export bans). There is evidence to suggest that in some countries illegal trade emerged circumventing these controls.[9] The international community has also intervened and placed many species under CITES control. Among the most notable include the listing of *Dalbergia nigra* on Appendix I in 1992, the listing of *Pterocarpus santalinus* on

Table 1 CITES listed tree-species in international trade under the name "rosewood"

APPENDIX	TAXA	DATE OF ORIGINAL LISTING IN THE APPENDICES	DATE OF LAST AMENDMENT TO THE LISTING
I	*Dalbergia nigra*	11.06.92	N/A
II	*Dalbergia spp. #15* (except for the species listed in Appendix I)	12.06.13	26.11.19
	Guibourtia demeusei #15	02.01.17	26.11.19
	Guibourtia pellegriniana #15	02.01.17	26.11.19
	Guibourtia tessmannii #15	02.01.17	26.11.19
	Paubrasilia echinata #10	13.09.07	N/A
	Platymiscium parviflorum #4	01.07.75	26.11.19
	Pterocarpus erinaceus	09.05.16	02.01.17
	Pterocarpus santalinus #7	16.02.95	13.09.07
	Pterocarpus tinctorius #6	26.11.19	N/A
	Senna meridionalis	12.06.13	N/A

Appendix II in 2007, and the listing of all *Dalbergia* species of Madagascar in 2013. Due to the difficulties of distinguishing *Dalbergia* species, the entire genus was listed in 2017.[10]

Up until 2013, one of the more prominent non-Asian sources for rosewood was Madagascar, where at least 48 species of *Dalbergia* are known to occur (of which 47 are endemic).[11] Since the 1980s, recognizing that it is losing its unique wild areas at a rapid pace, Madagascar has implemented a series of export bans and logging prohibitions that were later suspended or rescinded.[12] After the CITES listing in 2013,[13] there followed a series of seizures enforcing these controls, including the 2014 seizure of 3,000 metric tons of Malagasy rosewood by Singapore. A recommendation to suspend trade in species of *Dalbergia* from Madagascar was made by the CITES Standing Committee in 2016 and remains in place.[14]

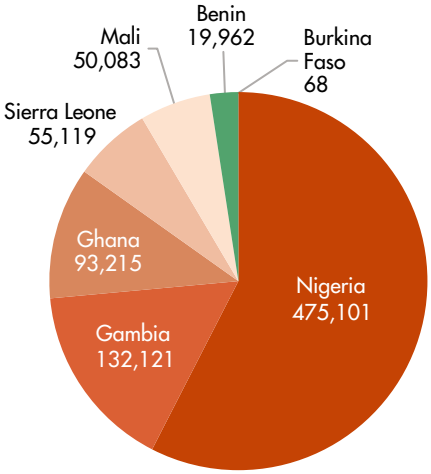
The last WWCR focused on another part of the continent: West Africa. From around 2011, great volumes of a particular species were exported from different countries in this region: *Pterocarpus erinaceus*, known in Nigeria as "kosso".[15] Kosso was not listed on the CITES Appendices at the time, but its export was often occurring in violation of a range of national laws and regulations. Kosso is the only species recognised as rosewood in Asia that grows in West Africa, so any Asian imports of rosewood from West Africa are highly likely to be kosso.[16] Because the species was not placed on Appendix II until 2017, prior to its CITES-listing it could be imported by destination countries without a CITES permit. This resulted in imports taking place despite the fact that harvesting in some cases had been illegal or that exports were in contravention of national laws. As a legal import, these flows were captured in the national import statistics of the destination countries, and they showed the rise of kosso to dominate rosewood imports.[17]

The CITES Appendix II listing of *Pterocarpus erinaceus* in 2017[18] required all exporting countries to certify that the trade was legal in origin and would not negatively impact the survival of the species. According to CITES trade data,[19] CITES Parties reported importing over 825,000 cubic meters of kosso logs in 2017. This is equivalent to about four million trees.[20] Based on these data, Nigeria was the exporter of 58% of the volume that year (Figure 3). Some 99% of the CITES reported kosso exports in 2017 were imported by China.[21]

Another way to look at this flow is through trade data based on the Harmonised System (HS). Based on these data, it is estimated that Asian countries imported about 1.4 million cubic meters of rosewood (presumably kosso) from West African countries in 2017, of which 58% came from Nigeria. This represents the largest volume of kosso ever imported and an increase of over one-third for Nigeria over the previous year (Figure 5). In the previous *World Wildlife Crime Report*, the flow of kosso from West Africa to Asia was described as illegally sourced, since most of the source countries had imposed domestic laws on harvest or export that were violated when the product was exported in contravention of those laws. In 2017, some of this flow was accompanied by CITES certificates, despite the fact that in some countries these laws were still in place. For example, these included a timber export ban in Nigeria.[22] The volume of the trade was so large that it prompted a mission by the CITES Secretariat to visit Nigeria in May 2018, to evaluate the basis for these permits.

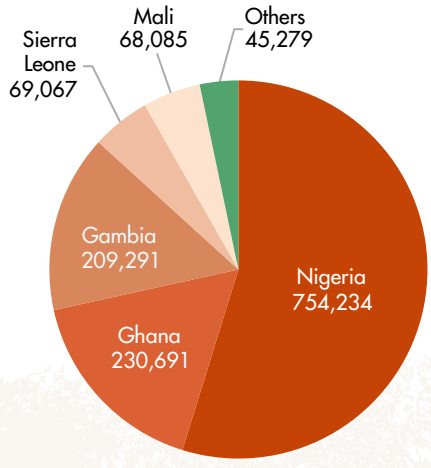
The mission found this timber might have been obtained in accordance with national law but it was not in accordance with the Convention. The CITES Secretariat pointed to the absence of recent scientific studies to estimate the level of sustainable harvest that could be authorized. In other words, CITES certificates were being issued without any evidence that the trade would not be harmful to the survival of the species, which is the point of certification. The CITES Secretariat described this trade as "lawful but awful" and in October 2018 the

Fig. 3 Distribution of CITES regulated imports of kosso* logs (cubic meters) by exporting country, 2017



Source: CITES Trade Database
Pterocarpus erinaceus

Fig. 4 Distribution of Asian countries imports of kosso logs from West Africa (cubic meters) by exporting country, 2017



Source: World Trade Atlas, UN Comtrade

Standing Committee recommended Parties suspend trade in this species with Nigeria.[23]

CITES recommended that West and Central African states with domestic legislation in place prohibiting the export of timber and timber products, establish a voluntary 'zero export quota' for kosso.[24] Also, at its 70th meeting , the CITES' Standing Committee requested the CITES Plants Committee to consider the inclusion of kosso from all range States in the Review of Significant Trade process.[25]

Alongside this trade, the smuggling of kosso continues. In 2017, Singapore seized over 1000 tons of kosso coming from Guinea-Bissau on its way to Viet Nam without CITES documentation.[26] At the same time, it appears other species are being drawn into the illegal rosewood trade. National trade data show that the Democratic Republic of the Congo, the Congo, and Mozambique are major suppliers of logs classified as "rosewood", but these are unlikely to be kosso, or any other rosewood species in the trade standard, because no recognised species is found in this region. Rather it appears these are exports of *Pterocarpus tinctorius*, known as "mukula" in Central Africa. Mukula is not among the species on the Chinese rosewood trade standard, but it bears a strong resemblance to other African *Pterocarpus* species. It was listed on CITES Appendix II in 2019 because, as the proposal justified:

> *While* Pterocarpus tinctorius *is not on the official hongmu list, it has achieved market demand due to its lookalike characteristics. Chinese buyers in Zambia reported to CIFOR interviewers that an early boom in* P. tinctorius *(beginning in 2010) was actually due to its being used as a false rosewood: shipments were sent through intermediary traders and nations to Viet Nam and the Philippines, where it was mixed with* Pterocarpus santalinus *(red sandalwood) and sold onto the Chinese furniture market.*[27]

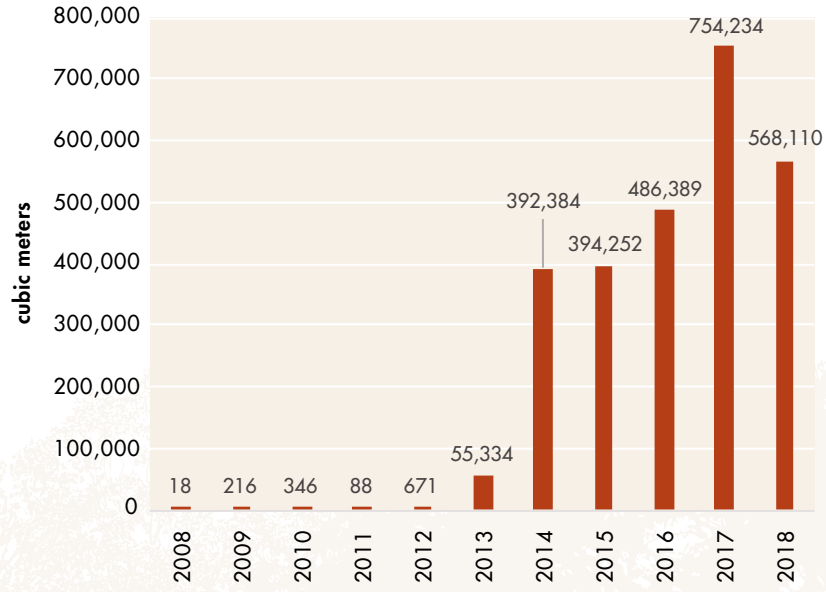
There appears to be a tendency to refer to a number of African *Pterocarpus* species as "red sandalwood" or "red sanders", terms that normally apply to *Pterocarpus santalinus*, an established rosewood endemic to South Eastern India.[28] Mukula also appears to be sold as "Zambian blood rosewood"[29] or "dye red sandalwood".[30]

Other African genera of the *Fabaceae* family, such as *Guibourtia,* known as "bubinga" in Central Africa, may also be feeding into the illegal rosewood trade, and several species were listed in Appendix II, effective in 2017.[31] Bubinga is not listed as rosewood in the Chinese trade standard,[32] but, according to the Proposal for the listing of these species:

> *The woods of the different Bubinga species, the aesthetic qualities of which are close to those of the Asian rosewood species which are most highly prized in the Hongmu tradition, have gradually become established as the first-choice alternative for this burgeoning sector.*[33]

According to World WISE, in 2019, 300 containers of bubinga were seized in Gabon. Another 74 tons were seized by China at Hong Kong, SAR China, coming from Gabon.[34] It is possible that other species or genera will become informally integrated into the trade in ways that are not captured in the national or international statistics.

Fig. 5 Volume of kosso logs (cubic meters) exported from Nigeria and imported by Asian countries, 2008-2018 (trade suspended October 2018)



Source: World Trade Atlas, UN Comtrade

Sourcing

Much of the following discussion is based on qualitative fieldwork conducted by UNODC in nine West Africa countries[35] in two periods: 75 interviews conducted over a period of six months spanning 2014-2015 and 46 interviews conducted over a period of two months in 2018. These interviews included senior national governmental officials, local authorities, border guards and port administrators, as well as traders and others active in the legal and illegal market. In addition, a range of site visits were conducted, including both harvest areas and timber markets. This fieldwork took place in the context of

long-term ethnographic research on the illegal timber trade in this region.

Kosso (*Pterocarpus erinaceus*) is found mainly in West Africa and some northern parts of Central Africa.[36] Often growing in arid areas with sparse forest cover, it is nitrogen fixing, fire resistant, and a source of animal fodder.[37] One of the cheapest rosewoods,[38] its ecosystem value as a species seems to exceed its export value. According to the *International Union for the Conservation of Nature* (IUCN), it is classified in 2018 as "endangered" with a decreasing population trend.[39]

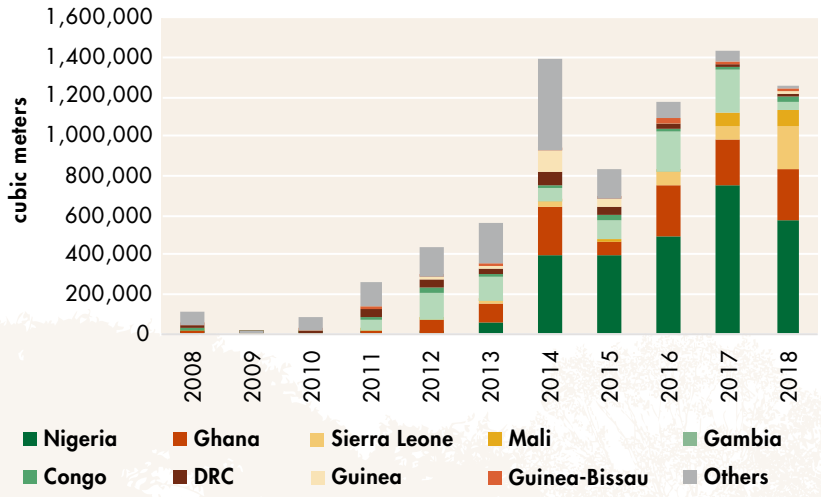
Aside from Nigeria, the other countries in the region responsible for the largest share of recorded exports of kosso are Ghana and Gambia. These three countries were collectively responsible for 85% of the volume traded in 2017.[40] In 2018, Sierra Leone also emerged as a top exporter (Figure 6).

- In Ghana, an academic study estimating the rate of extraction between 2004 and 2013 found, "The current level of exploitation is unsustainable…"[41] Exports from Ghana have more than doubled since that time. The government of Ghana has imposed and withdrawn bans on harvesting and export of rosewood several times since 2011, and, in April of 2019, a total ban on harvesting, processing and export of rosewood was imposed to "eliminate illegal activities that were endangering the species, especially in northern Ghana", although the Ministry of Lands and Natural Resources has indicated that 'salvage permits' would be issued for rosewood log stocks.[42] On 26 August 2019, the Ghanaian government established the Committee to Investigate Allegation of Corruption in Rosewood Trade in Ghana.[43]
- According to the IUCN, "Supplies of [kosso] are suspected to be exhausted from Gambia…"[44] Despite this fact, Gambia continues to be a major exporter, second only to Nigeria globally in 2017 according to the CITES Trade data. A 2019 Wildlife Crime Threat Assessment Report on West and Central Africa[45] commissioned by the CITES Secretariat, and prepared by UNODC states, that in the case of the Gambia illegal exports of rosewood are estimated to be worth about half of the country's total exports, about 10% of its GDP, and more than 20 times the budget of the Ministry of Environment, Climate Change and Natural Resources.
- Like Nigeria, Sierra Leone is a country that has increased exports of kosso since the CITES Appendix II listing in 2017, with export volumes tripling between 2017 and 2018, despite periodic export bans that year. In 2018, the longstanding log export ban was temporarily lifted, and this may have fuelled the surge in exports. The ban was reinstated by the President on 4 April 2018, as part of his first act in office[46] and then quickly rescinded again afterwards.[47] According to the Ministry of Finance, by raising the tariff on exports from US$1500 to US$2500 per container, the total amount realised from timber export between October 2018 and March 2019 was $16.5 million,[48] suggesting that 6,600 containers of timber were exported in those six months.

Comparing data on exports as reflected in the CITES Trade Database[49] with national import data, it appears that considerably more kosso was reported as imports than was reported as having CITES export permits issued, according to available export data for 2017. Trade data rarely line up neatly, and part of these differences may be due to delays between the year the permit was issued and when the export occurred, but the volumes involved are significant in some cases.

The fact that these four countries (Nigeria, Gambia, Ghana, and Sierra Leone) are currently exporting large volumes of rosewood does not mean the rosewood they are exporting came from within their counties. Interviews with traders indicate that Nigerian exports are supplemented by wood

Fig. 6 Asian country imports of kosso logs (cubic meters) by exporting country, 2008-2018



Source: World Trade Atlas, UN Comtrade

from Cameroon.[50] In Gambia, forestry officials interviewed estimated that nearly all the rosewood exported comes from the Casamance area of Senegal.[51] According to traders interviewed, exports from Ghana appear to be supplemented by illegal imports from Burkina Faso.[52] Under CITES, however, this trade between African countries would require export permits, and the subsequent re-export would require a designated re-export permit. In other words, under the CITES implementation laws of all these countries, all this trade would be illegal because the required permits were not issued.

These are not the only countries that appear to be exporting more rosewood than their known stocks would allow. For example, kosso has been a protected species in Mali since 1995. The country has been targeted by rosewood traffickers since at least 2003[53] and has very few forested areas remaining.[54] Nonetheless, according to harmonised system trade data, it managed to export over 80,000 cubic meters of rosewood in 2018, which represents about half a million trees.[55]

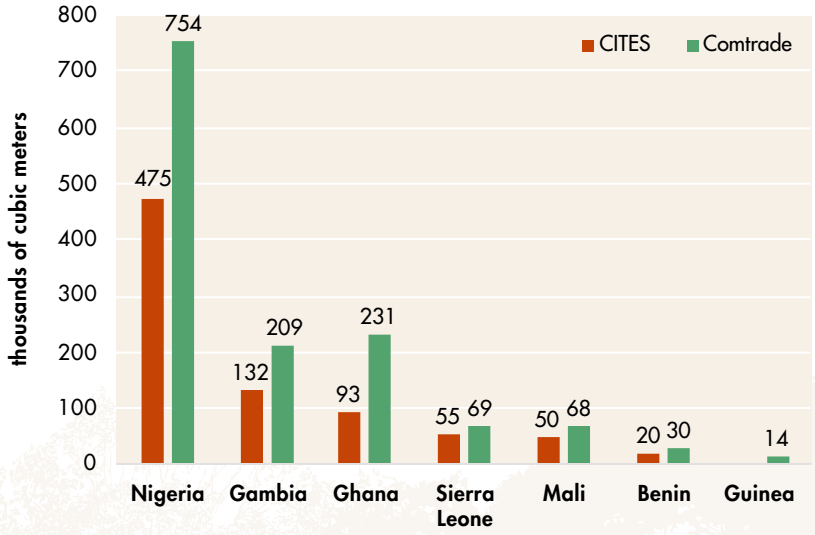
Recent interviews with kosso traders in West Africa suggested some of the rosewood being exported from West Africa was coming from outside the recognised range of the species, including from the Democratic Republic of the Congo along the Angolan border. It seems likely that a closely related species is being traded as kosso. The most likely candidate is *Pterocarpus tinctorius*, or "mukula", as it is known in Zambia. In 2018, researchers estimated that mukula was being extracted from Zambia at a rate of 110,000 cubic metres per annum, with estimated bribes paid to state officials of about US$1.7 million.[56]

The interface between kosso exporters and illegal loggers appears to be professional timber traders, many of whom have moved between countries to pursue supplies. Fieldwork conducted by UNODC in Nigeria give some idea of how this might be taking place more generally.[57] Traders interviewed often came from a logging area and had the logistical capacity to move the wood to the major cities. These traders "empower" (or "activate") local community leaders to source kosso, paying them a nominal fee for the service.[58] These leaders in turn recruit other community heads to promote logging. Designated depots are established in the periphery of a forested area and a "depot chairman" is assigned.

Local people are then recruited to find prime trees and local labour employed to extract them, often for very low wages. Typical labour costs cited were US$8.28 per log cut to chainsaw operators; US$ 5.52 per log to "pushers" who manually transport the log from the felling site to the depot; and US$1.38 per log to loaders, who work in teams of five or six and divide this fee among them. This labour is generally conducted without safety equipment.

Transport of illegally obtained logs from the depots by land is generally not a problem, although truckers are subject to all manner of roadside "taxes" from various dubious local authorities. During interviews, traders showed handfuls of printed receipts from these bodies that they had paid. As the more accessible kosso stocks become depleted, a seasonality in exports can be seen in some countries, with a dip during the rainy season when roads to remote areas become impassable.

Fig. 7 Volume of kosso log import permits and volume of kosso logs* imported by Asian countries based on trade statistics in 2017 (cubic meters) by exporting country



Source: CITES Trade Database, UN Comtrade

* That is, estimated volume of logs classified as rosewood from West Africa, which would almost certainly be kosso logs or logs passed off as kosso.

Trafficking

CITES-regulated wood from Africa, Asia and Latin America continues to be seized and CITES continues to monitor both illegal and legal trade. For example, in November 2018, CITES suspended commercial trade in the genus *Dalbergia* from Lao People's Democratic Republic (Lao PDR), including finished products, such as carvings and furniture. The suspension will remain "until Lao PDR makes scientifically based non-detriment findings for trade in the relevant species, including *D. cochinchinensis* and *D. oliveri* in the country to the satisfaction of the CITES Secretariat."[59] However, since 2015, most of

the rosewood imported by China came from Africa, much of it illegally sourced. For this reason, this chapter focuses primarily on the flow from Africa and African rosewoods.

Due in part to the bulk of the product, overseas shipments of logs are generally containerized. Seizures recorded in the World WISE database show that logs may be concealed behind worked planks or species may be intermixed or mislabelled, but this is generally the extent of physical concealment.[60] Planks may be used at the mouth of a container to conceal whole logs in countries with a roundwood export ban. For example, Benin is one of two exporting countries of sawn rosewood to China in the region,[61] and interviews conducted by UNODC in the country in 2014[62] found that kosso planks were frequently used at the mouth of a container to conceal logs within. Interviews with officials in the region in 2014 and 2018 showed that countries rarely have the capacity to unload or scan departing timber containers to verify the contents, so loading the outer third of the container with planks allows good cover for illegal log exports.

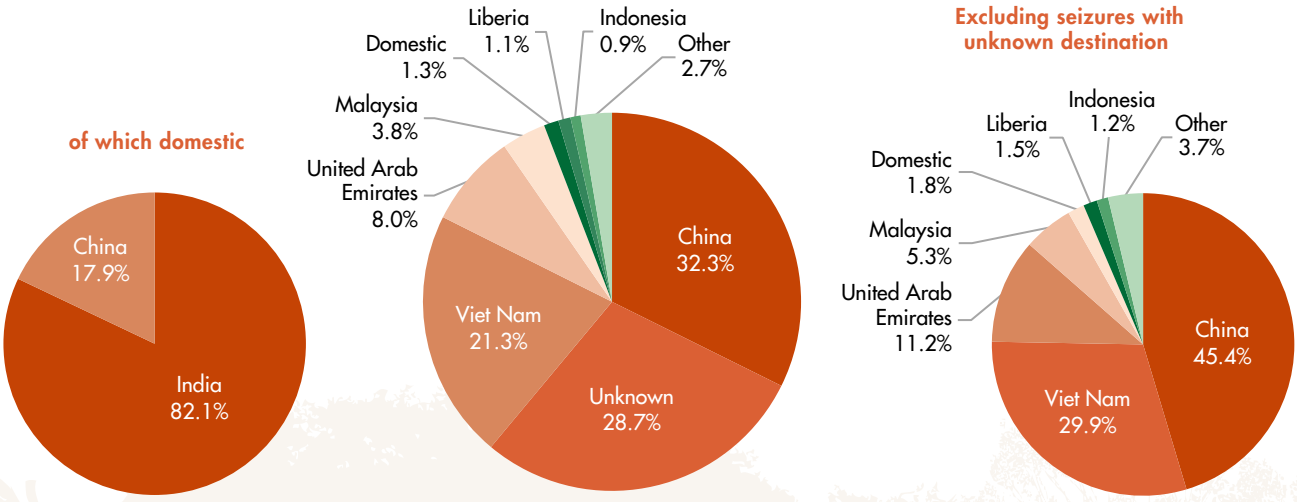
Logs of illegal origin may be consolidated in transit countries, so the origin and species of the wood can be concealed. On arrival in the destination countries, illicit shipments are laundered into mainstream timber markets. The buyers of this wood may be unaware that the product they are purchasing was illegally harvested or traded.

The World WISE seizure data suggest that China and Viet Nam are the main destinations for trafficked rosewood, and three-quarters of all the logs seized globally (where the destination was known) were on their way to one of the two countries. The United Arab Emirates has also been the destination of a number of significant seizures, as has Malaysia.

In most countries, the sheer volume of the trade makes comprehensive inspection impossible. If Nigeria exported around 750,000 cubic meters of kosso in 2017 (Figure 5), that is equivalent to nearly 40,000 containers of wood, or over 100 containers per day.[63] According to interviews conducted by UNODC in Nigeria in 2018, the Forestry Inspection Unit has only one officer designated to inspect the loads leaving the two ports in Lagos (Apapa and Tin Can Island, which are situated about one half hour drive apart) and two officers in Port Harcourt. Interviews with officials in the ports indicated that timber loads were never unloaded, even in cases where irregularities were suspected; scanners were used for imports only; and that there was very little space or scope to detain shipments for further inquiry. Apapa Port, for example, is owned by a private company (APM), and charges the government a daily rate for the storage of containers. As a result, interviews suggested that questionable shipments are generally returned to the shippers rather than seized.

According to interviews with timber traders in the region, corruption is an issue throughout the trafficking chain, from the bribes paid to local authorities to the road taxes and the bribes at ports. Multiple layers of overlapping bureaucracy in some countries further complicate the issue. In Nigeria, for example, federal authorities such as Customs, the National Park Service, the national police, the National

Fig. 8 Percentage distribution of seizures of Dalbergia and Pterocarpus by reported country of destination (in mass equivalent), 2005-2017



Source: UNODC World WISE Database

Agricultural Quarantine Service, the National Environmental Standards and Regulations Enforcement Agency, and the Forestry Department of the Ministry of Environment all have some responsibility for timber enforcement with varying mandates and capacities, but most of the regulation takes place at the state level. In addition, falsified CITES permits have been reported by senior officials interviewed by UNODC in 2018.
In response to illegal logging, many countries have seized wood and prevented the export of privately held timber stocks. The result is the accumulation of stockpiles of considerable value in poor countries, degrading through exposure and held in place only through the power of local law enforcement.

It appears that the primary illegal exporters of rosewood from Africa are Asian expatriate traders. UNODC field observations show these traders conducting their business illegally are in for the long term. For example, the same traders known for their involvement in illegal activities in 2014 can be seen today in Guinea-Bissau. They are mostly found in the urban export areas in West Africa, as risks in the source areas are high. For example, they were frequently targeted for kidnapping by local gangs during the early years of rosewood exploitation in Nigeria, according to interviews with officials in the region conducted in 2014.

Destination markets

Most of the tropical hardwood logs in international trade today are destined for Asia's massive furniture industry. China alone produced over 44% of the value of world tropical hardwood furniture in 2016, valued at about US$20 billion. Due to protections afforded forests in China, this industry was based almost entirely on imported logs. The country has also dominated exports of tropical hardwood furniture, topping US$11 billion in exports in 2016, 59% of the global total. Rosewood comprised about 20% of the value of log imports in 2017, based on import declarations, most of which were destined for Hunagpu (Guangdong) and Shanghai ports.[64]

However, in response to rising manufacturing costs in China, furniture production has been relocating to Viet Nam, where costs are lower.[65] Viet Nam exported more than US$3 billion in tropical hardwood furniture in 2016, while three other Southeast Asian countries combined (Indonesia, Malaysia, and Thailand) exported a similar amount. In addition to China, the United States of America, EU countries and Japan are destinations for wood furniture exports.[66] To feed this growing industry, imports of tropical hardwood logs from Africa (including rosewood) have increased by a factor of 10 since 2010 (Figure 9).

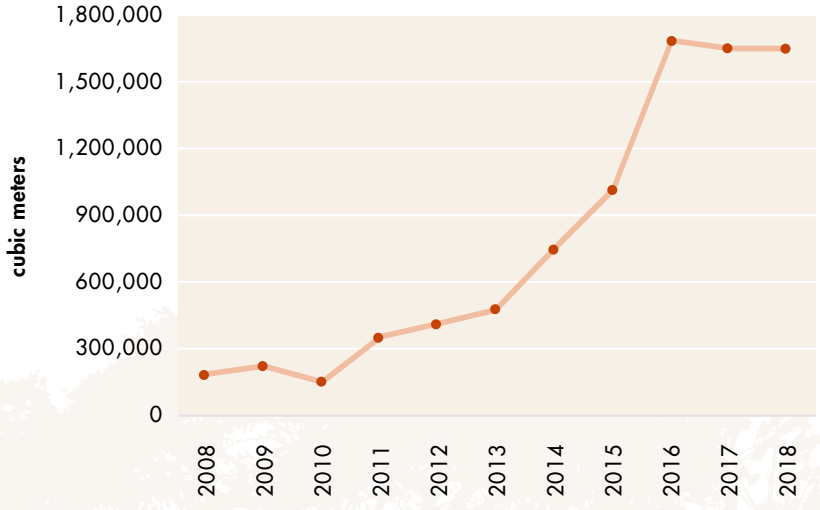
Based on a market analyst's report commissioned by UNODC,[67] Chinese demand for rosewood furniture appears to have dropped since 2014 due to a number of factors:

- According to media sources, it appears housing investment has slowed,[68] resulting in a decline in consumer spending on new furniture.
- On the high end, the government has spoken out against conspicuous consumption and anti-corruption efforts have looked critically at spending on luxury goods.[69]
- It also appears that demand in 2014 was buoyed by speculation, and that the drop in 2015 was the result of oversupply and market correction.[70]

In response, China's rosewood furniture industry has undergone considerable structural change and rationalisation in response to overcapacity, changing consumer demand, rising raw material and production costs, and increases in compliance costs associated with legality and environmental controls.[71]

In light of the new peak in imports from Africa in 2017 (see Figure 6 above), the market is likely far from exhausted.

Fig. 9 Imports of African logs (cubic meters) by Viet Nam, 2008-2018



Source: COMTRADE

Endnotes

1 Based on UN Comtrade data as captured by ITC Trade Map, Tropical wood in the rough, commodity HS code 440349 (2017 revision).

2 Ibid.

3 This chapter draws on the Harmonised System (HS) classification of trade data, captured in UN COMTRADE and national statistics. These data can be accessed through databases such as the International Trade Centre's Trade Map or commercial providers such as Trade Atlas. These data indicate that for China, rosewood (defined in Chinese National Standard 2017 and captured in China in HS code 44034980 'Tropical Rosewood in the rough') comprised 13% of all tropical hardwood log imports by weight and 20% by value in 2018.

4 For example, *Dalbergia* species are used in the manufacture of musical instruments, but the CITES Conference of the Parties (CoP) 18 in 2019 found that commercial and non-commercial trade in musical instruments was not detrimental to the species and these instruments were excepted from the listing.

5 红木 *Hongmu* (red wood) refers to just one of several sets of species that are used in traditional furniture manufacture, and other terms are used to refer to different groups of species. In China , the best definition of 'rosewood' comes from the species included in Chinese National Standard for Legal Marketing Purposes (GB/T 18107-2017, effective 1 July 2018): *Pterocarpus santalinus, Pterocarpus dalbergioides, Pterocarpus erinaceus, Pterocarpus indicus, Pterocarpus macrocarpus, Pterocarpus marsupium, Dalbergia odorifera, Dalbergia cultrata, Dalbergia latifolia, Dalbergia melanoxylon, Dalbergia nigra, Dalbergia spruceana, Dalbergia stevensonii, Dalbergia louvelii, Dalbergia cearensis, Dalbergia bariensis, Dalbergia cochinchinensis, Dalbergia frutescens var. Tomentosa, Dalbergia granadillo, Dalbergia oliveri, Dalbergia retusa, Millettia laurentii, Millettia leucantha, Senna siamea, Diospyros ebenum, Dalbergia crassiflora, Dalbergia celebica, Dalbergia philippensis,* and *Dalbergia pilosanthera*. Many species used in *hongmu* are also sought after by makers of other fine wood products, such as musical instruments, but, based on import statistics for protected species, the quantities used are much smaller.

6 The *Dalbergia* and *Pterocarpus* species comprise 25 of the 29 recognized species above.

7 CITES CoP 18, Working document 74 (2019), *Species specific matters: rosewood timber species [leguminosae (fabaceae)].*

8 See, for example, CITES CoP17 Prop.55 (2016); available at: https://cites.org/sites/default/files/eng/cop/17/prop/060216/E-CoP17-Prop-55.pdf

9 CITES CoP16 (2013) Prop. 60, p. 6 and CITES CoP17 (2016) Prop.55, p. 10.

10 CITES CoP17 Prop. 54 (2016): *Include 13 timber species of genus Dalbergia (native to Mexico and Central America) in Appendix II)*; CITES CoP17 Prop. 55 (2016): *Include the genus Dalbergia in CITES Appendix II with exception to the species included in Appendix I.*

11 Waeber, P., Schuurman, D., Ramamonjisoa, B., Langrand, M., Barber, C., Innes, J., Lowry, P. and Wilmé, L., 'Uplisting of Malagasy precious woods critical for their survival'. *Biological Conservation*, Vol 235, 2019, pp 89-92; CITES, Sixty-fifth meeting of the Standing Committee, *A preliminary Dalbergia checklist for Madagascar for CITES,* SC65 Inf. 21, 2014.

12 Ibid.

13 CITES CoP16 Prop. 63 (2013), *Inclusion of the populations of Madagascar in Appendix II, and limited to logs, sawn wood and veneer sheets by an annotation*.

14 CITES Notification to the Parties No. 2018/007, 15 January 2018.

15 *Pterocarpus erinaceus* is also known as *vène* in the Francophone countries, *pau de sangue* in Guinea-Bissau, *krayie/kpatro* in Ghana, and *keno* in the Gambia.

16 Of the 29 species recognised under the 2017 China trade standard, only one grows in West Africa: kosso. The other species are found in South-East Asia, Central America or Madagascar. It is theoretically possible that species from these other regions could be trans-shipped via West Africa, though this would make little commercial sense.

17 See UNODC, *World Wildlife Crime Report: Trafficking in Protected Species*, 2016, Chapter 3.

18 According to CITES CoP17 Prop. 57 (2016), "The last few years have seen a dramatic increase in trade of *Pterocarpus erinaceus* timber, in response to rising demand in Asia for rosewood furniture and increasing scarcity of other officially recognized 'rosewood' species." Before this, it was placed on Appendix III at the request of Senegal. See CITES, Notification to the Parties, 2016/008 (February 2016), available at: https://cites.org/sites/default/files/notif/E-Notif-2016-008.pdf.

19 Since the CITES listing only took effect in 2017, this is the first year CITES data are available. UNEP-WCMC (Comps.) 2019, *Full CITES Trade Database Download,* Version 2019.2; available at: trade.cites.org.

20 As discussed below, a cubic meter of kosso is estimated to weigh on average roughly one metric ton, each log weighs about 200 kg, and each log is equated to one tree, so 825,000 metric tons divided by 200 kg gives an estimate of 4,125,000 trees.

21 Viet Nam reported importing 17 cubic meters (out of 825,000).

22 Nigeria Customs Service, *Export Prohibition List*, item 2 (of 8) is "Timber (rough or sawn)" (available at:https://customs.gov.ng/?page_id=3079).

23 CITES, Seventieth Meeting of the Standing Committee, SC70 Doc.27.3.5 (2018), *Application of Article XIII in Nigeria*.

24 Decision 18.88, paragraph 6, recommendation q), on "Controlling trade in specimens of *Pterocarpus erinaceus*". See: *Recommendations to Parties in West and Central Africa for consideration in their implementation of measures and activities to address wildlife crime affecting the two subregions,* available at: https://cites.org/sites/default/files/eng/prog/enforcement/CoP18_Doc_34_Annex2_EN.pdf.

25 CITES, Seventieth Meeting of the Standing Committee, SC70, *Summary Record,* para. 27.3.5 1. d) (2018). Available at: https://cites.org/sites/default/files/eng/com/sc/70/exsum/E-SC70-SR.pdf.

26 World WISE.

27 CITES CoP18 Prop.54 (2019), *Consideration of proposals for amendment of appendices I and II.*

28 See, for example, http://chinatimber.org/price/69232.html. Chinatimber.org is a timber network with 160,000 registered members. It was founded in 2009 by Dongguan Xingye International Logistics City Co., Ltd.

29 "赞比亚血檀原木", https://www.1688.com/jiage/-D4DEB1C8D1C7D1AACCB-4D4ADC4BE.html

30 "将染料紫檀", http://chinatimber.org/price/69423.html (see also prior note on chinatimber.org).

31 CITES CoP17 Prop. 56 (2016), *Consideration of proposals for amendment of appendices I and II. Guibourtia demeusei*, *Guibourtia pellegriniana*, and *Guibourtia tessmannii* were included in Appendix II. Other CITES listed species that could possibly be used as rosewood include *Paubrasilia echinate* and *Platymiscium parviflorum.*

32 红木 *Hongmu* (red wood) refers to just one of several sets of species that are used in traditional furniture manufacture, and other terms are used to refer to different groups of species. Given the distribution of the market, the best definition of 'rosewood' are the species included in Chinese National Standard for Legal Marketing Purposes (GB/T 18107-2017, effective 1 July 2018): *Pterocarpus santalinus, Pterocarpus dalbergioides, Pterocarpus erinaceus, Pterocarpus indicus, Pterocarpus macrocarpus, Pterocarpus marsupium, Dalbergia odorifera, Dalbergia cultrata, Dalbergia latifolia, Dalbergia melanoxylon, Dalbergia nigra, Dalbergia spruceana, Dalbergia stevensonii, Dalbergia louvelii, Dalbergia cearensis, Dalbergia bariensis, Dalbergia cochinchinensis, Dalbergia frutescens var. Tomentosa, Dalbergia granadillo, Dalbergia oliveri, Dalbergia retusa, Millettia laurentii, Millettia leucantha, Senna siamea, Diospyros ebenum, Dalbergia crassiflora, Dalbergia celebica, Dalbergia philippensis,* and *Dalbergia pilosanthera*. Many species used in *hongmu* are also sought after by makers of other fine wood products, such as musical instruments, but, based on import statistics for protected species, the quantities used are much smaller.

33 Ibid.

34 Hong Kong Customs. (11 June, 2019). "Hong Kong Customs seizes suspected scheduled Guibourtia species wood logs." Retrieved from: https://www.customs.gov.hk/en/publication_press/press/index_id_2585.html.

35 Benin, Burkina Faso, Gambia, Ghana, Guinea-Bissau, Mali, Nigeria, Senegal and Togo.

36 According to the IUCN, its range includes Benin, Burkina Faso, Cameroon, Central African Republic, Côte d'Ivoire, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. Barstow, M., 'Pterocarpus erinaceus', *The IUCN Red List of Threatened Species 2018*: *e.T62027797A62027800.* Available at: http://dx.doi.

org/10.2305/IUCN.UK.2018-2.RLTS.T62027797A62027800.en. Downloaded on 18 September 2019.

37 Ibid.

38 See Table 1 in Ted Leggett, 'The rapid rise of rosewood trafficking in West Africa'. *Forum on Crime and Society*, Vol 9, Nos 1 and 2, 2018, p 71.

39 See IUCN 2019 op cit.

40 CITES CoP 18, Working document 34 (CoP18 Doc. 34; 2019), *Wildlife crime enforcement support in West and Central Africa.*

41 Dumenu, W.K and Bandoh, W.N. 'Exploitation of African Rosewood (*Pterocarpus erinaceus*) in Ghana: A situation analysis', *Ghana Journal of Forestry,* Vol. 32, pp. 1-15, 2016.

42 International Tropical Timber Organization (ITTO), *Tropical Timber Market Report*, Vol. 23, No. 6, 16-31 March 2019.

43 Ghana, Ministry of Lands and Natural Resources, *Lands and Natural Resources Minister investigate alleged corruption in rosewood,* news story (posted on the Ministry's website www.mlnr.gov.gh), 28 August 2019.

44 Barstow, M., 'Pterocarpus erinaceus', *The IUCN Red List of Threatened Species 2018*: *e.T62027797A62027800.* Available at: http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T62027797A62027800.en. Downloaded on 18 September 2019.

45 CITES CoP 18, Working document 34 (CoP18 Doc. 34; 2019), *Wildlife crime enforcement support in West and Central Africa.*

46 President Julius Maada Bio, *Executive Order No 1*, 9 April 2018.

47 International Tropical Timber Organization (ITTO), *Tropical Timber Market Report*, Vol. 22, No. 16, 16-31 August 2018.

48 Sierra Leone, Ministry of Finance, *2018 Annual Review* (available at: https://mof.gov.sl/wp-content/uploads/2019/07/FIRST-Year-Achievements-of-MoF-under-the-New-Direction.pdf).

49 Available at: https://trade.cites.org/.

50 Based on interviews with traders conducted in Nigeria in 2018. See Methodological Annex for details.

51 Based on interviews conducted in the Gambia in 2018. The exception being one senior Forestry official, who estimated that only 60% of the Gambia's exports came from the Casamance. See Methodological Annex for details.

52 Based on interviews in Burkina Faso in 2014. See Methodological Annex for details.

53 Based on interviews with forestry officials and traders in Mali in 2015. See Methodological Annex for details.

54 As of 2015, only 4% of the territory of Mali was forested, according to the World Bank's World Development Indicators (https://databank.worldbank.org/source/world-development-indicators). See Methodological Annex for details.

55 Depending on its moisture content, kosso has a density close to water (around 800-890 kg per m3), so one cubic meter is around one metric ton. Standard kosso logs are about 2.1 meters in length and of varying circumference, but on average about 200 kg, or one-fifth of a cubic meter. In most cases, one kosso log represents one entire tree, so 80,000 m3 * 5 = 400,000 trees.

56 Cerutti, P., Gumbo, D., Moombe, K., Schoneveld, G., Nasi, R., Bourland, N. and Weng, X., *Informality, global capital, rural development and the environment: Mukula (rosewood) trade between China and Zambia*, International Institute for Environment and Development, (London) and Center for International Forestry Research, (Lusaka), 2018.

57 Based on fieldwork conducted in Nigeria in 2018. See Methodological Annex for details.

58 Prices cited in interviews include US$138 to US$193 for a district head and only US$28 to US$55 for a village head as a one-off fee.

59 CITES, *Countries currently subject to a recommendation to suspend trade,* online running list, available at: https://www.cites.org/eng/resources/ref/suspend.php. See CITES, Seventy-first Meeting of the Standing Committee, SC71, *Summary Record,* p. 4, para. 10.1.a) (2019); available at: https://cites.org/sites/default/files/eng/com/sc/71/exsum/E-SC71-SR.pdf. Also, for example, according to COMTRADE data, the Lao People's Democratic Republic supplied about 9% of China's rosewood log imports in 2017, down from about 25% in 2014. A significant increase in imports from Myanmar occurred in anticipation of a log export ban, which was implemented in April 2014. See UNODC, *Criminal justice response to wildlife and forest crime in Myanmar,* UNODC Regional Office for Southeast Asia and the Pacific, Bangkok, 2015. In 2017, import demand was stimulated by a total ban on commercial logging in national forests in China. See the statement of the Director of the State Forestry Administration, Zhao Shucon, 'State Forestry Administration: Strictly protect all natural forests' (available at: http://news.sciencenet.cn/htmlnews/2015/2/313822.shtm). Production in 2018 was interrupted by the introduction of stricter environmental controls, which impacted wood processing industries. These include the rollout of the People's Republic of China Water Pollution Prevention and Control Law (available at: http://www.gov.cn/flfg/2008-02/28/content_905050.htm) and the Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution (available at: http://www.npc.gov.cn/zgrdw/npc/zfjc/zfjcelys/2018-07/09/content_2057589.htm).

60 Some rosewood concealed in cover loads has been observed, however. For example, World WISE contains a seizure in which the Gambia detained containers in July 2018 where *P. erinaceus* logs were concealed behind a load of plastic waste.

61 According to national trade statistics, with the other being Nigeria, which only began exporting sawn rosewood in 2014 but was the leading exporter in 2017.

62 See the Methodological Annex of the UNODC *World Wildlife Crime Report 2016.*

63 Based on a conservative estimate of 20 cubic meters per container.

64 Based on data from the World Trade Atlas.

65 Russell, T., 'The Vietnam connection', *Furniture Today*, 7 October 2019.

66 Based on UN Comtrade data (https://comtrade.un.org/).

67 See Methodological Annex for details.

68 Based on data from the National Bureau of Statistics of China, as cited in Yu, X., 'China's real estate market expected to adjust in H2', *China Daily,* 26 June 2019.

69 See, for example, Xi Jinping, *Eight-point Regulation of the Centre* (中央八项规定), 4 December 2012, which admonishes party leaders to "practice thrift".

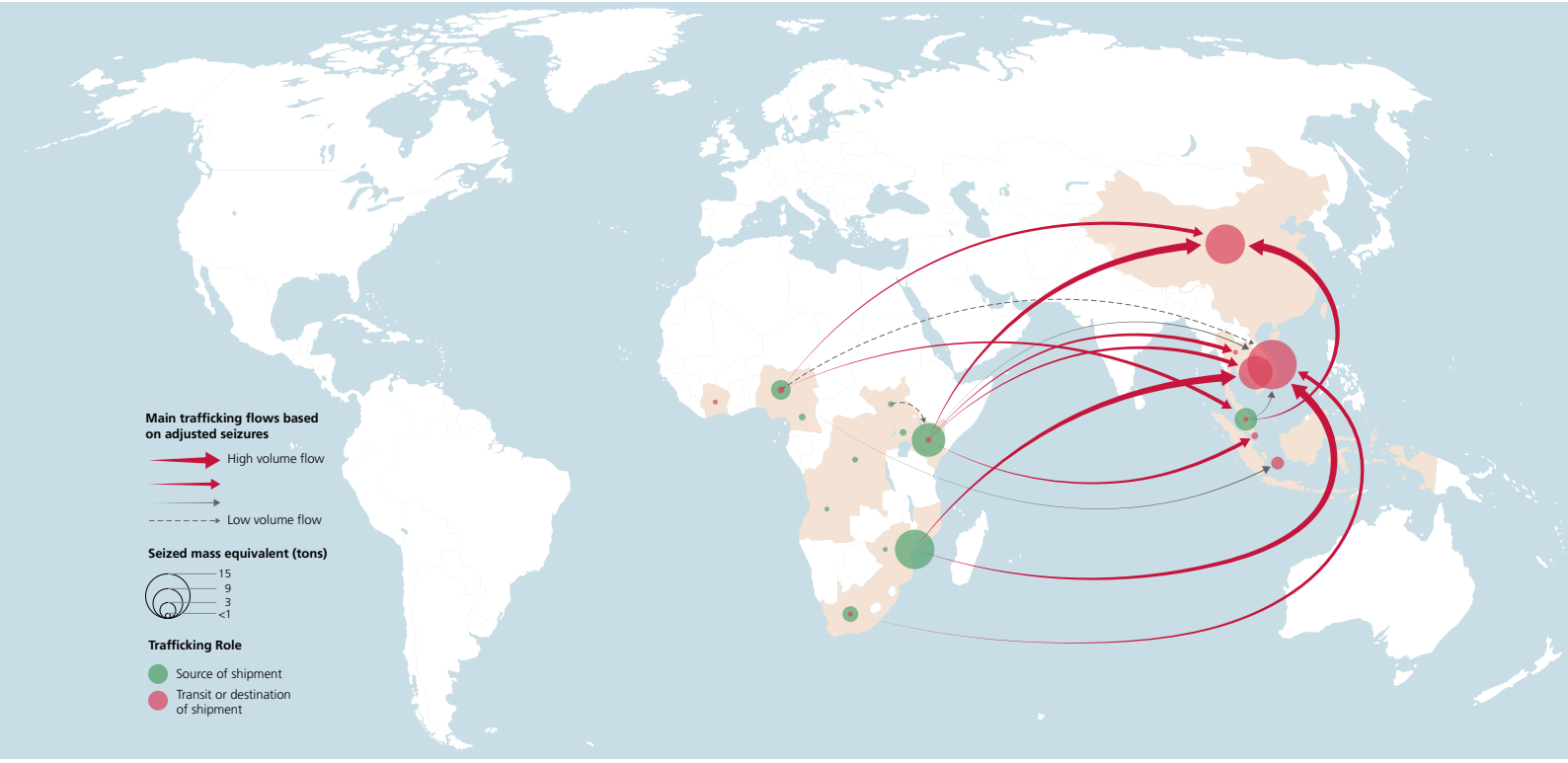
70 International Tropical Timber Organization (ITTO), *Analysis of trade trends for CITES-listed tree species and the impact on Chinese SMEs,* Project Technical Report, Research Institute of Forestry Information and Policy, Chinese Academy of Forestry (unpublished report), 2018.

71 Based on market analysts' report commissioned by UNODC. See Methodological Annex for details.

AFRICAN ELEPHANT TUSKS AND RHINOCEROS HORNS

3

Map 1 Trafficking flow map - Elephant ivory (2014-2018)



Source: UNODC World WISE Database

The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas). The year 2018 is based on partial data.

In the last *World Wildlife Crime Report*, elephant ivory and rhino horns were discussed separately. Ivory was discussed under the heading of "art, décor, and jewellery" and as an investment commodity. Rhino horn was classified as a traditional medicine, although it was already apparent at that time that it had also become a status item. In the last four years, the evidence has mounted that rhino horn is being sold for its artistic and investment value, so it is similar to ivory in this respect. The two commodities are sourced from different regions in Africa but require similar skills and equipment to procure. They also share many commonalities in their primary destination markets. For these reasons, the two species are considered together here.

The poaching of both elephants and rhinos appears to be in decline, as do the markets generally. For ivory, a downward trend since 2011 can be seen in the best available indicators of poaching, smuggling, and price. A similar, but more recent, trend can be seen with rhino horn poaching and prices, although seizures of rhino horns have continuously risen. A 2019 surge in very large seizures of both commodities may be related to the unloading of stocks in response to declining prices. This chapter reviews the data and discusses some explanations for these trends.

African elephant ivory

Ivory comes from elephants, particularly African elephants.[1] There are at least two different ways to estimate the number of elephants poached in Africa, and thus the size of the illicit ivory supply entering the market annually. Elephant *population* estimates can be compared across time and *poaching* data can be modelled to estimate the number of elephants illegally killed:

- Population estimates can be compared between two assessment dates; after accounting for natural growth rate and taking into consideration other factors that may lead to unexpected mortality (such as drought), unexplained declines could be attributed to poaching.
- Detections of elephant poaching can be compared to detections of elephants who died of other causes; based on natural

mortality rates, the share of natural deaths detected can be estimated, and this share used to estimate the number of poaching deaths that occurred.[2]

How many elephants are being lost?

Elephant populations are studied by many independent scientists, and the results of these studies are compiled and analysed by the African Elephant Specialist Group (AfESG) of the International Union for the Conservation of Nature (IUCN). In addition to the regular scientific efforts, a concentrated study was conducted on savannah elephant populations using aerial surveys in 18 range states in 2015, dubbed "the Great Elephant Census".[3] The results of these surveys were integrated into the IUCN *African Elephant Status Report 2016* (AESR 2016).[4] The AESR 2016 reports a strong decline in elephant populations based on estimates made in 2006 and 2015 (Figures1 and 2).

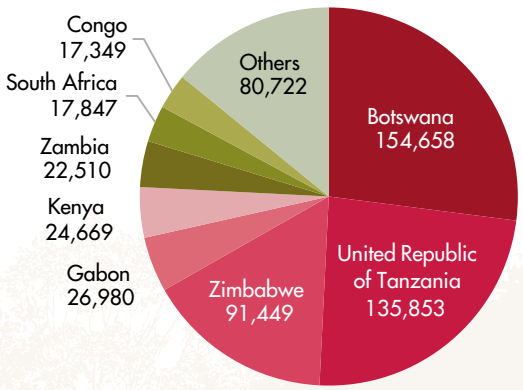
The AESR 2016 estimated that there were just over 400,000 elephants in the areas surveyed[5] and over 100,000 in the areas not systematically surveyed,[6] which combined cover 62 per cent of the known and possible elephant range. The AESR compared their 2015 figures to similar estimates made for 2006 and found that there had been a net decline in elephant populations of about 111,000 elephants in the areas comparably surveyed in the intervening years.[7] This decline suggests that unexplained losses not only offset expected natural population growth (which would have left the population unchanged) but also reduced the continental elephant population by an average of about 10,000 elephants per year.

While not all the missing elephants were poached, available data show that poaching over the last decade undoubtedly accounts for a significant portion of the elephants killed,[8] potentially resulting in some one thousand metric tons of illegal ivory over the decade, or an average of about 100 MT per year.[9] Evidence discussed below suggests that the actual amount of poaching varied greatly between years, so in some years more than 10,000 were lost, and in some, less. This average only gives a sense of the order of magnitude of the illicit ivory supply entering the market in recent years.

Over half of this continental decline can be attributed to losses in the United Republic of Tanzania, where the estimated population declined from 135,853 in 2006 to 50,433 in 2015.[12] The elephant populations in the Selous and Ruaha reserves in Tanzania alone declined by nearly 75,000 elephants between 2006 and 2013. Since 2015, Tanzania has increased its efforts against poaching and trafficking, supported by NGOs. These efforts include actions undertaken through its National Ivory Action Plan (NIAP),[13] as well as the undertaking of the ICCWC Analytic Toolkit on Wildlife and Forest Crime. Early indications are that this work is having some effect.

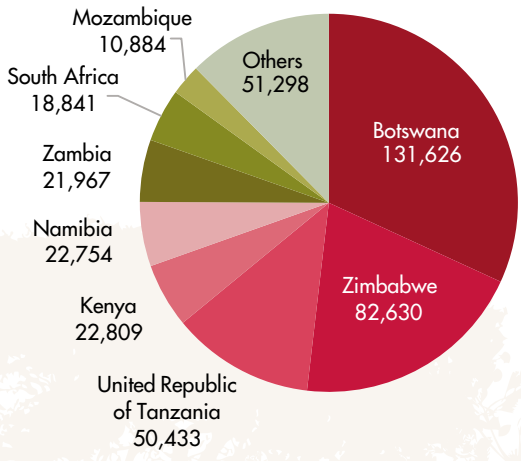
Other areas where the IUCN noted negative population trends associated with poaching included Gabon, Congo and Cameroon (home to the so-called TRIDOM range), as well as northern Mozambique (the Niassa range along the border with the United Republic of Tanzania and the Selous reserve) and parts of Kenya. Serious long-term declines were also noted in the populations of Central Africa[14] as well as parts of Southern Africa (parts of Zimbabwe, Angola, and, to a lesser extent,

Fig. 1 Estimated number of elephants residing in African countries in 2006 (556,973 elephants)[10]



Source: IUCN 2007

Fig. 2 Estimated number of elephants residing in African countries in 2015 (413,242 elephants)[11]



Source: IUCN 2016

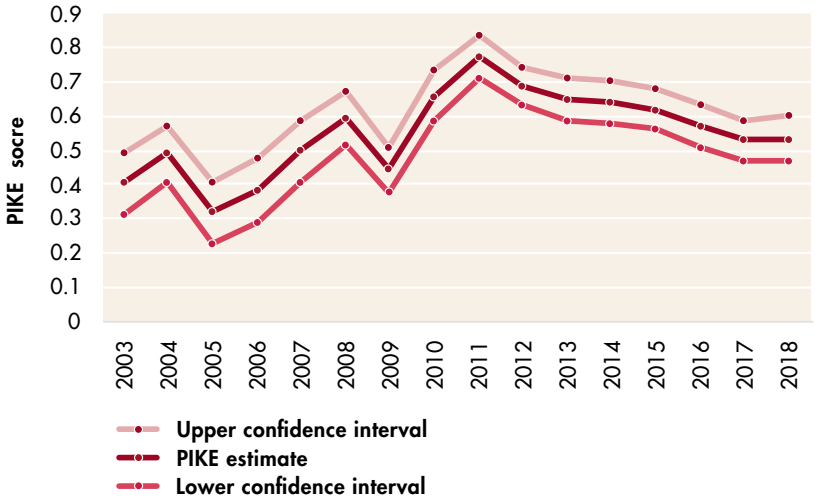
Zambia), which were attributed in part to poaching.[15]

These national population trends resonate with the findings of DNA research conducted on 28 major ivory seizures between 2010 and 2016.[16] The majority of the seizures were traced back to two broad elephant populations: one extending from central Tanzania to northern Mozambique (including Selous and Ruaha), and one centred on the TRIDOM area (north-east Gabon, north-west Congo, and south-east Cameroon).[17] They also align with the trafficking data, discussed below, which indicate East African (Mombasa) and West African (Lagos) hubs for illicit trade.

How many elephants are poached?

Another way of estimating the number of elephants poached (and thus the illegal ivory supply) is to extrapolate from elephant carcass data. Trends in elephant poaching are monitored by the CITES program "Monitoring the Illegal Killing of Elephants" (MIKE). Based on a network of over 60 sentinel sites, participating rangers report the number of dead elephants they detect and the share of these dead elephants that appear to have been illegally killed. According to CITES, the designated MIKE sites in Africa hold an estimated 30 – 40 per cent of the African elephant population.[18] The "share of the detected elephant carcasses that have been illegally killed" is known as the Proportion of Illegally Killed Elephants (PIKE), and it is calculated at the subregional and continental levels, adjusted for sample variation.[19] Since 2002, over 22,000 elephant carcasses have been so categorized, with between 1,000 and 2,000 observations per year between 2007 and 2018. Detections of both elephant carcasses and illegally killed elephants peaked in 2012, but the PIKE score was highest in 2011. Since then, it has declined every year until 2018, during which it increased by about 0.6 per cent.[20]

Fig. 3 PIKE score for Africa, 2003-2018



Source: CITES MIKE

Box 1: Assumptions and limitations in the poaching-based estimate of illegal ivory supply presented in this report

Like any estimate of the size of a hidden population, the estimate of the number of illegally killed elephants presented in this chapter is based on certain assumptions and limitations. The reliability of the estimates is subject to the validity of these assumptions which concern the demography of elephants, the nature of the carcass survey, and the selection of the sites for observation:

Demographic	The baseline death and birth rates are derived from a few, increasing populations
	It is assumed that the age structure does not impact on elephant survival or reproduction
	No effect of ecologically good or bad years in elephant mortality is taken into account
	No feedback from illegal killing is included in the model
	Density dependent effects are not taken into account
Carcass Survey	It is assumed there is no bias in the detection of natural versus illegally killed carcasses
	Patrol effort consistency across time is assumed
	It is assumed that the patrol effort is spatially representative of elephant distribution
Site Selection	It is assumed that sites are representative of poaching levels in the region
	No ecological differences between sites are taken into account

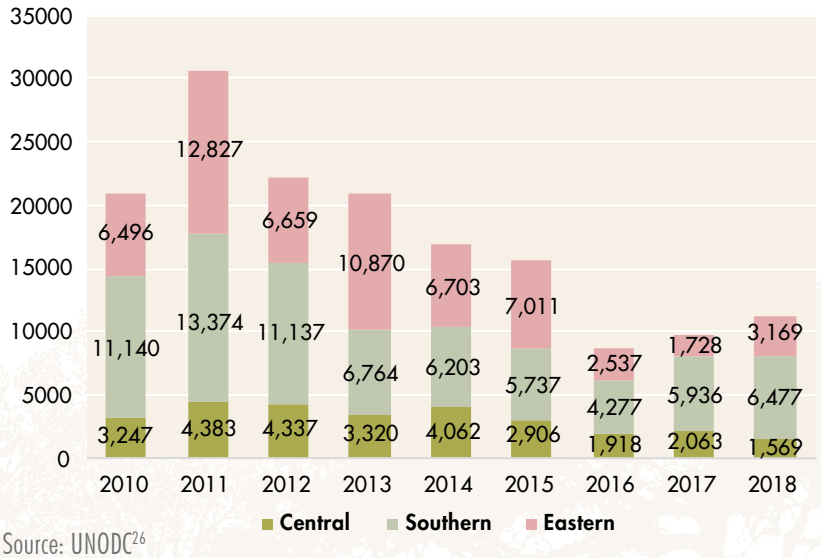
If elephants dying of natural causes and elephants poached are equally likely to be detected, it is possible to use the PIKE scores, estimates of natural mortality, and population figures to estimate the number of elephants poached. Crudely put, the ratio of the proportion of the carcasses illegally killed to the proportion that died of other causes can act as a multiplier to the natural rate of mortality in the elephant population. This provides an estimate of the poaching rate, as long these data are robust to the model assumptions (Box 3.1). This estimated poaching rate can then be multiplied by the population size to estimate the actual number of poached animals.[21] This approach has been applied in the past to generate poaching estimates between 2010 and 2012[22] and was extended to 2018 using updated population and PIKE data (Figure 4). These estimates suggest some 157,000 elephants were poached between 2010 and 2018, or an average of about 17,000 elephants per year.[23] They show a declining trend in poaching since 2011, rising again slightly in 2017 and 2018 (Figure 4).[24]

This analysis shows that the intensity of the poaching must be differentiated from the amount of illicit ivory produced. The PIKE score measures the intensity of poaching, not the volume of poaching. A relatively low PIKE score in a large population could produce more illicit ivory than a high PIKE score in a small population. According to the PIKE-based analysis conducted for this report, Southern Africa, despite its low PIKE scores, was responsible for the largest share of the elephants poached between 2010 and 2018. Oddly, this composition is not reflected in the population data, the forensic data, or the trafficking data, which indicate an Eastern African source as predominant in recent years.

There could be several reasons for this inconsistency. It could be an issue of data quality for one or more of the considered indicators. It is also possible that some parts of Southern Africa, with its large elephant populations, have been an unrecognised source of elephant ivory. The low PIKE values and, therefore, low estimated rate of poaching in many Southern African populations may be sustainable, meaning the level of poaching does not drive a population decline. For instance, using the modelled demographic rates, it would be expected that the poaching of up to 4,000 elephants annually in northern Botswana would not cause a decline in the size of the population.[25]

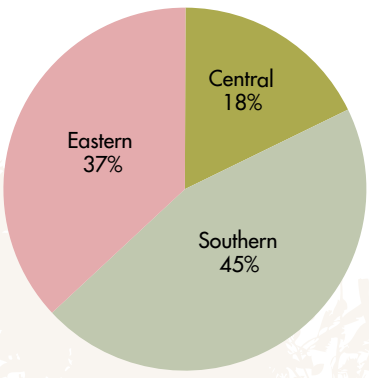
While not directly relevant for estimation purposes, aerial surveys, such as those conducted during the Great Elephant Census, can provide another indicator of poaching intensity: the "carcass ratio". The total number of elephants detected (live and dead) can be compared to the number of carcasses observed. A "carcass ratio" of less than 8 per cent is said to be indicative of growing elephant populations.[28] Whether these elephants died of natural causes or were poached is impossible to determine from the air, and environmental conditions can affect the rate at which carcasses disappear. Still, the stark variation between countries with regard to the share of dead elephants detected in aerial surveys gives some indication of the variation in threats faced across the continent, and high shares of dead elephants relative to live elephants in Cameroon (83%),[29] Mozambique (32%), Angola (30%) and the United Republic of Tanzania (26%) show higher mortality risk in these areas. High carcass ratios, possibly indicating high poaching levels, were found in the northern section of Tsavo East National Park, Kenya (52% carcass ratio), Niassa National Reserve, Mozambique (42%), and Rungwa Game Reserve, Tanzania (36%), areas also highlighted by the forensic data.[30]

Fig. 4 Estimated annual numbers of illegally killed elephants in Central, Eastern and Southern Africa (median figures)



Source: UNODC[26]

Fig. 5 Regional share of estimated elephants poached in Africa, 2010-2018



Source: UNODC[27]

Looking at both population-based and poaching data-based estimates, it appears that between 10,000 (population loss average) and 17,000 (poaching estimate average) elephants were poached per year between 2006 and 2018, producing potentially between 100 MT and 170 MT of illicit ivory on average per year.

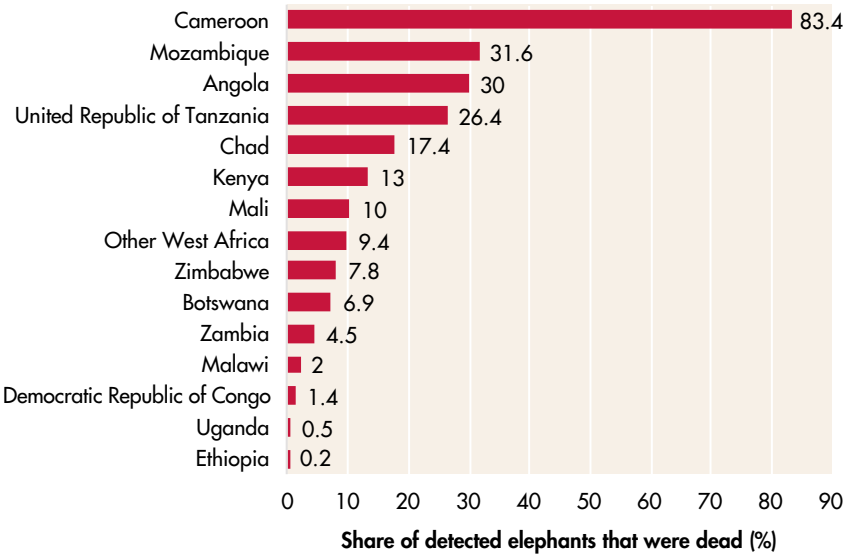
Based on both population modelling[32] and the PIKE estimate, it appears that the illegal ivory supply has been declining since 2011. If demand is constant or growing, then a decline in supply would normally result in a rise in prices. But despite indications that the supply of ivory is declining, the price of ivory in Africa also appears to have declined since 2014. UNODC fieldwork conducted in 2018 in Kenya and the United Republic of Tanzania found that poachers were being paid between half and one-third of the price they were paid in 2014 (Figure 7). Reports from the field even suggested that some poachers were holding onto their tusks in hopes that the price would eventually rise.[33]

Trafficking

Trafficking patterns can be detected through seizure records, but these do not give an accurate representation of the volume of the trafficking because it is not clear what share of the contraband flow is being seized, and this share can vary from year to year. This is particularly true with ivory seizures, where the total volume seized regularly doubles or halves year-on-year (Figure 8). Nonetheless, long term trends can be triangulated with other trend data to give an indication of market dynamics.

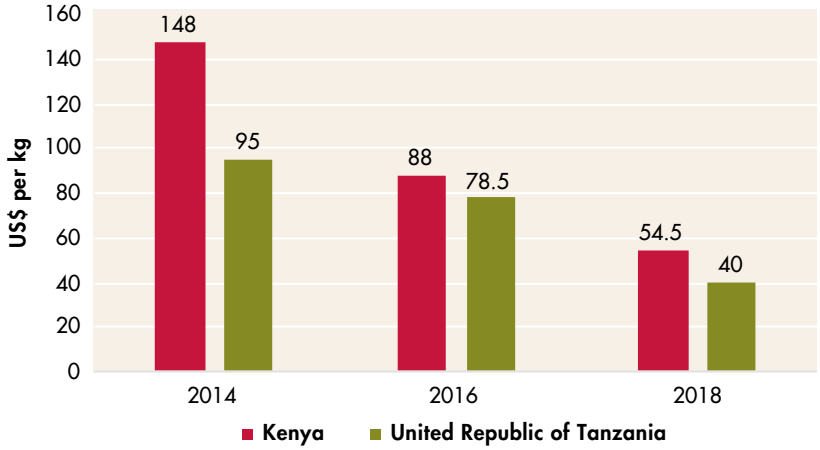
The official CITES data on elephant ivory seizures are maintained by TRAFFIC in the Elephant Trade Information System (ETIS). These raw data show the total annual weight of seizures reported to ETIS began to decline in 2013 and the number of seizures declined after 2011.[34] The trend parallels the decline seen

Fig. 6 Estimated share of observed elephants that were dead in 2015 surveys (carcass ratio)



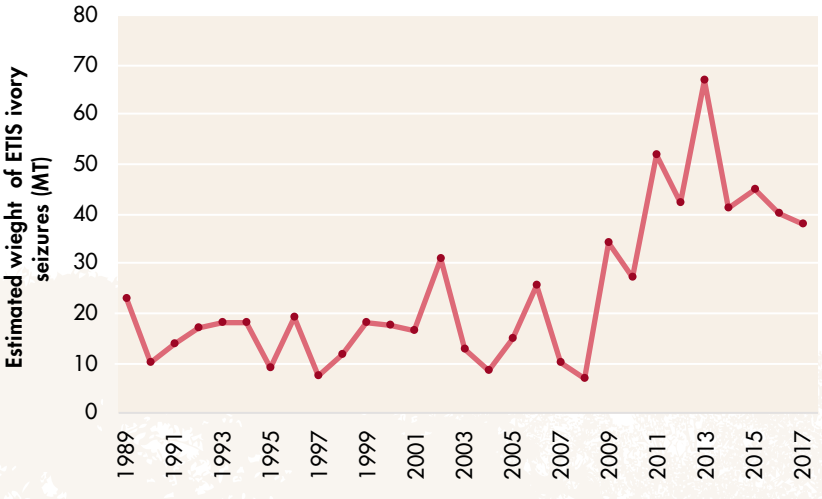
Source: Great Elephant Census[31]

Fig. 7 Ivory prices paid to poachers in Kenya and United Republic of Tanzania, 2014-2018 (US$/kilogram)



Source: UNODC fieldwork

Fig. 8 Estimated weight of ETIS-recorded ivory seizures, 1989-2017 (MT)



Source: ETIS.[35]

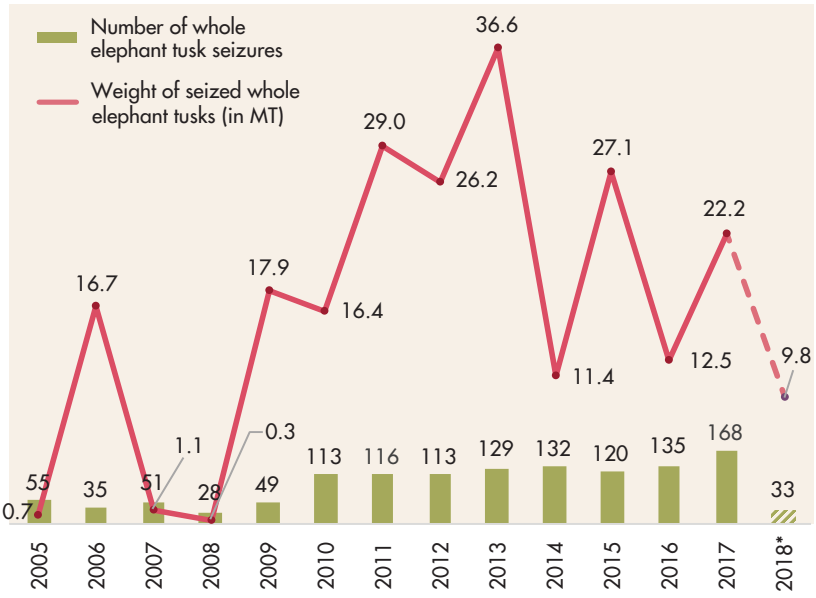
in the poaching data: both indicate that ivory trafficking grew between about 2007 and around 2011-2013 and has experienced an overall decline since that time.

If, as suggested above, an average about 100 MT to 170 MT of illicit ivory per year were generated between 2010 and 2018, the ETIS seizure figures suggest a high rate of interdiction: 17% to 35% on average across the decade.[36]

While it lacks the long time series, World WISE contains a comparable number of ivory seizures to ETIS in recent years. Looking just at tusks, the trend between 2007 and 2017 is similar to the ETIS raw data (Figure 9), with sharp growth between 2009 and 2013 and an uneven decline since then. Based on World WISE records of some 1262 African elephant tusk seizures where an alleged destination was known, between 2005-2017, China and South-East Asia were the destination of 90 per cent of these shipments by weight (Figure 10). However, some of the countries listed as destinations in World WISE for illicit ivory shipments are highly likely to be transit countries. While destination markets for raw ivory do exist outside South-East Asia and China,[37] it appears that almost all the illicit tusks detected are bound for this region.

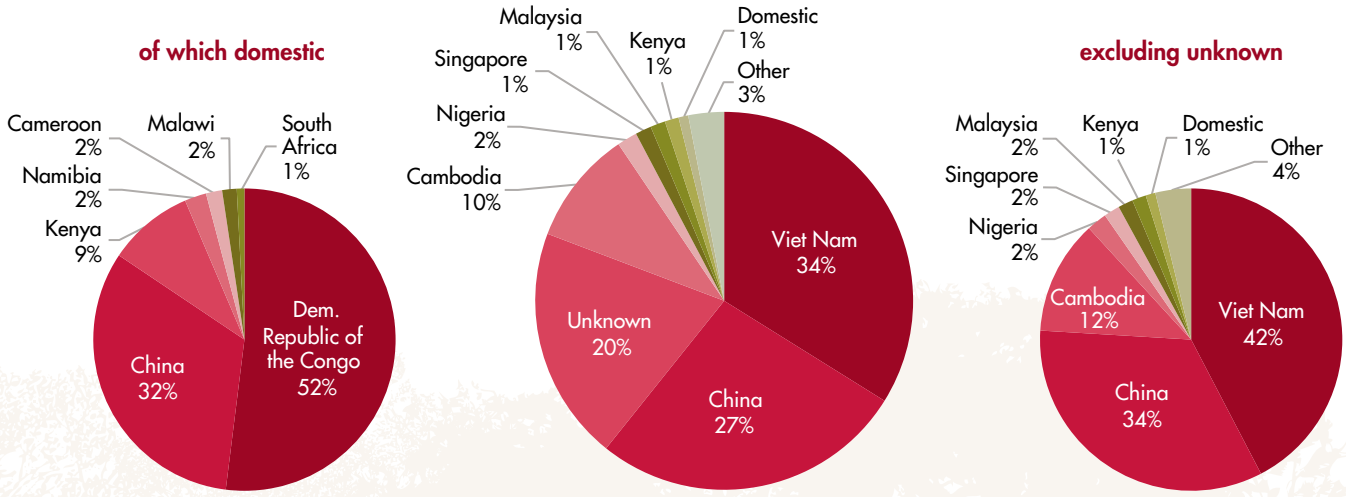
Analysis using the latest data shows a different picture in the identified destination of illegal ivory shipments to that in the previous *World Wildlife Crime Report*, with a growing role for countries like Viet Nam and Cambodia. For example, using data up to 2015, Viet Nam was the destination of about 3 per cent of total weight of ivory interdicted, but using recent data (2015-2019), the share has increased to 34 per cent. Recently, almost all the major seizures recorded in World WISE were destined for Viet

Fig. 9 Weight of elephant tusk seizures and total number of seizures captured in World WISE, 2005-2018 (metric tons)



Source: UNODC World WISE Database

Fig. 10 Share of reported national destination of ivory tusk seizures, (total reported seizures 104 MT), 2015-2019[38]



Source: UNODC World WISE Database

Nam and Cambodia,[39] although data in World WISE for 2018 and 2019 do not have the same coverage as previous years.

Just five large scale seizures made in 2019, totalling over 30 MT,[40] would make it a record year in terms of seizures, contradicting the downward seizure trend seen since 2014. Since poaching levels appear to be down, this suggests either improved interdiction (a higher share of the ivory flow being captured) or sourcing from stockpiles (not from recent illegal killings).

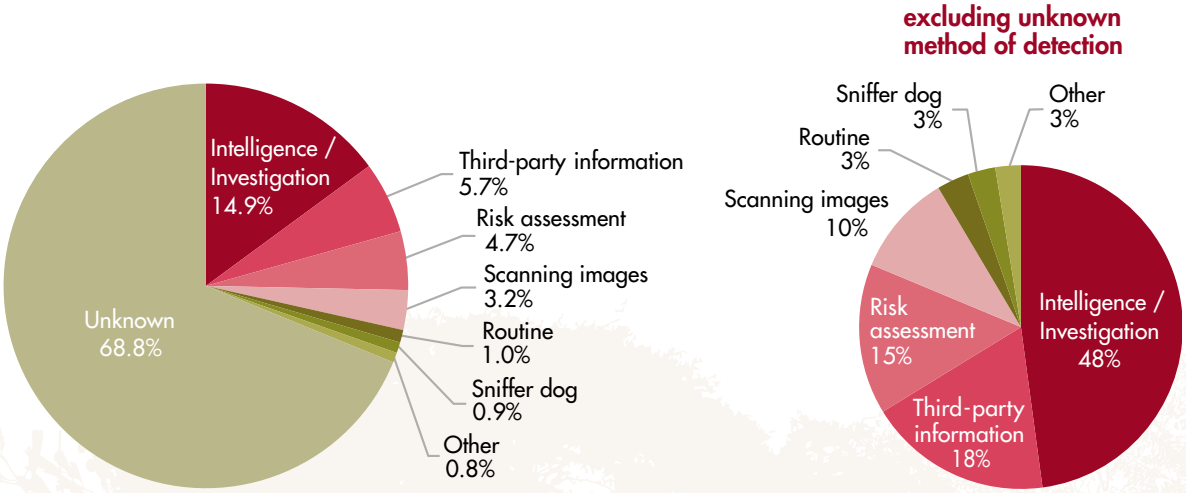
Forensic research suggests that a limited number of criminal groups may be responsible for a large share of the ivory seized (and, possibly, trafficked). This conclusion was reached by linking ivory shipments to a common trafficking organization when DNA from the same elephant was found in two seizures. A large share of the seizures tested could be thus linked together, suggesting as few as three or four major criminal groups were involved in the bulk of the trafficking.[41]

Another trafficking trend of note is the growth of mixed seizures containing both ivory and pangolin scales, often in large volumes. For example, on 21 July 2019, the government of Singapore seized almost 12 metric tons of pangolin scales alongside almost nine metric tons of ivory – remarkably large quantities of both commodities – in a container coming from the DRC on its way to Viet Nam, declared as timber. Wildlife seizures containing products of multiple species are fairly rare in World WISE, so this recent trend is worthy of attention. It is possible that ivory traffickers, facing declining demand, are taking advantage of their established networks to move a commodity for which demand is growing: pangolin scales. The *West and Central Africa Wildlife Crime Threat Assessment* noted that interviewed poachers knew that hunting pangolins was illegal, but they felt this offence was taken less seriously than elephant poaching.[42]

Based on an analysis of 265 cases of ivory tusk seizures (accounting for 72 metric tons of ivory), made in 41 countries[43] (where the reason for the seizure was reported), it appears that the vast majority were made due to investigations, risk-assessments, and tip-offs, with only 3% being found during routine inspections (Figure 11). This highlights the importance of intelligence-driven approaches and risk management practices in ivory interdiction. Countries that seize a lot of ivory do so because they have invested in finding it. Based on records involving the seizure of 144 metric tons of ivory tusks, China (specifically the Kwai Chung area of Hong Kong) and Viet Nam (specifically Hai Phong) lead the world in ivory seizures, followed by Port Klang in Malaysia and Mombasa in Kenya.

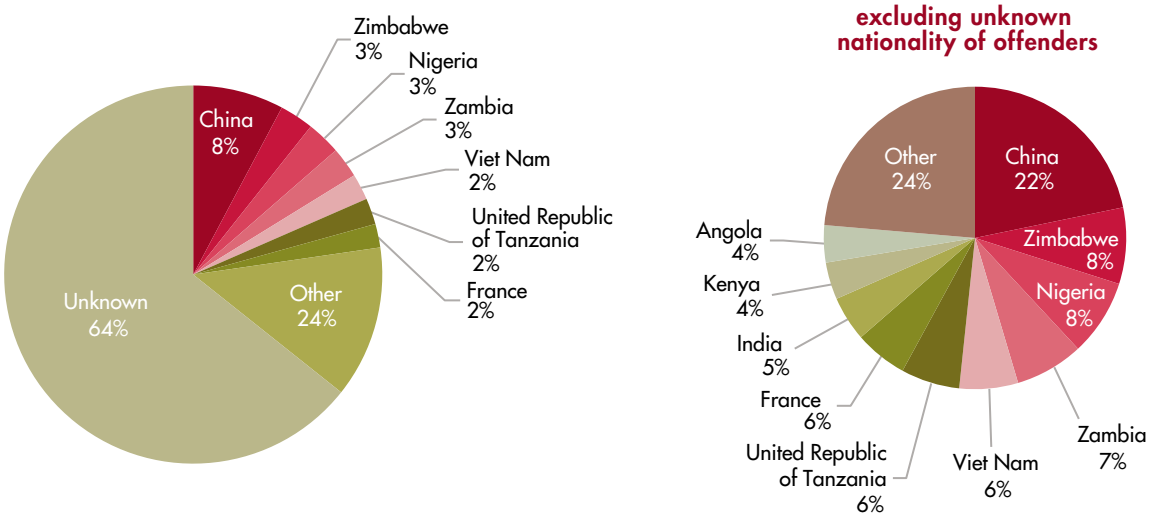
Based on those cases where the exact location of the seizure was specified, most of the tusks were seized at seaports, although private houses and airports were also frequent sites of tusk seizures. The majority of the tusks were found hidden in freight, although not all were concealed. Most seizures involving shipping containers do not present immediate opportunities for arrests but, based on 221 cases where arrests were reported in connection with the seizures, Chinese nationals were most frequently arrested, followed by Zimbabwean, Nigerian, Zambian, and Vietnamese nationals (Figure 12).

Fig. 11 Share of the most frequent method of detection in ivory tusk seizures (in mass equivalent), 2004-2018[44]



Source: UNODC World WISE Database

Fig. 12 Share of the nationality of persons arrested in connection with ivory tusk seizures, 2009-2018[45]



Source: UNODC World WISE Database

Destination markets

Numerous reports on Asian markets have indicated a decline in the price of illicit raw ivory tusks after 2014. This trend parallels the decline in price paid in Africa. Based on observational studies, prices in China almost tripled between 2010 and 2014, only to drop below their 2010 levels by 2018 (Figure 13). This declining trend was also reflected in price data gathered by the Chinese police in 50 law enforcement operations between 2015 and 2017 (Figure 14). These trends in China were paralleled by a decline seen by the Wildlife Justice Commission in 22 undercover price quotations in Viet Nam. The 2018 price observed in China (by TRAFFIC) and Viet Nam (by WJC) are very similar, and both are similar to the price in 2010.

Another indicator of the decline of the ivory market comes from studies on the type of objects being offered for sale in markets in South-East Asia and China. Surveys conducted around 2014 in China noted the sudden presence of whole polished tusks in urban markets. The last World Wildlife Crime Report suggested these were marketed to speculators more interested in the raw material than the art or jewellery that could be made from it. Large carved art-pieces were also prominent in the Chinese market at this time. However, a 2017 survey of 22 cities in China found that 90% of the illegal ivory objects offered for sale were small items, primarily jewellery.[49] This suggests that interest in buying raw ivory or large artworks for their investment value has declined, leaving only the retail market for trinkets. Of course, large investors in raw ivory were unlikely to buy from visible retail establishments even during peak demand, but the decline in visible high-value items is a significant indicator of the health of the market. It is also possible that sales have moved on-line, but physical markets remain important in this market. Recent surveys in China suggest only a small share of ivory buyers (17 per cent in 2018) bought ivory online, with most buying it in person either in China or while overseas.[50]

The situation in South-East Asia appears to be similar. Today, the ivory markets in Viet Nam and Thailand seem largely limited to bangles, amulets, and other jewellery. A 2018 survey of 60 online sellers and 852 physical outlets in 13 locations in Viet Nam found that 90 per cent of over 10,000 items reviewed were jewellery, and only the top 1% were priced over US$200.[51] The number of items viewed was fewer than a less extensive survey conducted in 2015, which also noted the lack of expensive items in the market.[52] A 2016 survey of ivory markets in Bangkok found the number of objects observed for sale dropped sharply over an 18-month period between the end of 2014 and mid-2016 (Figure). Some 86 per cent of the objects observed were jewellery, and only 4 per cent were carved ivory, with the number of carved ivory objects dropping from 614 in December 2014 to just 10 in May 2016.[53]

In Japan, which retains a legal domestic ivory market, most (80 per cent) ivory is used to produce *hanko* name seals,[54] though ivory is also worked into jewellery and other finished products often targeted at an international tourist clientele.[55] A survey of Japan's physical ivory market and auctions in 2018 found a strong reduction in the number of whole tusks offered for sale.[56]

Thus, surveys conducted in the largest known ivory markets globally seem

to reflect a move toward a smaller number of smaller objects, consistent with an overall reduction in the volume of ivory available.

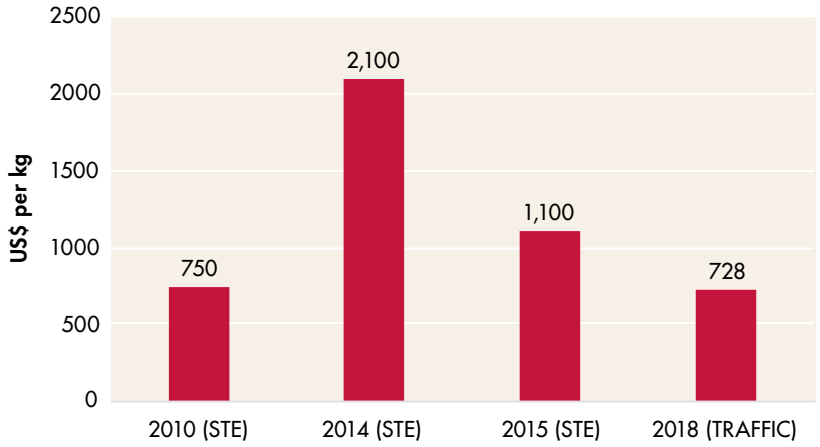
Trend analysis

The downward trend in supply and price is likely due to some combination of several factors. As discussed above, and average of around 100 to 200 metric tons of ivory had been entering the market annually since 2007. Ivory is a durable good, so unless the market continued to expand, at some point supply would exceed demand. The exact point when this occurred is unclear but was likely sometime between 2011 and 2015, and prices fell as the market adjusted.

The timing of this over-supply could have been influenced by a number of factors, including declining demand. One factor that surely affected demand was a radical change in the legal regime in some of the key legal ivory markets,

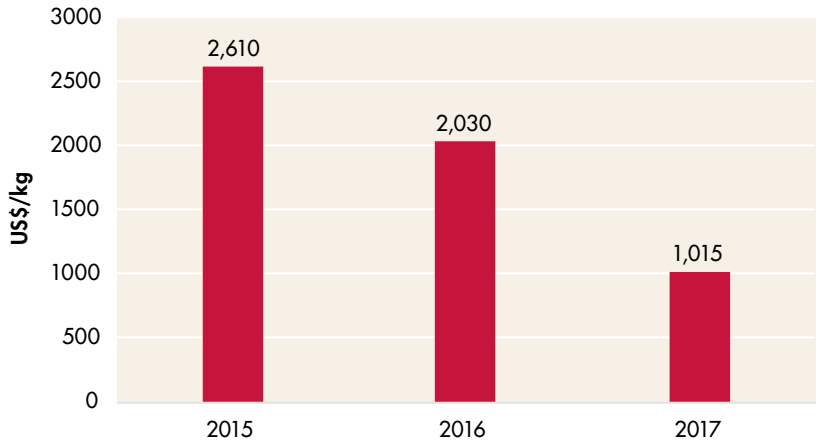
In December 2015, two of the largest ivory consumer markets globally – China and the United States of America – publicly committed to closing their legal domestic markets for ivory in the future.[57] Since the publication of the last *World Wildlife Crime Report*, this promise has been enacted in law in both countries. On 6 June 2016, the relevant rules under the United States Endangered Species Act were revised, prohibiting import, export, and interstate trade of African elephant ivory, with very limited exceptions.[58] On 30 December 2016, the Chinese government announced its decision to end the commercial processing and sale of ivory by the end of 2017.[59] In 2018, the Hong Kong Special Administrative Region of China also announced that would implement a three-step plan to phase out the trade in elephant ivory by the end of 2021, and to impose heavier penalties to enhance deterrence of the illicit trade in endangered species.[60]

Fig. 13 Wholesale prices for illegal ivory in China, selected years (US$/kilogram)



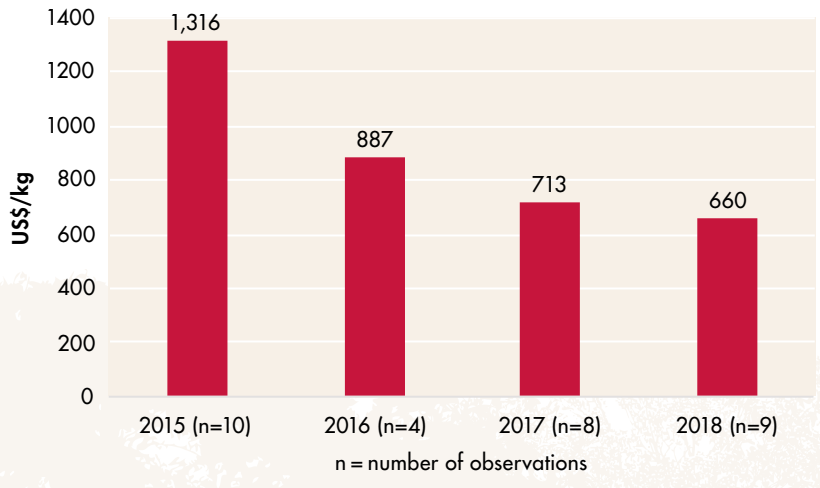
Source: Various sources.[46]

Fig. 14 Illegal raw ivory tusk price in China, 2015-2017 (US$/kilogram)



Source: Chinese law enforcement, as reported by TRAFFIC.[47]

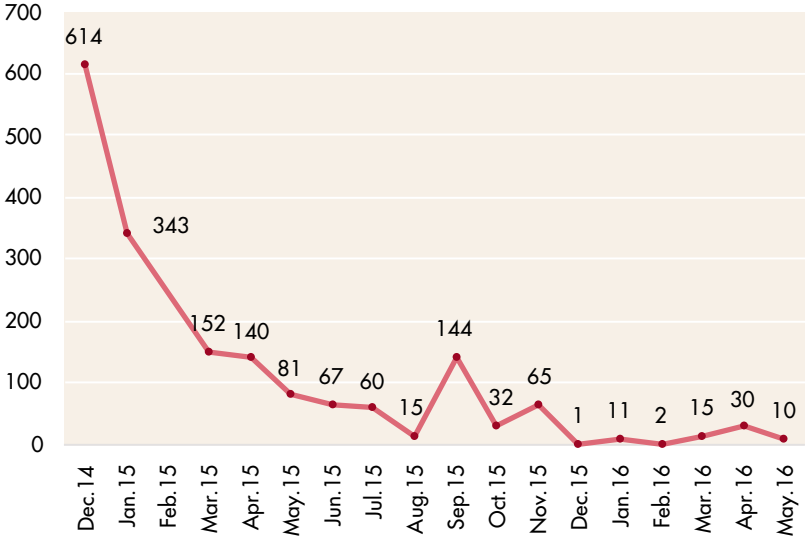
Fig. 15 Wholesale prices for illegal ivory in Viet Nam, 2015-2017 (US$/kilogram)



Source: Wildlife Justice Commission.[48]

In addition, Thailand has taken significant measures to criminalize the trade of African elephant ivory. Thailand initiated a series of reforms at the beginning of 2015, including the listing of African elephants on the national protected species list, mandatory countrywide registration of privately-owned ivory objects and several other measures.[61] In response, some 40,000 people registered over 200 metric tons of ivory with the national authorities, underscoring the importance of Thailand as an important ivory market. Significant reduction in ivory for sale in the domestic market was observed in 2016.[62] While not a ban on domestic sales, these measures appear to have dramatically reduced the visible retailing of ivory in Bangkok.[63]

Fig. 16 Number of carved ivory objects identified in Bangkok, December 2014-May 2016



Source: TRAFFIC

These restrictions in the legal market may have had an impact on the illegal one. Targeted surveys conducted in 2017 and 2018 in China found that many consumers have lost interest in ivory.[64] Even among those open to the purchase of ivory, the share that had purchased in the previous year declined. Some respondents said they saw owning ivory as shameful after the ban. In other words, the closing of the legal ivory market changed the way people view ivory as a product. Despite this shift, the survey found a contingent of die-hard ivory buyers, primarily affluent men who travelled abroad frequently and purchased the ivory while overseas.[65] In this way, tightened controls in China likely had the unintended consequence of displacing ivory markets into neighbouring countries.

It may be that speculation, not retail demand, was driving the poaching since 2007, as suggested by the previous *World Wildlife Crime Report*. Of course, by its nature, speculation is not directly tied to retail demand. The price of gold, for example, is not determined by trends in the retail jewellery market. But ivory's value as an investment may have declined relative to competing investment vehicles due to the tighter controls.

Once large investors began to sell, the cascading flood of ivory could have pushed the price for poached ivory down. One problem with the idea that tightened legal market controls undermined demand is the timing of the decline. These policy innovations only started in 2015. The data presented above suggest that poaching has been declining since 2011 and price has been declining since 2014. It may be that while poaching peaked in 2011, ivory trafficking only peaked in 2013 as suggested by seizure data or in 2015, as suggested by modelled ETIS data.

It is also possible that, as researchers have suggested,[66] prices began to drop in anticipation of the legal market ban. If the speculators knew in advance that market restrictions were forthcoming, they could have started dumping their ivory stocks in response. Buyers for this surplus could have been those who were directly involved in producing ivory artefacts: the carving factories. These buyers know what retail ivory objects can be sold for, so the price they were willing to pay would be much lower than the speculative price paid in 2014. Thus, the illicit market wholesale price as reported by market observers in 2018 is about the same as that observed before the boom in 2010: about US$750 per kilogram.[67]

Based on just the five major seizures cited above, it appears the global seizure trend will reverse in 2019. Poaching data for 2019 are not yet available but would have to reverse starkly to match the seizure trend. Unless evidence of renewed poaching emerges, this suggests either an increase in interdiction rate or the use of stocks rather than freshly poached elephants.

Box 2. Helmeted hornbill ivory: "Red ivory"

Despite its CITES Appendix I listing since 1975, escalating demand for hornbill ivory in recent years has contributed to the up-listing of the Helmeted hornbill (*Rhinoplax vigil)* from a "Threatened" IUCN Red list status in 2012 to a "Critically Endangered" status in 2015.[a] Also known as red ivory, golden jade, or "ho-ting," the hornbill's casque has long been considered a natural ivory substitute.[b] Unlike elephant, hippo and walrus ivory, which are dentine material, the casque of the helmeted hornbill is made of solid keratin.[c] The casque is orange-yellow in its raw appearance with a thin red outer layer on the upper portion, which may disappear once polished.[d] It is softer than elephant ivory and relatively easy to carve.[e]

After being listed on CITES Appendix I, the international market for helmeted hornbill ivory all but collapsed, with relatively low volumes of illegal trade occurring until sometime around the early 2010s. Hornbill ivory is reportedly worth five times that of black-market elephant ivory by weight[f] During 59 separate events between 2010 to 2017, 2,878 casques, worth US$3 million were seized.[g]

Most seizures occurred in Indonesia (a range State) and China (a destination market), peaking in 2012 and 2013.[h] Between 2014 and 2016, Indonesia reported at least 48 poaching cases in Sumatra (primarily in Leuser and Bukit Barisan Selatan National Parks)[i] and by 2016, Indonesian authorities had confiscated 1,398 casques in 25 seizures.[j] Poachers in Indonesia have confirmed the existence of organized crime networks in the trade, also targeting other species such as tigers and pangolins.[k] There have also been reports of seizures in Malaysia and Thailand.[l] The seizure of 72 helmeted hornbill casques at Soekarno Hatta Airport (Jakarta) in July 2019 highlights that illegal trade is still occurring.[m]

There are still many unknowns about the illegal trade in helmeted hornbill. Of special importance given current ivory poaching trends, is whether and how much a decline in ivory supply could lead poachers to source helmeted hornbill as a possible replacement product, whether consumers would accept such a change, and if non-wild sources could meet a possible shifted demand to this substitute.

a BirdLife International. *Rhinoplax vigil. The IUCN Red List of Threatened Species* 2018: e.T22682464A134206677 (2018).

b Liang, J., Li, H., Lu, T., Zhang, J., Shen, M. & Zhou, J., 'Identification characteristics of natural and imitation hornbill ivory', *J. Gemmology* 34: 42–49, 2014; Espinoza, E. O. and Mann, M.-J., *Identification guide for ivory and ivory substitutes*. Geneva, Switzerland: CITES Secretariat, 1999; Kane, R.E., 'Hornbill ivory', *Gems and Gemology*, pp. 96-97, 1981.

c Kane (1981); Liang *et al.* (2014) ibid.; CITES CoP 17, Doc. 69, *Illegal trade in the Helmeted Hornbill* (Rhinoplax vigil), 2016.

d Liang *et al.* (2014); Kane (1981).

e Liang *et al.* (2014); CITES (2016).

f Environmental Investigation Agency, *Seeing 'red' – the often-hidden colour of wildlife contraband*, 2015 (available at: https://eia-international.org/news/seeing-red-the-often-hidden-colour-of-wildlife-contraband/).

g Jain, A., Lee, J. G. H., Chao, N., Lees, C., Orenstein, R., Strang,e B. C., Chang, S. C. L., Marthy, W., Yeap, C. A., Hadiprakarsa, Y. Y. and Rao, M. (Eds), *Helmeted Hornbill (Rhinoplax vigil): Status Review*, Range-wide Conservation Strategy and Action Plan (2018-2027). IUCN Species Survival Commission Hornbill Specialist Group. 2018.

h Jain *et al.* (2018); Beastall, C., Shepherd, C.R., Hadipraksarsa, Y. and Martyr, D., 'Trade in the Helmeted Hornbill *Rhinoplax vigil*: the 'ivory hornbill", *Bird Conservation International* 26(2): 137–146, 2016.

i CITES, 69th meeting of the Standing Committee (SC69), Document 61 (Rev. 1), *Species specific matters. Illegal trade in the helmeted hornbill (Rhinoplax vigil): Report of the Secretariat*, 2017.

j CITES (2017); Indonesia Ministry of Environment (Kementerian Lingkungan Hidup dan Kehutanan), *Strategi dan Rencana Aksi Konservasi Rangkong Gading (Rhinoplax vigil) Indonesia 2018-2028*, Jakarta, Indonesia: KLHK (available at: http://ksdae.menlhk.go.id/assets/publikasi/SRAK%20Rangkong%20Gading_Published.pdf).

k Beastall *et al.* (2016).

l Jain *et al.* (2018).

m Indonesia Ministry of Environment and Forestry (KLHK), KLHK Gagalkan Penyelundupan 72 Paruh Burung Rangkong ke Hongkong. [In Indonesian]. Press release. Nomor: SP. 261/HUMAS/PP/HMS.3/7/2019 (available at: http://ppid.menlhk.go.id/siaran_pers/browse/1997#).

Endnotes

1 This chapter focuses on African species of elephants and rhinoceros, although there are Asian species of both animals. Although Asian elephants and rhinos are also subject to poaching, seizures indicate that the illegal trade is presently dominated by the flow from Africa to Asia. For the purposes of precision and simplicity, the chapter focuses on this dominant flow.

2 There are about half a million African elephants left and every year some of them die of natural causes. Due to its recognized value, their ivory is usually stockpiled by the state. Ivory is a durable good and can last for centuries, so stockpiles naturally accumulate. Since international trade in ivory is not allowed for CITES parties, these stockpiles can be a source of illegal supply. In addition, every year thousands of elephants are illegally killed for their ivory. Since it is this killing that is of concern to conservationists, this chapter focuses on the illegal ivory supply from elephants that have been poached.

3 Chase, M., Schlossberg, S., Griffin, C., Bouché, P., Djene, S., Elkan, P., Ferreira, S., Grossman, F., Kohi, E., Landen, K., Omondi, P., Peltier, A., Selier, S. and Sutcliffe, R., 'Continent-wide survey reveals massive decline in African savannah elephants'. *Peer J,* Vol. 4, No. 2354, 2016.

4 Thouless, C., Dublin, H., Blanc, J., Skinner, D., Daniel, T., Taylor, R., Maisels, F., Frederick H. and Bouché, P., *African Elephant Status Report 2016: an update from the African Elephant Database*, Occasional Paper Series of the IUCN Species Survival Commission, No. 60 IUCN/SSC Africa Elephant Specialist Group, IUCN, 2016.

5 415,428 ± 20,111. See IUCN 2016, op. cit. p. 29. These estimates are based on the latest population surveys available in the scientific literature, extensively vetted for reliability by the top authorities in the field, and therefore represent the best available data on elephant populations.

6 117,127 to 135,384, ibid.

7 The report notes that some new populations were found in areas surveyed for the first time, reducing the difference between two estimated number of elephants based on surveys to about 93,000.

8 CITES SC69 Annex document, p. 15.

9 There is a great need for an updated estimate of the amount of ivory carried by each elephant, which could be done through the centralized ivory stockpile databases held by several Member States. Although several figures have been used, the traditional yield has been estimated at 1.8 tusks per elephant and about 5.5 kg per tusk, resulting in an average of about 10 kg ivory per elephant. See Martin, R., Cumming, D., Craig, G., Gibson, D. and Peake, D., *Decision-Making Mechanisms and Necessary Conditions for a Future Trade in African Elephant ivory: Final Report* (CITES SC62 Doc. 46.4 Annex A), 24 May 2012, p. 16.

10 Combined "definite" and "probable" estimates; does not include "possible" or "speculative" estimates.

11 Does not include guesses or uncertainty range.

12 IUCN 2016 op. cit. p.3.

13 Such as the development of a National Anti-Poaching Strategy, the creation of a National Taskforce on Anti-Poaching, an increase in intelligence-led investigations, increased prosecution, and steep sentences for wildlife trafficking. Tanzania exited the NIAP process in 2019. See CITES, 71st meeting of the Standing Committee (SC71), Document 11, Annex 1: National Ivory Action Plan (NIAP) process: Implementation of Step 1 of the Guidelines to the NIAP process - Identification of Parties to participate in the NIAP process.

14 Chad, Central African Republic, the Democratic Republic of the Congo and Equatorial Guinea

15 IUCN 2016, op. cit. Parts of this region were also seriously affected by drought during this period.

16 According to CITES Resolution Conf. 10.10, *Trade in elephant specimens*, all ivory seizures over 500 kg should be submitted to forensic analysis but it appears that only 20% to 25% have been.

17 Wasser, S., Brown, L., Mailand, C., Mondol, S., Clark, W., Laurie, C. and Weir, B., 'Genetic assignment of large seizures of elephant ivory reveals Africa's major poaching hotspots', *Science*, Vol. 349 No. 6243, 2015. In TRIDOM, areas affected include the Minkébé National Park in Gabon, the Mengame Wildlife Sanctuary, the Abong-Mbang Forest Reserve, Bénoué National Park, Bouba Ndjidah National Park, Faro National Park, and the Yoko area in Cameroon. Using Cameroon as an example, the Mengame Wildlife Sanctuary was estimated in 2003 to have more than 1,000 elephants; the 2011 revision was 10. In addition, poaching around 2012 appears to have virtually wiped out the savanna elephant populations of northern Cameroon. Reserves that had previously held elephants with a zero population estimate in 2016 include Abong-Mbang Forest Reserve, Bénoué National Park, Bouba Ndjidah National Park, Faro National Park, and the Yoko area. See IUCN 2007 and IUCN 2016 op. cit.

18 CITES CoP18 Doc.69.2 (2019), *Species specific matters: Elephants (Elephantidae spp.), Report on Monitoring the Illegal Killing of Elephants (MIKE).*

19 See online data repository, which contains R script for analyses of data from the Monitoring the Illegal Killing of Elephants (MIKE) Programme to produce outputs for reports to CITES (https://github.com/CITES-MIKE/MIKE-LSMEANS).

20 That is, from a revised PIKE of 0.52948 in 2017 to 0.53544 in 2018, for an increase of 0.00596. However, 2018 also had the smallest overall carcass count since 2010: 1314, compared to an average of 1780 between 2011 and 2017.

21 The method used here is explained in detail in the Methodological Annex.

22 Wittemyer, G., Northrup, J. M., Blanc, J., Douglas-Hamilton, I., Omondi, P. and Burnham, K. P., 'Ivory poaching drives decline in African elephants', *Proceedings of the National Academy of Sciences,* Vol. 111, No. 36, 2014.

23 Wittemyer, G., 'Revisiting estimates of elephant poaching across Africa', Working Paper prepared for UNODC, 2018. Available in the online Methodological Annex.

24 See Chapter 8.

25 Wittemyer, G., 2020, *in litt.*

26 Analysis performed by George Wittemyer for UNODC (full paper available in the Methodological Annex). PIKE data from West Africa were insufficient for an estimate to be produced. Based on estimated poaching of over 150,000 elephants.

27 Ibid.

28 Chase, M., Schlossberg, S., Griffin, C., Bouché, P., Djene, S., Elkan, P., Ferreira, S., Grossman, F., Kohi, E., Landen, K., Omondi, P., Peltier, A., Selier, S. and Sutcliffe, R., 'Continent-wide survey reveals massive decline in African savannah elephants'. *Peer J,* Vol. 4, No. 2354, 2016. See also Douglas-Hamilton, I. and Burrill, A., 'Using Elephant Carcass Ratios to Determine Population Trends'. *African Wildlife: Research and Management,* 1991, pp. 98—105.

29 This very high share was based on a very small observed elephant population (148). Most of Cameroon's elephants are forest elephants, which are difficult to view from the air.

30 Chase et al. 2016, op. cit.

31 Ibid.

32 Martin, R., Cumming, D., Craig, G., Gibson, D. and Peake, D., *Decision-Making Mechanisms and Necessary Conditions for a Future Trade in African Elephant ivory: Final Report* (CITES SC62 Doc. 46.4 Annex A), 24 May 2012, p. 16.

33 UNODC fieldwork conducted in 2018 in Kenya and the United Republic of Tanzania. See online Methodological Annex for details.

34 In addition to these raw data, ETIS models intended to address bias found a later peak, in 2015. See CITES CoP18 Doc.69.3 (2019), *Species specific matters: Elephants (Elephantidae spp.), Report on the Elephant Trade Information System (ETIS).*

35 Milliken, T., Underwood, F., Burn, R. and Sangalakula, L., *The Elephant Trade Information System (ETIS) and the Illicit Trade in Ivory: A report to the 18th meeting of the Conference of the Parties to CITES*, CoP18 Doc. 69.3 (Rev. 1) Annex 1, December 2018.

36 Interdiction rate is usually estimated at the level of 10-15 per cent. To get lower interdiction rates with the same seizure estimates, the total amount of new illegal ivory generated would need to be increased, either by increang the yield per animal above 10 kg or increasing the number of animals poached above 20,000. It is also possible that seizures are exaggerated by incorrect weight imputation.

37 The "other" countries indicated include Kenya, Philippines, Sudan, United Arab Emirates, France and the United States.

38 The data for 2018 and 2019 are not complete.

39 For example, in December 2018, Cambodian customs seized 1,026 tusks (3.2 MT) at the Phnom Penh port in a shipping container from Mozambique that was never claimed. In January 2019, 2.1 MT of tusks were seized by China at Hong Kong, China, coming from Nigeria on their way to Viet Nam, alongside 8.2 MT of pangolin scales. Also that month, Uganda seized 3.3 MT of ivory alongside pangolin scales crossing into South Sudan on its way to Viet Nam, arresting two Vietnamese nationals. In March 2019, 9.1 MT ivory were seized by Viet Nam coming from the Democratic Republic of the Congo, one of the largest ivory seizures ever made. In April, the Mozambican tax authorities seized 867 pieces of ivory weighing 3.4 MT in a container of plastic waste destined for Cambodia. In July 2019, 8.8 MT of ivory was seized by Singapore coming from the Democratic Republic of the Congo to Viet Nam (alongside 11.9 MT of pangolin scales). Large amounts of ivory continue to be seized in China, such as the March seizure of 7.48 MT ivory by Chinese authorities in the village of Gaogou, Anhui, from a group that smuggled from Nigeria.

40 Ibid.

41 Wasser, S., Torkelson, A., Winters, M., Horeaux, Y., Tucker, S., Otiende, M., Sitam, F., Buckleton, J. and Weir, B., 'Combating transnational organized crime by linking multiple large ivory seizures to the same dealer', *Science Advances*, Vol 4, no. 9, eaat0625, 2018.

42 See CITES CoP 18, Doc. 34 (2019), *Interpretation and implementation matters: General compliance and enforcement: Wildlife crime enforcement and support in West and Central Africa.*

43 Out of 1,176 ivory tusk seizures in World WISE.

44 2018 data are not complete.

45 2018 data are not complete.

46 "STE" stands for "Save the Elephants" and refers to surveys conducted by Vigne and Martin. Martin, E. and Vigne, L., *The Ivory Dynasty: A Report on the Soaring Demand for Elephant and Mammoth Ivory in Southern China*, Elephant Family, The Aspinall Foundation and Columbus Zoo and Aquarium, 2011; Vigne, L. and Martin, E., *China faces a conservation challenge: The expanding elephant and mammoth ivory trade in Beijing and Shanghai*, Nairobi: Save the Elephants and Aspinall Foundation, 2014; Vigne, L. and Martin, E., *Decline in the Legal Ivory Trade in China in Anticipation of a Ban*, Nairobi: Save the Elephants, 2017. Yu Xiao, *China's Ivory Market after the Ivory Trade Ban in 2018*, Beijing: TRAFFIC, 2018.

47 Yuankun Zhao et al 2018 op cit

48 Data transmitted directly from WJC, 19 April 2019.

49 Yuankun et al 2017 op cit.

50 Meijer, W., Scheer, S., Whan, E., Yang, C. and Kritski, E., *Demand under the Ban – China Ivory Consumption Research Post-ban 2018*, Beijing: TRAFFIC and WWF, 2018.

51 Nguyen, M. D. T., Indenbaum, R. A. and Willemsen, M., *From Tusk to Trinket: Persistent illegal ivory markets in Viet Nam*. Ha Noi: TRAFFIC, 2018.

52 Vigne and Martin observed 16,099 ivory items at 242 open outlets in six locations. See Vigne and Martin 2016, op cit.

53 Krishnasamy, K., Milliken, T. and Savini, C., *In Transition: Bangkok's Ivory Market – An 18-month survey of Bangkok's ivory market.* TRAFFIC, Southeast Asia Regional Office, Petaling Jaya, Selangor, Malaysia, 2016.

54 Martin, E. and Stiles, D., *The Ivory Markets of East Asia, Save the Elephants,* 2003.

55 Kitade, T. and Nishino, R., *Ivory Towers: An assessment of Japan's ivory trade and domestic market*, TRAFFIC, Tokyo, Japan, 2017.

56 Kitade, T. and Nishino, R., Slow Progress: A Reassessment of Japan's Ivory Market in 2018, TRAFFIC, Tokyo, Japan, 2018. According to data from Japan's Ministry of Environment, as of the end of 2019, Japan had a registered stockpile of 181 metric tons of whole tusks and an additional 68.7 metric tons of cut pieces of raw ivory.

57 The White House, Office of the Press Secretary, *Fact sheet: President Xi Jinping's State Visit to the United States,* 25 September 2015; State Council of China, *Notice of the General Office of the State Council on Orderly Stopping Commercial Processing and Sales of Ivory and Products*, Notice 103 of 2016, 30 December 2016 (available at: http://www.gov.cn/zhengce/content/2016-12/30/content_5155017.htm).

58 50 CFR Part 17, "Endangered and Threatened Wildlife and Plants; Revision of the Section 4(d) Rule for the African Elephant (*Loxodonta africana*); Final Rule". *Federal Register*, Vol. 81, No. 108, Monday, June 6, 2016.

59 State Council of China, *Notice of the General Office of the State Council on the Orderly Stopping of Commercial Processing and Sales of Ivory and Products*, Notice 103 of 2016, 30 December 2016.

60 CITES, Notification to the parties, No. 2018/057, China: Stricter domestic measures on ivory trade in Hong Kong Special Administrative Region, China, 1 June 2018 (available at: https://www.cites.org/sites/default/files/notif/E-Notif-2018-057.pdf).

61 See Annex 1 to document SC66 Doc. 29 (Rev. 1) pg. 29 and 30: https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-29-Rev1.pdf.

62 CITES, 69th meeting of the Standing Committee (SC69), Document 29.3, paras. 122-127: *National ivory action plans process: report of the Secretariat.*

63 Krishnasamy, Milliken and Savini, 2016, op cit.

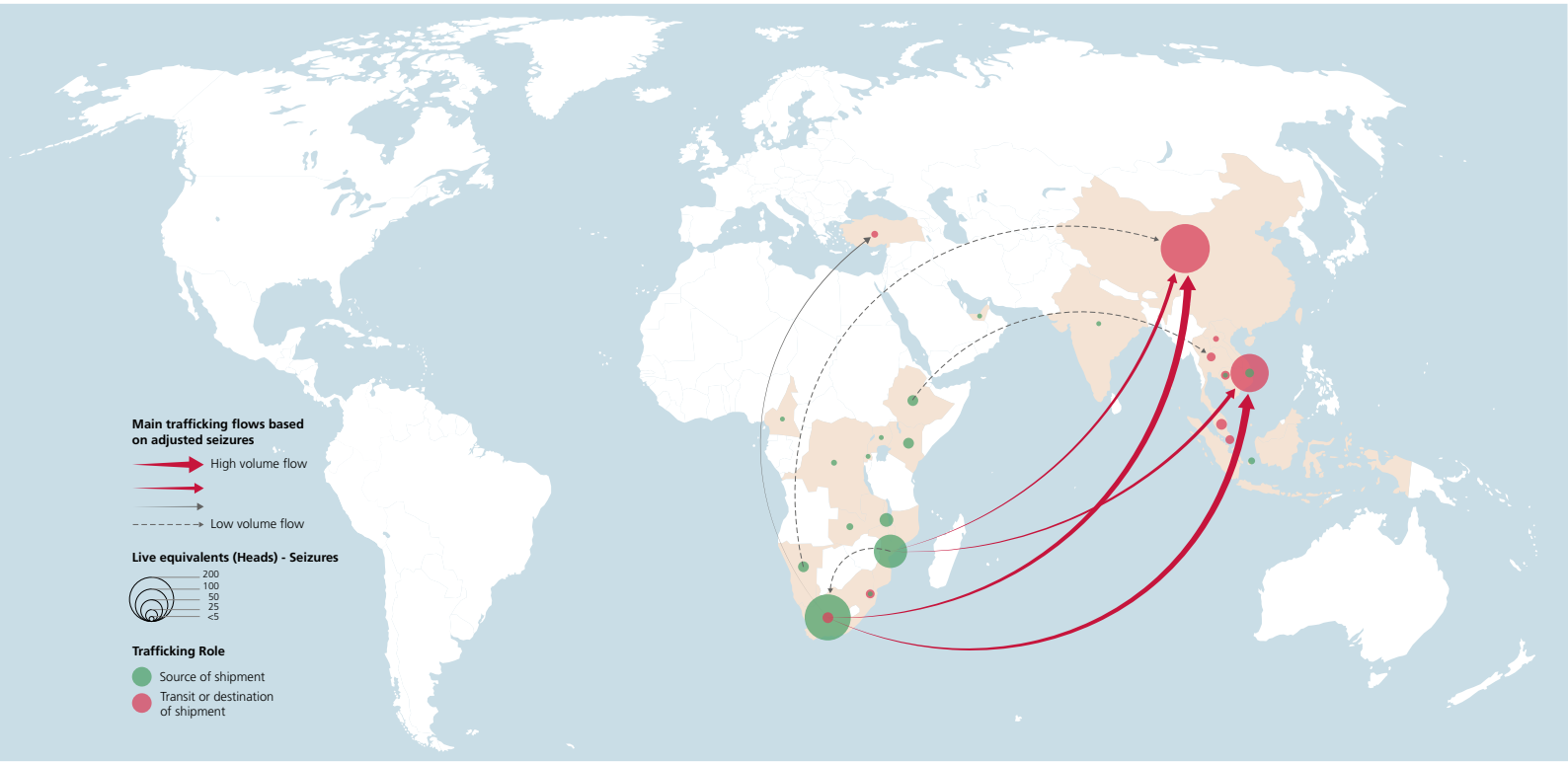
64 Meijer, W., Scheer, S., Whan, E., Yang, C. and Kritski, E., *Demand under the Ban – China Ivory Consumption Research Post-ban 2018*, Beijing: TRAFFIC and WWF, 2018.

65 Ibid.

66 Vigne and Martin 2017, op cit.

67 See the price trend discussion above.

Map 2 Trafficking flow map - African rhinoceros horns (2014-2018)



Source: UNODC World WISE Database
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The year 2018 is based on partial data.

Rhinoceros horn

African rhinos differ from African elephants in that there are far fewer of them, and they are far more concentrated geographically.[1] For every remaining African rhino (about 25,000 of them) there are perhaps 20 African elephants, and while it takes five countries to comprise three-quarters of the remaining elephants, 75 per cent of the remaining rhinos can be found in just one: South Africa. South Africa has been so successful in breeding rhinos that it has managed to export 538 live rhinos since 2014, feeding growing wild and captive populations in other countries. Drought and poaching have caused South Africa's rhino population to decline since 2012, however, driving down the overall continental population.[2]

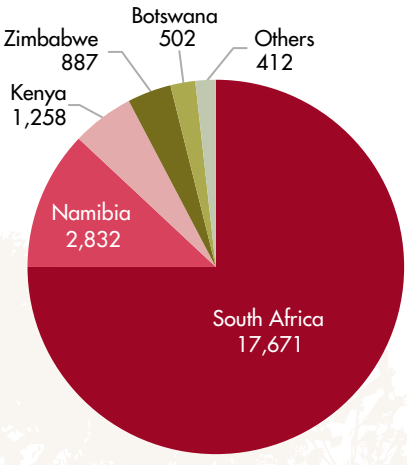
Around 7,500, or over 40 per cent, of these South African rhinos are privately owned by ranchers and private game reserves.[3] These operations have weathered a decline in the price of a live rhino by two-thirds between 2007 and 2018.[4] While legal prices have declined, the threat of poaching has imposed substantial security costs for rhino ranchers.[5] In this way, the illegal trade poses an additional threat to rhino populations: it threatens to make these private holdings unsustainable.

Poaching

Similar to ivory, there have recently been indications of a decline in the market for rhino horn, as both supply (poaching) and price indicators are declining. South Africa, which experienced 86 per cent of the recorded poaching incidents between 2006 and 2017, has seen a declining trend in its poaching numbers every year since 2014. In 2019, the number of poaching incidents decreased to 594, the lowest level since 2011.

Anecdotal data gathered on prices paid to poachers historically in Kenya, the United Republic of Tanzania and South Africa in 2018 were erratic and showed no clear trend. The consensus among experts interviewed, however,

Fig. 17 Estimated numbers of rhinoceroses by country in 2017



Source: IUCN

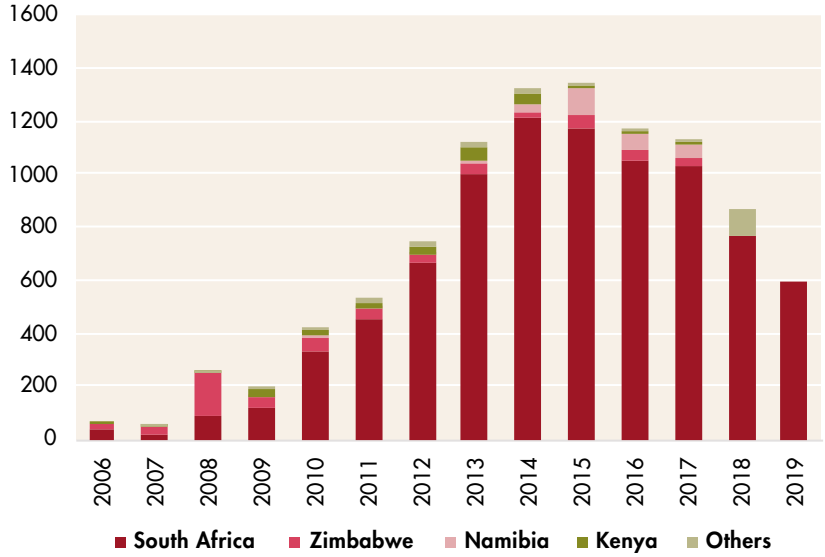
was that the price increased dramatically between 2013 and 2014 and had declined since then (Figure 19).

Trafficking

World WISE shows a strongly increasing trend in the number and weight of rhino horns seized, from 16 seizures in 2008 to 105 in 2017 (Figure 20). This trend stands in contrast to the declining number of poaching incidents and suggests increased enforcement has resulted in a higher share of the illicit flow being captured[7] or that some of the horn being seized is flowing from either public or private stockpiles. Based on World WISE data between 2014 and 2019 where the final destination was known,[8] accounting for about two metric tons of horn, more than three-quarters of the weight of horn was destined for China and Viet Nam. (Figure 21). Many of the seizures made in South Africa were domestic; the intended destination of this horn was unknown.

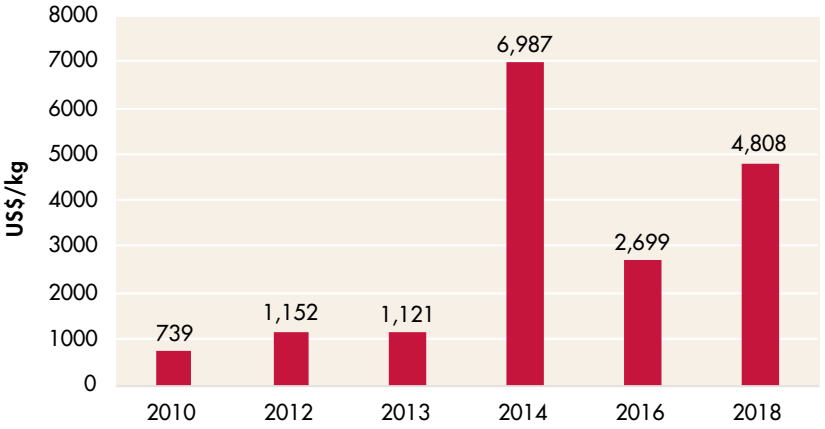
Because rhino horn is relatively portable and value intensive, the vast majority is trafficked by air in luggage and personal baggage (sometimes wrapped in tinfoil) and is seized at airports with a relatively large number of seizures involving arrests. According to World WISE data for the period 2010 to 2017, Chinese (including 24 suspects in 2017 alone), Vietnamese, Indian, and South African nationals are most commonly implicated in rhinoceros horn smuggling. Most of the Chinese suspects were arrested in China or South Africa; most of the Vietnamese in Viet Nam or Mozambique. All the Indians arrested were arrested in India, but it is unclear whether the horn they were carrying was of African or Indian origin. All the South Africans associated with seizures recorded in World WISE were arrested in their home country, although, according to the CITES Secretariat, in April 2019 a South African national was arrested in Viet Nam and 13 rhino horns confiscated. Maputo (in the suburb of Matola and

Fig. 18 Number of poaching incidents in Africa, 2006-2019



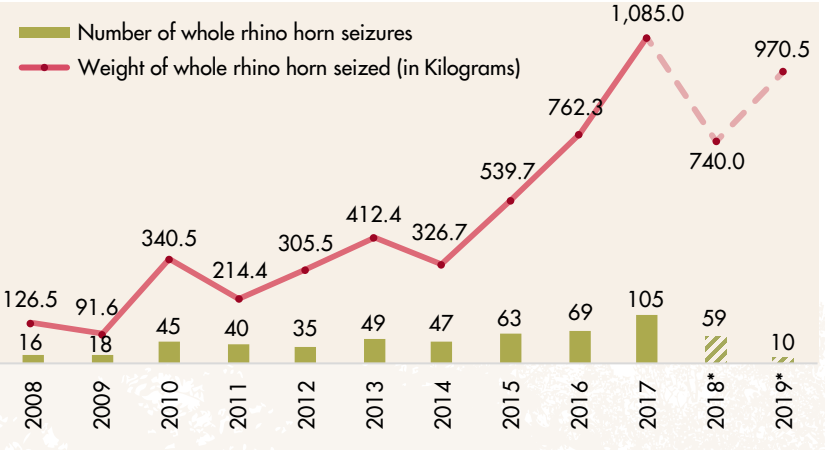
Source: IUCN (Emslie and Knight) and South African Department of Environment, Forestry, and Fisheries.[6]

Fig. 19 Reported prices paid for rhino horns to poachers in East and Southern Africa



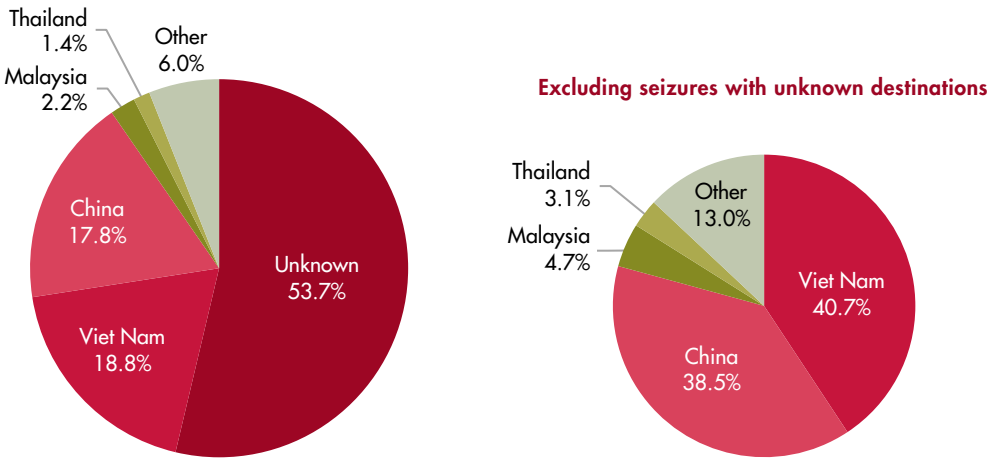
Source: UNODC fieldwork

Fig. 20 Kilograms of horn seized, 2008-2019



Source: UNODC World WISE Database

Fig. 21 Reported national destination of rhino horn seizures by weight, 2002-2019



Source: UNODC World WISE Database

at Maputo International Airport), Johannesburg and Hanoi are the three places where the most rhino horn has been seized.

More recent seizures found in World WISE include the following:

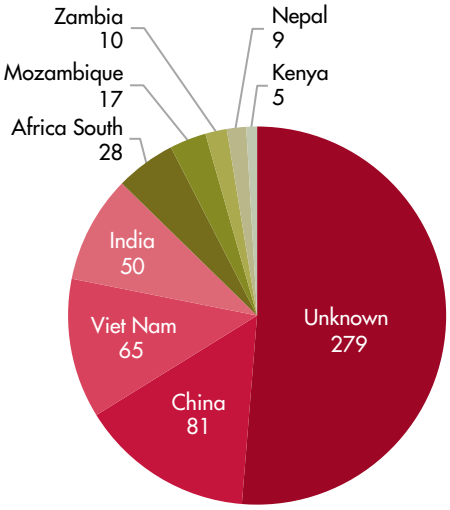
- On 20 August 2018, 116 kg of rhino horn en route to Viet Nam were seized by Malaysia.
- In January 2019, 116 kg of rhino horn en route to Dubai were seized in South Africa.
- On 8 February 2019, 21 rhino horns coming from South Africa and en route to Viet Nam were seized in Istanbul, Turkey.
- On 14 February 2019, 40 kg of rhino horn coming from South Africa and en route to Viet Nam was seized in the Hong Kong Special Administrative Region of China.
- On 5 April 2019, 82.5 kg rhino horn from South Africa and en route to Malaysia were seized in the Hong Kong Special Administrative Region of China.

Since most of these seizures took place in the first quarter of 2019 and amounted to almost 500 kg, the year is on track to be another record year for rhino horn seizures.[9] At the same time, poaching is clearly declining. If the 600 rhinos poached in South Africa in 2019 all bore five kilograms of horn, then about three metric tons would have generated that year, and more than one-sixth of that total would have been seized in just the five seizures detailed above. Just like ivory, the conclusion is that either the rate of interdiction has gone up or that a non-poaching source of rhino horn must be feeding the market, such as stockpiles.

Destination markets

Based on trafficking data, most rhino horn is destined for the consumer markets in China and Viet Nam. Recent market surveys have shown that, similar to ivory, demand for rhino horn in Viet Nam often involves Chinese nationals seeking to move the product to China. These surveys indicate a growing demand for rhino horn jewellery and décor items, including traditional libation bowls, rather than medicine. Also similar to elephant ivory, the prices paid for rhino horn appear to be in decline in Viet Nam since around 2014 or 2015.[10]

Fig. 22 Number of people arrested for rhino horn trafficking by nationality, 2010-2017

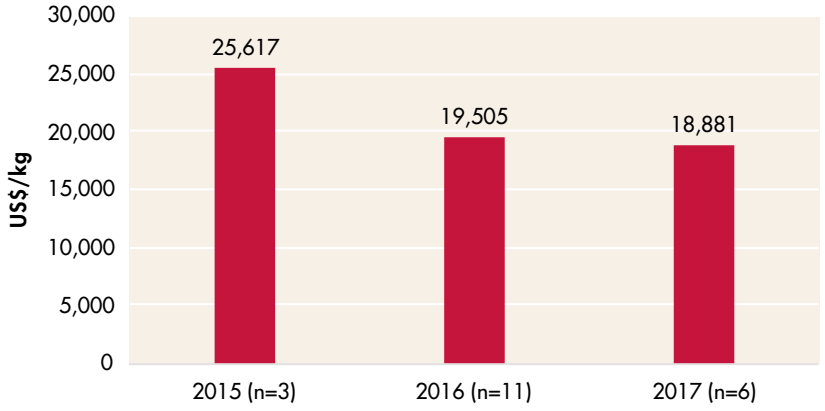


Source: UNODC World WISE Database

Analysis

It is too soon to confirm a decline in the rhino horn market. Like ivory, declines in new supply (poaching) seem to be teamed with declines in price in the destination markets. Unlike ivory, seizures show a clear and consistent upward trend. This could be due to improvements in the rate of interdiction or a genuine increase in the flow. If the flow has increased as poaching has decreased, this could suggest the new supply is coming from existing stocks. Many of these stockpiles are in private hands and can be sold in some range states. Sellers may be motivated by declining prices and possibly declining interest.

Fig. 23 Average wholesale prices of whole rhino horn observed in markets in Viet Nam, 2015-2017



Source: Wildlife Justice Commission[11]
'n' refers to the number of market observations in each year factored into this average price

Endnotes

1 There are two species of African rhinos, white and black. White rhinos carry more horn than black rhinos: 5.88 kg of horn per white rhino versus 2.65 kg for black rhinos. See Pienaar, D. J., Hall-Martin,A . J. and Hitchins, P. M., 'Horn growth rates of free-ranging white and black rhinoceros', *Koedoe*, Vol 34, No 2, 1991, pp. 97-105. But no distinction is made between the two species by horn traffickers and the species is rarely identified in the seizure records. For these reasons, no distinction is made between the two species in this chapter.

2 This includes 18,067 white rhinos (86% of which are found in South Africa) and 5,495 black rhinos (37% of which are found in South Africa and 34% in Namibia) as of 2017. Other countries with significant rhino populations include Kenya (1,258 rhinos), Zimbabwe (887 rhinos) and Botswana (502 rhinos). Lesser populations are found in Eswatini, Malawi, Mozambique, Rwanda, Uganda, United Republic of Tanzania and Zambia. See CITES CoP18, Doc. 83.1, Annex 2, p. 2 (2019), *Species specific matters: Rhinoceroses (Rhinocerotidae spp.), Report of the Standing Committee and the Secretariat.*

3 Nearly half (49.3%) of the continental white rhino population is now privately owned.

4 CITES CoP18, Doc. 83.1, p. 9 and Annex 2, p. 5 (2019), *Species specific matters: Rhinoceroses (Rhinocerotidae spp.), Report of the Standing Committee and the Secretariat.*

5 For example, South Africa's largest private rhino breeder has posted his accounts on-line reporting that security alone was costing US$400,000 per month. Save the Rhino, *World's largest 'rhino farm' at risk of collapse*, 19 June 2018 (available at: https://www.savetherhino.org/thorny-issues/rhino-farm-at-risk-of-collapse/).

6 CITES CoP18, Doc. 83.1, p. 7. Data from 2018 include projected values for "other" countries. South African data for 2019 were announced on 3 February 2020 (South Africa, Department of Environment, Forestry and Fisheries, *Department of Environment, Forestry and Fisheries report back on rhino poaching in South Africa in 2019,* press release, 3 February 2020.) Estimates for other countries are not available, although media reports suggest poaching in Botswana has increased.

7 See para. 27 in CITES CoP18, Doc. 83.1 (2019), *Species specific matters: Rhinoceroses (Rhinocerotidae spp.), Report of the Standing Committee and the Secretariat* for more discussion of this trend.

8 Out of 350 rhino horn seizures.

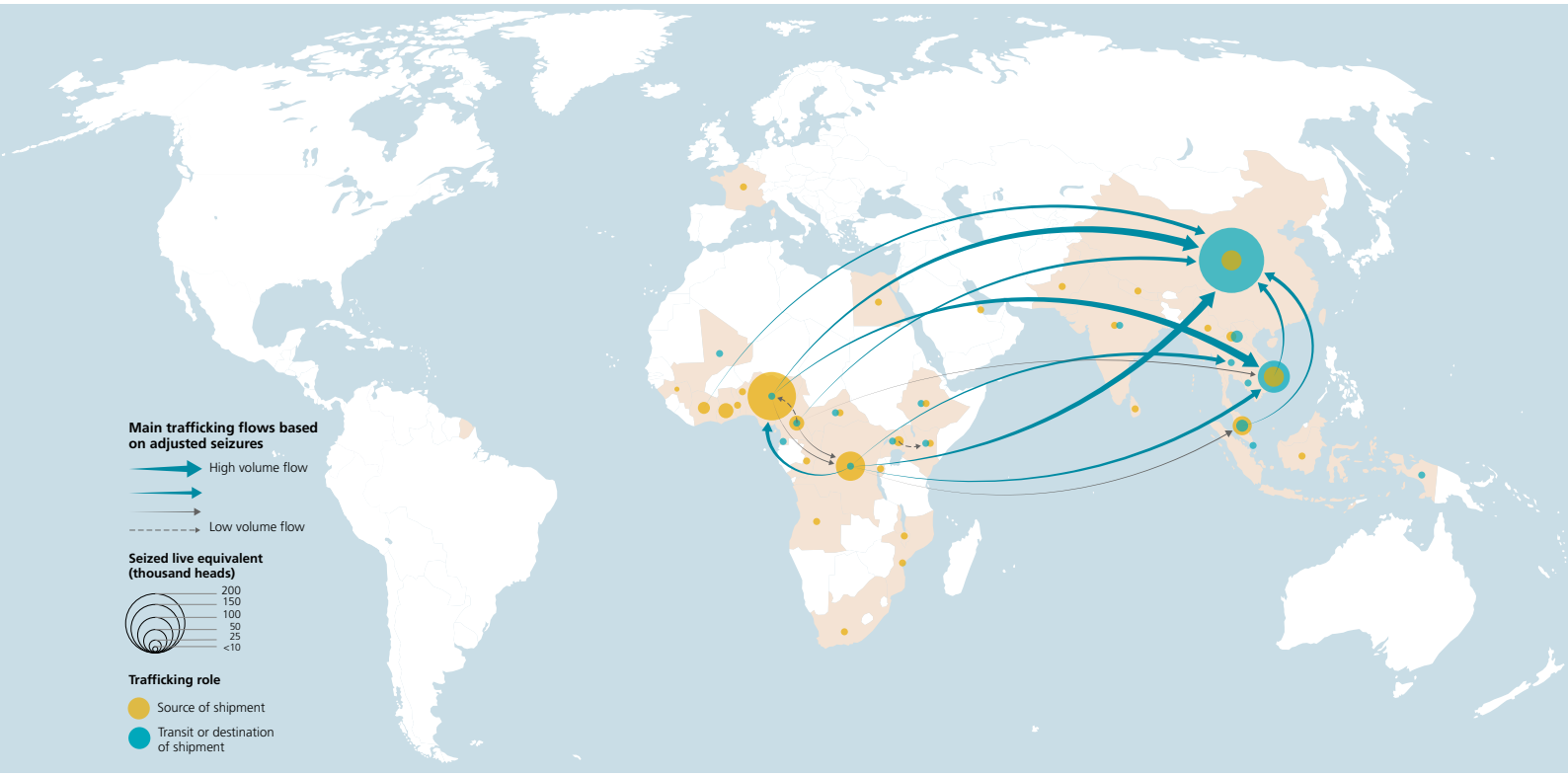
9 Media reports suggest this trend continued through the first half of the year. For example, on 13 April 2019, 167 rhino horns sourced from a private stockpile and destined for South-East Asian markets were seized in South Africa. On 17 June 2019, 246 kg of rhino horn were seized on a ship in coastal waters of Guangdong. On 25 July 2019, 55 rhino horns weighing 125 kg were seized at Noi Bai International Airport in Viet Nam.

10 Stoner, S., Verheij, P. and Jun Wu, M., *Black Business: Illegal Rhino Horn Trade Dynamics in Nhi Khe, Viet Nam from a Criminal Perspective, A Case Study,* Wildlife Justice Commission, 2017.

11 Ibid.

WILDLIFE CRIME: PANGOLIN SCALES[1]

Map 1 Main trafficking flows and reported origins/destinations of seized pangolin scales (2007-2018)



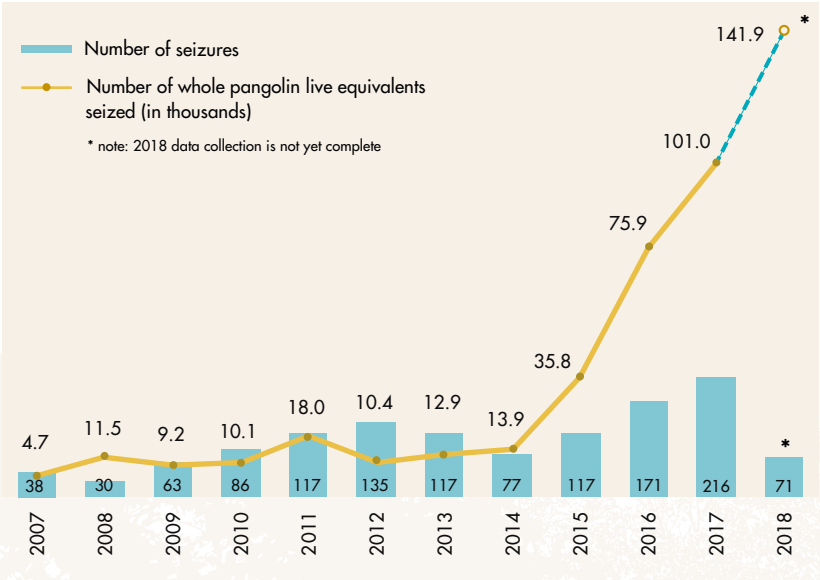
Sources: UNODC World WISE Database

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. The year 2018 is based on partial data.

Pangolins are reclusive nocturnal creatures and the only mammal wholly covered in scales. They remain elusive, with researchers having limited knowledge of their ecology, yet they are now arguably the most heavily trafficked wild mammal in the world.[2] There has been a sustained increase in seizures of the species since 2014 (Figure 1). Due largely to their exploitation in illegal trade, all species of pangolin were transferred from CITES Appendix II to Appendix I at the CITES Conference of the Parties in 2016.[3]

There are eight species of pangolin: four found in Asia and four found in Africa. They have traditionally been consumed in both regions, but only recently have the two markets met.

Fig. 1 Number of whole pangolin equivalents[4] seized and number of seizures annually, 2007-2018



Source: UNODC World WISE Database

Live, bodies, scales, meat and trophies

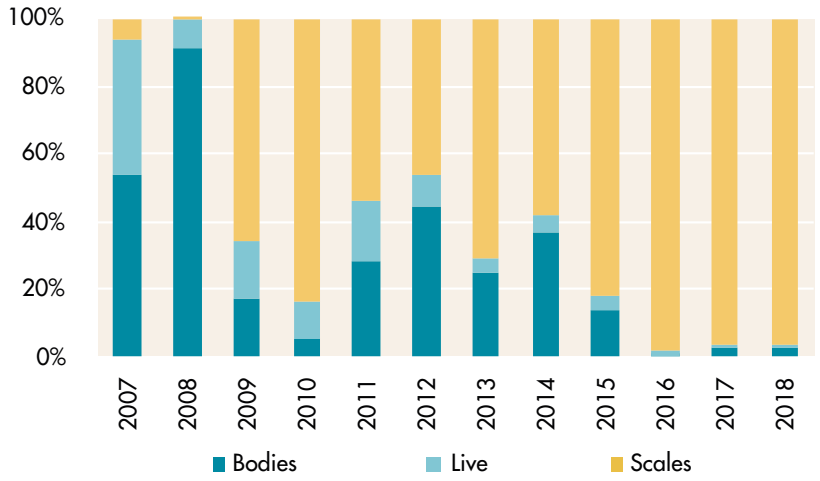
Today, demand for pangolins in Asia is being supplied by pangolins from Africa. In both regions, pangolins are killed for their meat[5] and their scales, which have been used medicinally.[6] Pangolin products have been used in traditional Chinese medicine for thousands of years to treat a wide range of ailments. The scales are said to promote blood circulation and increase lactation in pregnant women, while the meat is used as a tonic.[7] They are also used as medicine in Africa. In Nigeria, for example, pangolin parts are used to treat a wide range of physical and psychological conditions.[8]

All eight species of pangolins are believed to be in decline,[9] but since exact population counts are unavailable, it is difficult to determine the conservation impact of the illegal trade.[10] The sheer volume of seizures, though, suggests unsustainable harvesting, a hypothesis corroborated by hunters interviewed by UNODC in Uganda and Cameroon in 2018, who reported that pangolins are becoming harder to find.[11]

Since 2014, there has been a 10-fold increase in the number of whole pangolin equivalents seized globally. The inclusion of all pangolin species in Appendix I in 2016 likely had some role in this trend, especially as it increased awareness, but there are several reasons why the listing is unlikely to be solely responsible for the increase:

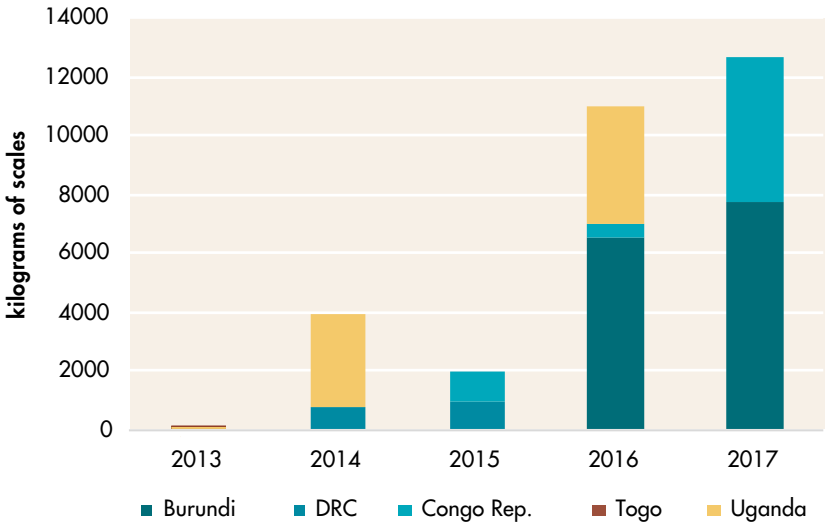
- The increase started in 2015, two years before the listing took effect.
- The size of individual seizures has increased, alongside the increase in overall seizure quantity.
- Before the Appendix I listing, the amount of pangolins seized was much larger than the legal trade, implying that the industries where pangolins are used have long drawn on illegal sources.

Fig. 2 Shares of whole pangolin live equivalents seized globally by product type, 2007-2018



Source: UNODC World WISE Database

Fig. 3 Kilograms of pangolin scales legally traded, 2013-2017 (importer reported quantities)



Source: CITES Trade Database

Sizable shipments of whole (often live) pangolins have been seized in Asia, but most of the largest recent seizures have involved pangolin scales sourced from Africa. Prior to 2009, the international trade involved mostly pangolin meat and scales, sourced in Asia (Figure 2).[12] The reasons for the shift to African sources is unclear, but may be due to declining Asian populations. There have been very few seizures of pangolin meat from Africa. The reasons for this are also unclear, but almost all the World WISE pangolin seizures coming from Africa have been comprised of scales. Most of the large African scale shipments originated in West and Central Africa,[13] where three out of the four African pangolin species are found.[14] Four pangolin species are also found in Southeast, South and East Asia. Most of the trade for all species is destined for East and Southeast Asian countries.[15] Before 2016, the largest seizures intercepted amounted to less than 10,000 live pangolin equivalents. In 2019, all the three major seizures made by Singapore were equivalent to more than twice that number.

In 2000, CITES Parties adopted a zero-export quota for wild-caught Asian pangolins traded for primarily commercial purposes. The legal trade in African pangolin species was rare until about 2014.[16] Between 2013 to 2017 (when all pangolin species were up-listed to Appendix I), the amount of pangolin scales legally imported went from almost zero to nearly 13 tons, with four countries being responsible for the bulk of the shipments: Burundi, the Democratic Republic of the Congo (DRC), Congo (Brazzaville) and Uganda (Figure 3). China was the importer of 99 per cent of this volume.

Demand for pangolin meat persists, but it appears to be satisfied regionally. For example, Malaysian authorities raided two high-volume pangolin meat facilities in February 2019, confiscating 29.8 tons of pangolins in the form of live and frozen animals, including frozen meat.[17] Intercontinental meat seizures, though, remain rare, and the short range of trafficking may be one reason why meat seizures are not detected at the same level as scale seizures in recent years. Based on World WISE data, meat seizures represented 15 per cent of pangolin seizures in 2015, compared to only 1-2 per cent of pangolin seizures from 2016 to 2018. There were 4,355 live pangolin equivalents' worth of meat seized in 2018, out of 187,256 live pangolin equivalents seized overall that year.[18]

There is some debate as to how much of the large increase in scale trafficking could be coming from stockpiles that existed prior to pangolins' CITES Appendix I listing, and therefore, how much poaching is taking place. Nineteen countries have declared pangolin scale stockpiles to CITES.[19] China reports regularly releasing these stockpiled scales for domestic use by designated hospitals and manufacturers of patented Chinese medicines.[20] The volume of declared stockpiles in source and destination countries is far smaller than the tens of thousands of whole pangolin equivalents seized over the past decade (Figure 3). It is therefore unlikely that leakage from declared government stockpiles contributes significantly to the illegal trade; most sourcing is likely coming from the wild and most from African source countries, and not from stockpiles.

The magnitude of the illegal trade - based on seizure records - suggests that this wild sourcing is unsustainable. Breeding of pangolins in captivity at commercial scale is currently not possible. Highly specialized diets combined with extreme sensitivity to capture-induced stress mean that pangolins fare poorly in captivity. Pangolins generally give birth to one cub at a time[21] with gestation periods that range from about 65 to 370 days.[22] Only a few births have been reported in captivity, with high infant mortality rates.[23] At present, sourcing from captive-bred populations does not seem to be possible to meet demand and/or replace the wild population of pangolins harvested by poachers.

Given that the scales from one pangolin weigh anywhere between 0.36 to 3.60 kg,[24] multi-ton seizures of scales represent far larger numbers of pangolins killed than meat shipments of a similar weight. Estimates of how many pangolins have been illegally traded in recent years are difficult to calculate given that:

- seizures represent only a small fraction of the animals killed;
- size and weight of scales vary between species; and
- incomplete seizure records that make it difficult to know what species was seized.

According to pangolin hunters and traders interviewed by UNODC in Cameroon and Uganda, giant pangolins are relatively rare. If each pangolin killed for illegal trade in Africa produced an average of 500 grams of scales, the 185 tons of scales seized between 2014 and 2018 would represent about 370,000 pangolin equivalents.

Sourcing

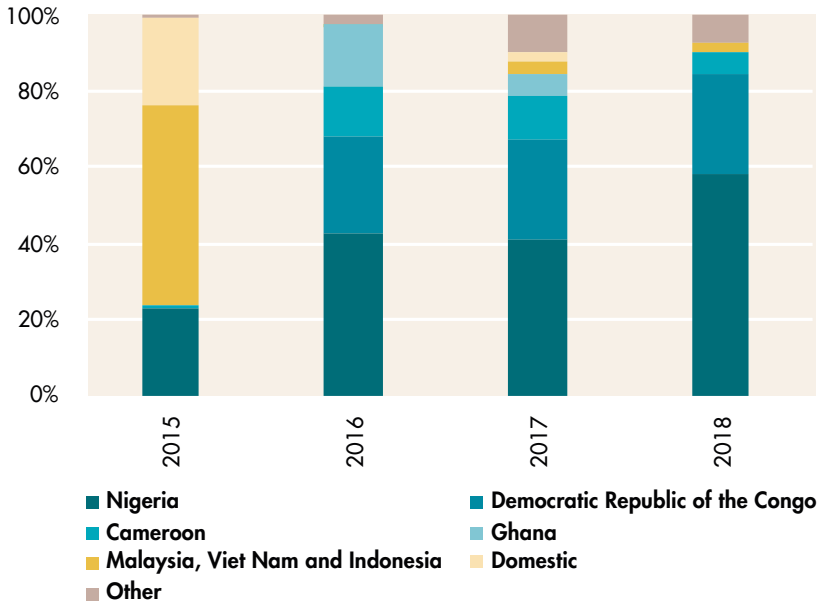
In 2000, zero export quotas were established for Asian pangolin species whose populations were seriously depleted from the skin and meat trade.[25] These zero quotas may have contributed to the decline in the skin trade,[26] but despite population depletion, sourcing from Southeast Asia (primarily from Indonesia, Malaysia and Thailand) continued in large quantities until 2013, at which point it dropped off significantly.

Based on seizure data, it appears that, starting in 2013, the source of seized pangolins shifted to the African continent, primarily to West and Central Africa. Seizures were made first on shipments coming from Cameroon, then Nigeria, and then (in 2016) to the Democratic Republic of the Congo (Figure 4). Other source countries mentioned by pangolin traders during fieldwork include the Central African Republic, Congo, Gabon and Uganda. Recent large seizures in Côte d'Ivoire involve Guinea and Liberia as additional source countries for trafficked pangolins.[27]

Nigeria, Uganda and the Democratic Republic of the Congo act as transit countries and logistical hubs for pangolin and wildlife trafficking more generally. Illegal pangolin trade in Nigeria seems to have grown significantly in recent years, and the country was the reported provenance of at least 51 tons of pangolin scales seized in 2019 (Figure 5)

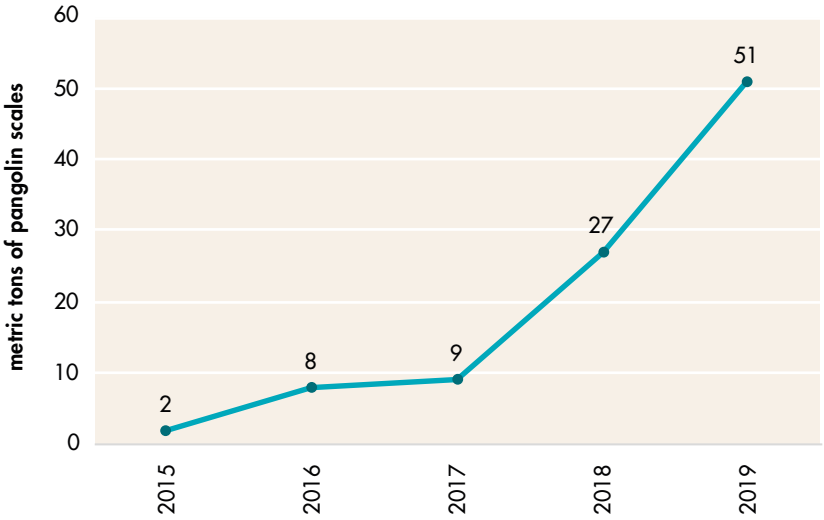
Based on UNODC fieldwork in Cameroon and Uganda in 2018, it appears that the initial hunting of pangolins for the trade is done by local community members. Wealthier local traders and intermediaries then consolidate their catch into bulk batches and transport them to urban centres where they are trafficked onward by

Fig. 4 Shares of global pangolin scale seizures by reported source of shipment, 2015-2018



Source: UNODC World WISE Database

Fig. 5 Pangolin scale shipments involving Nigeria as a source or destination, 2015-2019 (tons)



Source: UNODC World WISE Database and CITES

Asian expatriates.[28] In some locations, it is not unusual for a large number of members of a community to be involved in hunting pangolins, often in addition to their main job as farmers.[29] As a result, there are large numbers of suppliers dispersed throughout rural areas. These suppliers seem to be primarily part-timers.

Entering the illicit trade chain is easy. Without the need for the heavy guns and specialized equipment required for big game hunting, anyone can participate. UNODC fieldwork in Cameroon found that prospective new entrants only need supplies costing US$3 to US$5, with hunters making anywhere from US$ 8 to US$ 13 for a small live pangolin and US$ 25 to US$ 30 for a large one. In Uganda, hunters report being able to catch anywhere from one to 20 pangolins per day.[30]

Hunters in Uganda track the animals and set traps while hunters in Cameroon use wire traps or hunting dogs. Pangolins, once dead, are immersed in hot water or fire and descaled with a knife. The scales are then dried in the sun in centralized 'drying camps' set up by hunters in the forest. Some hunters reported keeping the meat to eat. In Cameroon, scales were also recovered from open bushmeat markets in the region or from restaurants selling the meat. According to UNODC fieldwork, most people seem to understand that pangolins can be sold for profit, which encourages local hunters to catch them whenever possible. Most hunters and even traders interviewed knew very little about the animal itself and had radically different and often misguided ideas of what consumers used the animals for, including making bullet-proof vests out of their scales. Local traders and intermediaries consolidate scales until at least 10 kg are ready for transit to urban centres. These operators – some of whom are women - tend to be local residents. They are in contact with international traffickers, who sometimes pay for their services by wire transfer.

The first buyers are often small business owners, local authorities or transportation workers that have enough cash to buy stock from local hunters and pay for transit to urban areas. In fieldwork in Cameroon and Uganda, it was reported that Congolese and Nigerian citizens act as traders and intermediaries.[31] In the urban areas, the goods are sold to international traffickers, primarily Chinese, but also some Nigerians and Vietnamese.[32]

International traffickers tend to be individuals with enough wealth and political connections to ensure protection from the authorities. These include high-level government officials and wealthy business people but can also be foreign workers based in the country for development projects. The number of actors involved in the

Table 1 Actors involved in pangolin scale trafficking and their costs and income (Uganda)

	HUNTER →	TRADER →	INTERMEDIARY →	TRAFFICKER
Income	US$ 2.5 - 9/kg scales US$ 4 - 14 per live pangolin	US$ 13-40/kg scales (consolidate to 10 kg)	US$ 135 commission per delivery (10 - 16 sacks, 50 kg each)	No data available
Costs	*Supplies:* US$ 3 to 5 per hunter (or per pangolin?)	*Storage:* US$ 40 per month *Car to city:* US$ 100-134 *Driver:* US$ 27 *Bribes*: US$ 27 - 100	No data available	No data available

trafficking from source to destination ranges from five to more than 15 people, with prices paid to each actor increasing the closer one gets to the consumer. For example, in Uganda, traders who consolidate scales are paid quadruple the price per kilogram than that paid to the hunters.

Traders order pangolin scales by the kilo, with a preference for the large scales from giant pangolins, *Manis gigantea*, which hunters report are harder to find. Several hunters described traders seeking them out and requesting they switch to hunting pangolin rather than other species. Table 1 provides an overview of the actors involved in the trafficking of pangolin scales from source to the international trafficker in major urban centres. It includes associated costs along the way, where known, using data collected through field interviews in Uganda as an example.[33]

Trafficking

Trafficking is done by sea, air and land, and parcel post is also sometimes used. Shipments may not be well concealed, but they have been found under frozen meat and ice,[34] hidden in logs using candle wax[35] and stuffed inside steel barrels of other goods.[36] Large illegal consignments of pangolin scales in shipping containers are either misdeclared or concealed under 'cover loads' such as plastic waste. International seizures have shown that traffickers are using the same techniques repeatedly, including regular air shipments of relatively small amounts of scales. For example, authorities in the Netherlands have repeatedly seized similarly packaged consignments of about 20 kg of scales from Nigeria in parcel post. Malaysia also seized a series of similarly packed shipments in air cargo from Ghana in 2017.[37] Some are even smuggled in luggage[38] and sent via parcel post declared as wood chips or other commodities.

Traders reported that pangolin traffickers often use the same routes to export and import pangolin scales as they do ivory.[39] A third of hunters and traders interviewed in Uganda reported that traffickers take advantage of the weak border controls and security challenges in northern Uganda, Democratic Republic of the Congo and South Sudan to offload the scales they collected, sometimes concealing themselves as impoverished locals to avoid detection at known checkpoints.[40] Traders and traffickers also store stockpiles of scales in countries where the rule of law is weaker and wildlife crime enforcement limited before moving the scales for immediate sale to buyers in more high-risk locations.

The development of logging operations in previously wild areas, bringing with it an influx of people and infrastructure like roads, facilitates hunters' access to wild pangolin populations, making areas near logging operations particularly vulnerable to pangolin poaching. In fact, two-thirds of the interviewees in Cameroon noted that traders often transport scales to larger cities on logging trucks, with the scales concealed as wood chips or foodstuffs.[41] A third of the traders interviewed in Uganda mentioned using motorbikes for local transport, although several choose "fancier" vehicles that belong to official organizations when possible to limit the chances that they will be searched.

Very large individual seizures in 2019 show that Nigeria is the primary point of export of pangolin shipments, while Viet Nam has emerged as the primary destination (Table 2). In October 2019, the Chinese government announced having seized 23 tons of pangolin scales in China in a series of operations. These shipments were coming from Nigeria via the Republic of Korea.[42]

Ivory traffickers appear to be involved in the pangolin scale trade, often transporting shipments of ivory and pangolin specimens together. Recent large seizures of pangolin scales are often mixed shipments of both pangolin scales and ivory.

The interviewed poachers also seem to be of the view that authorities consider crimes associated with pangolins as less serious than other forms of poaching, for example elephant poaching. Fear of enforcement action did not appear to play much of a role in their decision-making.

Currently, the market for ivory appears to be in decline, while, according to interviews with hunters in Cameroon and Uganda, pangolin prices have been going up since 2017.[43] UNODC fieldwork in Cameroon and Uganda suggests that some ivory traders may be entering the pangolin scale trade in response to lower risk. For example, poachers interviewed in

Table 2 Notable pangolin seizures in 2019

DATE	VOLUME OF PANGOLIN SCALES SEIZED (TONS)	REPORTED ORIGIN	SEIZING COUNTRY	REPORTED DESTINATION
January	1.4 (with 100 kg ivory)	Nigeria	Viet Nam	–
January	8.3 (with 2.1 tons ivory)	Nigeria	China (Hong Kong SAR)	Viet Nam
March	8.3	Nigeria	Viet Nam	
April	12.9 (with 175 kg ivory)	Nigeria	Singapore	Viet Nam
April	12.8	Nigeria	Singapore	Viet Nam
April	4 (with 3.4 tons ivory)	Democratic Republic of the Congo	Viet Nam	–
May	5.3	Nigeria	Viet Nam	–
July	11.9 (with 8.8 tons ivory)	Democratic Republic of the Congo	Singapore	Viet Nam
July	1.2	Democratic Republic of the Congo	Turkey	–
October	1.5	–	Nigeria	Malaysia
December	1.7 (with 330 kg ivory)	Nigeria	Viet Nam	–

Source: CITES

Uganda reported that while they used coded language to discuss transactions involving ivory and rhino horn over the phone, they did not feel the need to take such measures when trading in pangolin products and openly discussed the number of kilos of pangolin scales that they wanted to buy or sell. If those involved in the ivory trade are now selling pangolin scales, this would imply that the pangolin trade can now build on the supply chain of the well-established ivory market.

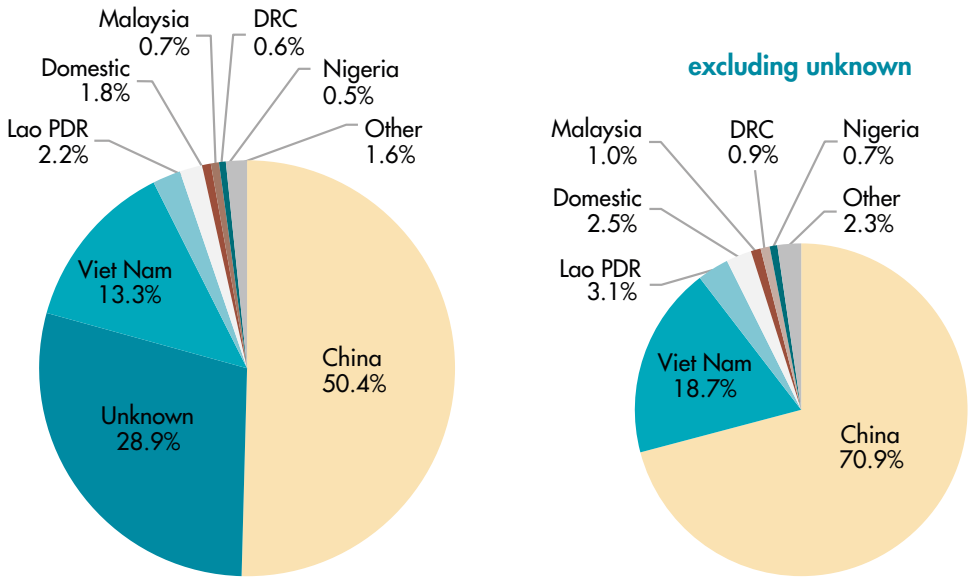
Demand

Based on seizures, most pangolin scales are destined for traditional medicine use in China, followed by other Southeast Asian countries. Some 71 per cent of seizures of whole pangolin equivalents recorded in World WISE between 2007 and 2018, where the destination was known, were destined for China, with 19 per cent bound for Viet Nam (Figure 6). As noted above, this routing seems to have changed dramatically in 2019, where all the major seizures were destined for Viet Nam.

In China, the cities of Fangchengang, Guangzhou and Kunming are key nodes for pangolin trafficking according to a 2016 study of 206 Chinese seizures.[44] In a survey of five major Chinese cities in 2012, Guangzhou residents reported the highest rates of wildlife consumption for food and as ingredients for traditional medicine.[45] Consumer surveys in 2018 of 1,800 people living in Chinese cities with active markets for wildlife products (Beijing, Guangzhou, Harbin, Kunming, Nanning and Shanghai,) support the increased demand argument, especially for scales.[46] The number of people who reported they had bought pangolin products in the last 12 months increased by 12 per cent from previous studies in both Beijing and Shanghai and remained stable in Kunming and Nanning while decreasing only slightly in Guangzhou and Harbin (4 and 3 per cent, respectively). Some 68 per cent of that group reported that they intended to rebuy pangolin products in the future, suggesting that there is a stable base of buyers[47] regardless of campaigns against the practice. The government announcement in August 2019 that pangolin products would no longer be covered by China's state insurance funds could reduce purchases overall.[48]

A 2018 survey of 1,500 wildlife product consumers in key Vietnamese cities (Can Tho, Da Nang, Hai Phong, Hanoi and Ho Chi Minh City) found similar results and consumer profiles for pangolin scales and powder.[49] About 60 per cent of the sampled buyers who bought pangolin products in the last 12 months and 54 per cent of all buyers of pangolin products surveyed indicated that they would purchase these again, suggesting a strong continuing consumer demand.[50] In addition, 52 per cent of these buyers, who mostly buy from private sellers, reported making an unplanned purchase of pangolin products influenced by the seller's recommendation. This suggests that sales pressure drives about half of consumer purchases.

Fig. 6 Destination of seizures in whole pangolin equivalents*, 2007-2018



Source: UNODC World WISE Database

*The figure refers to seizures of live pangolins, dead pangolins as well as pangolin scales.

Endnotes

1 This article is part of the forthcoming UNODC *World Wildlife Crime Report 2020* to be published in June 2020.

2 Challender, D. W. S., Waterman, C. and Baillie, J. E. M., *Scaling up pangolin conservation*, IUCN SSC Pangolin Specialist Group Conservation Action Plan, Zoological Society of London, 2014.

3 In 1975, all four Asian pangolins species, including *M. crassicaudata, M. culionensis, M. javanica* and *M. pentadactyla* were included in CITES Appendix II and one African species (*M. temminckii*) was listed in Appendix I. In 1995, all species of pangolins (including the African species) were included in Appendix II under the species listing *Manis spp*. In 2000, there was a proposal to transfer *M. crassicaudata, M. javanica* and *M. pentadactyla* to Appendix I. However, the proposal was not accepted, noting that the species were at that time under the Review of Significant Trade process. Following this process, a zero annual export quota for specimens removed from the wild and traded for primarily commercial purposes was established for all Asian pangolin species. In 2016, all eight species (Asian and African) were transferred to Appendix I.

4 The figure refers to seizures of pangolin bodies, scales, meat, trophies as well as live pangolins. For conversion factors, see Annex 1 of Challender, D. and Waterman, C., *Implementation of CITES Decisions 17.239b) and 17.240 on pangolins* (Manis spp.)., Cambridge: IUCN, 2017. Where the species is not specified in the seizures, the conversion factor of 360 grams of scale per pangolin (recommended by Challender and Waterman) is adopted for cases where Asian countries are reported as origin, whereas the conversion factor of 500 grams is adopted for the cases originating from African countries (UNODC Fieldwork). In cases of unknown origin, the conversion factor adopted is the average of the above conversion factors, that is 430 grams. These estimates should be regarded as liberal when taken on an annual basis, but consistent across time.

5 Krishnasamy, K. and Shepherd, C.R., 'Seizures of African pangolin scales in Malaysia in 2017', *TRAFFIC Bulletin,* 29(2), 52-55, 2017.

6 Challender, Waterman and Baillie 2014, op. cit.

7 Hua, L. et al., 'Captive breeding of pangolins: Current status, problems, and future prospects', *ZooKeys,* 507, 99-114, 2015.

8 Soewu, D.A. and Ayodele I.A., 'Utilisation of pangolin (Manis sps) in traditional Yorubic medicine in Ijebu Province, Ogun State, Nigeria', *Journal of Ethnobiology & Ethnomedicine, 5*, 39, 2009; Soewu, D.A. & Adekanola, T.A., 'Traditional-medical knowledge and perception of pangolins (Manis sps) among the Awori People, Southwestern Nigeria', *Journal of Ethnobiology & Ethnomedicine, 7*, 25-36, 2011.

9 Challender, Waterman and Baillie 2014, op. cit.

10 CITES SC69 Doc 57; IUCN, *The IUCN red list of threatened species*, Version 2019-2, see: http://www.iucnredlist.org, accessed on 30 August 2019.

11 UNODC fieldwork in 2018, see Methodological Annex for details.

12 Annex 1 of Challender, D. and Waterman, C., *Implementation of CITES Decisions 17.239b) and 17.240 on pangolins* (Manis spp.)., IUCN, 2017.

13 UNODC, *West and Central Africa Transnational Organized Crime Threat Assessment,* 2018.

14 The fourth species, Temmick's ground pangolin, is found primarily in East and Southern Africa. IUCN SSC Pangolin Specialist Group, *The status, trade, and conservation of pangolins (Manis spp.)*, Information document for the 17th meeting of the conference of the Parties to CITES (CoP17 Inf.59), CITES, 2016.

15 See, for example, Annex 1 of Challender, D. and Waterman, C., *Implementation of CITES Decisions 17.239b) and 17.240 on pangolins* (Manis spp.), IUCN, 2017.

16 UNODC, *West and Central Africa Transnational Organized Crime Threat Assessment,* 2018.

17 Papachristou, L., 'TRAFFIC: 30 Tonnes of Rare Pangolin Meat Seized in Malaysia', *Organized Crime and Corruption Reporting Project*, 15 February 2019.

18 World WISE. See note 4 above for conversion factors.

19 In response to Notifications to the Parties No. 2017/035 and 2014/059 , as included in table 13 in Annex 1 of Challender, D. and Waterman, C., *Implementation of CITES Decisions 17.239b) and 17.240 on pangolins* (Manis spp.), IUCN, 2017.

20 Challender, D. and Waterman, C., *Implementation of CITES Decisions 17.239b) and 17.240 on pangolins* (Manis spp.), IUCN, 2017.

21 Hua, L. et al. (2015).

22 This range is very approximate and debated by contradicting studies. Research is still ongoing to get more exact figures. See, f.ex. Hua et al. 2015, op. cit.; Chin, S.C. et al., 'Monitoring the gestation period of rescued

Formosan pangolin (Manis pentadactyla) with progesterone radioimmunoassay', *Zoo Biology, 31,* 479-489, 2011;Yang, C.W. et al., 'History and dietary husbandry of pangolins in captivity', *Zoo Biology, 26,* 223–230, 2007.

23 Hua et al. 2015, op. cit.; World Association of Zoos and Aquariums (WAZA), *WAZA statement in response to the pangolin trade crisis*, September 20, 2016.

24 Challender and Waterman 2017, op cit.; Zhou, Z.M. et al., 'Allometry of scales in Chinese pangolins (*Manis pentadactyla*) and Malayan pangolins (*Manis javanica*) and application on judicial expertise', *Zoological Research, 33*, 271-275, 2012; Challender, D.W.S. et al., 'Understanding markets to conserve trade-threatened species in CITES', *Biological Conservation, 187*, 249-259, 2015.

25 UNODC, *World Wildlife Crime Report*, 2016.

26 UNODC, *World Wildlife Crime Report*, 2016.

27 UNODC, *West and Central Africa Transnational Organized Crime Threat Assessment,* 2018.

28 UNODC fieldwork.

29 Despite heavy community involvement in the pangolin trade, there are certain communities, like the Lugave Clan in Uganda's Mukono District, that protect pangolin populations (in this case because the species is their totem animal).

30 Hunters operating near national parks reported the highest per day catches.

31 UNODC fieldwork.

32 UNODC fieldwork.

33 Note that prices for 1 kg of pangolin scales are on the low side in Uganda with hunters in Cameroon reporting being paid anywhere from US$6 to 23 per kilo (with the highest prices near major cities).

34 Osborne, S., 'Record haul of pangolin scales seized along with hundreds of ivory tusks in Hong Kong', *The Independent*, 2 February 2019.

35 Delegation of the European Union to the African Union, '3.2 tons of ivory and 423 Kg of pangolin scales seized thanks to support of EU Wildlife Conservation programme', 2 April 2019.

36 Doom, J., '7.5 tons of ivory, pangolin scales seized in Viet Nam', *ABC News*, 14 June 2019.

37 CITES, *Wildlife crime enforcement support in West and Central Africa*, CoP18, Doc34 (available at: https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-034.pdf).

38 TRAFFIC, 'Ivory processing workshop found in Angola following airport rhino horn seizure', 28 August 2018.

39 UNODC fieldwork; Osborne, S. 2019, op.cit.

40 UNODC fieldwork.

41 Also confirmed by research from the first UNODC *World Wildlife Crime Report* (2016).

42 China Daily, *Smuggled pangolin scales seized in joint operation,* 12 December 2019 (available at: http://www.china.org.cn/china/2019-12/12/content_75505980.htm).

43 UNODC fieldwork in 2018.

44 Cheng, W., Xing, S. and Bonebrake, T. C., 'Recent pangolin seizures in China reveal priority areas for intervention'. *Conservation Letters, 10*(6), 757-764, 2017.

45 Zhang, L. and Yin, F., 'Wildlife consumption and conservation awareness in China: a long way to go', *Biodiversity and Conservation*, 23, 2371-2381, 2014.

46 De Guzman, E., 'Research study on consumer demand for elephant, pangolin, rhino and tiger parts and products in China', *USAID Wildlife Asia*, 2018.

47 Primarily males in their 30s and early 40s with high levels of income and education, and frequent travel outside the country.

48 Bale, R., 'Pangolin scale medicines no longer covered by Chinese insurance', *National Geographic: Wildlife Watch,* 29 August 2019.

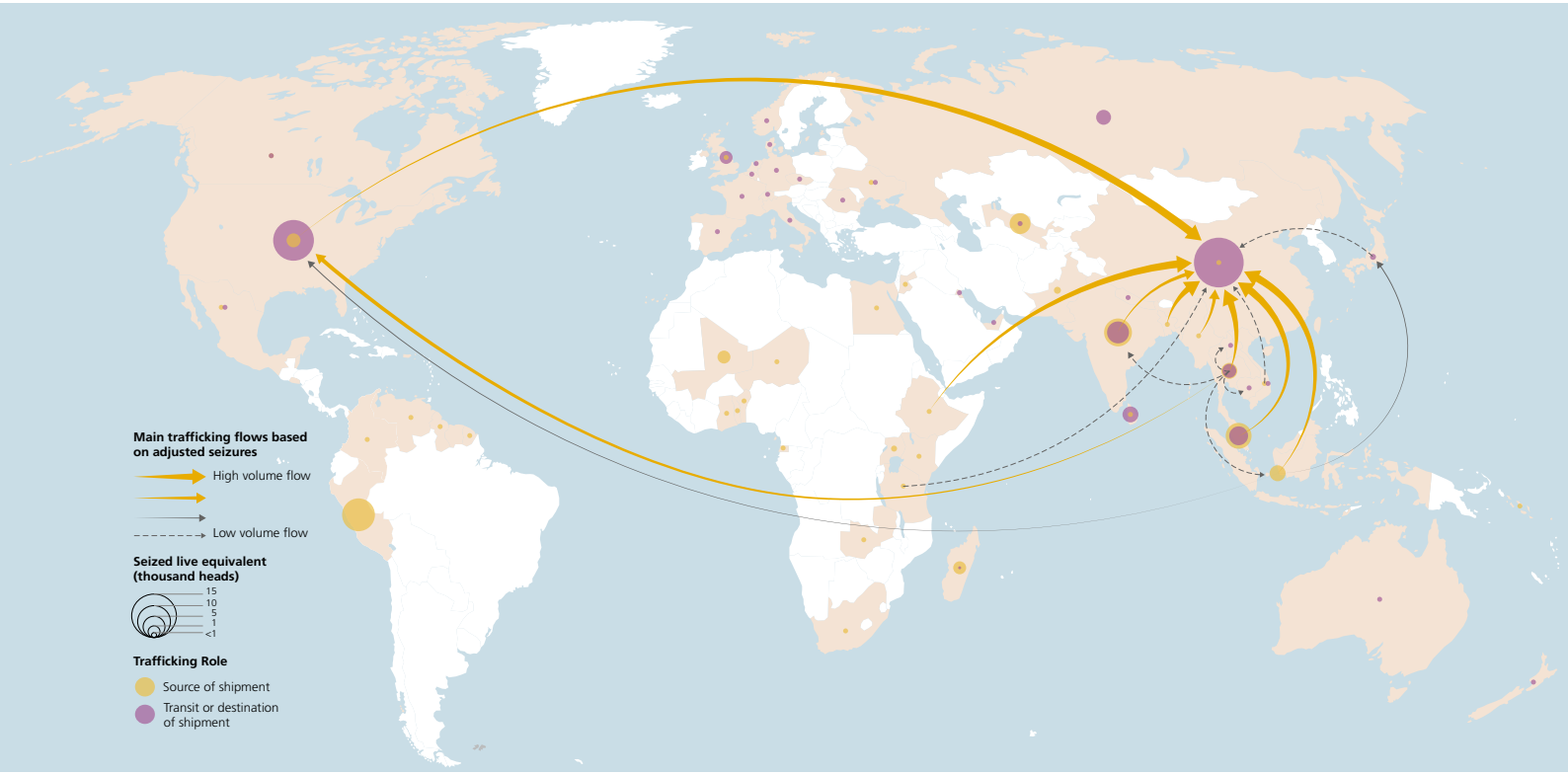
49 USAID Viet Nam, 'Research Study on Consumer Demand for Elephant, Rhino and Pangolin Parts and Products in Viet Nam', research study submitted by GlobeScan, 2018.

50 Supporting documents provided with requests for CITES listing upgrades for multiple pangolin species suggest that demand remains strong and is driving these species to extinction as demand outpaces the number of individuals available for consumption (CITES CoP17 Prop. 9).

LIVE REPTILES

5

Map 1 Trafficking flow map - Reptilia (2007-2018)



Source: UNODC World WISE Database

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. The year 2018 is based on partial data.
Note: A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

In the last *World Wildlife Crime Report*, several species of reptiles appeared among the most trafficked species in the world, including crocodilians, lizards, snakes, tortoises and freshwater turtles.[1] The same species remain prominent in the analysis conducted for this report. The three largest markets for illegally traded reptiles that appear in the seizure records are:

- Reptile skin or shells used in the décor or fashion industries;
- Reptile meat organs, or venom consumed as a food, tonic or medicine;
- Live reptiles used as pets, for zoos, or breeding.

The last *World Wildlife Crime Report* focused on the illegal skin trade, highlighting the ways that unregulated collection of wild pythons and boas can introduce illegally caught skins into the legal fashion industry. Since this time, however, according to the CITES Secretariat, fashion brands, designers and department stores have expanded their support to reptile conservation programmes around the world. While small leather items (such as handbags, wallets, belts, and shoes) continue to be the single largest category of reptile products seized, the number of live reptiles seized is comparable to the number of reptile skins from crocodilians, snakes, and lizards seized, and live reptile seized.[2]

Because the smuggling of live reptiles often results in high mortality rates, seizures involving live reptiles or whole reptile bodies[3] are included in the analysis below as "live reptile equivalents." In addition, species known to be widely used for their meat or skin or widely farmed were excluded,[4] so the analysis below focuses on wild-sourced species that are likely to be traded as pets or among reptile collectors and breeders. According to World WISE, nine out of the top ten CITES-listed wild-sourced live reptile species seized in recent years, based on a head count, were tortoises and freshwater turtles (Figure 1).[5] Consequently, this chapter pays particular attention to the illegal trade in live turtles and tortoises.[6]

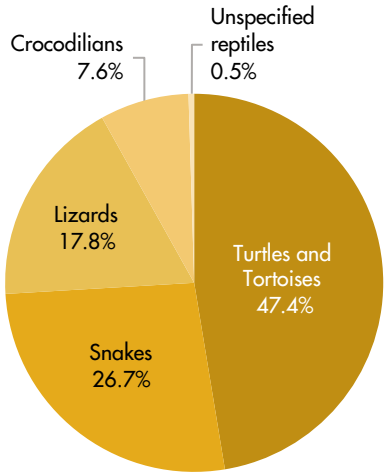
The majority of the live reptiles seized (70 per cent) were listed on Appendix II of CITES, with 18 per cent on Appendix I and 4 per cent on Appendix III. The remaining live reptiles seized for CITES violations were not identified down to a taxonomic level that allowed for an exact appendix listing classification.[7] The top 10 CITES-listed live reptile species seized, excluding food species, are indicated in the table 1 below, along with their Appendix listing and IUCN status.

In addition to World WISE data, the chapter uses qualitative data based on a series of 30 interviews with reptile experts and people involved in the live reptile trade during 2019.[14]

Sourcing

Live reptiles detected in illegal international trade come from several different parts of the world, including South Asia, Central Asia, South-East Asia, East Africa and West Africa. Based on World WISE seizure data, India is the leading national source of seizures and is the source of a variety

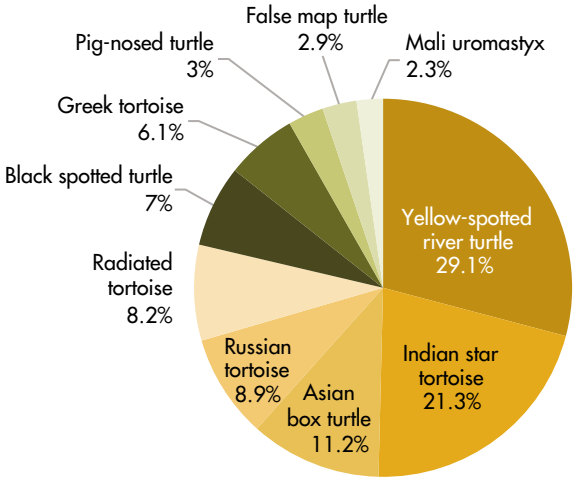
Fig. 1 Share of broad reptile groups in total number of live reptile equivalents seized, 2007-2017*



Source: UNODC World WISE Database

*Includes live specimens and bodies. Based on 6,015 seizure events.

Fig. 2 Share of top ten CITES-listed live reptiles seized, 2007-2017

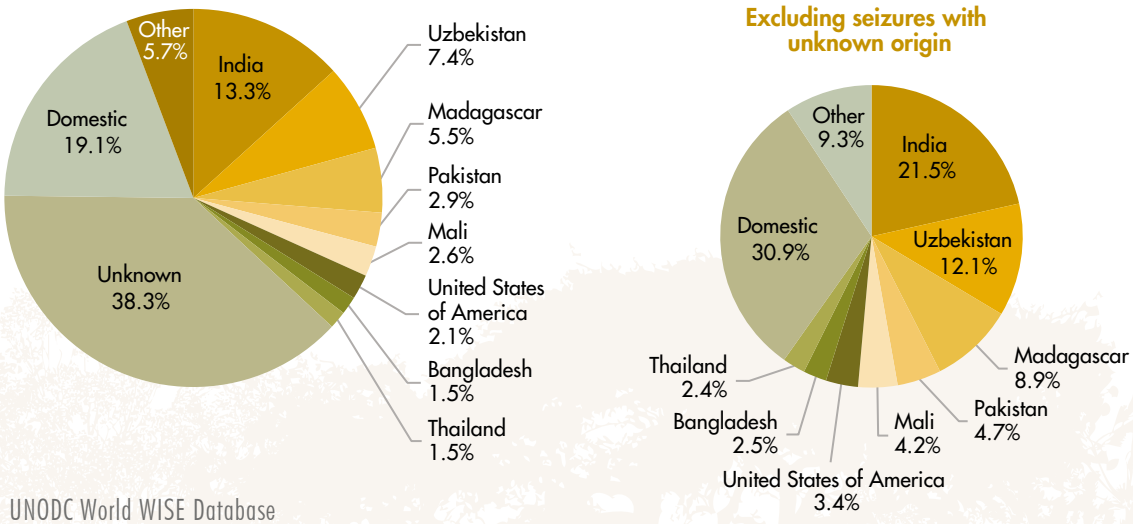


Source: UNODC World WISE Database

* Includes bodies.

** The top ten live reptile species seized represent 33% of all reptiles seized when looking only at bodies and live specimens.

Fig. 3 Share of source countries for the top ten live reptile species seized,* 2007-2017



Source: UNODC World WISE Database

*Excluding food species. Includes bodies.

Table 1 Top ten seized reptile species for the live trade, 2007-2017

TOP 10 CITES-LISTED SPECIES SEIZED	COMMON NAMES OF SPECIES	IUCN RED LIST STATUS[8]	POPULATION TREND[9]
Podocnemis unifilis (Appendix II)	Yellow-spotted river turtle[10]	Vulnerable	Unknown
Geochelone elegans (II)	Indian star tortoise	Vulnerable	Decreasing
Cuora spp. (II)[11]	Asian box turtle	Endangered or critically endangered[12]	Decreasing for three species & unknown for all others[13]
Testudo horsfieldii (II)	Russian tortoise	Vulnerable	Unknown
Astrochelys radiata (I)	Radiated tortoise	Critically endangered	Decreasing
Geoclemys hamiltonii (I)	Black pond turtle/ Indian spotted pond turtle	Endangered	Decreasing
Testudo graeca (II)	Greek tortoise	Vulnerable	Unknown
Carettochelys insculpta (II)	Pig-nosed turtle	Endangered	Decreasing
Graptemys pseudo-geographica (III)	False map turtle	Least concern	Unknown
Uromastyx dispar (II)	Mali uromastyx	–	–

* Excluding food species, including bodies.

of species, most notably the Indian star tortoise (*Geochelone elegans*). Uzbekistan appears prominently due to the indigenous Russian tortoise (*Testudo horsfieldii*). Madagascar is seen as the source of seizures of at least 30 species of reptiles, but most prominently the radiated tortoise (*Astrochelys radiata*). The black pond turtle (*Geoclemys hamiltonii*) is seized from a wide range of source countries, including India, Indonesia, Malaysia, Pakistan and Thailand.

The wide range of seizure source locations makes it difficult to generalize about the means of collection. Based on interviews with international reptile traders,[15] poachers collect animals by hand or with snares, pitfall traps, fishing line or funnel traps, and sometimes specialized hunting dogs. The advent of YouTube and other video sharing sites has resulted in an abundance of "how to" videos promoting the best ways to catch certain species, especially in South-East Asia. Most poachers living in the range area collect reptiles opportunistically for secondary income and keep them at their homes until middlemen come to collect them. They may also breed and grow-out reptiles.

At this early point in the trafficking chain, prices paid are often very low. For example, illegal market prices for turtles in the Philippines range from US$1-15 per turtle at the source. These are sold for 10 to 100 times that at the retail level. Radiated tortoises (*Astrochelys radiata*) from Madagascar are sold for US$2-10 at source, while they are sold to the end consumer for US$1,000-2,000 (for a one- to three-year-old animal, depending on the colour).[16]

Interviews with reptile traders around the world suggested that contraband reptiles may be laundered through captive breeding operations. International traders say that some suppliers will illegally source gravid females from the wild, so that they lay their eggs at their farm, and they then declare the offspring to be captive-bred. "Niche" species, with very specific or lesser-known ecologies, diets and behaviours that make them difficult or costly to breed in captivity, are typical targets for this sort of laundering.[17]

Trafficking

The intention of this kind of wildlife trafficking is to get the animals to arrive alive at their final destination. To reduce mortality rates due to suffocation, dehydration, starvation or otherwise, most international trafficking of live reptiles occurs by air: 56 percent of the live reptile seizure incidents in World WISE that included transport information involved air transport.

According to interviews with reptile dealers around the world, turtles and tortoises are a good product to sell because they tend to sell for higher prices than other reptiles and survive transportation well, providing higher profit margins. Some turtle and tortoise species are valuable enough to air courier, making use of carry-on or checked luggage. Some experts interviewed reported cases involving

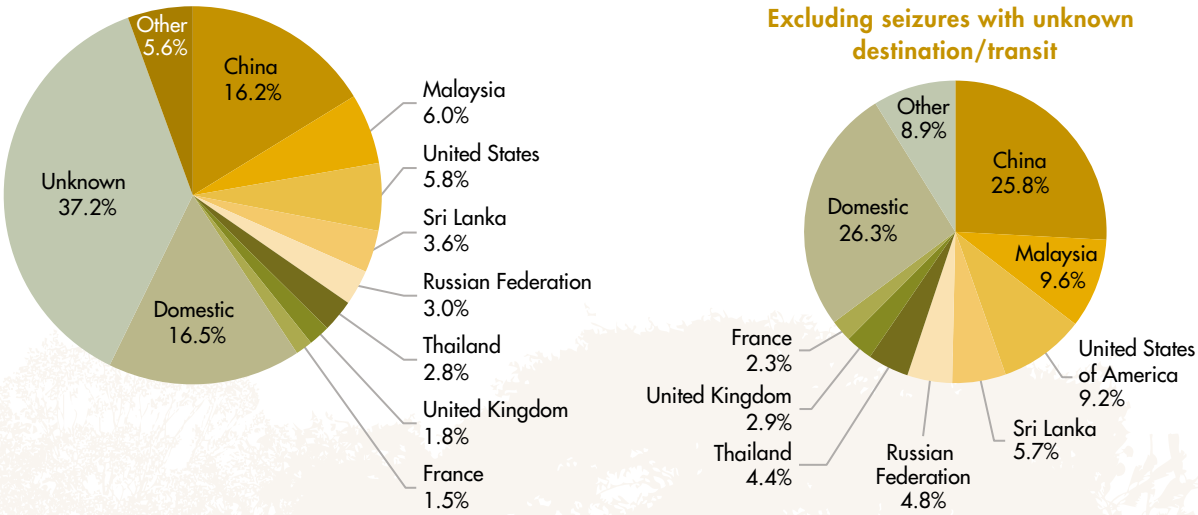
airport personnel facilitating the trafficking of ploughshare tortoises (*Astrophels yniphora*), for example.[18] Use of air freight also appears to be on the rise as well as the use of express mail using devised packaging and techniques that allow live reptiles to be posted to buyers. Mail and air courier seizures have increased more than any other means of trafficking documented in World WISE in recent years, each more than doubling from 2016 to 2017.

Small-scale seizures of less than 15 reptiles per shipment accounted for 80 per cent of seizures in World WISE. For these small-scale seizures, the 15 most valuable species seized represented only 9 per cent of shipments; the large majority of shipments were of less valuable species. Many seizures of tortoises and freshwater turtles seem to involve small numbers of animals carried or kept as personal pets or souvenirs. Trends in the illegal trade in tortoises and freshwater turtles, though, do differ geographically, with a relatively large number of seizures in Europe and North America involving smaller quantities of specimens per event, whilst a smaller number of seizures in Asia resulted in much greater quantities of specimens seized.[19] A smaller number of seizures of large to very large shipments (i.e. several hundred or thousands of live specimens) have also been documented suggesting the involvement of well-organized criminal networks, consisting of collectors, local traders, wholesalers, exporters and importers.[20]

Based on seizures, Asia is the main destination (or possible transit destination) for the illegal live reptile trade. East and South-East Asia, followed by the United States of America and Europe, are the main destinations for tortoise and freshwater turtle species.[21] Trafficking routes are in constant flux with traffickers seeking out emerging transit opportunities and concentrating their activities in major air transit hubs.[22] These hubs provide more direct flight options that reduce the transit time necessary to get trafficked live reptiles to their destination, limiting deaths in transit. The trafficking flow map at the beginning of the chapter provides an overview of some of the current trafficking routes.

Private Facebook groups and other social media platforms are in some cases the dominant sales points. For example, in Indonesia, according to interviews with experts in the trade, many physical markets have closed in favour of online sales, as these reduce overhead costs and often receive less official scrutiny. When online sales points are detected by law enforcement, traffickers simply switch platforms. Facebook, in May 2019, added a functionality to its site enabling the public to report illegal wildlife trade, and subsequently shut down various Indonesian Facebook groups. In response, traffickers moved to other platforms, such as vk.com or mewe.com, even keeping the same group names they had on Facebook. WhatsApp groups have also been used to traffic reptiles since the Facebook crackdown. These groups are smaller than those from Facebook because WhatsApp limits the number of people that can join groups. Perhaps partly as a result, these splintered groups have become more specialized, with some focusing on specific species. Some groups also moved to Telegram, which has no group member limit. In some cases, these moves have made illegal activity more difficult to detect because they make use of encoded private messaging applications.

Fig. 4 Share of the most reported final destination or transit countries for the top ten live reptile species seized,* 2007-2017



Source: UNODC World WISE Database
*Excluding food species. Includes bodies.

Box 1: Cheetahs

Cheetahs (Acinonyx jubatus) are highly sought-after luxury pets, popular in the Arabian Peninsula. Despite being listed on CITES Appendix I since 1975,[a] seizures of trafficked cheetahs do occur. World WISE data includes only 19 seizures from 2005-2019, amounting to 65 live seized cheetahs. To account for a lack of data, seizure data provided by the Cheetah Conservation Fund have been added to these World WISE seizures. Together, these data provide a more complete picture of the live cheetah trade: 144 live cheetah seizures from 2005 to 2019, accounting for 213 live seized cheetahs.[b] These numbers do not include domestic seizures or seizures for the skin trade, which are some of the additional threats to the species. The main countries of origin for these shipments (known in 62 per cent of cases), were Ethiopia (67 cheetahs) and Somalia (32 cheetahs). The destination for 69 per cent of the seized cheetahs was unknown, but it is worth noting that of these seizures, Somalia (including Somaliland) seized 111 cheetahs and the United Arab Emirates seized 53 cheetahs between 2005 and 2019.

Prices for a live cheetah on the black market can reach up to US$15,000, which is 50 times what illegal traders in Africa receive (anywhere from US$200 to 300).[c] Survivorship of cheetahs, both adults and cubs, in the illegal trade is quite low, between 30 to 52 per cent.[d] Juvenile mortality is even higher, as many as five out of six cubs taken from the wild will die before they reach their final destination[e] and many kept as pets will die due to the fact that most owners do not know how to properly care for them, generating an ongoing demand for new individuals.[f] Given the ongoing risks to cheetahs from habitat loss, human-wildlife conflict, and poaching, and their significant decline in population from an estimated 14,000 in 1975 to 7,100 in 2016, the illegal trade is non-negligible threat.[g]

At the 70th meeting of the CITES Standing Committee in 2018, Ethiopian, Kenyan and Yemeni authorities noted[h] that the illegal trade spans a far wider range of countries and that its volume is largely underestimated, posing a significant threat to wild populations.[i] In 2014, experts suspected that some South African breeding facilities were laundering wild-sourced cheetahs as captive-bred.[j] In 2016, CITES recognized that South African breeding operations had made significant strides in improving regulations, including requiring parental DNA as proof of captive-breeding for specimens to be exported as captive-bred. Since then seizures continue suggesting ongoing illegal trade but data is scarce on its extent and modus operandi.

a Commercial trade in wild cheetahs has been prohibited since 1975; however, there is an annual export quota in place for three countries pertaining to trophies and live trade (5 from Botswana, 50 from Namibia and 150 from Zimbabwe). See CITES Appendix I (available at: https://www.cites.org/eng/app/appendices.php); UNEP-WCMC, *The Species+ website* (available at: www.speciesplus.net).

b World WISE data were supplemented with seizure records provided by the Cheetah Conservation Fund (CCF). Only verified seizures with animals recorded present at CCF safehouses where included in the analysis. Animals that died during confiscation and on route to a safehouse were included. The source country was known for 71% of these seizures (155 cheetahs) and the destination was known only for 18% (38 cheetahs).

c Tricorache, P., Nowell, K., Wirth, G. Mitchell, N., Boast, L.K. and Marker, L. (2018). Pets and pelts: understanding and combating poaching and trafficking in cheetahs. In. L. Marker, L.K. Boast & A. Schmidt-Küntzel (Eds.), Biodiversity of the World: Cheetahs: Biology and Conservation (pp. 191 – 203). San Diego: Elsevier.

d Durant, S., Mitchell, N., Ipavec, A., and Groom, R., *Acinonyx jubatus. The IUCN Red List of Threatened Species* 2015: e.T219A50649567 (2015) (available at: https://www.iucnredlist.org/species/219/50649567); CITES. (2014). Interpretation and implementation of the Convention Species trade and conservation. Illegal Trade in Cheetahs (*Acinonyx jubatus*). Submitted by the Secretariat. Sixty-fifth meeting of the Standing Committee Geneva (Switzerland), 7-11 July 2014. *SC65 Doc.* 39 (Rev. 2). Retrieved from: https://cites.org/sites/default/files/eng/com/sc/65/E-SC65-39.pdf

e Ferard, E., 'The success of cheetahs as pets is threatening the survival of the species,' (unofficial translation from the French original) *Geo*, January 2019 (available at: https://www.geo.fr/environnement/le-succes-des-guepards-comme-animal-de-compagnie-menace-lavenir-de-lespece-194274).

f Durant et al. 2015, op. cit; Tricorache et al. 2018, op. cit.

g Durant et al., 'The global decline of cheetah *Acinonyx jubatus* and what it means for conservation', *Proceedings of the National Academy of Sciences of the United States of America, 114(3)*, 528-533, 2017; Durant, S., Mitchell, N., Ipavec, A., and Groom, R., *Acinonyx jubatus. The IUCN Red List of Threatened Species 2015*: e.T219A50649567 (2015) (available at: https://www.iucnredlist.org/species/219/50649567).

h CITES Seventieth meeting of the Standing Committee (SC70), Inf. 44, *Supplemental information on illegal trade in cheetah* (*acinonyx jubatus*), 2018.

i CITES (2018a). Report by Kristin Nowell, CAT, & IUCN SSC Cat Specialist Group. Implementation of CITES Decision 17.228: Review of implementation of Resolution Conf. 12.5 (Rev. CoP17) on *Conservation of and Trade in Tigers and Other Appendix-I Asian Big Cats.* Report for the 70th meeting of the CITES Standing Committee, Sochi, Russia, October 1-5, 2018; CITES SC70 Doc 54.1 Annex.

j CITES, *Interpretation and implementation of the Convention Species trade and conservation: Illegal Trade in Cheetahs (Acinonyx jubatus),* SC65 Doc. 39 (Rev. 2). (available at: https://cites.org/sites/default/files/eng/com/sc/65/E-SC65-39.pdf); Durant et al. 2015, op. cit; Marnewick, K., Beckhelling, A., Cilliers, D., Lane, E., Mills, G., Herring, K., Caldwell, P., Hall, R., and Meintjes, S., 'The status of the cheetah in South Africa', *Cat News Special Issue 3*, 22-31, 2007; Klein, R., 'Status report for the cheetah in Botswana, *Cat News Special Issue 3*, 14–21, 2007.

This rise in online markets allows hobbyists, and not only traders, to import and breed on a small scale and sell directly to other hobbyists, both to supplement their income and fund their hobby. In doing so they cut out the middleman and the overhead costs involved in brick and mortar operations. Private sellers are less exposed to law enforcement and specialized shipping services make it easy to ship from home.

In addition to these virtual meeting places, large reptile shows often act as rallying points for collectors and dealers to build relationships and trade merchandise. Sales of illegally imported reptiles at such shows are generally pre-arranged via social media and private messaging so the dealer can meet buyers outside the show to avoid law enforcement scrutiny as well as avoid the risk of returning with unsold trafficked animals.[23]

In September 2019, Austrian customs at Vienna International Airport intercepted an Austrian national living in the Philippines with a suitcase filled with 43 venomous snakes and 45 other reptiles.[24] His plan was to cross the open border between Austria and Germany and sell the animals at Terraristika Hamm, a quarterly trade fair that claims to be the largest of its sort in the world.[25]

Dealers at shows find different ways of circumventing legislation and bans on selling protected species. These include laundering the animals as captive bred, marking animals that are illegal to trade as "display only" in order to ensure dealers are officially acting within the law. Dealers can also label animals as being sold for "scientific or educational purposes only" in order, for example, to bypass legislation preventing commercial trade in turtle specimens smaller than 4 inches (10.2 cm).[26] After some scandals, most of the larger reptile shows in recent times have stricter controls to prevent these kinds of operations. A greater focus on traceability and proof of valid captive breeding claims would also help prevent these abuses.

Street markets, both permanent and temporary, are also a common place to obtain illegal reptiles based on seasonal availability. At the Mercado Sonora in Mexico,[27] reptile dealers sometimes keep native animals that are illegal to trade in the back of their stalls or have local suppliers nearby who can deliver rapidly if interested international collectors visit.[28] To evade law enforcement, some dealers at the Mercado de Peces, also in Mexico, suggested collectors come back on the weekend for sales of illegal wildlife because less law enforcement agents are on duty then.[29]

Endnotes

1 See figure 3 on the share of type of wildlife among total seizures (aggregated on the basis of standard value) 2005-2016 on page 16 of the first World Wildlife Crime Report published by UNODC in 2016. Included in these most trafficked species are various species of python, boa, monitor, alligator, crocodile, and caiman, as well as turtles and tortoises.

2 Small leather products made of reptile skin are very common (more than 13,000 seizures) but two-thirds of these were of one or two items (such as two shoes). These seizures may be related to tourists or others who inadvertently travel internationally with products made of protected reptile skins, rather than the actions of traffickers. Reptile skin seizures are sometimes reported by weight or another unit (as are live reptiles less commonly), but based on those seizures in which a count is given, there were 386,156 reptile skins seized in World WISE, compared to 316,393 live reptiles. World WISE contains 5,699 seizures of live reptiles (99.2% in which a count is given), compared to 1,644 seizures of reptile skins (98% in which a count is given).

3 Note that the World WISE database separates taxidermy specimens from dead bodies so the whole reptile bodies mentioned here are not meant for the taxidermy market.

4 Looking at the volume of all reptile species seized, the top species illegally traded include a number that are primarily consumed for meat or the skin trade and/or are heavily farmed with little need for wild-sourcing or conservation protection. They include, for example, the green iguana (*Iguana iguana*) and the ball python (*Python regius*), both of which are heavily farmed and in the top ten species for the legal reptile commercial trade based on number of live specimens, according to the CITES Trade Database. Also excluded are *Varanus nebulosus* (clouded monitor), *Varanus bengalensis* (bengal monitor), and *Ptyas mucosus* (oriental rat snake), excluded because they are primarily traded for the skin trade. *Amyda cartilaginea* (Asiatic softshell turtle), *Mauremys reevesi* (Chinese pond turtle), *Testudo hermanni* (Hermann's tortoise), and *Naja atra* (Chinese cobra) are primarily consumed for their meat (as well as for traditional Chinese medicine for Chinese cobra), so were also removed. These species are not, first and foremost, traded for the live pet trade and have therefore been removed from the analysis.

5 The exception being the Mali uromastyx lizard (*Uromastyx dispar*).

6 All analyses nevertheless include all reptile types.

7 30% of reptiles seized had no CITES listing information and were excluded from this analysis.

8 The Red List of the International Union for the Conservation of Nature (IUCN) is a compilation of research about plant and animal species put together on a voluntary basis by interested scientists. This compilation involves the assignment of a threat status, from "least threatened" and "critically endangered" which is updated periodically, as well as an assessment of the population trend.

9 International Union for the Conservation of Nature (IUCN), *The IUCN Red List of Threatened Species*, Version 2019-3 (available at: http://www.iucnredlist.org).

10 The yellow-spotted river turtle suffers from overfishing (partly as fisheries bycatch) and habitat loss in addition to harvesting for the pet trade. Its conservation status is unclear. Poaching in the wild for the pet trade is a major contributor to the decline in population numbers, so it was included in this list.

11 *Cuora spp.* is left at the genus level in this table because most seizures did not identify the specimen seized down to the species level. *Cuora amboinensis*, though, is number 14 in the top 15 seized reptile species for the live trade by count. The other reptiles in this top 15 seized were all identified down to the species level.

12 Except for the Southeast Asian box turtle (*Cuora amboinensis*) which is listed as vulnerable.

13 Decreasing for *Cuora picturata* (Southern Viet Nam box turtle), *Cuora galbinifrons* (Indochinese box turtle), *Cuora yunnanensis* (Yunnan box turtle) and *Cuora bourreti* (Bourret's box turtle). Unspecified for *Cuora trifasciata* (golden coin turtle), *Cuora mouhotii* (keeled box turtle), *Cuora flavomarginata* (yellow-margined box turtle), *Cuora zhoui* (Zhou's box turtle), *Cuora mccordi* (McCord's box turtle), *Cuora amboinensis* (Southeast Asian box turtle), *Cuora aurocapitata* (Yellow-headed box turtle) and *Cuora pani* (Pan's box turtle).

14 See the Methodological Annex for details.

15 UNODC fieldwork, see Methodological Annex.

16 UNODC fieldwork.

17 Ibid.

18 UNODC fieldwork.

19 See CITES CoP 17, Doc. 73, Annex 2 (2016), *Species specific matters: Tortoises and freshwater turtles (testudines spp.).*

20 See CITES CoP 17, Doc. 73, Annex 2 (2016), *Species specific matters: Tortoises and freshwater turtles (testudines spp.).*

21 66% of the seizure incidents in World-WISE reported origin while 74% included destination.

22 UNODC fieldwork.

23 UNODC fieldwork.

24 Federal Ministry of Finance of the Republic of Austria. (September 16, 2019). 43 poison snakes and another 45 reptiles seized by Austrian customs. Vienna, Austria: Federal Ministry of Finance of the Republic of Austria. See, for example, '43 Giftschlangen und 45 weitere Reptilien auf Flughafen Wien sichergestellt', *Der Standard,* 12 September 2019.

25 For more information about the trade fair, see: http://www.terraristikahamm.de/content/index.php.

26 UNODC fieldwork.

27 Sellers also sell reptiles along the highways in Mexico, especially those with high national tourist traffic.

28 UNODC fieldwork.

29 Ibid.

BIG CATS

6

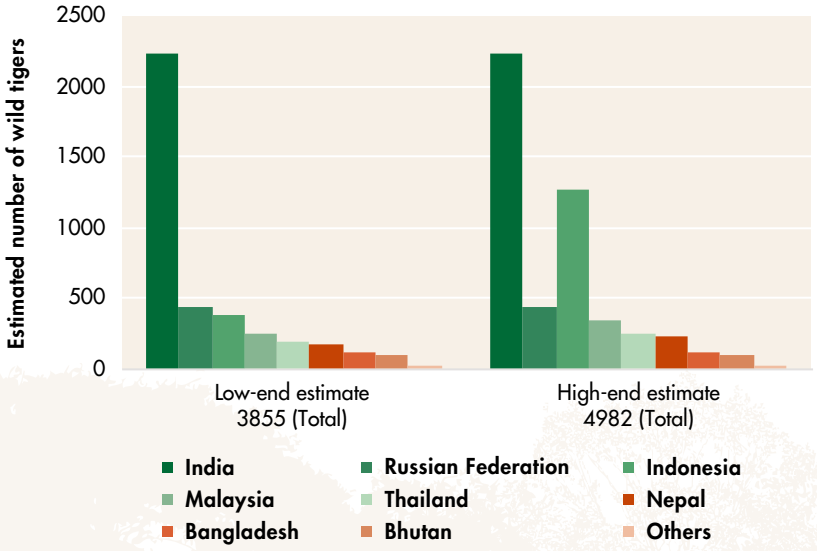
With the exception of the African lion, all big cat species are listed in CITES Appendix I, meaning international commercial trade in these species is illegal except under a few narrow conditions.[1] This chapter focuses on the illegal market for tiger products, specifically bone products, but also touches on the markets for products from other species of big cats, like lion and jaguar, some of which are used in ways similar to, in place of, or sold as, tiger products. The focus on bone products stems from the fact that almost two-thirds of tiger seizure incidents in World WISE from 1999-2018 corresponded to either tiger bone products or tiger medicinal products, which themselves are primarily made from bone.[2]

Tigers – and tiger products – have been traded continuously since antiquity. They have been traded live, as pets. Their skin, claws, and teeth have been and are still used ornamentally. Various parts, including their bones, have and continue to be used in tonics and medicines in East Asia. While in 1994, a TRAFFIC report concluded that the most serious threat to the tiger's survival was the trade in parts for medicine,[3] more recent reviews have shown that tiger parts (such as meat) and other products (such as bone wine or glue), are now less consumed for medicinal purposes and more as exotic luxury products and tonics.[4] Poaching for these uses is the greatest threat to tigers across their range.[5] In addition, tigers have a long history of being hunted due to conflicts with humans and livestock. As a result, they have disappeared from 90% of their original habitat range.[6]

In 2016, there were an estimated 3,855 to 4,982 tigers in the wild, most of which are found in eight countries (Figure 1).[7] It is estimated that there are up to three times as many tigers in captivity (estimated at 12,574),[8] 91 per cent of which are held in 716 facilities in seven countries for which data are available: China, the United States of America, Thailand, Lao People's Democratic Republic, India, Viet Nam and South Africa (see Table 1). Some of these facilities appear to supply domestic tiger product markets, and some appear to be the source of illegal international trade.

Captive breeding of Appendix I species, such as tigers for the international commercial trade of these captive-bred species and their parts is permitted but strictly regulated under CITES[9] and can only be carried out by facilities registered with the CITES Secretariat.[10] There are no captive tiger facilities registered under this system.[11] In 2007, however, the Conference of the Parties agreed in Decision 14.69 that tigers should not be bred for the purpose of commercial international trade in their parts and voted for "trade", in the context of this Decision to refer to domestic as well as international trade.[12] Captive breeding of tigers is occurring in several range and non-range States, with the United States, South Africa and Czechia having many captive tigers. Many captive breeding facilities appear to be operated in a manner that would not seem to align with this CITES Decision (14.69).[13] Breeding of tigers for commercial purposes is thus contrary to this Decision, although this alone may be perfectly legal in some countries according to domestic legislation.[14] Some tiger range countries have legal provisions that permit domestic trade under a permit system.[15] Some non-range states, meanwhile, simply do not have regulations regarding non-native species. Regulations vary widely in what they allow and how and if they are applied. Trading these products across borders, however, is contrary to CITES under national CITES

Fig. 1 Estimates of wild tiger populations in 2015, selected countries



Source: CITES, citing WWF and Goodrich et al 2015*

* CITES CoP18, Doc. 71.1, p. 13 (2019), *Species specific matters: Asian big cats (Felidae spp.): Report of the Secretariat.*

implementation laws, and it is this trafficking as well as the trafficking of wild tigers that is the subject of this chapter.

Fieldwork conducted by UNODC in 2019 suggests that some of the data on captive breeding operations obtained through studies commissioned by CITES in Table 1 may have changed over time and suffered from incomplete reporting. For example, it appears that in 2016, there were an estimated 537[17]- 700 tigers in captivity in the Lao People's Democratic Republic,[18] with a decline in 2017 following the unaccounted disappearance of 300 tigers from just one facility.[19] By 2017 the number of captive tiger facilities in the Lao People's Democratic Republic had increased from three to four, and by 2018 there were more than 600 tigers in six facilities in the country. Likewise, UNODC fieldwork documented over 450 tigers in South Africa in 2019.[20] Numbers in some countries are more difficult to assess because record-keeping is spotty and non-centralised or some tigers are being held in facilities that are unregistered or not open to the public.[21]

When all sources of tigers are combined (wild and captive), China likely has the largest number of living tigers in the world, followed by the United States, India, and Thailand. The Russian Federation, which does not have a large captive population, has the sixth largest tiger population in the world. The top eight countries hold about 90 per cent of the remaining tigers on earth (Figure 2). All of them, except the United States and South Africa have some indigenous tiger populations. According to the World Wildlife Fund, tiger ownership in the United States appears to be lightly regulated[22] as many tigers are privately owned, as pets or in small, unlicensed menageries,[23] with some anecdotal evidence of trafficking to Southeast Asia.[24] This is not to suggest that captive tigers do or do not have any conservation value per se but rather to point out that these countries with high levels of both wild and domestic tigers are potential sources of tigers for the illegal trade because of existing tiger "supply."

Sourcing

Assessing the illegal supply of tiger products is complicated by the fact that the species is used in so many forms and that seizures are only a partial picture of the trade since there can be no seizures in countries without adequate laws and enforcement capacity and limited seizures in countries with weak governance and/or high levels of corruption. Nevertheless, seizures do provide some insight into illegal tiger trafficking when properly contextualized. World WISE contains 1,032 seizure records for tigers from 2007-2018 where the type of product was specified. Of these, 40 per cent involve medicinal products reportedly containing tiger parts. Since these seizures were usually made on the basis of labelling, not forensic analysis, it is unclear how many individual tigers were used in the manufacturing of these products, if any.[25] All other types of tiger products account for the remaining 60 per cent of all seized items (Figure 3).

Seizures of live tigers, tiger bodies, rugs, skins, skulls, skeletons and trophies can be most easily analysed so as to represent equivalent numbers of individual tigers involved.[26] While the number of animals reflected in seizures of tiger products in these categories in World WISE is relatively small (913 in 1,032 seizures over 12 years),[27] based on just these products, the amount seized appears to be rising between 2007 and 2018 (Figure 4). This number should moreover be understood in the context of a small

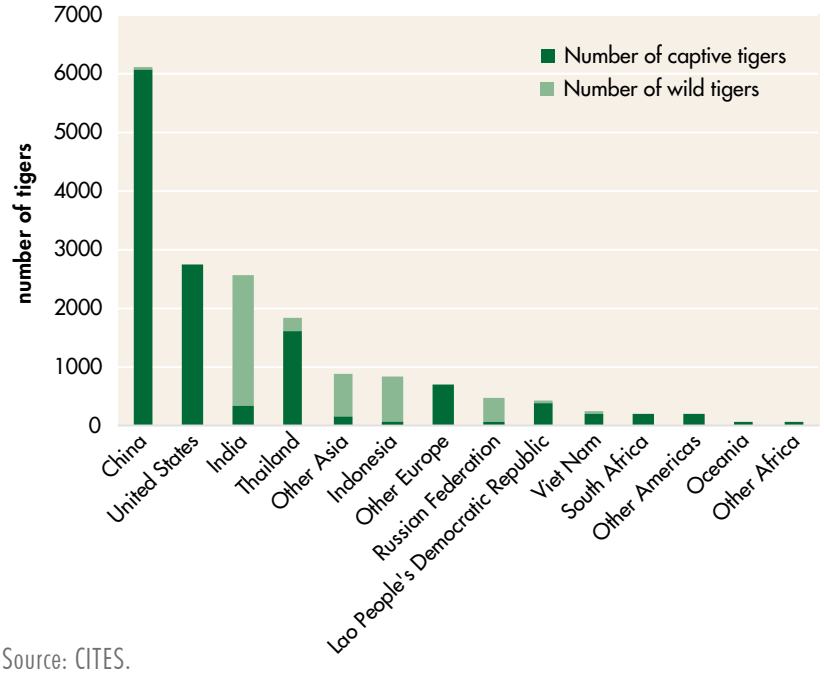
Table 1 Estimated number of facilities holding tigers and the number of tigers held in the seven countries with the greatest captive tiger populations up to early 2018

COUNTRY	NUMBER OF TIGERS LEFT IN THE WILD[16]	NUMBER OF FACILITIES	NUMBER OF TIGERS HELD IN FACILITIES
China	>7	210	6,057
United States	Not indigenous	355	2,729
Thailand	189-252	46	1,595
Lao People's Democratic Republic	2	4	380
India	2,226	48	309
Viet Nam	<5	13	186
South Africa	Not indigenous	36	186
61 other countries	–	326	1132
TOTAL	–	**1,038**	**12,574**

Source: CITES*

* CITES Seventieth meeting of the Standing Committee, *Review of facilities keeping Asian big cats (Felidae ssp.) in captivity*, SC70, Doc. 51, Annex 2 (Rev. 1).

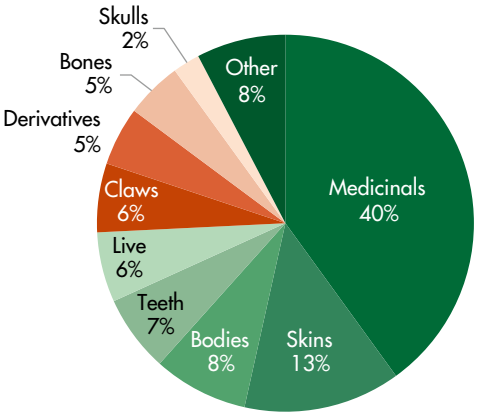
Fig. 2 Estimated number of tigers (wild and captive) by selected country, 2016 or most recent data*



Source: CITES.

* For countries where the number of wild tigers is estimated as a range, a midpoint figure was used for this graph. See: CITES CoP18, Doc. 71.1., p. 13 (2019), *Species specific matters: Asian big cats (Felidae spp.): Report of the Secretariat.*

Fig. 3 Share of tiger seizures by type of product 2007-2018*



Source: UNODC World WISE Database

* The year 2018 is based on partial data.

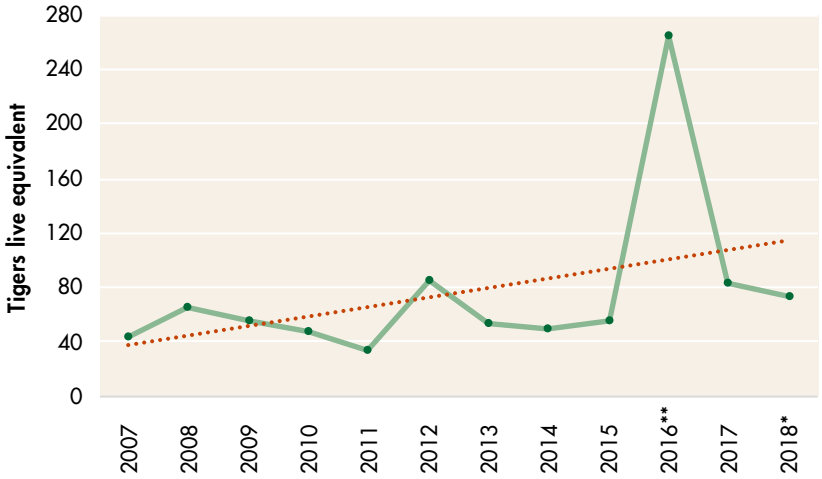
global tiger population of 3,855-4,892.[28] It should also be noted that these seizure data may not be complete, particularly for 2018.[29]

Looking only at products that convert readily to whole equivalents, it appears from the World WISE data covering 2007-2018 that Thailand and India are the main source countries of shipments seized in international trade, together representing 82 per cent of the total whole tiger equivalents seized where the origin was known (Figure 5).

Thailand has one of the largest captive tiger populations, but fewer than 200 wild tigers, so most of these seizures since 2007 likely involved captive-sourced animals. The Tiger Temple case is one notorious example.[30] In India, the opposite is true, with the world's largest wild population and a small captive population with no indicators to suspect captive specimens in trade,[31] the seized products are more likely from wild animals.

While some research has asserted that tiger products sourced from wild individuals are preferred by consumers over those from captive animals because they are thought to be more powerful with more effective medicinal properties,[32] it is almost impossible for consumers to differentiate between wild and captive animals. Given the current use of other species in products purporting to be tiger, the first concern for consumers is likely whether the product is genuine tiger.[33] This is part of the reason why, for example, whole tiger cubs have been found in large, transparent bottles or jars: they offer proof that the wine contains genuine tiger.[34] In addition to tiger products, products containing body parts of other

Fig. 4 Number of whole tiger equivalents seized based on reported seizures of products that can easily be converted into an equivalent number of individuals, 2007-2018*

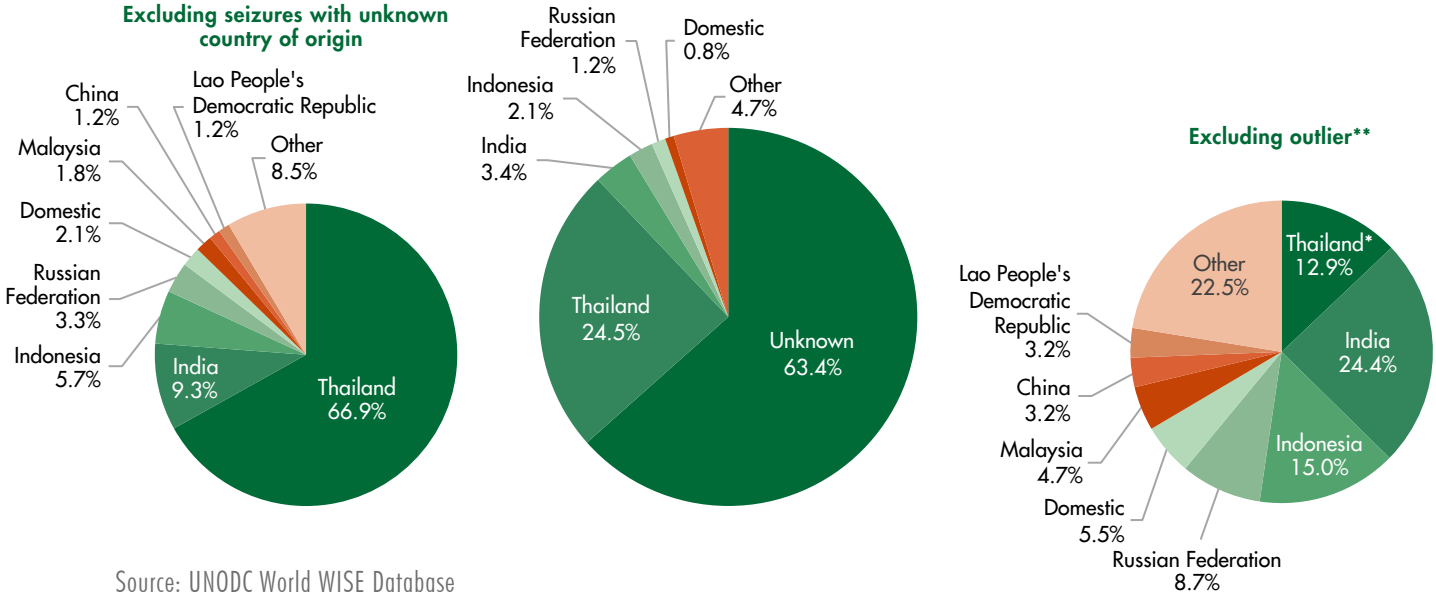


Source: World WISE.

* Included are bodies, live animals, rugs, skeletons, skins, skulls, and trophies. Teeth and claws are excluded. The year 2018 is based on partial data.

** 2016 includes an outlier of considerable size, the Tiger Temple case that occurred in Thailand.

Fig. 5 Share of reported origin countries for whole tiger equivalents seized globally, 2007-2018*



Source: UNODC World WISE Database

* Included are bodies, live animals, rugs, skeletons, skins, skulls, and trophies. Teeth and claws are excluded. The year 2018 is based on partial data.

** The Tiger Temple case that accounts on its own for 207 tigers (live equivalent) and clearly represents an outlier has been removed, the resulting chart shows that the prominent role of Thailand as a source of illegally traded tiger products is driven by this one single seizure incident of considerable size.

big cat species have been recorded in illegal trade, including leopards, snow leopards, clouded leopards, jaguars, and lions. Some of these products could be passed off as tiger products, particularly bones, teeth, and claws, although some of these species are also illegally traded to consumers seeking these species specifically. Leopard bone was officially recognised as a substitute for tiger bone in China in 1993, when domestic trade in tiger parts was prohibited.[35] Later, in 2006, the hunting of wild leopards was prohibited, as was the purchase of bones except from official stockpiles.[36] In addition to being used in place of tiger bones in traditional medicinal preparations,[37] leopard bone products are openly marketed as containing leopard, including in a tonic product known as Hongmao Yaojiu.[38]

Data on the use of snow leopard as a possible supplemental species to tiger is limited. One case of snow leopard use in Asian medicines was detected through DNA analysis in 2015.[39] Snow leopard claws and canines have more recently been advertised as medicine to cure heart and blood vessel ailments.[40] Given that the term for "leopard" used in traditional Chinese medicine is not specific and could refer to three species (leopard, snow leopard, and clouded leopard), it remains difficult to parse out the involvement of each in illegal or even legal trade.[41]

As for jaguar, the IUCN Red List assessment group noted in 2018, "jaguars are starting to be considered a replacement for tiger bone for traditional medicine purposes by the increasing Asian community in Latin America."[42] The CITES Secretariat also has plans to commission a study on the illegal trade in jaguars as it becomes a concern for the species' survival.[43] Jaguar parts appear to be entering the trade when jaguars are killed as menaces to humans and livestock (see box on jaguar canine trade below). World WISE contains records of only 121 seizures of jaguar parts (excluding medicines and derivatives) from 1999 to 2018, including skins or skin pieces (32 per cent of jaguar parts seizures), teeth (18 per cent), and live animals (13 per cent).

As a supplement to the tiger bone supply, African lions appear to be the species of greatest concern (see box 2 below). Nevertheless, greater insight into actual substitution trends between different big cat products is needed to determine its importance as a threat.

Trafficking

There are only 155 cases recorded in World WISE where the nationality of the tiger traffickers was identified, but of these, 29 per cent were Chinese, 18 per cent Indian, 14 per cent Vietnamese and 8 per cent Indonesian. Research conducted for CITES suggests the trafficking networks for tiger products involve Chinese and Vietnamese traders who sell the products to medicinal industries in China, casino towns bordering China in the Lao People's Democratic Republic or Myanmar, urban markets in the Lao People's Democratic Republic, and manufacturers in Viet Nam, or directly to consumers.[69] They link suppliers in source countries, both poachers and farms, with retailers in consumer countries. Supply chains converge to some extent with traders moving wild and captive-bred tigers

Box 1: Jaguar canines

Although jaguars *(Panthera onca)* are mainly killed in retaliation for conflict with humans and their livestock,[44] poaching for jaguar parts is a concern across the range states of Latin America (including Belize, Brazil, Costa Rica, Honduras, Panama, Peru and Suriname).[45]

Despite being listed on CITES Appendix I since 1975, jaguar parts have entered illegal trade,[46] and this appears to be an increasing problem.[47] While necklaces and keychains made of canines are found in local markets in source countries, local traders have reported increased interest in jaguar parts (including canines) from Asian nationals.[48] Recognizing the issue in 2018, the Chinese consulate in Santa Cruz (Plurinational State of Bolivia) and the Chinese embassy in Suriname issued advisories, warning Chinese citizens in these countries that jaguar trafficking is strictly forbidden.[49]

Seizures of canines en route to Asia[50] began as early as 2012-2014.[51] From January 2012 to March 2018, over 1,900 jaguar canines were reported seized.[52] 34% of these incidents were linked with China and these seizures were 14-fold larger than those meant for the domestic market. The majority of these canines were seized in the Plurinational State of Bolivia.[53] Many Bolivian seizures involved postal trafficking, with some seizures made in personal luggage at airports.[54] It is unclear whether the seized canines originated from Bolivia, or if they were smuggled into Bolivia from neighbouring countries.

In July 2019, representatives from jaguar range states met in Santa Cruz, Bolivia, at a regional seminar on wildlife trafficking. There, they signed a declaration recognizing the jaguar as an integral part of the ecosystem, and that its protection was a regional responsibility.[55] The signatories proposed the jaguar as the emblem of the fight again wildlife and forest crime. They highlighted that wildlife trafficking should be considered a serious transnational organized crime that affects sustainable development, communities, and security, and that sharing information, strengthening enforcement capacity, and regional cooperation are critical to halting the trafficking. Like the first regional conference of the Americas on illegal wildlife trade that took place in Lima, Peru in October 2019, such regional commitments to address the poaching and trafficking of protected species raise awareness of the seriousness of these crimes and their wide-ranging impact.

and African lion through their networks.[70] Two trafficking routes for tigers that have been identified are:

- A trans-Himalayan route sourcing primarily from wild populations in South Asia;[71] and
- Multiple Southeast Asian routes through the Mekong Delta making use of captive, as well as wild, tigers.[72]

Some border areas in South Asia have been identified as hotspots for tiger trafficking based on high seizure rates recorded there.[73] From South Asia parts move across the borders of India and Nepal into China, and via the northeast India route to Myanmar. Tiger parts from South Asia and South-east Asia, including from Indonesia move through Myanmar to China. Tiger parts are also trafficked via Myanmar to China via Lao People's Democratic Republic. Tiger parts from Indonesia, Malaysia, Thailand may be trafficked via Lao People's Democratic Republic to Viet Nam and China[74].The Southeast Asian routes are used to transport captive and wild tigers.[75] Captive tigers in China and Viet Nam are used for illegal domestic consumption.[76]

Of those seizure cases where the destination was reported (54 cases, 16 per cent of seizures over the period 2007-2018), the most common reported destinations were China, Thailand, and Viet Nam, which together were believed to be the destinations for more than half of the whole tiger equivalents seized.

Destination markets

All parts of the tiger are traded and used, for traditional medicine and for other purposes, but the bones are generally most sought after.[77] The tiger's strength and power are said to be the reason for its medical properties, with the bones believed to promote healing of bone, joint, and ligament issues and reduce inflammation.[78] Tiger bone is used in a variety of forms depending on the destination. It is soaked in wine to make tiger wine, boiled down to make glue or cake, and ground into powder for use in pills, plasters, and other manufactured medicinal products.[79] Of these, tiger wine and tiger glue (also known as *cao*, in Vietnamese, and *gao,* in Chinese) are believed to be the most sought-after products.[80]

Tiger bone is traditionally cleaned and fried in oil or vinegar to remove all flesh and cartilage. It is then ground into powder and mixed with herbs to make pills or added to camphor and menthol to make tiger balm.[81] Reported wholesale prices for tiger bone in Southeast Asia ranged from US$1,200 per kg in 1994, to US$1,250-3,750 per kg in 2007, to US$2,260 per kg as of 2014, but prices vary significantly based on the source of information used.[82] For example, Chinese court records

Box 2: South African lion bones

Sport hunting of lions has been a mainstay of some South African private game reserves for decades. In 1977, African lions were listed on Appendix II, so international trade in all lions requires CITES documentation. As late as 2000, more than 90 per cent of legally exported lion trophies worldwide were wild-sourced according to the CITES Trade Database,[56] but concern about wild sourcing as well as the profitability of farming other big cats led game ranchers to breed lions for their reserves.[57] Captive lion populations made possible the hunting of farmed and released animals. By 2015, the total number of lion trophies exported had doubled, but 93 per cent of these trophies came from farmed animals.[58]

Around 2007, further scrutiny of the adverse effects of trophy hunting on lion conservation and restrictions on trophy exports put pressure on game ranchers to find new outlets for their stock, including the international sale of lion bones as a supplement to tiger bones in the trade. These restrictions culminated in the 2016 United States trophy import ban, which significantly affected the sport hunting business in South Africa. A survey of South African lion breeders carried out in 2017 revealed that 79 per cent of respondents were affected by the United States trophy hunting import ban, and that 21 per cent of the respondents had decided to compensate by focusing on the lion bone trade. When asked what they would do if the United States ban was to remain in place, 52 per cent of respondents said they would instead focus on the lion bone trade.[59]

It appears that the first evidence of lion bone use in the production of products marketed for medicinal use or tonics in China was found in 2005, when lion bone was listed as an ingredient in "bone strengthening wine."[60] It is unclear whether the consumer was meant to notice this change in bone type, given that the wine bottle was in the shape of a tiger and the name of the product remained similar to tiger bone wine, despite the ingredients listing lion bone. There is also some debate as to whether and/or how much lion bone is considered a substitute for tiger bone or an additional possible ingredient for medicinal use.[61]

Small scale breeding of tigers has existed in South Africa since the 1990s,[62] but the interest in the bone trade has spurred growth in this industry.[63] The current tally is 72 facilities with over 450 captive tigers recorded in South Africa, compared to 363 lion breeding facilities with over 7,000 captive lions.[64]

Lion appears to be the main supplemental species for tiger bone at this point because there is a plentiful supply from South Africa. According to the CITES Trade Database between 2010 and 2018, most legal lion exports fall into three categories:

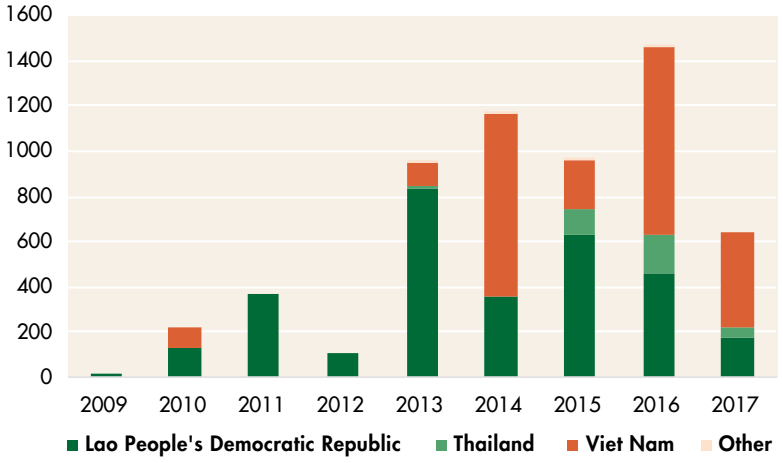
- Live animals, which are shipped to virtually every country in the world, mostly for circuses and zoos;
- Hunting trophies, which are also exported to many countries, but particularly to the United States (up until the 2016 ban) and Europe; and,
- Skeletons, bones, and bodies which are exported in commercial trade to Southeast Asia (Lao People's Democratic Republic, Viet Nam and Thailand), presumably for the creation of products like bone glue (Figure 6).[65]

Between 2007 and 2017, about half the legal live trade, over 80 per cent of the trophies, and virtually all the skeletons, bones, and bodies of lions were exported from South Africa.

UNODC fieldwork in South Africa suggests that exporters sometimes illegally combine tiger bones with lion bone exports, the two being difficult to distinguish. Examples of illegal trade in tiger bone from South Africa to Asia have been detected. There have also been instances where tiger and lion bone coming from legal captive-breeding facilities in South Africa have been seized in connection with the same organized criminal group.[66]

A recent CITES study also found indications that much of the lion bone legally imported into Southeast Asia was then likely being illegally re-exported internationally. The same study reported multiple court cases relating to "tiger bones" seized from illegal trade in China, which, when tested, turned out to be lion bones.[67] Chinese court records suggest that lion bones sold as tiger fetch similar prices.[68]

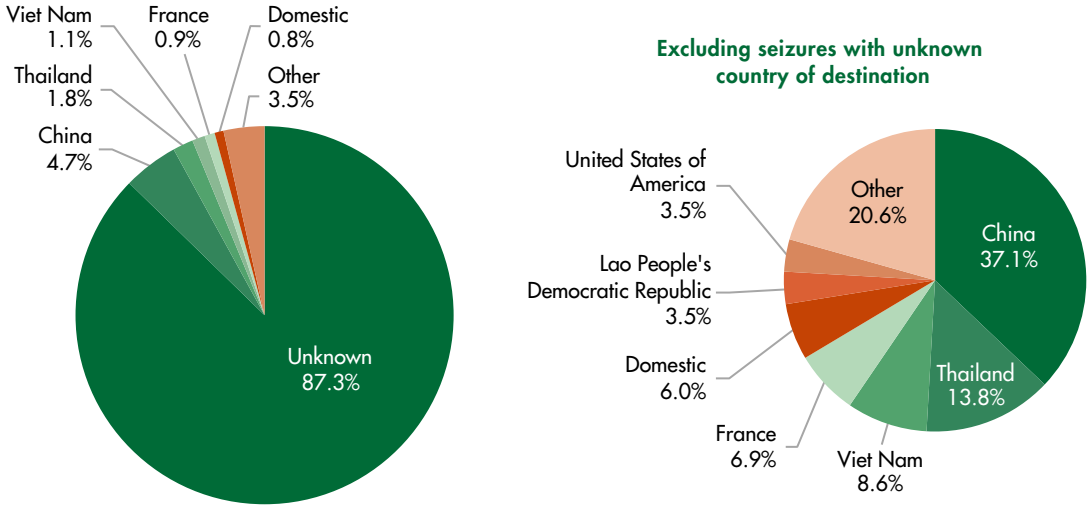
Fig. 6 Number of lion skeletons legally exported from South Africa by importing country (exporter reported data), 2000-2017*



Source: CITES Trade Database.

* The drop in exports in 2017 is linked to the South African government setting a quota of 800 skeletons, but questions remain as to the exact volume of bones exported.

Fig. 7 Share of reported destination countries for whole tiger equivalents seized globally, 2007-2018*



Source: UNODC World WISE Database

* Includes live, bodies, rugs, skins, skulls, skeletons, and trophies. The year 2018 is based on partial data.

indicate prices of about US$1400 per kg in 2015 closer to the retail end of the trafficking chain.[83] There are thought to be cultural preferences for certain tiger bone products: use of tiger bone wine is more commonly associated with Chinese culture, while use of tiger glue is associated with Vietnamese culture.[84]

Tiger wine is produced in several ways. The Hunan Sanhong Pharmaceutical Company describes one procedure where tiger bone is crushed into powder and mixed with sorghum liquor.[85] Other methods include soaking tiger bones in alcohol to produce tiger stock rather than mixing crushed bone (bones are used for a maximum of three batches in this case). Tiger wine is sold in East and Southeast Asia for an average of about US$80 for a bottle aged three years, US$155 for six years, and upward of US$290 for an eight-year wine.[86] In venues where tiger wine is consumed for prestige, bottles can range in price from US$500 to over US$1,000 per bottle.

Tiger glue is a concentrated product manufactured by boiling the bones for three to seven days, producing a red-brown substance that is poured into a frame to make a gelatinous cake and cut into bars of approximately 100 grams for sale.[87] It is often ground into powder or scrapings and consumed with alcohol. Tiger glue bars, weighing about 100 grams, are sold in Viet Nam for about US$1,000 each.[88]

China is the largest of the three destination markets identified on the basis of seizure records (Figure 7). China implemented a ban on all domestic trade of tiger bone in 1993.[89] China's national medicine standard for using tiger bone in prepared Chinese medicine was annulled, but leopard bone was permitted as a substitute.[90] Recently, new regulations concerning tigers have been issued.[91] Despite these regulations, some illegal trade continues, as tiger products repeatedly appear in seizure cases. But more evidence is needed to understand the magnitude of this trade given the limited number of seizure cases where the destination is known (16% of seizures).

Vietnamese law and regulations allow internal trade in wild or captive-bred big cats with a permit from designated authorities (the Provincial People's Committee, which then reports to the Ministry of Agriculture and Rural Development).[92] Based on interviews in 2019 in Viet Nam, it appears no permits have yet been granted. A new law is said to be under review that would require all tigers to be registered, with the government surveying all tiger facilities.[93] The result of these controls is that few pharmacies, traditional medicine shops, or wildlife markets now openly carry tiger products in Viet Nam.

The same is happening in Thailand.[94] Tiger glue is sold behind closed doors through acquaintances, only to be discovered during investigations and seizures.[95] A large part of the trade, though, including the tiger wine and live trade, has shifted to online sales through social media and messaging apps, like Facebook, Instagram, Weibo, Taobao, WhatsApp and We Chat.[96]

Consumer demand profiles for tiger products have started to change, and new forms of demand are emerging. Instead of health, wealth is becoming the primary motivation of consumers. The switch is from tiger meat and tiger wine being consumed only as health products to now also being consumed as exotic luxury products that demonstrate affluence.[97]

In Viet Nam, gifts of tiger products were made to obtain respect from others. 71 per cent of those who

Box 3: Captive breeding facilities in the U.S.

Around the world, facilities are established to deal with captive populations of endangered species for a variety of reasons, including research, conservation, and entertainment. In the United States, privately-owned commercial entertainment facilities (parks, zoos, etc.) in several states have engaged in breeding and crossbreeding of big cats, and some generate over US$1 million per year while providing opportunities for visitors to take photos when petting and feeding cubs.[104] The presence of cubs is a fundamental ingredient for the commercial success of these facilities, but also poses a considerable challenge because cubs are no longer suitable for petting after age two to three months. To reduce the costs of maintaining adult tigers, many are sold, sometimes on the black market to collectors, unaccredited zoos, or are killed by their owners.[105]

In the United States, there is no federal law that prohibits the possession and sale of big cats and exotic pets[106], including tigers (*Panthera tigris*) and lions (*Panthera leo, Panthera leo melanochaita*). The Animal and Plant Health Inspection Service (APHIS) under the Department of Agriculture (USDA) administers the Animal Welfare Act (AWA) by conducting routine, unannounced inspections of all entities that are registered or licensed under the AWA. The focus of these inspections is on the prevention or cessation of inhumane treatment of animals, as well as the resolution of trade issues. Violations of AWA are generally handled through civil litigation.[107] The Endangered Species Act (ESA) does prohibit the sale across states or the international import/export of listed species and their parts, without a valid ESA permit or registration under the Captive-Bred Wildlife Programme.[108] Furthermore, the Lacey Act prohibits the import, export, interstate commerce and sale of fish, wildlife and plants taken in violation of international laws or laws in the country of origin.

The United States Fish and Wildlife Service (USFWS) is responsible for the enforcement of both the ESA and Lacey Act (in cooperation with other agencies), and it can press criminal charges against those who violate these laws. The current legislative system makes it difficult to address crimes related to possession, captive breeding, and transport of exotic wildlife. The agency responsible for the inspections of these wildlife facilities, the USDA, has a clear focus on animal welfare rather than on crime investigations,[109] while at the same time, the agency responsible for wildlife crime investigations – USFWS – is not significantly involved in zoo and other animal commercial entertainment facility inspections as the possession of exotic species does not fall under its remit.

Recent media coverage about one of the most popular exotic animal attractions in the United States – the Greater Wynnewood Animal Park (or G.W. Exotic) in Oklahoma – re-ignited the debate about the effectiveness of this existing regulatory system. The attraction owner was convicted on eight counts of violating the Lacey Act for falsifying wildlife records and nine counts of violating the ESA in 2019.[110] The wildlife offences included the killing of five tigers, the sale or offer for sale of five tiger cubs in interstate commerce, and false documentation hiding the sale of nine lions, three tigers and one lemur. These charges were secondary, however, to the murder-for-hire charges that triggered the prosecution. They were also limited to a timeframe spanning only two months in 2017 when the facility has been in operation since 1997 and under investigation for the past 10 years, including for the death of 23 tiger cubs in 2010.

The Big Cat Public Safety Act[111] has been introduced in both houses of the United States Congress. The Act would create an overarching federal law on ownership of big cats as pets and would ban public handling (including cub petting) and prohibit breeding that did not fall under specifically managed Species Survival Plan[112] conservation breeding programs.[113] It is currently being considered by the United States Congress to help control the possible exploitation of big cat breeding facilities by organized crime and other black market actors.

used tiger products purchased them for medicinal uses (83 per cent of purchases were for tiger glue).[98] Purchasers reported buying primarily for themselves or for close family in equal proportion, purchasing for family members to gain their respect.[99] There was also a recent trend toward using big cat tooth and claw jewellery among young men, sometimes made of other species than tiger.[100]

Thai consumers, on the other hand, tended to buy tiger products for spiritual reasons and because they believed these products would provide protection (86 per cent),[101] with less than half of consumers buying for status reasons. These purchases were mainly in the form of spiritual items and amulets, oftentimes blessed by a Buddhist monk, despite a strict 2014 prohibition against the use of tiger parts in amulets from the Sangha Supreme Council, the governing body of the Buddhist order of Thailand.[102] This prohibition is in keeping with the fact that tiger products are not formally included in the Thai traditional medicine practice.[103]

Table 2 Tiger body parts utilized for healing and preventive medicine in Asia

TIGER DERIVATIVE	EXAMPLE USES
Bone plasters	Aches and pain, bone and joint conditions (e.g. arthritis, rheumatism), replenish calcium, anti-inflammatory, treat osteoporosis
Bone wine	Aches and pain, bone and joint conditions (e.g. arthritis, rheumatism), replenish calcium, anti-inflammatory, treat osteoporosis, increase sexual capacity, paralysis
Bone gelatine "cake"/"glue" (cao *in Viet Nam)*	Give strength, arthritis
Penis	Increase sexual performance, treat impotence
Fat	Vomiting, dog bites, bleeding haemorrhoids, scalp ailments in children
Skins	Clothing, magical amulet, trophies, decoration, treat mental illness
Claws	Magical amulet, jewellery to ward off common cold
Teeth	Magical amulet, rabies, asthma, sores on the penis, diabetes
Whiskers	Tooth ache
Eyeballs	Epilepsy, malaria, nervousness of fever in children, convulsions, cataract
Nose	Epilepsy, children's convulsions
Tail	Skin disease
Brain	Decrease laziness, heal pimples
Lung	Relieve cancer
Testes	Tuberculosis of lymph nodes
Blood	Strengthening the constituion and willpower
Bile	Convulsions in children
Stomach	Calming upset stomachs
Gallstones	Weak or watering eyes, abscesses on the hand
Meat	Nausea, malaria, improving vitality, tonifying the stomach and spleen
Paws	Arthritis, improve general health
Hair	Drives away centipedes when burnt

Source: CITES SC70 Doc. 54.1, Annex

Endnotes

1 That is, all species of the genus *Panthera* including tigers, Asian lions, leopards, clouded leopards, and snow leopards. Most *Panthera* species were placed on Appendix I in 1975, the exceptions being lions (*Panthera leo*) and one subspecies of tiger (Siberian tiger, *Panthera tigris tigris,* formerly *Panthera tigris altaica*), which was later included in 1987. Asian lions (*Panthera leo persica*) were up-listed to CITES Appendix I in 1977. Currently African lions (*Panthera leo leo*) remain on CITES Appendix II with an annotation.

2 CITES also noted the importance of the skin trade for tigers, although World WISE data does not reflect this. See: See CITES, Sixty-fifth meeting of the Standing Committee, Interpretation and implementation of the Convention: Species trade and conservation: Asian big cats, SC65, Doc. 3, (available at https://cites.org/sites/default/files/eng/com/sc/65/E-SC65-38.pdf).

3 Mulliken, T. and Haywood, M., 'Recent data on trade in rhino and tiger products, 1988-1992', *TRAFFIC Bulletin, 14* (3), pp. 99-106, 1994.

4 CITES, Sixty-fifth meeting of the Standing Committee, *Interpretation and implementation of the Convention: Species trade and conservation: Asian big cats*, SC65, Doc. 38, para. 6.; CITES CoP18, Doc. 71.1., p. 13 (2019), *Species specific matters: Asian big cats (Felidae spp.): Report of the Secretariat.*

5 Goodrich, J., et al., *Panthera tigris, The IUCN Red List of Threatened Species 2015:* e.T15955A50659951 (2015). (Available at: http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T15955A50659951.en).

6 Ibid.

7 CITES Seventieth meeting of the Standing Committee, *Species specific matters: Asian big cats (felidae spp.): Report of the Secretariat,* SC70, Doc. 51, Annex 4.

8 CITES Seventieth meeting of the Standing Committee, *Review of facilities keeping Asian big cats (Felidae ssp.) in captivity,* SC70, Doc. 51, Annex 2 (Rev. 1) (available at: https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-51-A2-R1.pdf).

9 In accordance with CITES, Appendix I animal species bred in captivity for commercial purposes shall be deemed to be specimens of species included in Appendix II (see Article VII, paragraph 4, of the Convention). Therefore, trading in captive bred Appendix I species, such as big cats, is permitted under CITES. In 2007, however, the CITES Conference of the Parties decided that tigers should not be bred for the purpose of trade in their parts and derivatives. CITES Decision 14.69, on captive-bred and ranched specimens, was directed to the Parties, especially Appendix I Asian big cat range States, and reads as follows, "Parties with intensive operations breeding tigers on a commercial scale shall implement measures to restrict the captive population to a level supportive only to conserving wild tigers; tigers should not be bred for trade in their parts and derivatives." Violation of this directive does not carry criminal penalties unless supported by national legislation. Decision 14.69 is still valid.

10 CITES. *Registration of operations that breed Appendix-I animal species in captivity for commercial purposes,* Conf. 12.10 (Rev. CoP15) (available at: https://cites.org/sites/default/files/document/E-Res-12-10-R15.pdf); CITES Sixty-fifth meeting of the Standing Committee, *Review of implementation of resolution conf. 12.5 (rev COP16) on conservation of and trade in tigers and other appendix-I Asian big cat species,* SC65, Doc. 38, Annex 1, (available at: https://cites.org/sites/default/files/eng/com/sc/65/E-SC65-38-A01_0.pdf).

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12 CITES Fourteenth Meeting of the Conference of the Parties, *Summary record of the 14th session of Committee II,* CoP14 Com. II Rep. 14 (Rev. 1), (available at: https://www.cites.org/sites/default/files/eng/cop/14/rep/E14-Com-II-Rep-14.pdf).

13 The CITES Secretariat refers to this misalignment in CITES SC70 Doc. 51 and again in CITES CoP18 Doc 71.1.

14 Wildlife crime related to CITES trade violation is clearly defined by CITES requirements, but outside trade violations, wildlife crime varies from country to country and some actions involving wildlife may be a criminal offence in one country but not in another. CITES Decision 14.69, on captive-bred and ranched specimens, was directed to the Parties, especially Appendix-I Asian big cat range States, and reads as follows, "Parties with intensive operations breeding tigers on a commercial scale shall implement measures to restrict the captive population to a level supportive only to conserving wild tigers; tigers should not be bred for trade in their parts and derivatives." Violation of this directive does not carry penalties unless national legislation specifically criminalizes it.

15 See annex 5 of https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-071-01.pdf, paragraph 2 commencing "Legislation and administrative regulations are in place to regulate the management of those facilities and the trade in those big cats, their products and derivatives originated from them."

16 Ibid.

17 CITES Secretariat. 2017. Application of Article XIII in the Lao People's Democratic Republic. SC69 Doc.29.2.1 (page 5-6). (Available at: https://cites.org/sites/default/files/eng/com/sc/69/ESC69-29-02-01.pdf; Wildlife Justice Commission (WJC). 2016. Operation Ambush. Available at: https://wildlifejustice.org/wp-ontent/uploads/2016/10/WJC-Ambush-Briefing_Public.pdf).

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24 For instance, a resident of New York in 2018 admitted during court proceedings having purchased and exported from the United States to Thailand an assortment of endangered species parts corresponding to a market value of US$150,000 (Department of Justice, US Attorney General Office. 1 August 2018. *New York Man Sentenced To Prison For Trafficking In Endangered Lion And Tiger Parts*).

25 For example, World WISE contains seizures of a product known as "Jian Bu Hu Qian Wan", which contains nine ingredients, including "Os Tigris," aimed at treating a wide range of maladies. It is unclear what portion of these seizures is tiger bone. Forensic tests of natural supplements in the West have often found little or none of the active ingredient claimed. See, for example, Newmaster, S. G., Grguric, M., Shanmughanandhan, D., Ramalingam, S. and Ragupathy, S., 'DNA barcoding detects contamination and substitution in North American herbal products', *BMC Medicine*, Vol. 11, p. 222, 2013.

26 Each live tiger, body, skin, skull, skeleton, and trophy was counted as one tiger. In World WISE, seizures marked are skeletons are meant to be whole skeletons meaning that adding skulls in this analysis is unlikely to double count. Furthermore, skull seizures make up only a fraction of cases limiting any risks from possible double counting. While double counting with skins and skeletons is also possible, World WISE data appears to under-represent skins compared to other public data sources, meaning this possible duplication would also be limited.

27 Data from EIA's database of tiger seizures were included in this sample if cases met the following criteria: confirmed seizures with a specific date and location.

28 CITES Seventieth meeting of the Standing Committee, *Species specific matters: Asian big cats (felidae spp.): Report of the Secretariat,* SC70, Doc. 51, Annex 4.

29 Other sources report a higher number of seized tigers over the same period. (See,

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105 Ibid.

106 While there is no federal law, 36 states ban the ownership of tigers as pets, but it is possible to obtain a license for breeders and exhibitors to transfer and keep big cats. Four states have no laws on ownership at all, while ten others require permits. Licenses to run establishments that own these animals are issued by Government authorities, often with requirements for regular inspections to ensure compliance with animal welfare standards, regulations for obtaining and disposing of animals, and sanitary and public health standards to, for example, avoid disease transmission (including zoonoses). See National Geographic map on state laws on keeping big cats as pets retrieved from https://www.nationalgeographic.com/animals/2019/11/map-shows-tiger-trade-in-united-states-feature/.

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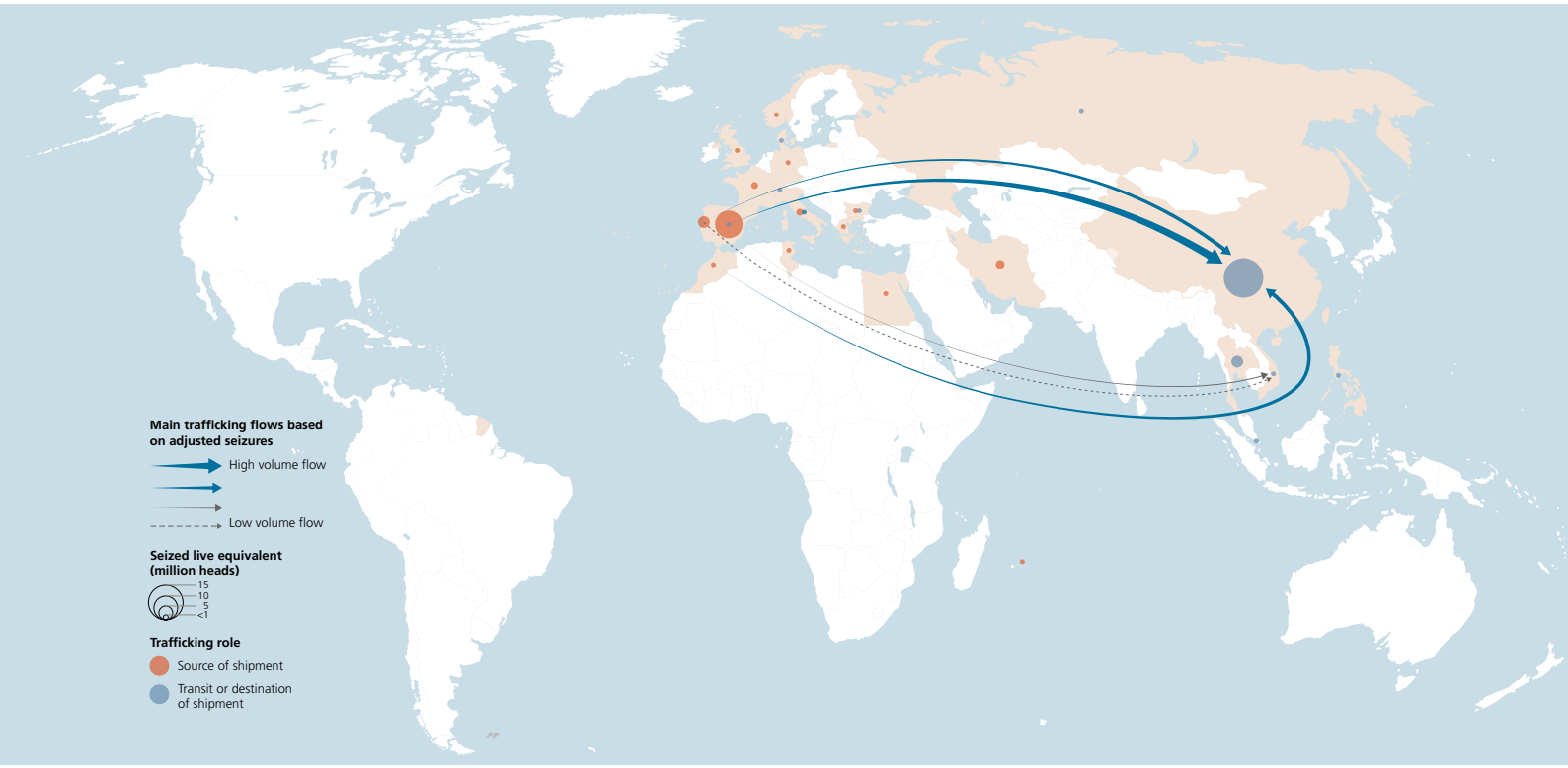
EUROPEAN GLASS EELS

7

Map 1 Trafficking flow map - European glass eels (2007-2018)



Source: UNODC World WISE Database

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. The year 2018 is based on partial data. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

On 28 October 2019, French customs officers at Charles de Gaulle Airport arrested two people on their way to Kunming, China, because they had 300,000 live glass eels[1] in their luggage. Contained in water-filled plastic bags kept cool by frozen water bottles, this contraband weighed 91 kilograms and was worth over 100,000 euros. What these "fish mules" were doing was illegal because, following a significant decline in the wild population, European eel (*Anguilla anguilla*) was listed in Appendix II of CITES in 2009, and the European Union (EU) placed a ban on the import and export of these eels in 2010. This seizure represents just one small portion of a large-scale illicit flow involving many tons of live, critically endangered European eels smuggled from Europe to Asia every year.

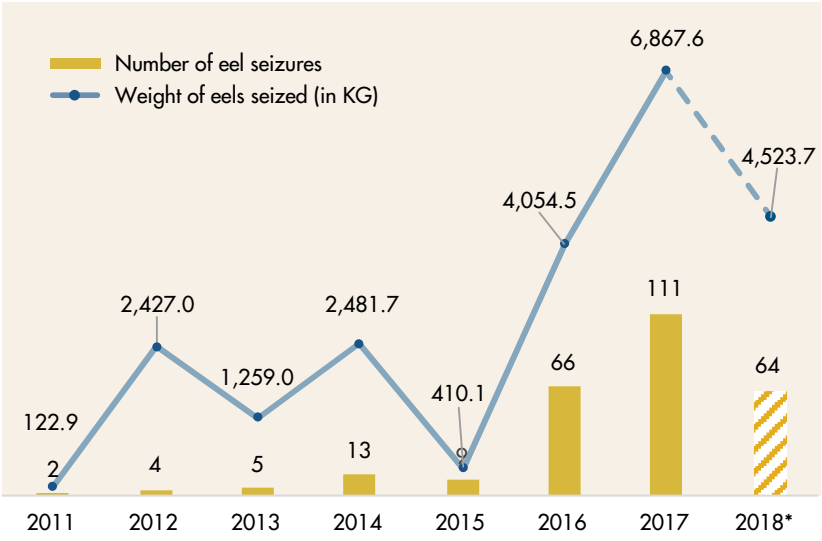
The first *World Wildlife Crime Report* focused on a different market: illegal sturgeon caviar. The illicit caviar market, however, appears to be in decline. In the 1990s and early 2000s, seizures of hundreds of kilograms were made. While a few large seizures continue to be made,[2] the volumes seized have plummeted in recent years. For example, in 2001, over six metric tons of caviar were seized, which is more than all the caviar seized between 2003 and 2017. While poaching continues in both the Caspian and Black Sea regions, it appears that the value of the illicit market has declined over the last two decades.

The first World Wildlife Crime Report concluded that the decline of caviar trafficking was attributable to two things: the growth of farmed caviar as a viable alternative and the decline in wild Caspian sturgeon populations. While poaching of sturgeon continues to pose a threat to the remaining wild population, most of this contraband appears to be consumed in source country markets, as very little is seized internationally. As a result, this report focuses on a different marine species, European glass eels, where the alternative of captive breeding is not available.

Freshwater eels are one of the most widespread marine genera and are part of the national cuisine in countries around the world. European eels, like most sturgeons, are diadromous, which means they spend part of their life cycle in saltwater and part in freshwater. While sturgeons spend most of their lives in saltwater and return to the freshwater to breed, eels do it the other way around, spending most of their lives in rivers and streams and returning to sea to mate. Scientists believe that both European and American eel *(Anguilla rostrata)* breed in the Sargasso Sea, a calm area of the North Atlantic bordered by ocean currents and home to a characteristic seaweed.[3] While this breeding has never been witnessed, captured larvae grow increasingly larger radiating from the Sargasso Sea toward the US and European coastlines.[4]

After riding the Gulf Stream to the European and North African estuaries over the course of a year or longer, the arriving larvae have matured to the glass eel stage, reaching between six and eight centimetres in length. These juveniles, referred to as "glass eels" due to their transparent appearance, are needed for aquaculture because adult European eels have never been successfully bred in captivity. This means that, unlike sturgeon caviar, demand for wild caught eels cannot be replaced by captive breeding. And since populations of Japanese eel *(Anguilla japonica)*, American eel and European eel are in steep decline, some of the multi-billion-dollar[5] eel industry appears to have become reliant on poaching.

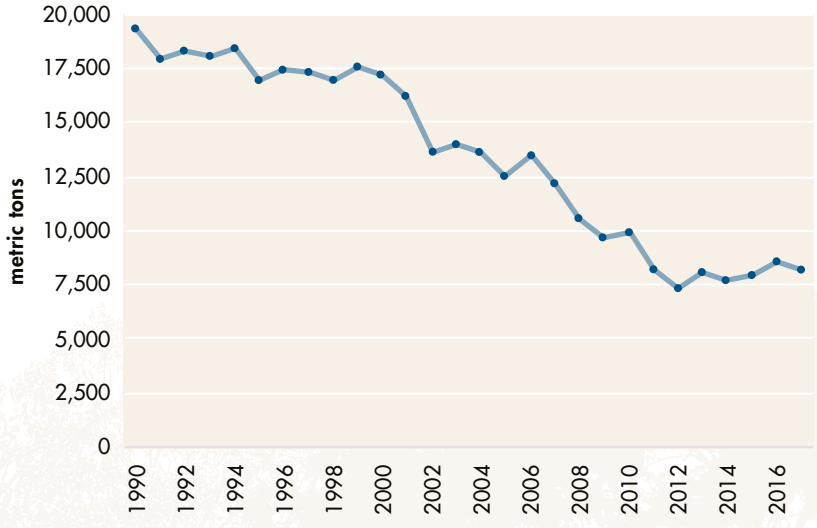
Fig. 1 Weight equivalent of European eels seized and number of European eel seizures (live, fingerlings), 2011-2018*



Source: UNODC World WISE Database

* Data for 2018 should not be considered as complete and are therefore not directly comparable with those from previous years.

Fig. 2 European eel produced (aquaculture and capture fisheries) in Europe, 1990-2017



Source: FAO

The legal global eel market

Eel products are legally produced and consumed in countries around the world. This legal market is relevant to a discussion of eel trafficking, because it is largely fed by aquaculture producers who may receive some of their glass eel stock from illegal sources. Unlike contraband like street drugs, there is no back-alley black market for eel meat products. Rather, similar to some other wildlife products, legitimate products can be tainted by illegitimate sources of supply. The following section describes the parameters and trends of this legal market and the role European glass eels have played in it.

Adult eels may be caught from rivers for consumption, but most eels consumed today come from aquaculture. In 2017, FAO statistics show over 96 per cent of the global eel supply was from aquaculture.[6] As explained later in this chapter, some of these farming operations make use of illegally taken glass eels.

There are many species of freshwater eel (of the genus *Anguilla*), but it appears that just four provide most of the glass eels for eel aquaculture:[7]

- *Anguilla japonica* (Japanese eel),[8]
- *Anguilla rostrata* (American eel),[9]
- *Anguilla bicolor* (shortfin eel),[10] and
- *Anguilla anguilla* (European eel).

According to the IUCN, shortfin eels are classified as "Near Threatened", with an uncertain population trend.[11] Both Japanese and American eels are "Endangered", European eels are "Critically Endangered", and all three species have a declining population trend.[12] However, only European eel is CITES-listed (Appendix II as of 2009) and, in 2010, the European Union banned all European eel imports and exports. While sourcing and trading of other eel species could be contrary to national fisheries laws, only European eel are subject to international controls, and so they are the focus of this chapter.

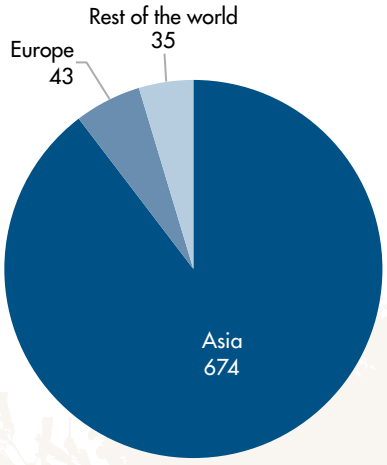
Only the import and export of European eel is banned in the European Union.[13] Production of eel in the EU for European consumption continues, although at greatly reduced levels compared to 30 years ago (Figure 2). For more than 50 years, stock abundance and fishing yield of European eels have declined by about 5% annually, to less than 10% of their historical levels today.[14] In the 1980s, official glass eel catch figures for Europe exceeded 3,000 MT per year, but between 2010 and 2016, the official catch was less than 60 MT.[15] This decline is due to a number of factors, not just overexploitation,[16] but the species has been deemed too vulnerable for international commercial trade from the European Union. National trade data show that France, Spain, Portugal and the United Kingdom hosted the primary fisheries for glass eels in the past, and a different group of countries (particularly the Netherlands, Denmark and Germany) grew the glass eels to maturity and processed the meat. Today, the Portuguese fishery is strongly restricted, so most of the legal glass eel catch in Europe comes from the other three countries:

- In Spain, the situation is complicated by the fact that the coastal areas have autonomous status, so the fishery is regulated locally with no national quota, and recreational fishing of glass eels for personal consumption is allowed in some areas.[17]
- In France, a national quota is set (just under 65 MT for 2017-2018), which is the sum of local quotas and includes glass eels set aside for restocking.[18]
- In the United Kingdom, there is no national quota, but fishing is limited to the use of hand nets by a small number of fishers (about 300) operating during a constrained season in a limited geographic area.[19]

The volumes legally fished for Europe appear to be less than those illegally exported for aquaculture. Global seizures alone can represent more than 10 per cent of the French national quota, and have trended upward since 2011, the year after the eel export ban was put in place (Figure 1). Based on World WISE data, Spain, France and Portugal appear to be the source of most of glass eels seized today. Seizure data also show the destination of these glass eels is also the region with the highest legal production: Asia. In 2017, 96 per cent of global aquaculture eel production took place in Asia.[20]

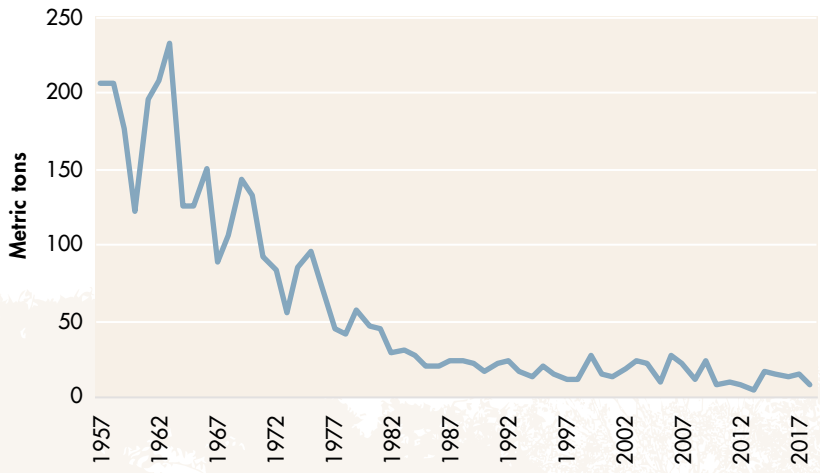
Traditionally, Asian eel production was based on Japanese eel, but declines in catches have forced the industry to import glass eels of other

Fig. 3 Live eel imports in 2018 (US$ millions)



Source: UN Comtrade

Fig. 4 Juvenile eels (Anguilla japonica) legally caught in Japan (metric tons), 1957-2017



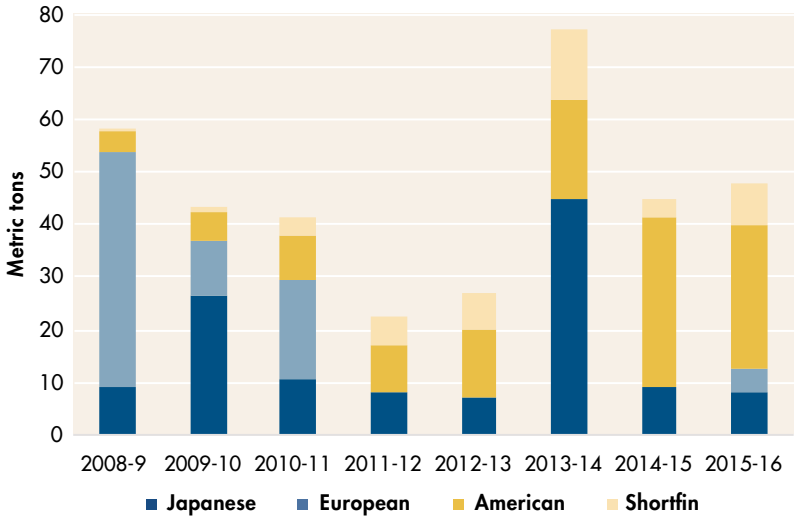
Source: Japan Fisheries Agency

species. Based on UN Comtrade data, 89 per cent of the world's live eel imports (including glass eels) were made by Asian countries in 2018, particularly Japan, the Republic of Korea and China (Figure 3). Japan was the leading importer, importing virtually all its live eels from China.

Nowhere are eels more important as a food source than in Japan, where *unagi kabayaki* is popular year-round, but traditionally eaten by everyone on the Midsummer Day of the Ox. Fisheries catches of Japanese eels (*Anguilla japonica*) have been steadily declining since the 1960s (Figure 4) due to a variety of factors, including over-exploitation.[21] The species has been classified as "Endangered" on the IUCN Red List since 2014.[22] Parallel to this decline, export of European eels to East Asia began to rise steeply in the 1970s.[23] According to the CITES Trade database, in 2009,[24] Japan imported 96 per cent of the legally traded European eel meat.[25] While Japan dominates imports, China dominates aquaculture production. In 2017, 85 per cent of global eel production by weight occurred in China (Figure 5). The combination of species of the glass eels on which this production is based has varied over time. Until exports from the European Union were banned in 2010, most of the Chinese eel production was based on European eel (78 per cent in 2008-9, see Figure 6). Since then, there have been limited CITES certified exports of live European eel from North Africa, which is within the range of the European eel but outside the EU export restrictions.

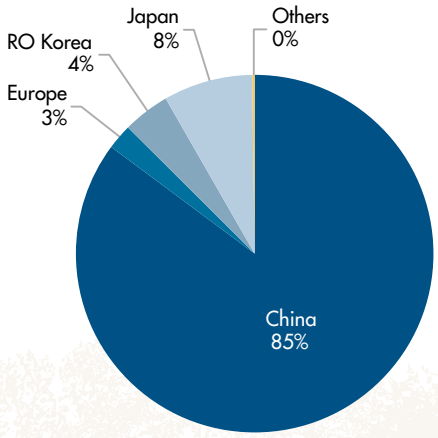
The 2010 EU export restriction triggered a rush for glass eels from other sources. Based on UN Comtrade import data, it appears that demand for Chinese aquaculture was satisfied by imports from Malaysia and the Philippines (presumably shortfin

Fig. 6 Imports of glass eels into legal aquaculture ponds in China (metric tons), 2008-2016



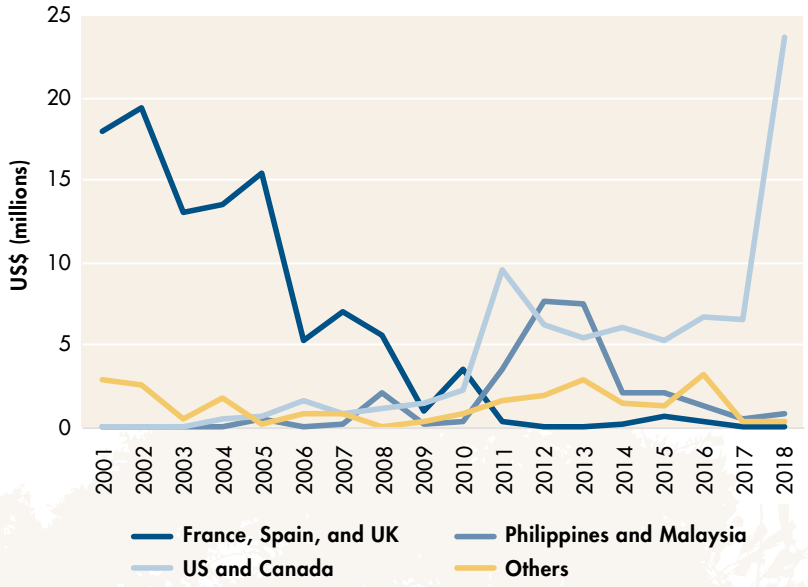
Source: CITES

Fig. 5 Imports of glass eels into legal aquaculture ponds in China (metric tons), 2008-2016



Source: FAO

Fig. 7 Legal imports of live glass eels to China by exporting country (US$ millions), 2001-2018



Source: UN Comtrade

eel) initially, but increasingly from the United States and Canada (presumably American eel) (Figure 7). The shift in demand outside Europe can be seen, for example, in export data on American glass eels. In the state of Maine, the catch quadrupled as prices increased twenty-fold in three years, from just under US$100 per pound[26] in 2009 to just under US$2,000 per pound in 2012. The increase in both price and volume caused a sharp increase in the total market size in 2012 (Figure 8). In 2018, renewed demand for American eel was seen, albeit at lower prices, suggesting a competing source of supply.

Despite population declines and fluctuations in the source of glass eels, global eel production has remained remarkably consistent over the years, driven by rising production in China (Figure 9). Although the 2010 ban on exports from the European Union did cause a slight decline in eel production until 2013, production again increased after that time, reaching a new high in 2016 (Figure 9). Since the total value of recorded glass eel imports (of all species) by China have declined by half since the CITES listing of European eel in 2009 (Figure 10),[27] it remains unclear how production is being maintained. Data on the species input for Chinese aquaculture shows a different pattern in the sourcing after 2009 (Figure 6), with increasing reliance on the endangered American eel. Despite its "Endangered" status, American glass eel can still be legally exported without CITES certification.

Sourcing

Based on World WISE data, it appears that it is in the traditional source countries that much of the illegal glass eel supply originates. According to high ranking wildlife law enforcement officials interviewed in 2018,[28] there are two main sources of European glass eels illegally trafficked internationally:

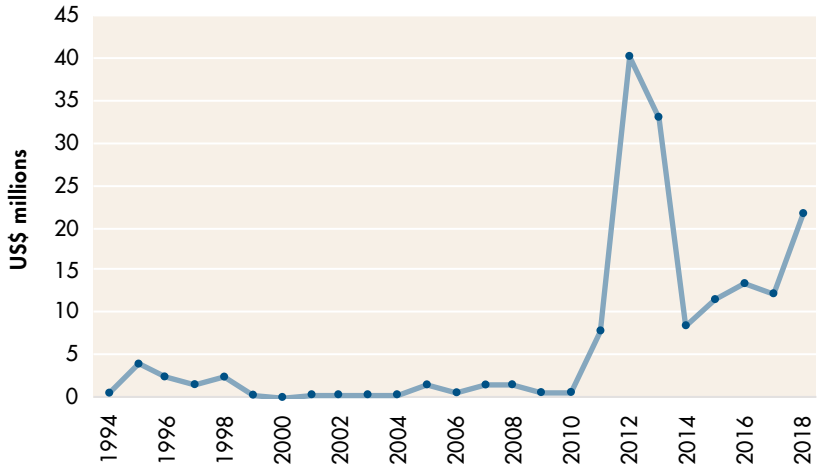
- commercial fishers who catch glass eels for the legal market and knowingly or unknowingly supply illegal exporters (diversion);
- poachers, who fish clandestinely with the intent to supply the illegal market.

Established eel traders have been found to be involved in illegal exports, so any commercial fisherman selling glass eels to a trader could unwittingly be complicit in illegal exports. Commercial traders can also be involved in acquiring glass eels illegally and then further exporting them illegally.

For example, European investigations uncovered a Spanish eel trader who was working with a Greek eel farm to illegally export large (800 kg) shipments of glass eels to China. The eels were illegally taken in Spain, transported in trucks to Barcelona, and then by ferry to Italy and onwards to Greece, where the legal eel farm was located.[29] This ostensibly legal farming operation gave cover to both illegal fishing and illegal export.

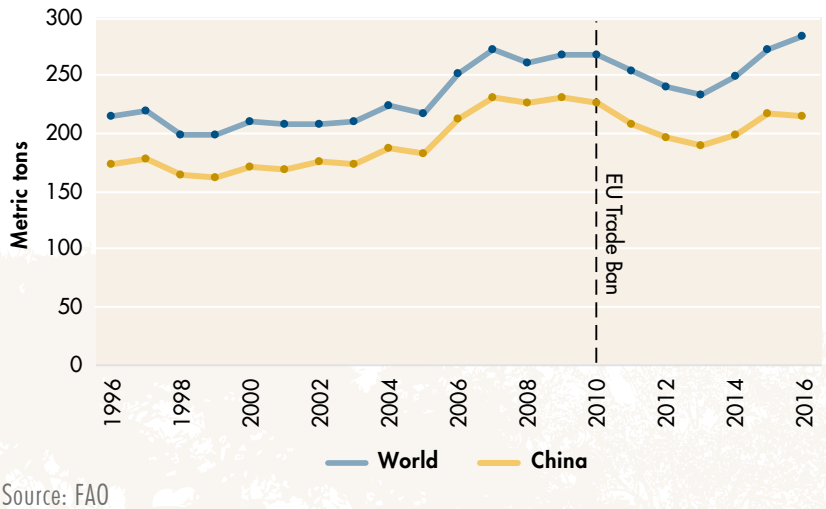
In parallel, there are also networks of poachers who acquire their glass eels clandestinely. Based on their

Fig. 8 Recorded value of the legal American glass eel fishery (*Anguilla rostrata*) in the state of Maine (US$ millions), 1994-2018



Source: Source: State of Maine Department of Marine Resources

Fig. 9 Legal aquaculture eel production in China and the world, 1996-2016 (metric tons)



Source: FAO

knowledge of the timing and location of eel migration, poachers use hand nets, trap nets or small trawling nets to work the estuaries where glass eels transit at night. According to European law enforcement sources, on average, a poacher can gather between 200 grams and one kilogram of glass eels per night, although much larger takes are possible under the right conditions.[30] One kilogram of glass eels represents about 3,000 individual fish,[31] so each poacher can remove between 600 and 3,000 eels for every night of work. The number of poachers is unknown, but they collectively add to glass eel shipments measured in the tens and hundreds of kilograms.

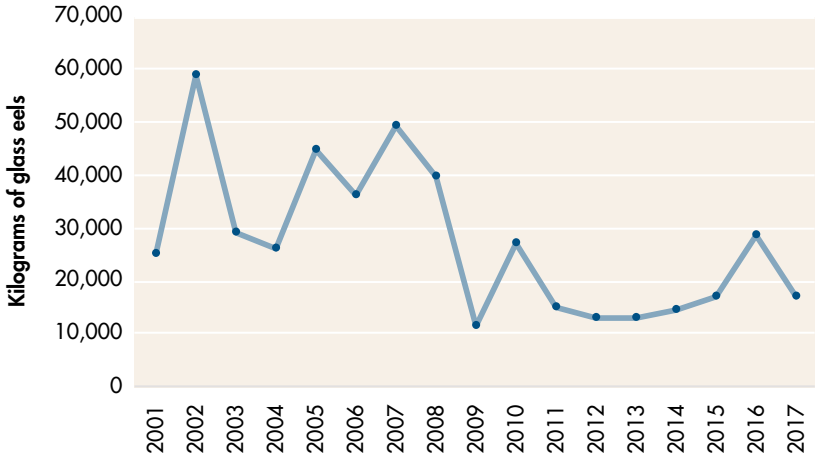
The poachers receive between 180 euro and 400 euro per kilogram from buyers, thus receiving up to 400 euro per night. Some poachers keep tanks in their homes and sell to buyers from their front door. In some instances, buyers travel to the harvest locations and consolidate the output of many poachers, paying cash on the spot.[32]

After the glass eels are collected from the poachers or licensed collectors, they are transported to consolidation facilities, often located near international airports. These facilities generally include a series of aerated tanks in which the glass eels are stored; typically, about 20 kg of glass eels are put into oxygenated water tanks with about 1,000 litres of water. To ensure the highest survival rates, the eels are kept in these conditions no longer than 15 days, so the exports should be closely tied to the harvest season. At these facilities, the local buyers are paid between 400 euros and 900 euros per kilogram by those who traffic the glass eels internationally.[33]

Trafficking

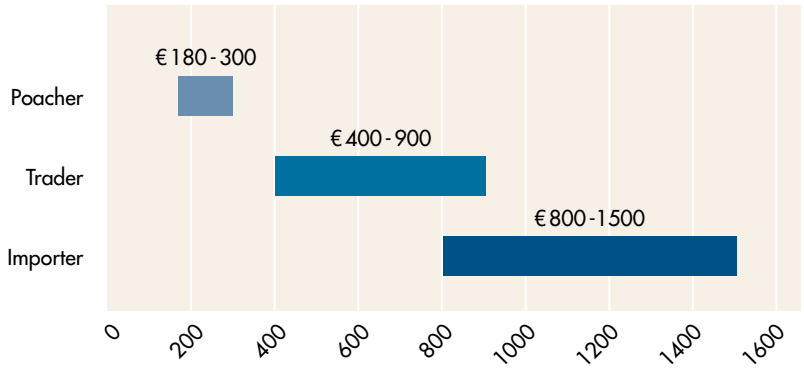
Based on World WISE data and interviews with law enforcement officials, glass eels are smuggled using two main techniques:

Fig. 10 Glass eels (all species) legally imported by China (kilograms), 2001-2017



Source:UN Comtrade

Fig. 11 Price per kilogram for illegal eels paid to poachers, traders and importers in 2018 (Euros)



Source: UNODC

- They are shipped in refrigerated containers via air freight under cover of, or mis-declared as, other seafood products.
- They are smuggled using commercial air couriers in specially prepared luggage.

The two trafficking techniques roughly correspond to the two forms of illegal sourcing (diversion and poaching), although it is entirely possible that eels sourced from poaching could be shipped using cover loads, or that diverted eels could be smuggled by couriers.

To be transported internationally and arrive alive, glass eels must be kept in controlled conditions and released as quickly as possible. Containers suitable for transporting other live seafood can be used in airfreight, so mislabelling (as shrimp, mussels, or octopi, for example) or concealing the eels in these containers containing other forms of live seafood is common practice.

Air couriers make use of luggage containing bags of glass eels in addition to some form of refrigeration, typically frozen bottles of water. This luggage may be shielded with inexpensive insulation material, such as car windshield sun protectors. Raids on consolidation sites have revealed hundreds of identical suitcases used for this purpose. The longer the flight, the fewer glass eels that will survive the trip, so direct flights are likely

to be favoured, unless a secondary staging area is used. In the latter case, European, North African and other Asian countries are used for transit to Asia. Upon arrival, the traffickers are paid between 800 euros and 1,500 euros per kilogram for the contraband. In effect, each buyer in the initial stages of the supply chain doubles or triples their money.

Enforcement activities associated with Europol's Operation Lake (2017-2019) uncovered a new variation in trafficking method, in which glass eels are hidden in Styrofoam ice chests that are packed in checked luggage. European eel was also detected in European consumer markets mislabelled as American eel. In connection with Operation Lake, some 3.8 MT of European glass eels were seized in the 2017-2018 season and 5.8 MT in 2018-2019.[34] Speaking of the 2017-2018 season, Europol estimated that around 100 MT were smuggled from the EU to China.[35]

Seizures of European glass eels have increased from an annual average of less than 1.5 metric tons in the first four years of the European Union ban to an average of just under 5.5 metric tons in the last four years. Considerable resources were applied to interdiction, and this trend is surely affected by these dedicated efforts. Some 80 per cent of these seizures were made by the governments of Spain, France and Portugal, the origins of almost all the eels seized. To put this figure in context, these seizures are equivalent to about 10 per cent of the total supply of glass eels introduced into aquaculture in major producer states.[36]

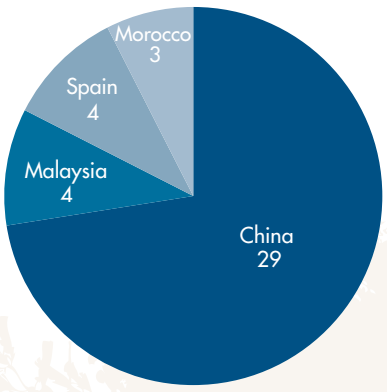
Of those seizures whose destination was known between 2011-2018, more than half were destined for China and 19 per cent for Thailand. Thailand does export hundreds of tons of eels every year, but this is about 1 per cent of what China exports, so some share of these is likely trans-shipped. Those arrested in connection with these seizures represent a mix of European and Asian nationalities (Figure 12). Of intercepted shipments, the most common destination was Hong Kong, China, which is located near the largest eel farms, located in the provinces of Guangdong and Fujian. Genetic testing has proven that European eel are smuggled from Europe to Hong Kong, SAR of China.[37]

Destination markets

On arrival in Asia, it appears the illicitly exported European glass eels are fed into the commercial eel farming industry. According to the Food and Agriculture Organization of the United Nations (FAO), in 2017 some 259,000 metric tons of eel (all species) were produced, of which about 221,000 metric tons were produced by China, accounting for 85 per cent of global production.[38] According to the China Eel Industrial Association, more than half of this is exported, with the rest for domestic consumption. Much of the exports are destined for the Japanese market, but also to the United States and other destinations around the world.

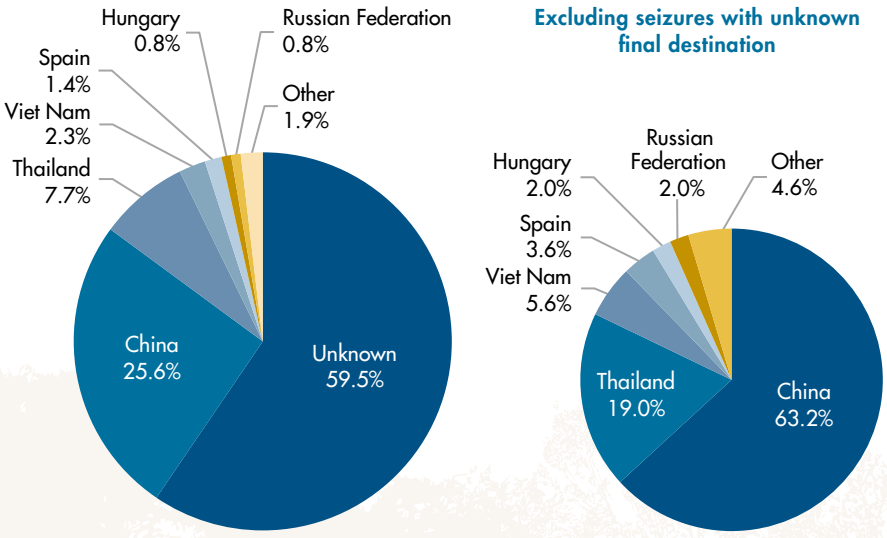
From the 1970s to the 1990s, live eels imported by Japan mainly came from Taiwan, Province of China,[39] but eel production gradually moved to the southern provinces of mainland China, predominantly Guangdong and Fujian, which have been responsible for about 86 per cent of Chinese production in recent years. Before the European glass eel export ban in 2010, Fujian production was focused on European eel.[40] Once imported, despite starting out larger than other

Fig. 12 Number of people arrested for European glass eel trafficking in Spain by nationality, 2016-2018



Source: SEPRONA response to UNODC questionnaire

Fig. 13 Share of total seizure volume by reported shipment destination, 2011-2018*



Source: UNODC World WISE Database

* The year 2018 is based on partial data.

species, it takes between 18 and 36 months to grow European glass eels to marketable size (400 to 500 grams for export, or 600 grams for the domestic market), making them one of the slowest growing species of eels, according to the Chinese Industrial Eel Association.[41]

The Chinese Bureau of Fisheries reported that there were 797 eel aquaculture operators in 2017.[42] In 2013, the United Nations Industrial Development Organization (UNIDO) produced a study focused on an eel processing company (*Firm Y*) from the Guangdong province. The company employed 200 workers and procured live eels from 16 different suppliers to produce 10,000 metric tons of output per year.[43] The sheer volume of production, the number of firms involved, and the complexity of the supply chain makes this industry vulnerable to the introduction of illicit sources of supply. For example, any of the 797 aquaculture operators could unwittingly contract with an overseas glass eel supplier who illegally sources European glass eel.

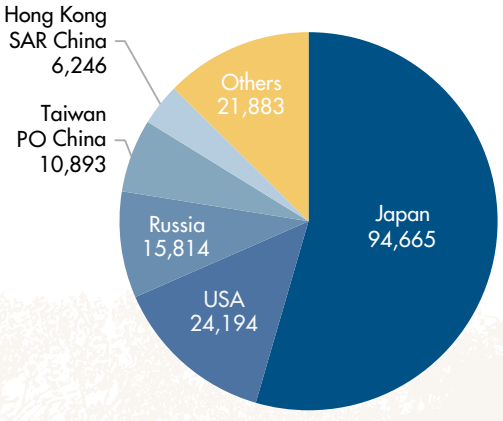
Aside from the seizure record, one way of estimating the amount of illegal eel introduced into legal supply chains is to compare the amounts of glass eels of all species imported and the amounts of adult eels produced. In the case of China, this analysis is complicated by the fact that the country is within the range of Japanese eel and could, in theory, supply most of the aquaculture demand for glass eels from this source. In practice, however, this has not been the case. Rather, as shown in Figure7.6, glass eels from a variety of species are used in Chinese aquaculture, while China exports about half the Japanese glass eel it catches. Between 2008 and 2016, China exported roughly half the Japanese glass eel it caught.[44] As a result, only one-third of aquaculture demand for glass eels between 2008-9 and 2015-16 came from domestic sources, leaving the industry two-thirds dependent on imports.

With this in mind, it is difficult to reconcile reported imports of glass eels with total eel production and exports over time. Of course, glass eels of any species can be utilised, but stark changes between glass eel imports and production (taking into account utilization of domestically caught *Anguilla japonica*) suggest an undocumented source of glass eel supply. This supply need not be of European eel, but the fact that these ascribed imports of glass eels are not recorded raises suspicions about their origins.

Between 1995 and 2000, China's reported production amounts to an average of about 1.5 metric tons of eel for every kilogram of glass eel imported. Between 2001 and 2008, this figure rose to about 4.5 metric tons of eel for every kilogram of glass eel imported. From 2009 (the year of the CITES listing) to 2015, the figure rose to an average of almost 15 metric tons of eel for every kilogram of glass eel imported. Even considering the likelihood that eel growing technology has improved, mortality rates in transit and production will have decreased and that domestic sourcing of glass eels may have increased, this tenfold rise is difficult to explain, whatever the yield of the species introduced.

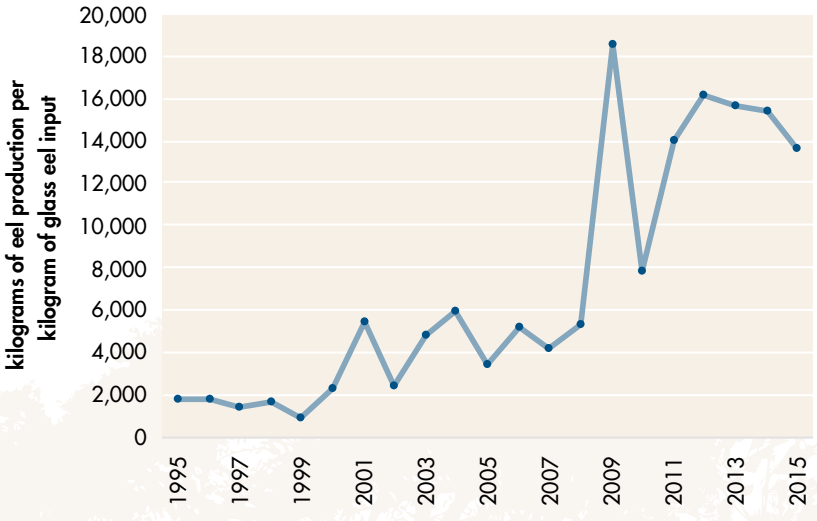
While there are often discrepancies in trade statistics, there are stark differences between the data presented by

Fig. 14 Share of legal exports of prepared or preserved eels (all species), whole or in pieces (excluding minced), from China by destination country or territory, 2014-2018 (metric tons)



Source: ITC Trade Map.

Fig. 15 Kilograms of adult eel produced in China for every kilogram of glass eel imported, 1995-2015



Source: China Customs for imports, FAO for production

CITES, UN Comtrade and Eurostat.[45] Comparison is complicated by the very wide range of codes used to describe eels and eel products in trade: 72 different, partly overlapping, codes were identified in this study. In the absence of evidence of illegal trade, it would be difficult to ascribe significance to the discrepancies, but when taken in context, they appear to be evidence that the industry is affected by some unrecorded supply.

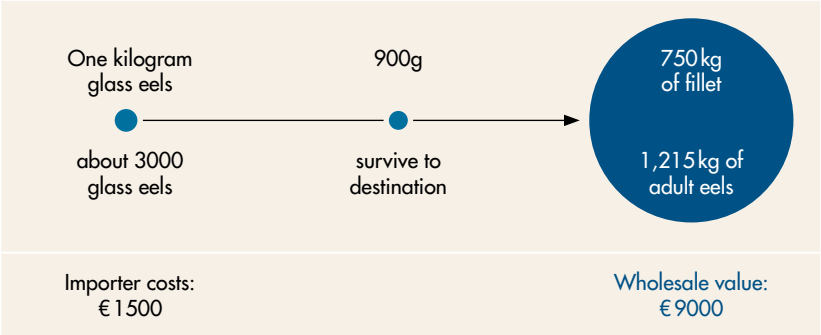
Analysis

Thousands of kilograms of European glass eels have been seized since 2012, representing millions of individual eels. It is unclear what share of the total illegal flow is interdicted, but law enforcement surveillance and intelligence suggest the share is relatively low. For example, one operation seized less than 500 kg of eels from a group that evidence later suggested had exported more than ten times that amount.[46]

The volume and value of this trade is thus difficult to estimate. The 6,000 kg of glass eels seized in 2018 alone would have been worth up to nine million euros to importers. According to law enforcement sources interviewed by UNODC, records seized from a criminal group as evidence suggest that similar volumes are shipped by individual groups annually. Of course, the glass eels are only the front end of the production process. Each kilogram of glass eels, costing 1,500 euros on the black market, can be converted into some 9,000 euros worth of filet on a wholesale level, thus enriching businesses who use trafficked eels in their production process. Wholesalers do not pocket all this money, of course, since the costs of farming must be taken into account, but given the volumes, the profits appear considerable.

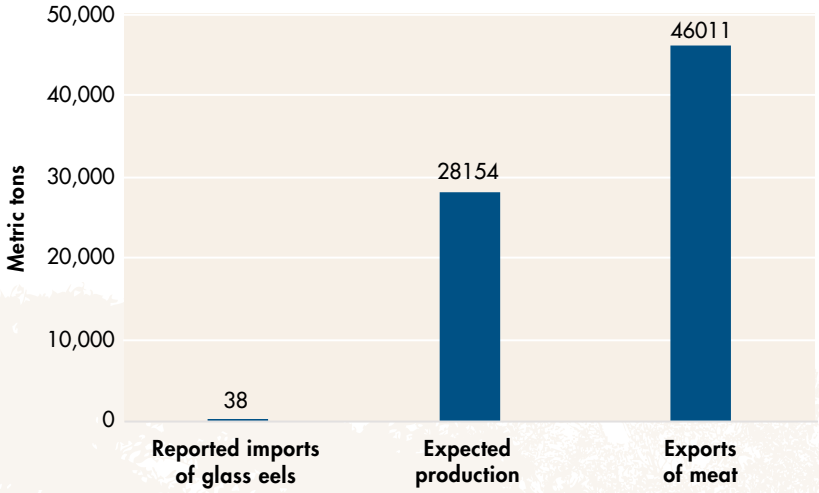
At this point in time, every European glass eel imported for the purposes of farming requires a CITES certificate to export, as should every adult European eel exported after being grown out. Interviews with aquaculture specialists indicate that one kilogram of European glass eels yields 750 kilograms of filet. If so, it should be possible to reconcile glass eel imports with eel meat exports. Even taking into account the gap between introduction and harvest, it is unclear how such large exports of European eel meat would be possible given the low quantities of reported European glass eel imports (Figure 17). This suggests that glass eels were imported without CITES certification. In 2017, eel meat exports were commensurable with expected production, but this would only be possible if all European eel meat were exported and none retained for the domestic market. Additional, though incomplete, data reported to the CITES Animals Committee suggest that only 4.5 MT of European glass eels may have been introduced into Chinese cultivation ponds between 2011 and 2017.[47] Teamed with the seizure data, which indicate the majority of intercepted shipments were destined for China, these trade data provide evidence of a sizable illegal flow.

Fig. 16 Transformation of European glass eels to eel filet



Source: UNODC

Fig. 17 Comparison of European glass eel imports, expected production, and legal European eel meat exports reported by China (metric tons), 2009-2017 aggregated



Source: CITES Trade Database

Box 1. Sea Cucumbers

Sea cucumbers have important functions within marine ecosystems; they are considered the 'ocean's vacuum cleaners'[48] and important for the overall health of the ocean.[49] They are harvested primarily as a food,[50] and are considered a delicacy in their processed form, known as *bêche-de-mer, trepang* or *hai-som*.[51] Sea cucumbers' emergence as a luxury food item in the 1980s has since expanded into a highly lucrative market,[52] with demand for hundreds of thousands of metric tons (MT) annually.

To meet this demand, capture fisheries[53] have grown, and aquaculture has also expanded exponentially, surpassing capture production in 2003. Global capture fisheries increased from 4,300 MT in 1950 to 53,000 MT in 2017; aquaculture production rose from virtually zero in 2002 to 222,000 MT in 2017 (Figure 1), with an estimated value of US$1.4 billion.[54]

Sea cucumber capture fisheries are important for the livelihoods of coastal communities across a wide range of countries, and, in some regions, is the most economically important fishery.[56] Ten countries accounted for 87 per cent of global capture production in 2018: Canada, Iceland, Indonesia, Japan, Mexico, Nicaragua, Republic of Korea, the Russian Federation, Sri Lanka and the United States of America.[57] In contrast, aquaculture is dominated by one country: global aquaculture production from 2008 to 2017 was estimated to be 1.6 million MT, with China accounting for 99 per cent of this production.[58]

While there are approximately 1,500 species of sea cucumbers, only 42[59] were identified in the first half of the 2000s as being under population stress due to demand for international trade.[60] While price varies considerably by species,[61] they can reach US$1,800 per kilogram.[62] The value and demand for sea cucumbers appear to be increasing in recent years.[63]

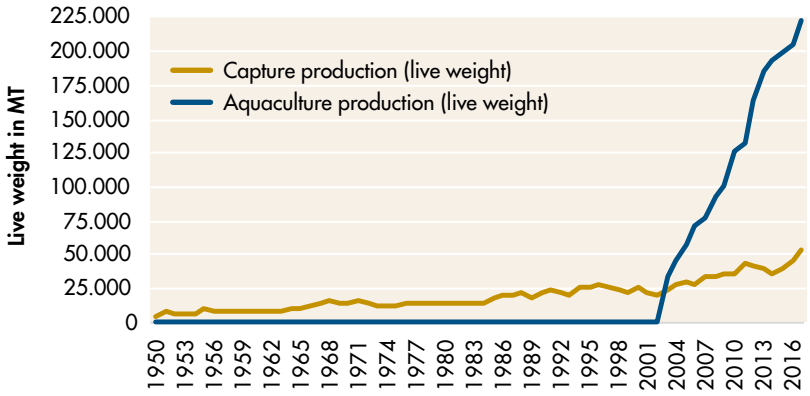
In 2002, the Parties to CITES started to consider whether a listing on any of the CITES Appendices would be appropriate for some of the most harvested wild species.[64] In 2003, Ecuador decided to list one species, the Brown sea cucumber (*Isostichopus fuscus)* on Appendix III,[65] and at the 18th meeting of the Conference of the Parties to CITES in 2019, three species of sea cucumbers (*Holothuria fuscogilva, Holothuria nobilis and Holothuria whitmaei*) were listed in Appendix II.[66]

Similar to other capture fisheries, illegal fishing for sea cucumbers[67] is a known threat, either perpetrated by source country nationals or by foreign vessels.[68] Local fishermen are offered high prices and pressured to poach by international buyers, which often leaves fishermen in a 'loan-to-debt' cycle, where buyers will provide cash advances for harvesting but then buy fishermen's catch at low prices, requiring them to pay back part of the advance or overfish to compensate for low prices.[69]

Data on illicit trade is quite limited. World WISE has data for CITES-listed species (*Isostichopus fuscus)*, and a few seizures for non-CITES listed species. For the period between 2008 to 2017, World WISE contains seizures accounting for approximately 139 tons (wet weight, 365,000 live equivalents) of Brown sea cucumbers (*Isostichopus fuscus*).[70] The majority of sea cucumber seizures in World WISE appear to be coming from Mexico with almost a third (29 per cent) headed for the United States, where the seizures were made.

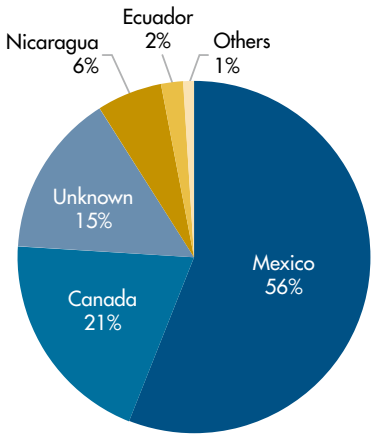
Although transnational organized crime involvement in illegal fishing is hard to quantify, strong anecdotal evidence suggests that sophisticated trafficking networks target totoaba fish, abalone, and sea cucumbers, among other marine species.[71] In a notable case in the United States, in March 2018, an Arizona firm and two of its executives pled guilty to illegal trafficking in US$17 million worth of sea cucumber from Mexico from 2010-2012. They were further charged with conspiracy to illegally export sea cucumber to Asia by means of documents containing false information, importation contrary to the law and false labelling. They were sentenced to pay over US$1.2 million in fines, forfeiture and restitution.[72]

Fig. 18 Global production of sea cucumbers, live weight (MT) from 1950 to 2017



Source: Data obtained from FAO FishStatJ. Data presented in live weight; no conversions applied.[55]

Fig. 19 Reported country of origin of sea cucumber seizures (by estimated mass in kilograms), 2008 - 2017



Source: UNODC World WISE Database

Endnotes

1 A juvenile eel is approximately six to eight centimeters in length and with a transparent appearance. See https://www.scmp.com/news/world/europe/article/3035646/chinese-man-and-woman-caught-france-smuggling-60kg-live-baby-eels

2 Based on World WISE data. There are frequent small seizures of non-compliant caviar in Europe, as well as seizures of "caviar" face creams without CITES documentation. Some larger-scale international trafficking does continue, however, but not from the Caspian. For example, in 2017, the United States made two large seizures (71 and 30 kg) of kaluga caviar shipped from China. In addition, there have been some very large seizures of sturgeon meat, including 14 metric tons seized in Genoa harbour on its way to Georgia in 2016.

3 General facts on eel biology and reproduction can be found in Tesch, F.-W., The Eel (Fifth Edition), Oxford: Wiley, 2003.

4 Ibid.

5 According to Food and Agriculture Organization of the United Nations (FAO), Fisheries Global Information System (FIGIS), global river eel aquaculture was worth US$2,042,180,000 in 2017. The retail trade is necessarily worth significantly more (FIGIS is available at: http://www.fao.org/fishery/figis/en).

6 FAO FIGIS (ibid.). That is, about 260,000 metric tons out of about 270, 000 metric tons globally.

7 This is based on data of the species introduced into aquaculture in the largest eel producer countries, as shared in the Tenth Meeting of the Informal Consultation on International Cooperation for Conservation and Management of Japanese Eel Stock and Other Relevant Eel Species (CITES AC29 Inf. 13). FAO does gather species-specific eel production data but it does not appear to be accurate in light of the data presented at this meeting, as it suggests the vast bulk of eel production since 1970 was based on Japanese eel. It does suggest, however, that a wider range of eels have been used in production, including the use of speckled longfin eel (*Anguilla reinhardtii*) in Oceania. This species, however, accounted for less than two-tenths of one per cent of Oceania eel production between 1952 and 2017.

8 According to the International Union for Conservation of Nature (IUCN), Japanese eel is only found in China (including Taiwan Province of China), Japan, the Philippines and the Republic of Korea. See Jacoby, D. & Gollock, M., *Anguilla japonica,* The IUCN Red List of Threatened Species 2014: e.T166184A1117791, 2014 (available at: http://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T166184A1117791.en).

9 According to the IUCN, American eel is found throughout Central America and the Caribbean, as well as in the Bolivarian Republic of Venezuela, Canada, Colombia, Greenland and the United States. See Jacoby, D., Casselman, J., DeLucia, M. and Gollock, M., *Anguilla rostrata* (amended version of 2014 assessment). The IUCN Red List of Threatened Species 2017: e.T191108A121739077, 2017 (available at: http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T191108A121739077.en).

10 According to the IUCN, shortfin eel is found in Australia, Bangladesh, Federated States of Micronesia, India, Indonesia (Sulawesi, Lesser Sunda Island, Java), Kenya, Madagascar, Maldives, Mozambique, Myanmar, Northern Mariana Islands, Oman, Papua New Guinea, Philippines, Somalia, South Africa, Sri Lanka, United Republic of Tanzania, Viet Nam and Yemen (Socotra). See Jacoby, D., Harrison, I.J. and Gollock, M., *Anguilla bicolor. The IUCN Red List of Threatened Species* 2014: e.T166894A67015710, 2014 (available at: http://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T166894A67015710.en).

11 Possibly due to its very wide range – see the reference above.

12 See references above.

13 European eel is also produced in North Africa, but at a lower rate than in Europe. For example, in 2017, just over 1000 MT of European eel was produced in Africa, compare to over 8000 MT in Europe.

14 Dekker, W., 'The history of commercial fisheries for European eel commenced only a century ago.' *Fisheries Management and Ecology*, Vol. 26, pp. 6-19, 2019; International Council for the Exploration of the Sea (ICES), *Report of the Joint EIFACC/ ICES /GFCM Working Group on Eel*, 3 - 10 October 2017, ICES CM 2017/ACOM:15.

15 International Council for the Exploration of the Sea (ICES), *Report of the Joint EIFACC/ ICES /GFCM Working Group on Eel*, 3 - 10 October 2017, ICES CM 2017/ACOM:15, pp. 32-33.

16 Contributing factors may include changing oceanic conditions, migration barriers, predation, pollution, disease and parasites. See Miller, M. J., Feunteun, E. and Tsukamoto, K., 'Did a "perfect storm" of oceanic changes and continental anthropogenic impacts cause northern hemisphere anguillid recruitment reductions?', *ICES Journal of Marine Science: Journal du Conseil*, Vol. 73, No. 1, pp. 43-56, 2016.

17 Based on responses to a UNODC questionnaire administered to law enforcement officials in 2018.

18 This total is more than twice that needed for restocking and eel aquaculture on a European level (estimated at 30 metric tons).

19 Based on responses to a UNODC questionnaire administered to law enforcement officials in 2018.

20 FAO FIGIS, op.cit. That is, about 260,000 metric tons out of about 270,000 (?) metric tons globally.

21 According to the IUCN, "Threats to this species include overfishing, loss of habitat and changes to oceanic conditions among other threats" Jacoby, D. and Gollock, M., *Anguilla japonica*. The IUCN Red List of Threatened Species 2014: e.T166184A1117791, 2014 (available at: http://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T166184A1117791.en).

22 Ibid.

23 Briand, C., Bonhommeau, S., Beaulaton, L. and Castelnaud, G., *An appraisal of historical glass eel fisheries and markets: landings, trade routes and future prospect for management*, The Institute of Fisheries Management Annual Conference 2007, conference paper, 2008, p. 21.

24 The CITES Appendix II listing took effect on 13 March 2009 and the European Union import and export ban went into effect in December 2010.

25 7.4 million kilograms of 7.7 million kilograms in trade based on importer reporting, all exported from China.

26 1 pound is 454 grams. In the United States, only Maine and South Carolina have legal glass eel fisheries, and South Carolina's data are confidential.

27 According to import data, in the eight years between 2001 and 2008, China reported importing 310 metric tons of live eel fry, and in the eight years between 2009 and 2016, it reported importing only 141 metric tons.

28 During 2018, law enforcement officials were contacted in a variety of forums, including CITES meetings and closed operational sessions. Questionnaires were also completed by key national enforcement agencies, including those of France and Spain. The information that follows is based on their investigations from around from 2012 to date, which involved seizure of multiple tons of glass eel annually and over 100 arrests. See Methodological Annex for details.

29 Ibid.

30 Ibid.

31 The China Eel Industrial Association reports that there were between 2,200 and 3,800 European glass eels per kilogram, making them the largest glass eel species imported. In contrast, there are between 5,500 and 6,000 Japanese eels per kilogram, and around 5,000 American eels per kilogram.

32 Based on responses to a UNODC questionnaire administered to law enforcement officials in the affected European countries in 2018. These observations are based on police operations.

33 Ibid.

34 EU Trade Enforcement Meeting, Brussels, 16 October 2019.

35 https://www.europol.europa.eu/newsroom/news/glass-eel-traffickers-earned-more-eur-37-million-illegal-exports-to-asia

36 CITES Twenty-ninth meeting of the Animals Committee, *Joint press release on the occasion of the tenth meeting of the informal consultation on international cooperation for conservation and management of Japanese eel stock and other relevant eel species*, AC29 Inf. 13, 2017.

37 Stein, F.M., Wong, J.C.Y., Sheng, V. Law, C., Schröder, B. and Baker, D., 'First genetic evidence of illegal trade in endangered European eel (*Anguilla anguilla*) from Europe to Asia. *Conservation Genetics Resources* Vol 8, pp. 533–537 (2016).

38 The FAO statistics have been questioned by some analysts, but they correspond directly to figures cited in the official China Fishery Statistical Yearbooks.

39 United Nations Industrial Development Organization (UNIDO), 'Case Study: Chinese Eel Exports', *Meeting Standards, Winning Markets: Regional Trade Standards Compliance Report, East Asia 2013,* Ch. 4, pp. 49-61, November 2013.

40 Ibid.

41 In contrast, the China Eel Industrial Association reports Japanese eels only require 12 to 24 months to grow to marketable size, and American eels between 15 and 30 months

42 CITES Twenty-ninth meeting of the Animals Committee, *Joint press release on the occasion of the tenth meeting of the informal consultation on international cooperation for conservation and management of Japanese eel stock and other relevant eel species*, AC29 Inf. 13, 2017. In e-mail communication, the China Eel Industrial Association estimates that there were between 900 and 1,000 eel farms in China in mid-2018. The Japanese Ministry of Health, Labour and Welfare lists 93 Chinese eel farms registered for the export of live eels to Japan and 278 farms authorized to supply 49 food processing companies. See *List of 278 Chinese eel farms*. Available at: https://www.mhlw.go.jp/file/06-Seisakujouhou-11130500-Shokuhinanzenbu/0000080001.pdf and *List of the registration farm of live eel exportation*. Available at: https://www.mhlw.go.jp/file/06-Seisakujouhou-11130500-Shokuhinanzenbu/0000079999.pdf

43 United Nations Industrial Development Organization (UNIDO), 'Case Study: Chinese Eel Exports', *Meeting Standards, Winning Markets: Regional Trade Standards Compliance Report, East Asia 2013,* Ch. 4, pp. 49-61, November 2013.

44 According to the data attached to CITES AC29 Inf. 13 (CITES Twenty-ninth meeting of the Animals Committee, *Joint press release on the occasion of the tenth meeting of the informal consultation on international cooperation for conservation and management of Japanese eel stock and other relevant eel species, 2017)*, between 2008-09 and 2015-16, China caught 253 metric tons of Japanese glass eel and introduced only 123.5 metric tons of Japanese glass eel. Between 2008 and 2016, China exported 108.5 metric tons of Japanese glass eel.

45 CITES AC30 Doc 18.1, Annex 1, *Implementation of the CITES Appendix II listing of European Eel Anguilla* (available at: https://cites.org/sites/default/files/eng/com/ac/30/E-AC30-18-01-A1.pdf). CITES has recently revised the guidance regarding reporting of eel trade and illegal trade. See *Guidelines for the preparation and submission of CITES annual reports* (December 2019), Ch. 6a) 'Description of specimens and units of quantity', pp. 7-11 (available at: https://cites.org/sites/default/files/notif/E-Notif-2019-072-A1.pdf) and *Guidelines for the preparation and submission of the CITES annual illegal trade report* (https://cites.org/sites/default/files/notif/E-Notif-2019-072-A2.pdf).

46 Based on responses to a UNODC questionnaire administered to law enforcement officials in 2018.

47 CITES Twenty-ninth meeting of the Animals Committee, *Joint press release on the occasion of the tenth meeting of the informal consultation on international cooperation for conservation and management of Japanese eel stock and other relevant eel species*, AC29 Inf. 13, 2017.

48 Purcell et al. (2016) Ecological Roles of Exploited Sea Cucumbers. Retrieved from https://www.researchgate.net/publication/311234596_Ecological_Roles_of_Exploited_Sea_Cucumbers

49 National Geographic, 30 August 2018. https://www.nationalgeographic.com.au/animals/watch-sea-cucumbers-are-the-oceans-vacuum-cleaners.aspx

50 To a lesser extent, they are also used for traditional medicines, as well as cosmetic, pharmaceutical, aquaria, and biomedical research purposes. See CITES. (2002b). Trade in sea cucumbers in the families *Holothuriidae* and *Stichopodidae*. Twelfth meeting of the Conference of the Parties Santiago (Chile), 3-15 November 2002. CoP12. Doc. 45 Annex; CITES. (2007a). Biological and trade status of sea cucumbers in the families *Holothuriidae* and *Stichopodidae*. Report by Verónica Toral-Granda, Charles Darwin Foundation. Fourteenth meeting of the Conference of the Parties. The Hague (Netherlands), 3-15 June 2007. CoP14 Doc. 62 Annex 1; CITES. (2019a). Consideration of proposals for amendment of appendices I and II. Eighteenth meeting of the Conference of the Parties Geneva (Switzerland), 17-28 August 2019. CoP18 Prop. 45 (Rev. 1); Conand, C. (2006). Harvest and trade: Utilization of sea cucumbers; sea cucumbers fisheries trade; current international trade, illegal, unreported and unregulated trade; bycatch, socio-economic characteristics of the trade in sea cucumbers. In: Bruckner A (editor) The Proceedings of the CoP18 Prop. 45 (Rev. 1) – p. 20 Technical workshop on the conservation of sea cucumbers in the families *Holothuridae* and *Stichopodidae*. NOAA Technical Memorandum NMFS-OPR 44, Silver Spring, 239 pp; Toral-Granda, V., Lovatelli, A., Vasconcellos, M. (eds). (2008). Sea cucumbers. A global review of fisheries and trade. *FAO Fisheries and Aquaculture Technical Paper.* No. 516. Rome, FAO. 317p.

51 Conand, 2006; CITES, 2002b; 2019a; Toral-Granda et al., 2008; Purcell, S.W. (2010). Managing sea cucumber fisheries with an ecosystem approach. Edited/compiled by Lovatelli, A.; M. Vasconcellos and Y. Yimin. (2010). FAO Fisheries and Aquaculture Technical Paper. No. 520. Rome, FAO. 157p.

52 CITES, 2002b; 2019a.

53 Capture fisheries refer to harvesting of naturally occurring living resources (wild fish catches), which can be in marine or freshwater environments. Aquaculture is the farming of aquatic organisms.

54 Based on live weight for sea cucumber and Japanese sea cucumbers. FAO. (2019a). Fishery and Aquaculture Statistics. Global aquaculture production 1950-2017 (FishstatJ). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 2019. www.fao.org/fishery/statistics/software/fishstatj/en.

55 FAO presented sea cucumber and Japanese sea cucumbers data in live weight. FAO, 2019a; 2019b; Data obtained from FAO FishStatJ, collected since 1950, were presented in live weight, while in previous years FAO data was presented in dried weight. This made it difficult to compare with prior studies on sea cucumbers which used also used FAO data, but where the unit of measurement was different.

56 Conand, 2006; Toral-Granda et al., 2008.

57 FAO, 2019b.

58 FAO, 2019a.

59 Belonging to the families *Stichopodidae, Holothuriidae* and some in *Cucumariidae* (Purcell, 2010; CITES, 2007a).

60 CITES, 2007a.

61 Conand, 2006.

62 M. Fabinyi, K. Barclay & H. Eriksson (2017). Chinese trader perceptions on sourcing and consumption of endangered seafood. Frontiers in Marine Science, 181: 1-12; Purcell, S.W., Williamson, D.H., and Ngaluafe, P. (2018). Chinese market prices of beche-de-mer- Implications for fisheries and aquaculture. *Marine Policy*. 91: 58-65.

63 Purcell et al., 2018.

64 At CoP12, the US submitted a background document on sea cucumbers, specifically on the families *Holothuridae* and *Stichopodidae* to highlight exploitation and trade concerns and consider a CITES listing. While a proposal was not put forward, decisions were taken at CoP12 to evaluate these unlisted species, since they were subject to significant international trade, and determine whether they would qualify and benefit from a CITES listing (CITES Decisions 12.60 and 12.61 refers to a technical workshop and preparation of a discussion document on the biological and trade status of the species). At CoP13, CITES Decision 13.48 and 13.49 were adopted (to review the proceedings of the workshop, extend the deadline for the preparation of the discussion document, and to assist in raising funds for the development of the discussion paper). CITES, 2002b; CITES, 2007a; CITES. (2002a). CITES Decisions. Decisions of the Conference of the Parties to CITES in effect after the 12th meeting. Retrieved from: https://cites.org/sites/default/files/eng/dec/valid13/E12-Dec.pdf; CITES. (2007b). Interpretation and implementation of the Convention. Species trade and conservation issues Sea cucumbers. Fourteenth meeting of the Conference of the Parties. The Hague (Netherlands), 3-15 June 2007. CoP14 Doc. 62. CITES. (2004). CITES Decisions. Decisions of the Conference of the Parties to CITES in effect after the 13th meeting. Retrieved from: https://cites.org/sites/default/files/eng/dec/valid13/E13-Dec.pdf.

65 UNEP. (2019). The Species+ Website. Nairobi, Kenya. Compiled by UNEP-WCMC, Cambridge, UK. Available at: www.speciesplus.net. [Accessed 21/08/2019].

66 This listing took effect on 28 Aug 2020. CITES, 2019b. Summary record of the twelfth session for Committee I. CoP18 Com I. Rec. 12. Eighteenth meeting of the Conference of the Parties Geneva (Switzerland), 17-28 August 2019.

67 As defined by CITES, "illegal Holothurian fisheries are characterized by: 1) poaching and exports by nationals in remote areas, marine protected areas, the use of illicit

devices, the existence of different regulations between regions of a country and 2) poaching and exporting by foreigners in the majority of cases by temporary bandits 'poach and go', Chinese entrepreneurs, in remote areas, countries with low regulations, poor countries." (CITES CoP18 Prop45, p. 12). This is however not necessary fitting with the FAO definition so I would suggest to be more general.

68 CITES, 2007a; CITES, 2019a.

69 Ibid.

70 Based on live sea cucumbers and bodies. WorldWISE recorded 99,839 kg (converted to wet weight) or a total of 272,543 live equivalents of *Isostichopus fuscus* from 2008 to 2017. An additional 100,226 sea cucumbers with no description were also reported, so it is impossible to determine if they were fresh/frozen or dried, but they would be equivalent to approximately 38,703kg (wet weight).

71 Bergenas, J. (2016). Fish crime: What do the numbers say? Retrieved from: https://www.stimson.org/2016/fish-crime-what-do-numbers-say/.

72 https://www.justice.gov/usao-sdca/pr/illegal-sea-cucumber-trade-nets-more-12-million-dollars-fines-forfeiture-and

Supply and value chains and illicit financial flows from the trade in ivory and rhino horn

8

The market for illicit wildlife products is – like all other markets – driven by profit. In recent years, wildlife crime has grown into a significant and specialized area of transnational organized crime, driven by high demand.[1] Illicit wildlife trade is a highly lucrative business, with wildlife products commanding high prices on international, illicit markets.

Wildlife criminal cases very often start and end with the seizure, with limited investigation into the wider criminal network beyond the poacher or courier. Financial investigation and anti-money-laundering techniques are rarely used in the fight against wildlife crime.[2] As a result, there are major gaps in the understanding of the financial flows behind wildlife crime, which means that inadequate measures are being undertaken to mitigate the risks of wildlife crime and associated money-laundering.

Little is known about the profits made by organized crime groups from illicit wildlife trafficking and the significant gaps in understanding supply and demand for certain wildlife products make such estimates challenging. Existing estimates that monetarize the size of wildlife trafficking and crime are highly aggregated and utilize broad frameworks that include environmental costs and loss of public revenues. These aggregates are useful for advocacy purposes but have limited usefulness for understanding how wildlife traffickers operate and for monitoring and evaluating progress made in containing the illicit profits and financial flows generated by the illegal wildlife trade.[3] Estimates of the monetary value of global wildlife crime also suffer the challenge of internationally defining the crime.[4]

A detailed understanding of the value chain of illegal wildlife products, from producers (e.g., poachers) through intermediaries to end consumers, allows for identifying vulnerabilities that may enable disruption of illegal markets and the value chain. This encompasses understanding the trading patterns, assessing the value added at each step of the value chain, the overall illicit income generated and the income made by each group of actors, as well as analysing illicit financial flows from the trade in illegal wildlife products.

This chapter presents such an analysis using the examples of illegal trade in ivory and rhino horn, which were selected out of relevance and data availability. Both come from large, valuable and endangered animals and have received considerable attention from national law enforcement authorities and international bodies, such as the United Nations[5] and other governmental and non-governmental organizations concerned with wildlife conservation. Because of this attention, these two species are better documented than most others, and the information available allows for an estimation of the volumes traded, as well as the economic value of the markets and associated illicit financial flows.

The analysis demonstrates the importance of profits as an engine for wildlife. It also provides countries with a tool to monitor trends to understand if progress is being made in disrupting the illicit financial flows related to wildlife trafficking.

The illegal trade in ivory and rhino horn

Over the past decade, complex and diverse illegal supply chains for rhino horn and ivory have developed, and trafficking routes from Africa to Asia span multiple countries. Exploiting weaknesses and adapting dynamically to changed situations, traffickers move ivory and rhino horn by land, sea and air, often concealed in legitimate cargo.[6]

Citizens of destination countries in Asia are often heavily engaged within Africa in rhino horn and ivory trafficking. They play major roles in the acquisition and transport of rhino horn out of Africa to Asian destinations.[7] Motivated by the potential high revenues, these trafficking networks form a crucial part of the illegal supply chains.

A comprehensive understanding of the entire trade chain from poacher to end-consumer allows for a careful formulation of policy responses in the countries affected by the illegal trade in rhino horn and ivory.

A model supply chain of illegal trade in ivory and rhino horn

The illegal supply chain for ivory and rhino horn describes the processes and actors involved in sourcing, manufacturing, trafficking and selling products to end consumers.

The illicit supply chains start with poaching: Most of the ivory and rhino horn on illicit markets come from (newly) illegally killed animals

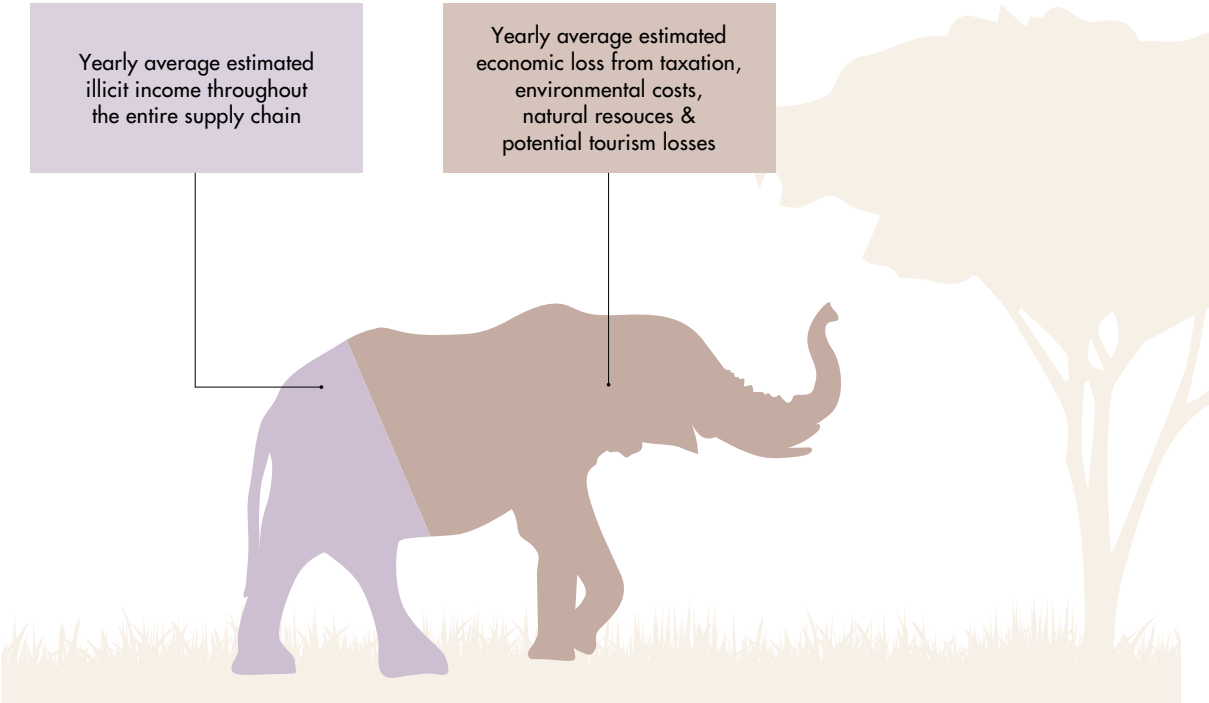
Box 1: The value of wildlife crime: concepts and estimates

The 'value' of an illegal activity can be defined in different ways, depending on purpose of the estimates and on the conceptual framework behind the estimates.

In economic terms, the value of an activity can be measured by the overall income they generate, be it licit or illicit income. Estimating markets in economic terms often involves estimating the amounts produced and sold, and the value thereof. Such measurements are (most often) direct estimates, which means that they are estimated in direct relation to the underlying economic activity, and reflect – in simple terms – the amount of money made by all participating in a certain economic activity. This approach is in line with the System of National Accounts, a standard used by all countries to construct the gross domestic product (GDP) and it has been applied to illegal activities, too.[a]

Other approaches to quantify wildlife trafficking have used broader concepts such as economic loss and have adopted a full cost analysis. These concepts do not measure the value of wildlife trafficking as described above in the context of generated income, but they consider factors such as loss of taxes or other licit income and assets through the illicit nature of the activity. In the context of wildlife, this includes environmental costs and damage[b] e.g., through the loss of capacity for carbon sequestration in illegal forestation,[c] (potential) loss of tourism[d] through loss of species diversity, or loss of natural resources through e.g. illegal fisheries. Estimates produced through this approach are by their very nature much larger than those constructed on the basis of economic value and are not comparable to illicit income estimates.

The estimates provided in this chapter focus on illicit income and are in line with the System of National Accounts and Eurostat's recommendations[e] on how to incorporate illicit income in GDP estimates. The estimates are based on a disaggregated, direct measurement approach using estimates on supply of rhino horn and ivory and respective price data. The approach allows for frequent updates based on updated price and supply data and thus facilitates a close monitoring of the market.



a Eurostat (2018), *Handbook on the compilation of statistics on illegal economic activities in national accounts and balance of payments*, Luxembourg.

b For detailed discussion on environmental crime see Christian Nellemann, Rune Henriksen, Patricia Raxter, Neville Ash, and Elizabeth Mrema (eds), *The Environmental Crime Crisis – Threats to Sustainable Development from Illegal Exploitation and Trade in Wildlife and Forest Resources. A UNEP Rapid Response Assessment*. United Nations Environment Programme and GRID-Arendal, Nairobi and Arendal, 2014, p. 23.

c World Bank. 2019. *Illegal Logging, Fishing, and Wildlife Trade: The Costs and How to Combat it*. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/32806 License: CC BY 3.0 IGO."

d Robin Naidoo, Brendan Fisher, Andrea Manica & Andrew Balmford, *Estimating economic losses to tourism in Africa from the illegal killing of elephants*. Nature communications 7.1 (2016): 1-9.

e Eurostat, op cit.

and some – comparatively small – amounts from other sources such as stockpile thefts or theft from natural mortalities.

As shown in chapter 3, 86 per cent of the recorded rhino poaching incidents between 2006 and 2017 took place in South Africa, which was home to 75 per cent of the African rhino population in 2017.[8] Other countries of origin of illegally sourced rhino horn were for example Zimbabwe, Namibia and Kenya. Elephant populations are much larger and less concentrated than rhino populations, and research showed that illegal killings of elephants took place in a large number of range States, in Southern Africa, Eastern Africa and Central Africa.[9]

Once poached, the horn and tusks are collected and further trafficked. These products are passed on or sold to local traders and then to intermediaries who compile and organize larger shipments at the national level or subregional level. Typically, these shipments are then trafficked by internationally connected individuals or groups to destination markets in Asia, where wholesale and retail traders sell final products to end-consumers. Small quantities are also trafficked towards destinations outside Asia.

According to UNODC World WISE seizure data from 2015-2019, most ivory tusk shipments were destined to Viet Nam (42 per cent), China (34 per cent) and Cambodia (12 per cent). For rhino horn, based on a longer time period from 2002 to 2019, the main destinations were similar, with Viet Nam (41 per cent), China (39 per cent), Malaysia (5 per cent) and Thailand (3 per cent).[10]

A common model to describe the illegal supply chain uses six different trade levels: poachers, runners or brokers, intermediaries, exporters, importers/wholesalers and retail traders. While there are some differences between the rhino horn and ivory trades, the general set-up of the illegal supply chain appears to be comparable.[11] The levels may vary case by case in composition and nature, and some products may not be handled by all levels when arriving at their end-consumer; they provide, however, a useful model for analysing illegal markets.

Poachers can be roughly grouped by their degree of professionalization.[12,13] Subsistence or artisanal poachers are usually from poor communities and are driven by the need to sustain their livelihoods. These poachers are not highly organized, often hunt opportunistically and do not use long range weapons or tranquillizers.[14] They are often driven by their socio-economic situation,[15] taking the risk of poaching for comparatively little reward.

On the other side, there are highly organized poachers and poaching groups who work with a degree of professionalisation, and are well equipped with, for example, long-range weapons. This has been reported for rhino horn poachers,[16] and was substantiated by reports on the increased involvement of military personnel, police officers or game scouts, all of whom would have had specialized training to develop tracking or shooting skills.[17] These poachers achieve higher prices for their products, are often paid up front and are well connected with trafficking organizations who organize the further trafficking of the illicit products.

Poachers may work independently or may be hired by trafficking groups ('dependent poacher'). A poaching group typically comprises a skilled shooter, an experienced tusk or horn cutter, and porters to carry food, water and the product back to safety. A rhino poaching group will usually be smaller than one for elephants; two to four members for rhinos and from four to more than a dozen for elephants.[18] Independent poachers self-finance the hunt and sell the horn or tusk to the highest bidder; dependent poachers are hired and subsidized by others higher up in the supply chain.

Besides poaching, rhino horn and ivory can enter the illegal market from stockpile theft (for example,

Box 2: Illicit supply chains

Supply chain analysis helps to understand the functioning of illicit markets and how organized crime groups interact to organize the – often global – illicit trade in goods and services.

Supply chains exist in licit and illicit markets alike. Broadly speaking, a supply chain is a set of actors involved in the (licit or illicit) flows of products, services, information and finances from the source to the end customer. A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer demand (the term 'market' encompasses all actors who are producing, trading and purchasing a good or service).

Illicit supply chains share many of the same functional attributes as licit ones. Criminal organizations plan activities, source and procure raw materials, manufacture, refine, transport, store inventory, sell and distribute products to customers. Often more than one group is involved in the supply chain, fulfilling different roles.

The primary differences between licit and illicit supply chains lie in risk levels and mitigation strategies. Organized crime groups face the risk of detection and arrest by law enforcement and the risk of losing products when they are confiscated by authorities. Actors in illicit supply chains face logistical challenges and extra costs to conceal their operations.

from government-held repositories of seized products), and from being harvested from natural mortalities or legal killings (such as problem animal control).

Runners or brokers are the next link in the supply chain. These low-level traffickers usually live in the vicinity of the poaching areas and are familiar with community leaders and persons who purchase the products from the poacher(s). These players are often termed 'runners' in Southern Africa, 'brokers' in East Africa or 'commanditaires' in Francophone Africa (if they have ordered and financed the hunt). In most cases, the persons involved in the onward trafficking of illegal wildlife parts are not the same persons carrying out the poaching.[19] There are indications that higher-level traffickers systematically attempt to distance themselves from the poaching offence.[20] Runners or brokers separate higher-level traffickers from poachers.

Intermediaries or dealers operate at the national level and are often based in a large urban area. They aggregate products and either sell them to exporters or export them themselves (in this case this role conflates with the next). Intermediaries are tasked with the logistical organization of the transaction and the transport of the products to exporters or international wholesalers. Intermediaries are often of Asian (destination country) descent but are resident in or close to source countries.[21]

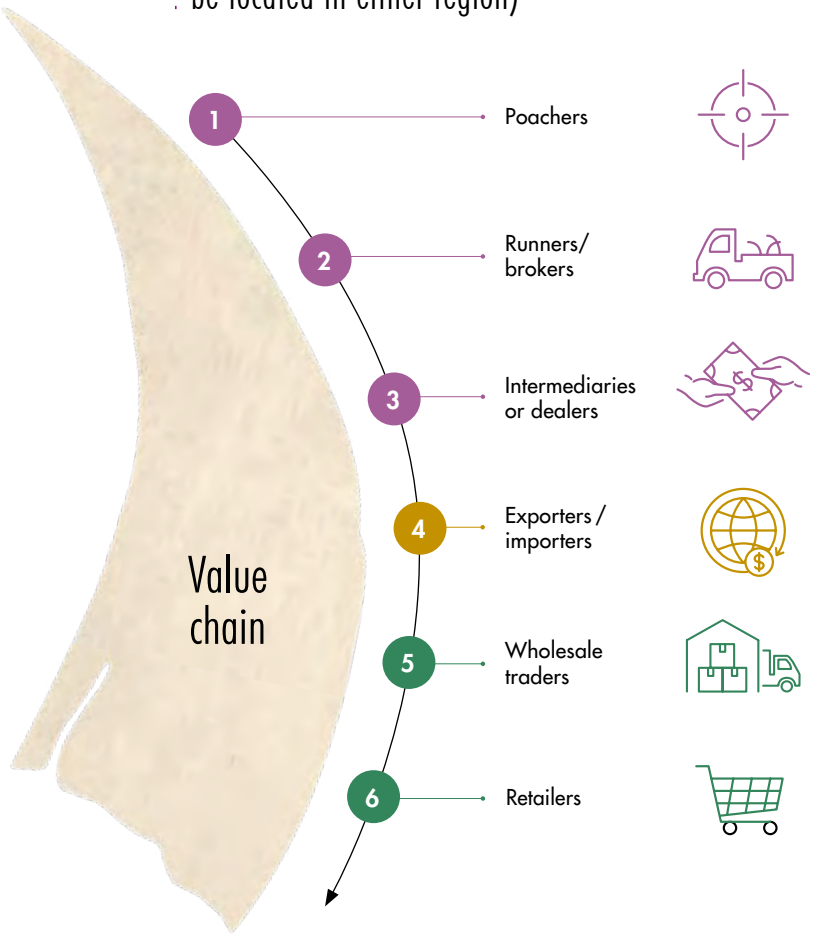
Exporters/importers are usually part of organized crime groups. They facilitate international trafficking (for example, by using front companies and corrupting authorities), and carry out packing, preparation of paperwork and export of the products. Packing may involve specialists who make use of fake stones, hollowed out logs or other methods to conceal the products. These players are based in cities with an international airport or seaport. The products can be shipped in containers by sea or air freight, carried by air by couriers in personal luggage, or sent in packages by courier service or the post.

Wholesale traders receive the products in the destination country. Once in the country, the products are processed[22] and sold to end consumers at markets, jewellery stores and other retail outlets or online.

Retailers in destination markets sell refined products to end-consumers, where the supply chain ends.

Besides these actors, who can be categorized as "primary actors" and handle ivory or rhino horn products directly, many others make profits by providing supporting services, such as transportation or money-laundering. Others facilitate the trade by taking bribes; at lower levels, it is generally

Fig. 1 Actors along the value chain of rhino horn and ivory (violet actors are thought to be in Africa, green ones in destination countries, yellow may be located in either region)



Source: Adapted from INTERPOL and UN Environment, Strategic Report: Environment, Peace and Security – A Convergence of Threats, p. 40, 2016; Maggs, K., 'South Africa's National Strategy for the safety and security of rhino populations and other relevant government and private sector initiatives' in Dean, C. (ed.), Proceedings of the tenth meeting of the IUCN African Rhino Specialist Group, 5-10 March 2011, pp. 130–146, 2011 and Milliken, T. and Shaw, J., The South Africa – Viet Nam Rhino Horn Trade Nexus, TRAFFIC, 2012.

Box 3: Limitations and strengths of seizure data

Organized crime groups invest a lot of effort in concealing their activities. For this reason, statistics on trade patterns and routes, volumes traded and profits made are hard to come by.

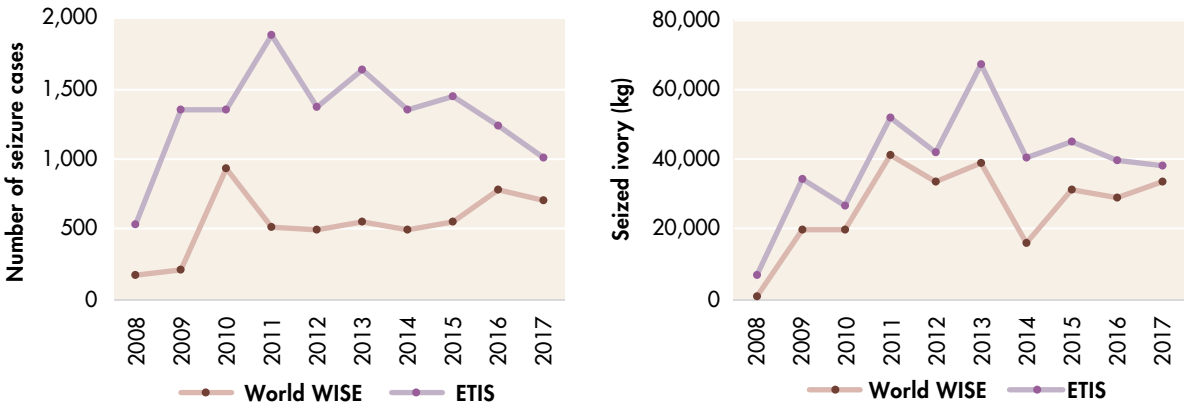
Seizure data provide some insight into the illegal trade. A seized parcel is an indication of illegal activity and accompanying information on alleged origin and destination or the nationality of the offenders can shed light on operations otherwise conducted in the dark.

Seizure data require careful interpretation because they are a mixed indicator, demonstrating both the presence of a problem and the initiative of the relevant authorities in addressing it. On their own, they cannot be used to demonstrate the magnitude of trafficking or effectiveness and capacity of law enforcement.

When used in aggregated form and interpreted together with other indicators, seizure data can yield insights on major trafficking routes, concealment methods and techniques used by traffickers. Data from ivory seizures for example provide valuable information on transit and destination countries, and make it possible to assess the share of ivory taken out of the trade by law enforcement. This report uses seizure data included in UNODC World WISE Database for the analysis.

There is a parallel data collection system, the CITES Elephant Trade Information System (ETIS), which appears to be more complete than UNODC's data. A comparison between aggregated data reported by ETIS[a] and World WISE shows that the ETIS system recorded more seizure cases and more seized weight over time. Data reported by ETIS was only available in aggregated from and include imputation of missing weights, but no open source information was available to assess it and understand how much it accounts for the difference between the two database systems.

Fig. 2 Comparison between ETIS and World WISE ivory seizure data, 2008 - 2017



Source: Source: ETIS[a] and UNODC World WISE database

a T. Milliken, F. Underwood, R. Burn and L. Sangalakula, *The Elephant Trade Information System (ETIS) and the Illicit Trade in Ivory: A report to the 18th meeting of the Conference of the Parties to CITES.* CoP18 Doc. 69.3 (Rev. 1) Annex 1, December 2018.

local police officers and park rangers who take their cut, while at the international level, it is custom officers at the borders and high-level officials.[23] These groups are facilitators and beneficiaries of the illegal trade in wildlife goods, and part of the illicit supply chain, too.

No generalization fits all cases. There have been reports[24] that some trafficking networks of East Asian origin operate in South Africa, and process and craft rhino horn locally into final products before smuggling them to consumers in Asia. Police investigations in South Africa have uncovered small home workshops where rhino horn is cut into rough "discs", beads and bracelets are manufactured, and offcuts and rhino horn powder are packaged for export. Other cases suggest that intermediaries, exporters and wholesalers conflate. In such cases, the supply chains are cut short and involve a smaller number of actors.

The size of the illicit market

The illicit markets for ivory and rhino horn comprise all buyers and sellers, and thus all actors in the supply chain, including end consumers. The market sizes in monetary terms is defined as the total illicit income generated from the trade in ivory and rhino horn.

Overall illicit income is calculated as amounts purchased multiplied by

prices. There are, however, no direct estimates of the annual amounts of rhino horn and ivory purchased by customers in destination countries, or data on the numbers of buyers and sellers: Studies have investigated the number of ivory and rhino horn items displayed,[25] estimated the weight of the items,[26] or studied the behaviour and motivation of customers.[27] None of these studies allowed for the inference of the total amounts of ivory or rhino horn purchased in a year, however.

One quantity that can be assessed is supply: elephant and rhino populations are well-documented, and (relatively) good poaching data are available. These data together with estimates on average amounts of rhino horn and ivory per animal yield an annual average supply of raw ivory and rhino horn from poaching. Data on rhino horn and ivory entering the market from sources other than poaching are less robust but can be used to complete the assessment.

With supply estimates available, the total quantities purchased by end consumers can be assessed considering that along the supply chain product is seized by law enforcement, stockpiled or otherwise lost. In terms of where the final products are purchased UNODC World WISE data is used to estimate the destination of the products.

Combining all these data allows for an assessment of the volumes purchased by end consumers in destination countries under certain (critical) assumptions (see Boxes 3 and 4). Multiplying these volumes with respective prices yields the illicit gross income generated from the trade in ivory and rhino horn and thus a market size estimate in monetary terms. Disaggregated price data allow for a further breakdown of the illicit income by group of actors, providing an indication of the distribution of income along the supply chain.

Annual supply of rhino horn

As described in chapter 3, between 2016 and 2018,[28] an annual average of 1,060 rhinos have been illegally killed in Eastern and Southern Africa.[29] Each animal carried two horns, weighing on average together 5.56 kilograms or 2.78 kilogram each.[30] This yielded some 2,100 horns[31] or 5.8 tons of rhino horn harvested from poached animals per year. Of these, 91 per cent or 5.3 tons were estimated to have entered the illegal market (sold onwards), the remainder supposedly recovered in the field before being sold. [32]

Poached animals are not the only source of rhino horn entering the illegal market. Emslie et al. (2019) estimated that an annual average of 113 horns or 314 kilograms of horn were obtained from sources other than poaching, such as stockpile theft, theft from natural mortalities or trophy hunting.[33] In these ways, an estimated total of some 5.6 tons of rhino horn entered the illegal market in Africa each year between 2016 and 2018.

These numbers may be underestimations and are surrounded by some uncertainty. The numbers of illegally killed rhinos are to be understood as minimum numbers, since it is possible that carcasses were not detected. The weight of horn per animal is an average that may mask significant variation in the data. Older animals have larger horns than younger ones, males larger than females, and the probability of being poached might vary depending on horn size. Estimated recoveries from the field and shares of horns entering from other sources may also vary over time.

Annual supply of ivory

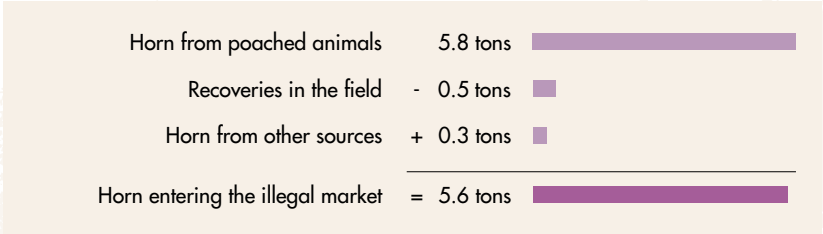
Illegally traded ivory can come from a variety of sources. Most important for conservation of the elephant species is ivory harvested from illegally killed elephants, but ivory can also originate from private stockpiles or from leakages from national ivory repositories. Such repositories hold ivory seized during law enforcement operations or harvested from legal killings (for example, killings in the context of problem animal control) or natural mortalities.

Ivory from illegally killed elephants

As detailed in Chapter 3, there are two ways to estimate the number of elephants poached, and thus the size of illicit ivory supply. This chapter used results from a modelling approach that determined the numbers of illegally killed elephants by using data on detected elephants' carcasses (illegally killed or died from natural causes) recorded by the CITES program "Monitoring the Illegal Killing of Elephants" (MIKE). [34]

As with rhino horn, a three-year average of the latest available data of

Fig. 3 Rhino horn entering the illegal market, annual average 2016-2018



Note: Numbers are rounded, calculations were done with full precision.

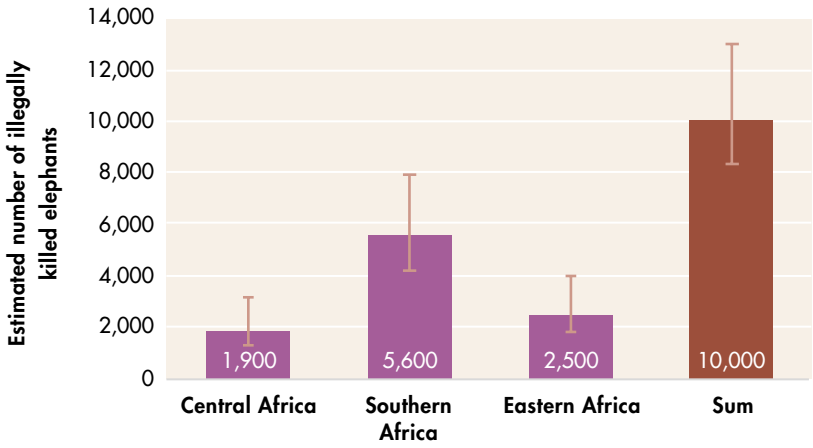
illegally killed elephants was used as a basis for estimating the illegal ivory supply. Between 2016 and 2018, an estimated average of 10,000 (range 8,300 – 13,000)[35] elephants were illegally killed per year in Central, Southern and Eastern Africa.

These estimates are highly uncertain. The model used to estimate the number of illegally killed elephants incorporated variation in demographic rates and from the carcass sampling process (reflected in the ranges), but not from population survey data. The model was run on carcass data from MIKE sites in Central, Southern and Eastern Africa, but did not incorporate information from West Africa due to their comparatively lower reporting rates.[36]

The IUCN African Elephant Status Report 2016 put the estimated elephant population in a bracket of roughly ±5 per cent and acknowledged that there "*may be an additional 117,127 to 135,384 elephants in areas not systematically surveyed.*"[37] These additional population numbers are obtained from statistically less reliable methods and referred to as 'guesses'. Guesses potentially add another 28 to 33 per cent to the total elephant population, and are of significant size in Central Africa, where in addition to the estimated 24,119 ± 2,865 elephants, another 87,190 to 103,355 (up to 4 times as many) may exist. Elephants may have been poached from these populations, but the estimated poaching rates cannot be directly applied to guessed elephant populations. In absence of any means to estimate poaching rates for elephant populations in this category, the total estimates are considered to be on the lower, conservative side.

The estimated numbers of illegally killed elephants combined with estimates of the average weight of elephant tusks yield an estimate of the ivory entering the illegal market per year.

Fig. 4 Estimated numbers of illegally killed elephants, total and by subregion, 3-year-average, 2016-2018



Source: UNODC estimates based on modelling by George Wittemyer

Note: Uncertainty ranges represent a 95 per cent confidence interval. The model incorporated variation in demographic rates and from the carcass sampling process, but no uncertainties from the underlying population survey data.

Table 1 Annual estimated ivory harvested from illegally killed elephants, 3-year average 2016-2018

SUB-REGION	TONS OF IVORY HARVESTED PER YEAR
Central Africa	19.2 (12.7-32.2) tons
Eastern Africa	25.8 (18.1 - 40.4) tons
Southern Africa	57.1 (42.7-81.2) tons
West Africa*	2.9 tons
Total	**105 (88 – 136) tons**

Source: UNODC estimates based on modelling by George Wittemyer

* Note: The illegal killing rate applied to West Africa is a weighted average of the other subregions (UNODC calculations). The ranges reflect the 95% confidence intervals of the estimates on illegally killed elephants.

Elephant tusks are continuously growing front teeth that come usually, but not always, in pairs. The yield figure used historically has been 1.9 tusks per elephant and about 5.5 kg per tusk, resulting in an average of some 10 kilograms[38] per elephant.[39] Applying such an average to estimated numbers of illegally killed elephants provides an order of magnitude but can be misleading. Poachers would seek out older, male animals with the largest tusks to increase the ivory yield per hunt, so the above average might be at the lower end for mature, undisturbed populations. In populations that already suffered substantial losses in the oldest age groups, average expected ivory yield per poached animal may have drastically decreased[40] and the above number may overestimate the current ivory yield. [41]

Combining estimates of illegally killed elephants with estimates of the average ivory yielded per elephant results in an annual average of 105 (88-136) tons of ivory available for the illegal market between 2016 and 2018.

Ivory from other sources

Poaching is not the only source for ivory entering the illegal market. There are national stocks of tusks in source, transit and destination countries, and ivory has gone missing in the past.[42] These stockpiles accrue due

to several factors, including legal killings, natural elephant mortality and seizures of contraband.

In the absence of systematic monitoring and public reporting on ivory stocks held by countries affected by ivory trafficking,[43] producing a well-founded estimate of ivory stocks and leakages does not appear to be feasible. There are, however, some indications of the magnitude of leakages in comparison to the annual supply of newly sourced ivory.

Cerling et. al.[44] used C-14 dating methods to determine the time between elephant death and tusk seizure. The examination of 231 African ivory samples from 14 seizures made between 2002 and 2014 showed that the lag time between elephant death and seizure had median values generally ranging between 6 months and 3 years. The authors concluded that they did not find evidence that long-term government or other stockpiles contributed significant amounts of ivory to the illegal trade and emphasized that poached ivory was being rapidly moved into the illegal trade.

Estimates presented by Nkoke et al.[45] point towards amounts that are small compared to ivory collected from poaching: The authors estimated a minimum amounts of stockpile leakages in Central Africa of a total of 56.5 tons over the course of 26 years (1990 to 2015).

Leakages from repositories may thus be small in comparison to the ivory harvested from poached animals and leakages are not considered in the following analysis. It needs to be stressed that the available data is very weak, and more data is needed to come to a reliable estimate of leakages from legal stockpiles.

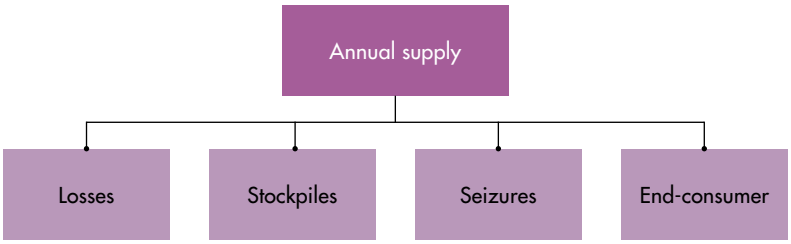
Volumes reaching the end-consumer

All rhino horn and ivory entering the illegal market in a year is either purchased by end consumers, seized by law enforcement, stockpiled for later sale or otherwise lost in the process. How much of the supply reaches end consumers is therefore determined by the amounts seized, stockpiled or lost.

Stockpiles or inventories may be kept by all actors (poachers, traffickers, wholesalers and retailers) along the supply chain. Some actors may keep stocks as an investment to speculate on higher prices,[46] others may hold on to products to wait for less risky trafficking opportunities or to collect more products to collate a larger shipment. Losses include products rendered unusable during transportation, products lost during manufacture of items[47] and products disposed to avoid arrest. With the uncertainty around stockpiles and in absence of data to estimate losses other than seizures, the calculations in this report assume that all products that enter the market over a certain period are either seized or sold to end consumers in the same period (this goes with the implicit assumption that inventories are constant, that is, products entering inventories are offset by products entering the market from inventories).

The annual estimates are based on three-year averages of supply and seizures, which is thought to account for some delays in the supply chain between source and destination of the product and to smooth the volatility in seizure data.

Fig. 5 Flow chart of illicit ivory and rhino horn products



A detailed description of trafficking modalities, routes, origin and destination countries can be found in Chapter 3. Here, the focus is on the overall volumes traded from Africa to destination countries in Asia and on the approximation of the illicit income generated by the illicit trade at a regional level.

Rhino horn

Between 2016 and 2018, an annual average of 426 kg[48] of rhino horn and rhino horn parts were seized in Africa and 500 kg in Asia, according to data from the UNODC World WISE Database. In total, some 976 kg were seized per year (50 kg outside of Asia and Africa).

The data, together with the assessment that there is hardly a retail market for rhino horn in Southern and Eastern Africa,[49] indicate that the main flow of rhino horn originates in Southern and Eastern Africa and goes to East and South-East Asia for final consumption. A minor flow of rhino horn could be destined for the European market (accounting for four per cent of all World WISE seizures). However, out of all products seized in Europe between 2016 and 2018 for which a destination country was reported, 43 per cent were destined for East Asia and 15 per cent for South-East Asia. The remainder, less than two per cent all horn seized, was believed to have its final destination in Europe.

Combining supply estimates with seized amounts and destinations of flows, makes it possible to estimate that out of the 5.6 tons of rhino horns entering the illegal market each year, 5.2 tons leave Africa and out of these, 4.6 tons reach end-consumers in Asia. Less than 100 kg might be destined for other regions in the world.[50]

Ivory

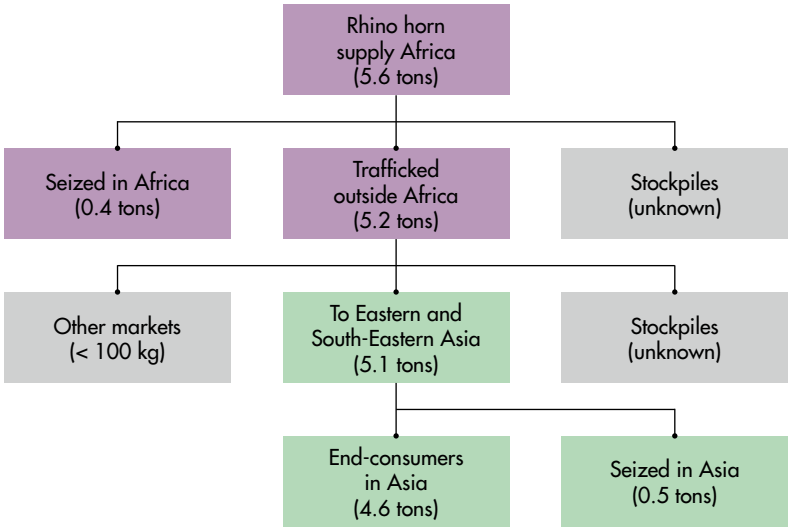
A similar calculation can be made for ivory. The destination of the products is estimated by using the country of destination of the shipments, as reported by Member States.[51] If all ivory harvested within a certain period is consumed in the same period,[52] and if the information provided on the destination of represents actual trade patterns, the following flows of ivory can be deduced.

An annual average of 105 (88 – 136) tons of ivory was supplied from African range states between 2016 and 2018. Based on World WISE seizures,[53] out of these, 5 tons were seized by law enforcement in the region, and 9 tons were destined for the region,[54] leaving 92 tons available for export to destination markets. Some 88 tons reach Asian countries via various routes (including routes passing through European countries). In Asia, 24 tons were seized by law enforcement and 63 tons remained available for consumption. Some 3.6 tons were destined for Europe, of which 2 were seized and 1.6 were thought to be consumed.

The value of the illicit market

The annual, overall gross illicit income generated by ivory was estimated to be US$400 (310 – 570) million and the income generated by rhino horn US$230 (170 – 280) million in between 2016 and 2018. The gross income is the overall income made by retailers. These estimates pertain to the quantities reaching South-East

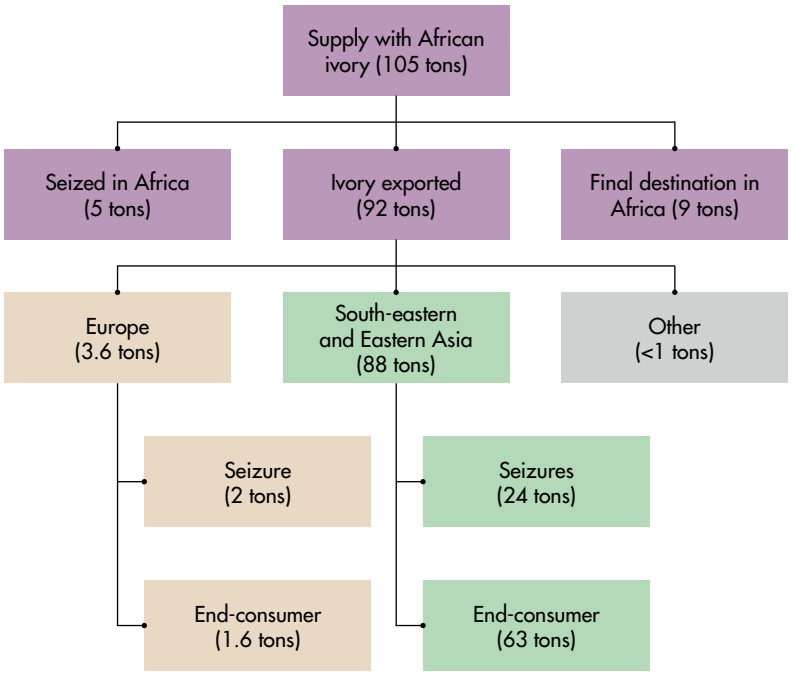
Fig. 6 Flows of rhino horn, annual estimates based on 2016-2018 data



Source: UNODC estimations

Note: Numbers are rounded, calculations were conducted in full precision. Seizure data for 2018 was approximated with an average of 2016 and 2017.

Fig. 7 Flows of ivory, annual estimates based on 2016-2018 data



Source: UNODC estimations

Note: Numbers are rounded, calculations were conducted in full precision. Seizure data for 2018 was approximated with an average of 2016 and 2017.

Box 4: Uncertainty surrounding the estimates: impact of assumptions

All estimates presented on market sizes and illicit income are subject to uncertainty. Each estimate is based on incomplete information. access to better information may affect the quality of the estimates.

Illegal killings of elephants. The methodology yields results on the lower, cautious side. Better information on elephant populations and the geographical distribution of poaching may lead to an increase in the supply of ivory (as would incorporating estimates on Asian ivory). The extrapolation made using the proportion of illegally killed elephants is based on a number of assumptions (see Box 1 in chapter 3).

Leakages of ivory and rhino horn from private and government repositories. The few data points available[a] indicate leaked quantities that are small in comparison to supply from newly killed elephants and rhinos. Better data might yield an increased supply of ivory and rhino horn.

Seizures. Seizures are suspected to be underreported,[b] and a comparison of officially reported seizures with media reports corroborated the hypothesis that seizures officially reported may not be complete. More complete seizure data would decrease the amounts of ivory and rhino horn reaching end consumers and thus decrease the market value.

Ivory yield per elephant. The impact of better data on this element is unclear. The data used for the calculations are based on natural measurements. Selective poaching may lead to larger tusks, on average, when old, male animals are sought out. In populations that already suffered substantial losses in the oldest age groups, the average expected ivory yield per poached animal may be much smaller than the assumed size in the calculations.

Losses in production. Milliken et al estimate that up to 30 per cent of the ivory is lost in the carving process[c] when final products are made from ivory and rhino horn. If these losses are incorporated into the estimates, the estimated weight of ivory and rhino reaching end consumers - thus the value of the retail market - would decrease accordingly.

a Nkoke, S. C. et. al., *Ivory markets in Central Africa*, TRAFFIC, September 2017.

b T. Milliken, F. Underwood, R. Burn and L. Sangalakula, The Elephant Trade Information System (ETIS) and the Illicit Trade in Ivory: A report to the 18th meeting of the Conference of the Parties to CITES. CoP18 Doc. 69.3 (Rev. 1) Annex 1, December 2018.

c In CITES document CoP14 Doc. 53.2, the losses through various carving and mechanized manufacturing processes were taken as 30 per cent. Losses could thus be of significant size and reduce the estimated illicit financial flows accordingly.

and East Asia. There are indications that rhino horn and ivory are sold in other regions, too, for example, in Europe. These markets are not considered here given that their size is very small, and that price data are not available.

In the absence of a systematic monitoring of prices by Member States, UNODC undertook field and desk research to collect prices of ivory and rhino horn at all levels of the supply chain.[55] The prices used were average prices covering multiple years. A multi-year average was used to smoothen year-on-year variations, to increase sample sizes and to make the value estimates consistent with the supply estimates.

With these prices, the illicit income generated can be further broken down by group using the supply chain model presented above. Intermediaries, exporters and wholesale traders are grouped together under "international trafficking".

For both products, the largest increases in prices - and thus income - are found between wholesale and retail selling in Asian countries. As in many other licit and illicit markets, the largest value added is generated in retail. At this stage, rhino horn and ivory are manufactured into artistic products with qualities varying from machine made items to carefully crafted pieces of art.

Table 2 Annual illicit income generated by the illicit trade in ivory and rhino horn (US$ millions), annual average, 2016-2018

	IVORY	RHINO HORN
Overall market size Asia (end-consumer), gross income	**US$ 400 (310 – 570) million**	**US$ 230 (170 – 280) million**
Retail	US$ 260 – 490 million	US$ 120 – 160 million
International trafficking	US$ 38 – 60 million	US$ 28 – 79 million
Runners and brokers	US$ 7 – 11 million	US$ 7 – 15 million
Poachers	US$ 8 – 13 million	US$ 6 – 43 million

Note: International trafficking summarizes intermediaries, exporters and wholesale traders. The income presented as breakdown of the overall market size is the gross income minus the income of the actors earlier in the supply chain. The estimates are to be understood as orders of magnitude, not robust statistics. The numbers are based on the model of a consecutive supply chain: poacher – trafficker Africa – international trade – trafficker Asia – retail Asia. This model is thought to be applicable to a majority of cases, but not all. One such exception would be manufacturing in Africa and direct shipments to end consumers in Asia. The ranges reflect different degrees of uncertainty (see methodology section).

The price data at retail needs thus to be interpreted with caution. The prices cover a very broad range, with prices per kg differing between minimum and maximum by a factor of 13 in ivory items and a factor of 36 for rhino horn products, reflecting the wide range of possible qualities (see Box 6). Using an average price masks these large differences, and the resulting values therefore represent an order of magnitude rather than a precise statistical estimate.

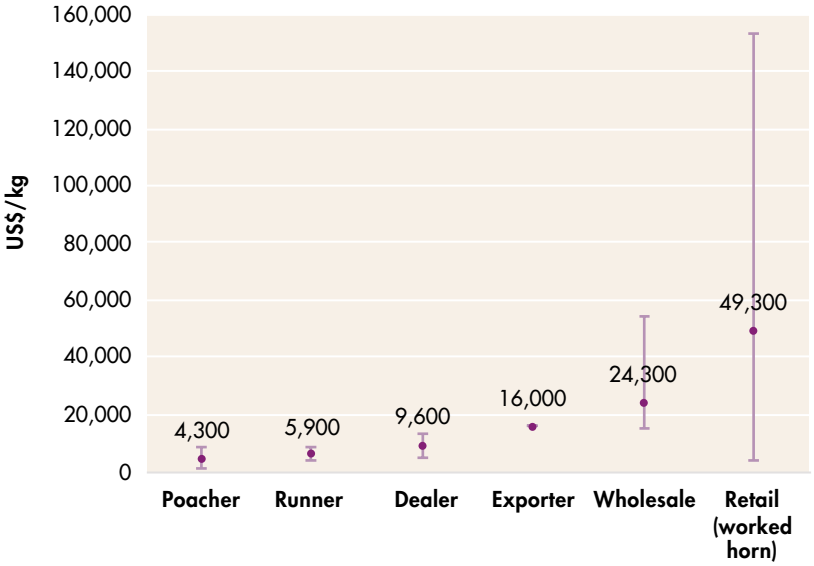
Comparing the rates of increase (mark-ups) of prices between rhino horn and ivory shows that they are consistently higher for ivory than for rhino horn. Mark-ups cover profits (net income) and costs. They are thus not only reflecting the actor's desire or ability to make profits, but also the costs an actor incurs. Besides overall market dynamics and the dynamics between actors, their power in price negotiations, the costs and the related business models can drive differences in prices between trade levels.

Gross income and net income

As every productive process, illicit income can be represented by three main aggregates: illicit gross income (or output), intermediate expenditure or intermediate costs, and value added, presented in this chapter as illicit net income (see Box 7).

The estimated annual illicit income broken down by actor does not reflect the net income, which accounts for all the costs the actors face in conducting the illicit activity (intermediate expenditure). Net income is key to understanding the proceeds of crime along the supply chains and it is the more accurate metric for comparing the profitability of crime across the actors of the supply chain. Net income is the income available to actors for consuming other goods and services and for investing in licit or other illicit activities or terrorist groups.

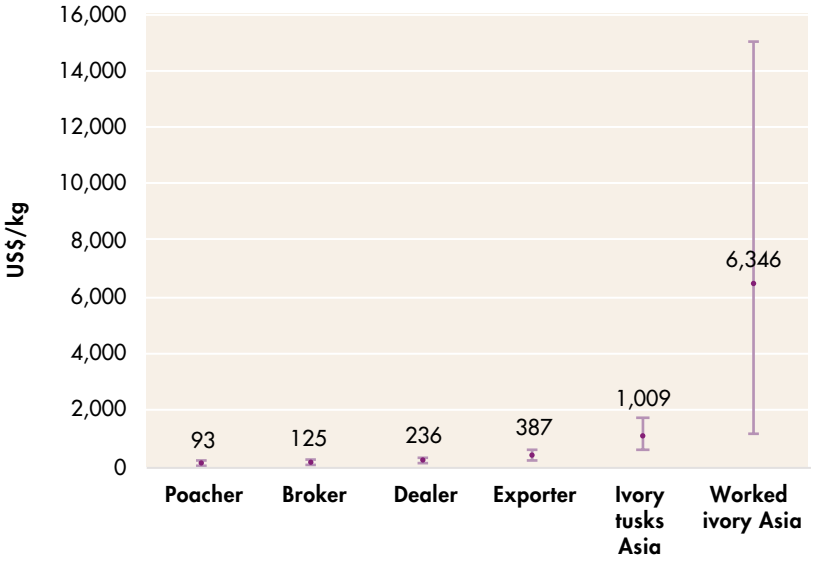
Fig. 8 Variation of price data for rhino horn, by trade level, multi-year average, 2014-2018



Source: UNODC estimations based on data collected in 52 field interviews and available literature (poacher to exporter) and on data provided by the Wildlife Justice Commission and the Environmental Investigation Agency, UK (wholesale to retail). Mid-points are a simple average of all observations (weighted by weight where available). To increase sample sizes and coverage, data from 2016 to 2018 was supplemented with earlier years.

Note: Ranges reflect varying degrees of uncertainty.

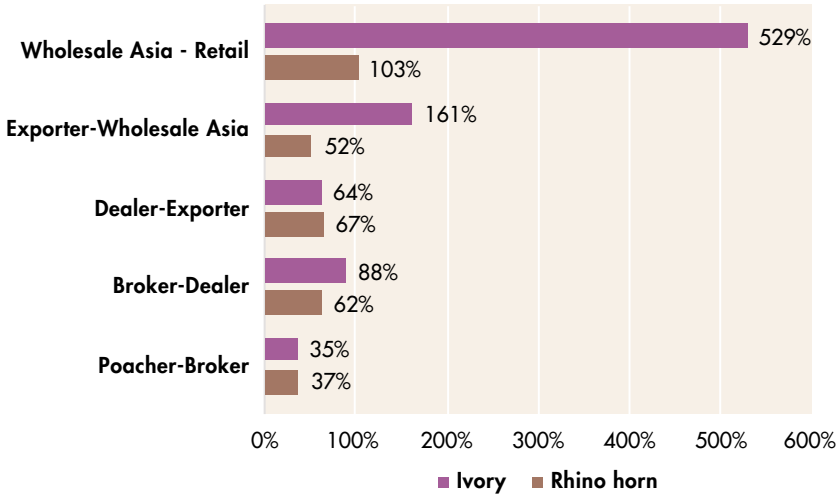
Fig. 9 Variation of ivory price data, by trade level, multi-year average, 2014-2018.



Source: UNODC estimations based on data collected in 52 field interviews and available literature (poacher to exporter) and on data provided by the Wildlife Justice Commission and the Environmental Investigation Agency, UK (wholesale to retail). Mid-points are a simple average of all observations (weighted by weight where available). To increase sample sizes and coverage, data from 2016 to 2018 was supplemented with earlier years.

Note: Ranges reflect varying degrees of uncertainty.

Fig. 10 Percentage increase of per kilogram-prices between different actors in the supply chain, rhino horn and ivory, average 2014-2018



Source: UNODC estimations

Only the percentage changes from one level to the next are shown. Ranges are omitted for clarity.

Box 5: Rhino horn is less valuable than commonly believed

The prices of rhino horn found during the research for this study were significantly lower than the widely quoted US$65,000 per kilogram at the wholesale level in Asian countries.[a] The average price found was US$24,300; less than half of the prices frequently reported by media sources.

The price data used in this report for destination countries is based on two main sources: Stoner et al[b] who collected prices between 2015 and 2016 in a village in Viet Nam that held at this point more than one ton of rhino horn products (see Case study 3), and prices provided by the Wildlife Justice Commission[c] and the Environmental Investigation Agency.[d] The majority of prices was collected by Stoner et al.

In absence of more detailed price data, it is not possible to assess whether the high prices cited in the media (which appear to date to 2012) have been overestimated and/or were higher than the now observed prices due to differences in the market structure. There are indications for an actual reduction in prices (see Chapter 3 and Stoner et al. 2018, note b), but it remains unclear if the reduction can explain the magnitude of the differences in prices.

At US$24,300 per kg of raw rhino horn, rhino horn might not be more valuable than gold. It is, however, as the efforts made to poach rhinos show, still a highly sought-after product that yields sound revenues to those involved in the trade.

a Tracking down this number was challenging. In their oft-quoted article, Biggs et al. (Biggs, D., Courchamp, F., Martin, R. and Possingham, H. P., 'Legal trade of Africa's rhino horns', *Science, 339*(6123), 1038-1039, 2013) list US$65,000 per kg as price, naming a National Geographic blog entry as a source (*Record 618 South African Rhinos Poached for Horns in 2012, so far, 11 December 2012*, available at: https://blog.nationalgeographic.org/2012/12/11/record-618-south-african-rhinos-poached-for-horns-in-2012-so-far/). This source appears to be a dead end, however, as it does not provide the origin of this number.

b Stoner, S., Verheij, P. and Jun Wu, M., 'Illegal rhino horn trade in Nhi Khe, Viet Nam,' UNODC F*orum on Crime and Society*, Vol. 9, Nos. 1 and 2, 2018.

c In litt.

d In litt.

Box 6: Price building at the retail level

The large differences in retail prices of ivory and rhino horn are due to the large variation in quality and artistic value of the products. A product carefully crafted by hand commands higher prices than a product that is produced (partially) by machines.

The material used can make a difference too. Stoner et al.[a] noted for rhino horn that "the structure and colouring of a rhino horn differs from base to tip. If a segment of rhino horn is cut from the middle and held up to the light, it has a translucent, amber glow. In contrast, horn tips are compressed, almost black, and the material is much firmer than the base of the horn. Colour and density can affect the price. In general, the blacker the horn, the more expensive it will be.

The most precious part is the core, sometimes referred to as the "meat", where it is darkest, gradually fading into brown, red, yellow and even white in successive concentric rings towards the surface. The tip is the most expensive part of the horn because that is believed to be where the energy of the rhino is concentrated."

Ivory as a material is more homogenous, although the products are very diverse. Ivory products range from machine-produced chopsticks or bangles to highly artistically crafted whole tusks with respective great variations in prices.[b]

a Stoner, S., Verheij, P. and Jun Wu, M., 'Illegal rhino horn trade in Nhi Khe, Viet Nam,' *UNODC Forum on Crime and Society*, Vol. 9, Nos. 1 and 2, 2018.

b See Gao, Y., and Clark, S. G., 'Elephant ivory trade in China: Trends and drivers', *Biological Conservation*, 180, 23-30, 2014 for a detailed discussion on ivory products.

Box 7: Market size, illicit income and expenditure

The **market** for a product involves all buyers and sellers of the product in a certain geographic region. Its size can be determined by the number of buyers and sellers, the amounts traded and the respective prices.

Illicit gross income (market value or sales) is the value of illicit goods and services produced in a given period (for example, a year). The value is determined as quantity multiplied by price, where prices need to correspond to the geographic extension of the market under consideration. In a global market, gross income is represented by retail prices and corresponding quantities sold at retail; in a country, the appropriate prices may be domestic retail prices multiplied by domestic consumption and export prices multiplied by the amounts of goods exported.

*Gross income = Quantity purchased * Price.*

Intermediate expenditure is the value of inputs acquired to produce the illicit goods and services over a given period. The value of inputs is determined as quantity multiplied by price. Intermediate expenditures for poachers may include lodging, transportation, guns or bribes to persons facilitating the trade. Intermediate expenditure for traffickers includes the costs for purchasing raw material (for example, the payments traffickers make to poachers), but also others, such as expenditure for transportation or bribes.

Illicit net income of an actor or a group of actors is the illicit gross income minus intermediate expenditure. Illicit net income is the income available to an actor after accounting for costs.

Net income = Gross income - Costs.

Net income is the income that remains with the actors after accounting for their expenditures.[a] Net income is considered to be the more suitable metric for comparing the amounts of money made by actors.

Illicit income generation refers to all transactions that are carried out in a certain illicit productive process (supply chain) where profits are made. Here, it refers to all transactions directly related to the trade in ivory or rhino horn. Income generation can be represented by three main aggregates: gross income, intermediate expenditure (or intermediate cost), and net income or value added.

Once the illicit income is generated, it is used by the actors. **Income management** refers to all transactions of illicit (net) income outside of income generating activities, such as purchasing property or movement of funds to offshore bank accounts.

a This corresponds to the value added in national economics.

The available data did not allow for a comprehensive estimation of costs and net income, although understanding the cost structure affecting different actors would provide insights into the trade business models.

The costs of the illicit trade

Organizing crime can be costly. The illegal trade in ivory and rhino horn comprises all activities also found in the legal sphere, such as the procurement, production, transportation, sales and distribution of commodities; and all these activities are associated with expenditures for the organizers. Operations of illegal nature require additional precautions to evade detection, arrest and prosecution by law enforcement, to mitigate the risk of interception, and to conceal or erase traces that may lead to the organizers themselves.

These costs can be substantial. Case study 1 showed that the costs of purchasing and transporting ivory for international traffickers can make up from two-thirds to 90 per cent of their gross income, with bribes alone making up from 4 to 10 per cent of the sales value. A different study[56] on smuggling in South-East Asia found that border officials were paid an 'unofficial fee' from US$10-20 per shipment.

The possible cost components can be grouped into four broad categories.[57]

- Operational costs, which are costs encountered in activities required to facilitate the smuggling. Examples are transportation, labour, material and other inputs.
- Concealment costs, stemming from the actor's activities to conceal and disguise their operations. These costs comprise, for example, the costs for concealment in transportation (such as hiding products in legal shipments), financing safe houses used for hiding products, or purchasing custom-made vehicles (or modifying existing vehicles) to transport illegal commodities.
- Evasion costs, associated with evading arrest and prosecution by law enforcement. Organizers of large-scale operations employ intermediaries to distance themselves from the poaching offence and from the goods and services trafficked. They use complex structures to launder the proceeds of crime into legal businesses, use non-traceable ways for monetary transactions (including nominee accounts, shell companies) and pay other criminal organizations to protect their contraband (security payments).

- Corruption costs, that can be part of any of the above or be a separate category. Corruption costs are payments (bribes) to government officials and other corruptive acts or that facilitate the illegal trade at all levels.

Each link in the supply chain faces different costs, and the costs can vary significantly between cases, depending on the business model, the size of the operation and the modus operandi of the organized crime group. Analysing the possible costs components by group of actors yields insights into their finances and helps to shed light on the motivations for choosing one business model over the other.

Poachers and first-level traffickers

The costs of poaching operations can vary substantially and depend on the business model under which poachers operate. Independent poachers finance their own guns, ammunition, food and transport. To make up for their expenses, these poachers may achieve higher prices than dependent ones, who are hired and subsidized by individuals higher up in the supply chain. Dependent poachers are thought to have less influence on the price building process than independent ones.[58]

The differences in prices between ivory and rhino horn are substantial. At the poacher's level, a kilogram of rhino horn is 55 times more valuable than a kilogram of ivory and a poached elephant yields on average some US$1,000 for its ivory,[59] but a rhino some US$24,000 for its horns.[60]

These differences may not directly translate into a difference in net income of the same magnitude. There are indications that rhino poachers may face – on average - higher costs than elephant poachers. The data available on the costs of poaching is scattered for both species. Fenio[61] obtained data from in-depth interviews in communities where rhino poaching takes place. The interviewed persons reported that poachers spend between three to four days on a hunt, and community members can make up to US$1,000 per night for providing shelter to poaching gangs (some nights however may be spent in the bush). That shows how much income poaching can bring to local communities.

Other cost components depend on the methods used. Cost components identified in the literature include costs for guns and rifles,[62] transportation,[63] the use of helicopters,[64] bribes to law enforcement, and other equipment such as tranquilisers to sedate the animals before harvesting the horn.[65] All these require well-organized logistics and substantive up-front investments.

Such sophisticated methods do not seem to be applied for killing elephants. Elephants are more easily accessible due to the larger population size and the fact that populations are more wide-spread. Leggett and Salgueiro[66] researched the motivations of elephant poachers in selected areas of the Central African Republic. Acknowledging the limitations of transferability of the findings to areas other than the studied one, they found that hunting remained an important part of the livelihoods of many people, including elephant hunting.

These findings can be indications that elephant poachers are operating – on average – more opportunistically, are less specialized in hunting elephants and might therefore employ simpler and less costly methods of hunting than rhino poachers. Moreto and Lemieux[67] reported the use of snares, wire traps, poison or nails to catch elephants, and spears as weapons to kill the trapped animals.

Another difference may lie in profits: in addition to the income made from ivory, elephant meat was mentioned[68] as traditional and highly prized meat, with a considerable cash value, even in poor areas. The estimated income made from the ivory of a poached elephant may thus underestimate the overall income made from an elephant.

Elephant poaching thus appears not to be in the hands of few, highly organized groups, but more an activity conducted as one of many different strategies to build one's livelihood. In contrast to rhinos, which mostly live in heavily monitored national parks, elephants can in some places be hunted with little risk of detection, and indeed, all the interviewees of Leggett and Salgueiro[69] in the researched parks perceived the risk from law enforcement as marginal.

All these findings rather speak for low-cost operations with little risk of detection, which can be an indication of why elephant poaching is profitable[70] even when much smaller prices are obtained than for rhino horn. This however does not exclude that highly organized elephant poaching operations are being conducted.

Runners and brokers

Little is known about runners and brokers who link poachers with international traffickers. The services provided by this group[71] encompasses everything from collecting and storing the ivory to concealing it for transport to paying off law enforcement officers. It is used by those who have the funds available to distance themselves from handling the contraband to evade arrest.

International traffickers

Intercontinental trafficking of large shipments from Africa to Asia requires well-organized logistics, and illegal operations have unique requirements in terms of routing and transportation that make them distinct from legal trade. Trafficking logistics are specifically designed to evade detection by

Case study 1: "The Shuidong connection" - the gains and costs of trafficking

In 2017 an organized crime group (OCG) trafficked three tons of ivory from Africa to Shuidong in China. The case led to convictions of several individuals in 2019 by the Anti-Smuggling Bureau of China Customs.[b]

The case provided evidence for a number of distinct practices:[c]

- The OCG consisted of individuals operating from China. World Customs Organisation, China Customs disrupts major wildlife trafficking syndicate, WCO News 88 – Panorama. Details on the case can be found here: Environmental Investigation Agency (EIA), The Shuidong Connection: Exposing the global hub of the illegal ivory trade, 2017.
- The OCG employed locals in Africa to collect and store the tusks in order to minimize physical contact with the ivory.
- The group chose complex trade routes with multiple transit ports such as Mombasa (Kenya), Singapore, Busan (Republic of Korea), and Hai Phong (Viet Nam) for shipping products from Africa to China.
- The OCG used a variety of legitimate products to conceal several tons of ivory in containers. The goods used to conceal ivory included plastic pellets, sea shells, peanuts and tea leaves.
- All payments in Africa were made in US dollars, with the group using black-market moneychangers based in Dar es Salaam (United Republic of Tanzania) and Pemba (Mozambique). Money was paid in Chinese renminbi into designated accounts in China, after which local moneychangers in Africa were informed, who then provided the cash for collection in dollars.

The traffickers who were arrested financed the operation and made US$720 per kg of ivory, yielding a gross income of US$2.16 million. After deducting costs of the operation, net earnings of US$80 to 240 per kg or US$234,000 to 720,000 per operation remained for the group of at least three persons.

The information presented on this operation highlights the following:

A single shipment can result in a noteworthy gross income; the remaining net income may be much smaller (here, between 10 and 30 per cent of the gross income).

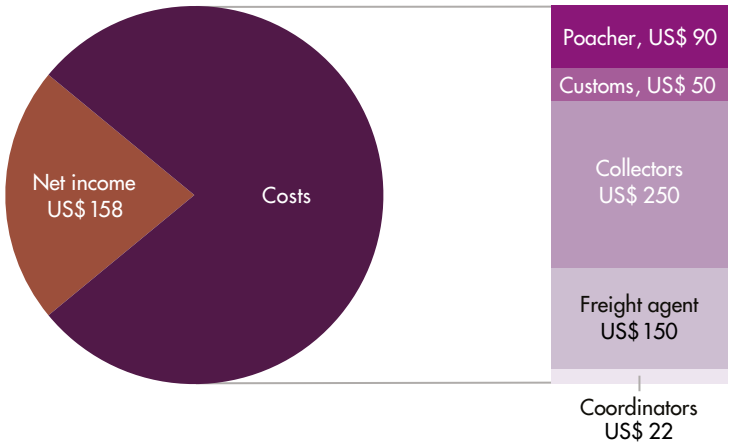
A single shipment of large size requires a large number of persons involved and the organizers behind the trade use complex structures to distance themselves from the predicate offence of poaching.

The high volumes of funds involved show potential to use financial investigations to identify and prosecute the organisers of the trade

a World Customs Organisation, 'China Customs disrupts major wildlife trafficking syndicate, *WCO News 88* – Panorama. Details on the case can be found here: Environmental Investigation Agency (EIA), *The Shuidong Connection: Exposing the global hub of the illegal ivory trade*, 2017."

b Ibid.

Fig. 11 Gross and net income (US$ per kilogram) of ivory traffickers in the "Shuidong Connection", 2016.



Source: See footnote a

Table 3 Costs for traffickers and net income of a single shipment of ivory from Africa to Asia.

ACTOR	PRICE PER KILOGRAM (USD)	OVERALL EXPENDITURE (USD)
Poachers	80-100	240,000-300,000
Collectors of ivory (low to mid-level traffickers), packers in Africa	200-300	600,000-900,000
Customs (bribes)	30-70	90,000-210,000
Freight agent onwards trafficking	150	450,000
Coordinators of the shipments	22	66,000
Net income traffickers	80 – 240	234,000 – 720,000

Source: See footnote a

law enforcement and to reduce the risk of interception.

All this can be costly. In an exceptional case study, EIA documented a shipment of three tons of ivory from Africa to Asia, including all the logistics and costs that the traffickers faced (see Case study 1).

How traffickers may decide their modus operandi

The means of transport, routes, concealment methods and the logistics involved are strongly interlinked as one determines the other. How traffickers or trafficking groups make decisions may differ from operation to operation and may be led by different circumstances and need including a drive to minimize the costs of the operation while maximizing the income.

When choosing their modus operandi, organized crime groups may compare expected costs and income. Expected costs involve all costs related to the transportation logistics, including bribes, and the perceived risk of losing a shipment to law enforcement or being arrested. The expected income is the income that can be achieved when successfully selling all illegal products multiplied by the probability that the sale will be completed.

A basic distinction can be made between choosing to ship small or large amounts. Whole rhino horns seized between 2014 and 2019 had a median weight of 4.4 kilograms per seizure; 2 per cent of seizure cases were larger than 100 kg (accounting for 28 per cent of seized weight) and none were larger than 500 kg.[72] Ivory seizures had median weight of 12.8 kg per seizure, and 18 per cent of seizures were larger than 100 kg, and 7 per cent larger than 500 kg (accounting for 79 per cent of seized weight).[73]

The main means of transport for rhino horn appears to be air. Between 2014 and 2019, 62 per cent of all rhino horn was seized in air traffic. The second largest quantity was seized on the road (31 per cent), together accounting for 93 per cent of all seized weight. Ivory on the other hand was seized in largest quantities in maritime traffic (62 per cent), followed by road (14 per cent) and air (10 per cent).

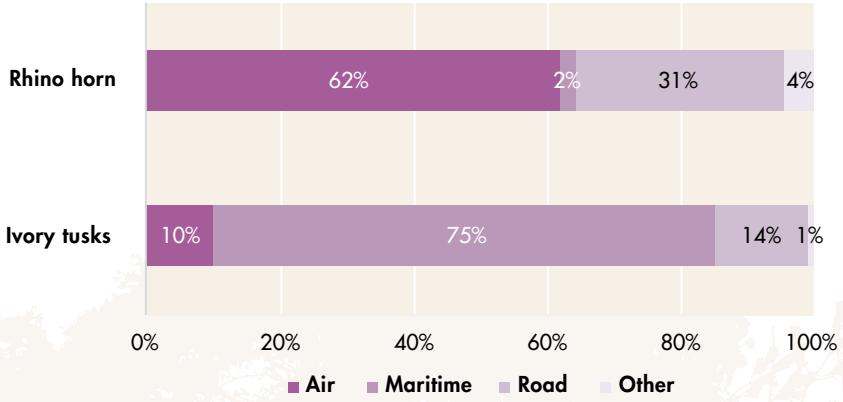
Larger shipments promise higher income per operation but require larger upfront investments and stronger logistics. A large shipment requires logistics on the ground in source and destination countries. Products need to be purchased and collected, stored, then packed, moved to a seaport and transported to the destination country. The logistics, personnel and cash requirements can be substantive and require up front investments to purchase all the ivory needed (see Case Study 2). Logistics in destination countries involve the need for buyers and storage for the product if it cannot be sold immediately.

There are differences in the personnel requirements, too. Large shipments require more personnel, more transactions and more communication between the persons involved. All these are potential weaknesses that can be exploited by law enforcement and thus increase the risks of detection. However, due to economies of scale, costs per unit may decrease and the returns on investment could increase.

Lastly, more complex operations use the services of persons specialized in facilitating the movement of large amounts of money across borders. While the intra-African trade of ivory and rhino horn is reportedly mostly financed by cash transactions,[74] transferring larger amounts of money from destination to source countries requires formal or informal money service providers. These services, in particular when operating in the illegal sphere, incur costs that need to be priced in.

Smaller scale shipments, on the other hand, involve – in all likelihood – less complex structures. Trafficking a small number of rhino horns requires less upfront investment, storage or personnel handling the products in source countries. Finding buyers in destination countries may be easier, and in demand shipments (for example, by mail order or through internet-based trade) link the trafficker directly to the end consumer, cutting costs for intermediaries.

Fig. 12 Means of transport for ivory and rhino horn, as percentage of total weight seized, 2014-2019



Source: UNODC World WISE Database

Note: Based on seizures where information on means of transport was available (236 ivory seizure cases and 144 rhino horn seizure cases). "Other" includes mail, rail and seizures that took place e.g., in a house or other stationary place.

In small shipments, the per-operation gross income is smaller; however, low-level logistics can reduce costs drastically and the remaining net income can be considerable.

The risk, or perceived risk, of being intercepted may vary in the different scenarios (more complex operations may allow the organizers to distance themselves from the products more effectively) and may affect pricing.

Retail

Retailers finally sell the illegal products directly to end consumers. Retailers may operate openly in shops or hidden, with remote communication with customers if the selling is, for example web-based.

Case study 2: The ivory queen

UNODC's SHERLOC database contains a significant case ("The ivory queen") involving the conviction of a major ivory trafficking ring.[a] The following are extracts from the case documentation.

The case received wide attention from the media. The main perpetrator and was soon after referred to as the "Ivory Queen". Intensifying the public interest in the case was the long period of time the illegal business was maintained (14 years); the amount of money generated; the iconic specimen trafficked (elephant ivory); and the fact that a female foreigner, who held a public position, was heading the illegal operations.

Adding to the severity of the case was the fact that the main perpetrator was involved in several public and private engagements during the time of her arrest. She was the vice-president of the China-Africa Business Council and operating a Chinese restaurant as well as an investment company in the United Republic of Tanzania. Moreover, she was fluent in Swahili, having lived in Tanzania for several years already.

In 2015, three perpetrators were found guilty of running one of Africa's biggest ivory smuggling rings in Dar Es Salaam, United Republic of Tanzania. The three individuals smuggled 860 elephant tusks, worth more than 5.4 billion Tanzanian shilling (around US$2.5 million) between 2000 and 2014.

In total, 11 witnesses testified against the trio. They were able to report that the head of the operations received ivory tusks from the other two perpetrators and shipped them through the port of Dar Es Salaam to Asia.

The witnesses were individuals that had been contracted by the perpetrators in functions such as security guard, taxi driver, waiter or banker. The perpetrators denied all accusations; however, the considerable evidence led the judge to sentence each of the three individuals to 15 years' imprisonment. The court ordered the confiscation of the buildings used for the illegal operations and a fine double the value of ivory trafficked.

Some details from the judgement:

- One of the witnesses worked at a bank where two of the offenders held bank accounts. The bank statements that showed the transactions proved the business relationship of the two individuals to the court.
- The convicted Tanzanian nationals were tasked with collecting ivory from various places, and the operations of these two were financed by the Chinese citizen.
- The trio used property in the country to store and hide tusks for later shipment.
- The offenders kept books of their operations, which helped the court to establish that 860 tusks had been trafficked over the time period.

a UNODC, Sharing Electronic Resources and Laws on Crime (SHERLOC), Case Law Database, available at: sherloc.unodc.org. Case number TZAx002.

Box 8: Economic damage caused by seizures

Intercepting wildlife contraband reduces the amount of product available on the market and acts as a deterrent to criminals, as seized contraband is an economic loss for those trafficking it.

The damage caused by a seizure is affected by the mark-ups in the supply chain.[a] With an increasing value and increasing mark-ups, the value of the products seized closer to the destination is much higher than the value of products at lower levels. With that, the costs of replacing seized products in source countries are much lower for organized crime groups than the cost of replacing the same amounts seized at the retail level.

By weight, most of the products seized come from large seizures at the international trafficking level (such as intermediaries, importers/exporters or wholesalers in Asia). The monetary loss of trafficking chains is thus not reflected by the retail prices that would have been accrued, but in the prices at the level where the seizure is made.

a For a discussion of drug markets see: Caulkins, J. P., and Reuter, P., 'What price data tell us about drug markets', *Journal of drug issues*, 28.3: 593-612, 1998.

Depending on the risk level for selling of ivory and rhino horn, retail sellers may openly operate as any legal business or may have to resort to clandestine operations (see Case study 3 for a detailed description). An important element of the retail market is the quality of the product. Higher quality products require more labour inputs than lower quality ones, but can achieve higher profits.

Illicit financial flows

Volumes of IFF from ivory and rhino horn

The 2030 Agenda for Sustainable Development[75] identified the reduction of illicit financial flows (IFFs) as a priority area to build peaceful societies around the world. Countering IFFs is considered as crucial component of global efforts to promote peace, justice and strong institutions as reflected in the SDG target 16.4.[76]

IFFs are cross-border flows of resources that are illicitly generated (for example, originating in criminal activities or tax evasion), illicitly transferred (for example, violating currency controls), or illicitly used (for example, for financing terrorism). IFFs concern the exchange of value, which includes currency but also the exchange of goods and services and financial and non-financial assets.[77] As such, IFFs are a flow measure as opposed to illicit income which measures a stock. 'Cross-border' means that an exchange is made between a resident and a non-resident of a country, regardless of their geographical location. [78]

IFFs can emerge at various stages of illicit activities, relating to different actions and exchanges. A basic distinction of transactions can be made based on their purpose: transactions can be performed for either generating or managing income. Income generation describes transactions that directly generate illicit income or that are performed in the context of the production of illicit goods and services (e.g., for purchasing necessary inputs). Income management describes transactions related to the use of the illicit income for investment in financial and non-financial assets or for consuming goods and services.[79] An income management transaction would be acquiring real estate with illicit income in a different country.

The overall volumes of IFF in the illegal trade in ivory and rhino horn depend on the number and size of cross-border transactions of the illicit income. The larger the volumes that are transferred across borders and the more frequently such transactions occur along the supply chain, the larger the related IFFs are.

In terms of income generation, the overall number of transactions constituting IFF depends on the (geographical) complexity of the supply chains. If supply chains are short and final products are sold directly from the source to the destination country, only a few cross-border transactions are involved. If complex constructs involve actors from many countries, more complex cross-border transactions are made, which in turn increases the overall volumes of IFF.

Box 9: Major rhino horn seizures in air cargo

Viet Nam

On 25 July 2019, at the warehouse of the Noi Bai Cargo Terminal Service JSC (NCTS), Viet Nam, national authorities and the Viet Nam Institute of Ecology and Biological Resources inspected 14 suspicious packages. The packages were transported from the United Arab Emirates via airplane to Noi Bai International Airport.

The forces identified 55 rhino horn pieces with a total weight of 125.15kg. The horns were hidden inside gypsum blocks to evade detection.

Source: Customs news under the general department of Vietnam customs, *"Holding in custody 125.15kg of rhino horn transported to Noi Bai International Airport"*, press release, https://customsnews.vn/holding-in-custody-12515kg-of-rhino-horn-transported-to-noi-bai-international-airport-11467.html

Hong Kong, China

On 5 April 2019, Hong Kong Customs seized 82.5 kg of suspected rhino horn with an estimated market value of about US$16.5 million from a trans-shipment cargo at the Hong Kong International Airport. This was a record seizure of suspected rhino horn in the past five years.

Customs officers screened cargo that arrived from South Africa with Malaysia as its destination. The cargo was declared as "auto parts" but suspicious X-ray images alerted the authorities. The seizure was made subsequent to the opening of the consignment.

Source: The Government of the Hong Kong Special Administrative Region, *Hong Kong Customs makes a five-year record seizure of suspected rhino horn under smuggling*, press release, 6 April 2019.

Turkey

In February 2019, a Turkish customs enforcement team confiscated 21 rhino horns, and seven packs of wild animal claws at Istanbul Atatürk Airport. Authorities through X-ray imaging detected horn-shaped objects in the suitcases belonging to two suspected passengers reportedly flying from Southern Africa to East Asia.

Turkish police detained the two passengers for carrying rhino horns.

Source: Hurriyet Daily News, *Rhino horns seized at Istanbul Ataturk Airport*, February 2019 (available at: https://www.hurriyetdailynews.com/photo-rhino-horns-seized-at-istanbul-ataturk-airport-141102#photo-1).

Case study 3: Retail sale in South-East Asia

Stoner et. al.[a] documented research conducted by the Wildlife Justice Commission on the illegal trade in rhino horn products in a village in Viet Nam in 2015 and 2016 . The research was based on six field investigations in the village over the course of July 2015 to October 2016, and on monitoring of 36 Facebook and 27 WeChat accounts to detect illegal advertisement and sales of wildlife products. The following summarizes the findings.

The rhino horn trade in the village catered to tourists mainly interested in ornamental objects, rather than medicine. The larger shops in the market arranged the smuggling of products into China. The traders used Chinese terms in relation to the illicit trade and prices were primarily quoted in Chinese Renminbi. The traders were found to use Chinese bank accounts for the receipt of payments for wildlife products. In addition, an emerging trend of Chinese buyers using WeChat Wallet to pay Vietnamese suppliers was identified. This is a payment application within the instant messaging service WeChat.

During the one-year research, large amounts of rhino horn, ivory, tiger and other illegal wildlife parts and products were found for sale. The quantity of raw and processed rhino horn alone amounted to an estimated 1,061 kg, corresponding to between 401 and 579 rhinos killed.[b] Since about 1,000 rhinos have been poached annually in the years prior to the research, and far lower volumes before 2013, this represents a substantial portion of the global market.

Stoner et. al. estimated the retail value of the rhino horn items observed between 2015 and 2016 at US$42.7 million. While profit margins were not estimated, this represents a significant sum, given the limited number of traders identified and the size of the village (in 2016, an estimated 600 families lived in the village).

The retail outlets had a number of policies in place similar to those of legitimate businesses, including:

- Volume discounts;
- A deposit policy (usually quoted at between 20-30 per cent);
- Refunds for shipments intercepted by enforcement agencies;
- Use of international bank accounts.

The traders offered delivery services for rhino horn products to China. The strong preference for certain delivery points suggested that their ability to offer this service was dependent on connections to specific locations where, according to the trades of the village, border control officials could be corrupted. Investigators observed that the delivery services were important to Chinese customers. The fee requested varied by destination, an average of US$357 per kilogram was charged for delivery to Pingxiang, on the border, and an average of $893 for delivery to Fujian Province, which lies further away. In addition to corruption of border control officials, interviewed traders suggested that local police corruption was essential to their business model.

Many of the traders used social media platforms for advertising their products, with WeChat and Facebook being the platforms of choice. While fewer traders (some 10 per cent of all observed) used both platforms to advertise their products, others displayed a clear preference for one or the other, possibly indicating the target audience, given that Facebook is not available in China while WeChat is a Chinese platform.

a Stoner, S., Verheij, P. and Jun Wu, M., 'Illegal rhino horn trade in Nhi Khe, Viet Nam,' UNODC *Forum on Crime and Society*, Vol. 9, Nos. 1 and 2, 2018.

b Stoner et. al. used the following calculations. Raw horn: in 2015, only front horns were observed, therefore, one rhino horn or rhino horn tip was taken to represent one rhino. During 2016, several back horns were observed in addition to front horns; one rhino horn or rhino horn tip was considered to represent a minimum of half a rhino, and a maximum of one rhino. For processed rhino horn products, the total weight recorded was divided by 2 kilograms, which was the average weight of rhino horns observed.

Fig. 13 Illicit income and illicit financial flows

IVORY

Illicit financial flows in income generation	Illicit income from the illegal trade	Illicit financial flows from the income management
US$10 – 570 million	US$400 (310 – 570) million	No estimate available
IFFs cross borders	**Illicit gross income** **Illicit net income** = Illicit gross income − Intermediate expenditure	IFFs cross borders

RHINO HORN

Illicit financial flows in income generation	Illicit income from the illegal trade	Illicit financial flows from the income management
US$24 – 390 million	US$230 (170 – 280) million	No estimate available
IFFs cross borders	**Illicit gross income** **Illicit net income** = Illicit gross income − Intermediate expenditure	IFFs cross borders

Note: **Illicit financial flows** are cross-border flows of illicitly generated, transferred or used income. IFFs emerge from the trade in ivory and rhino horn (income generation) and from the use of the generated net income for consumption or investment outside of the supply chain (income management).

Illicit income is the money made from the illegal trade by all actors in the supply chain. It is the value of all goods traded and can be broken down in illicit net income and intermediate expenditure.

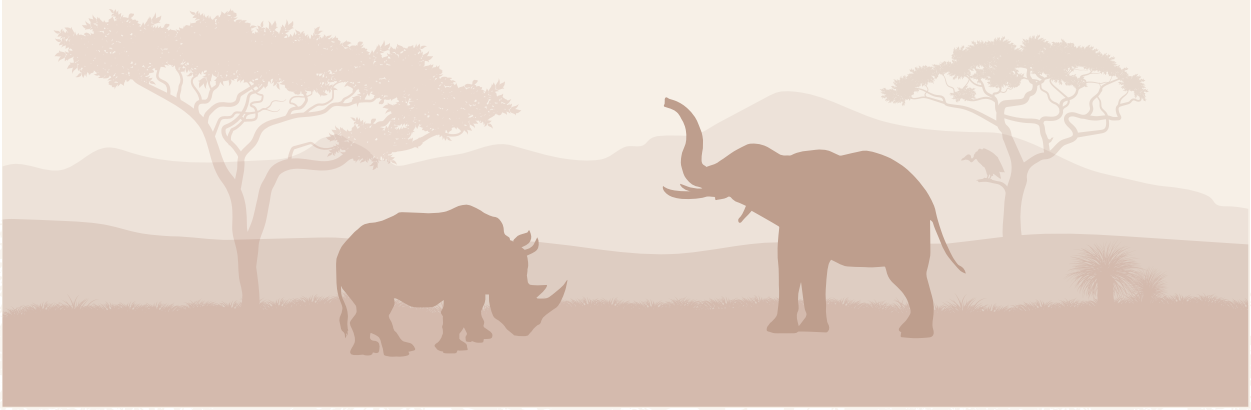
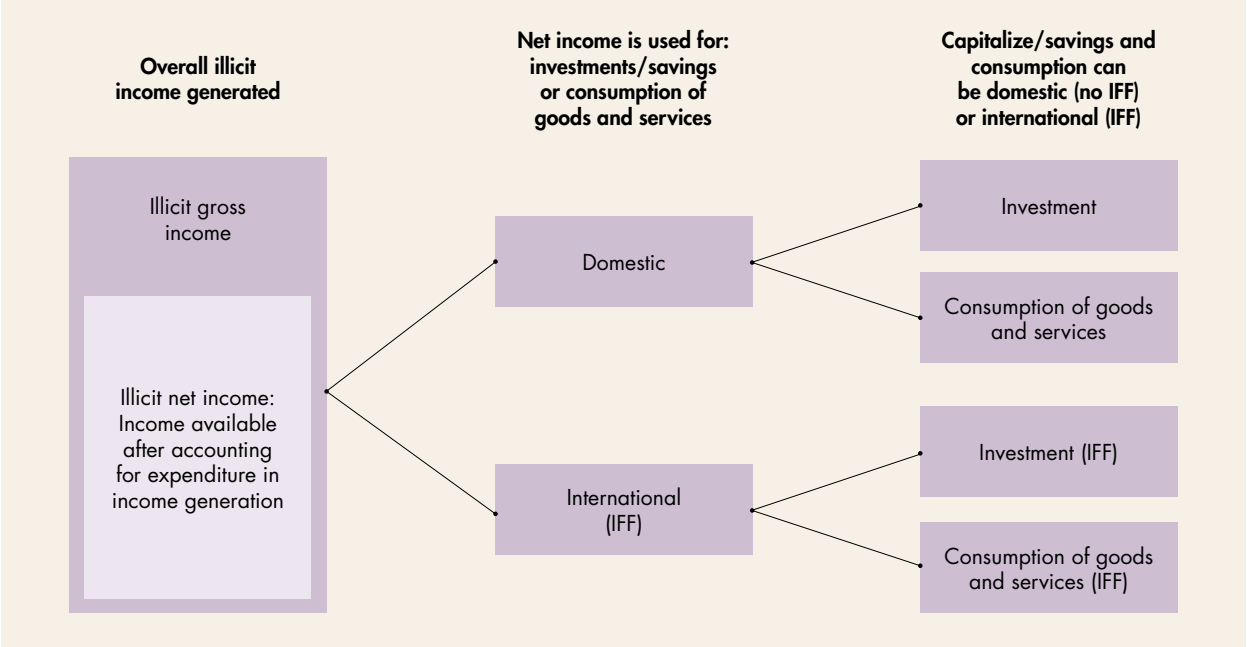


Fig. 14 Streams of illicit income management (IFF and non-IFF)



The overall volume of the transactions depends on the value that is transferred between the trade levels.

The volumes of illicit income moved across borders for income management depend on a variety of factors, all of which are more challenging to estimate and monitor than volumes illegally traded and their value. A few possible determinants can be listed without claiming to be comprehensive (for more details see Box 10):

- Only income that is available to the actors can be moved abroad. The available income is part of the net illicit income, but not all net income is available for cross-border movements. At least some of the illicit income generated will likely remain in the country where the illegal activity takes place[80] to be used for daily, 'normal' expenditures such as housing, transportation, food and other daily needs.
- The structure of the illicit market can play an important role. In a competitive market that involves a large number of small-scale players, the net income available may be smaller and more evenly distributed. In such a scenario, there are no players making excessive profits that may benefit from being moved abroad. If, on the other hand, the international trade is in the hands of a few, highly successful organized crime groups,[81] these groups may make substantive amounts of money that they might move abroad.
- The proportion of net income moved abroad depends on the actors' propensity to invest and consume internationally rather than investing and consuming domestically. This in turn may be determined by their personal characteristics/attitudes/preferences as well as structural characteristics of the country in which the illicit income is generated.

Numerical examples and a simulation study

The available data were not comprehensive enough to produce a statistical estimate of the overall IFFs from the illegal trade in rhino horn or ivory (income generation flows). However, by using different scenarios and numerical simulations,[82] an order of magnitude of the IFFs involved can be mapped out. The scenarios considered were based on possible numbers of transactions along the supply chain (length of the supply chains) and on different proportions of volumes transferred that constitute IFFs (e.g., only a certain proportion of wholesale-retail transactions cross a border and thus constitutes an IFF).

The possible range of IFFs for the scenarios considered was for rhino horn between US$24 and 390 million a year and the average of all scenarios was $163 million. For ivory, the minimum was $10 million and the maximum $570 million with an average value of $240 million. [83] The IFF do not include bribes or income management flows; if these were included, the resulting IFFs would be correspondingly larger. The results show that the volume of IFF could be almost twice as large as the overall illicit income generated.

The more complex the supply chains (the more actors are involved), the more complex and diverse the

Box 10: Illicit financial flows from income management: possible drivers and motivations

Illicit financial flows from income management are challenging to measure. There is no standardized way to assess the proportion of illicit net income moved abroad, nor to measure how much illicit income enters a country from outside. Direct measurement methods (for example, based on identifying illicit transactions) are difficult to employ as the money-laundering process is clandestine in nature. The following presents an initial list of factors that may drive individuals to send illicit income to another country (push factors) and factors that may influence the decision of the destination of the funds (pull factors).

Push factors: motivating people to send their illicit income abroad

Most push factors that apply when legal income is invested abroad apply to illicit income, too. Reasons to invest or spend the illicit income abroad may include, for example, buying products and services that do not exist domestically or not at the desired prices or quality, sending money to family/friends abroad in the form of remittances, diversifying investment or increasing the security of investments (for example, against political instability or currency crises).

There are, however, factors that are specific to (large amounts[a] of) illicit income. Concealing illicit income and moving it abroad requires some effort and may incur costs. It may therefore be – all other things being equal – the preferable choice to keep illicit income in the country where it was earned. There are, however, certain reasons that push individuals to spend/invest illicit income abroad.

Avoiding scrutiny from law enforcement. Sending illicit income abroad can reduce (perceived) scrutiny from law enforcement. The degree to which domestic law enforcement is effective in detecting and confiscating the proceeds of crime may push illegal income to other countries.

Avoiding scrutiny from family and friends. Illicit income may involve a degree of stigma and maintaining a lifestyle that is hard to explain by legal earnings may cause unwanted attention. Individuals may therefore choose to diversify their spending to other countries, for example by purchasing real estate abroad.

The political environment. Political instability and a lack of trust in the government can motivate criminals to move their money abroad. In highly corrupt environments, criminals may not trust the authorities to maintain impunity and may choose to move their illicit income abroad to secure it in case of a change in the political environment.

Limited domestic possibilities to launder money. Large volumes of illegal income may call for sophisticated money-laundering schemes, such as shell companies or assistance from professional money-laundering service providers.[b] If such services do not exist in the criminals' home country or if the available services are too costly or otherwise unfavourable, criminals may opt to launder their proceeds via other countries.

Factors that attract illicit income from abroad

Some research has argued that factors that influence consumption and savings patterns of licit income influence consumptions and savings of illicit income, too:[c] if countries are likely to attract legal income from other countries, they may also attract illicit income. The effect was assumed to become proportionally larger with the level of illicit proceeds generated in the sending countries.

Factors that have been shown to attract income from abroad include common borders, common languages, common colonial legacies[d], common legal systems[e] and common currencies[f], to mention some. For financial investments, the size, reliability, sophistication and financial openness to foreign investments of the financial sector are also likely to be factors in attracting income from abroad.

Other factors pertain specifically to illicit income, for example, the lack of effective measures against money-laundering. Effective measures include but are not limited to:[g] Providing proper and effective money-laundering legislation; providing regulators, law enforcement and supervisors proper tools, incentives and authority to combat IFF from other countries; making it easy and effective for national authorities engaging in international cooperation regarding money-laundering.

The availability of high-risk money-laundering products and services,[h] such as shell companies, may be another factor. Such products can be used to hide the beneficial owner and provide a layer of anonymity, which make them attractive for hiding illicit proceeds. Sectors that operate unregulated are likewise commonly seen as high-risk, such as lawyers, hawala brokers or the real estate sector, as all these operate unregulated in several jurisdictions.[i]

a Often well above the average gross domestic product (GDP) per capita in each country.

b For more info see: Financial Action Task Force (FATF), *Professional Money Laundering*, FATF Report, July 2018.

c Walker, J. and Unger, B., 'Measuring Global Money Laundering: "The Walker Gravity Model"', *Review of Law and Economics*, 5 (2), January 2009.

d Ekanayake, E. M., Mukherjee, A. and Veeramacheneni, B., 'Trade Blocks and the Gravity Model: A Study of Economic Integration among Asian Developing Countries', *Journal of Economic Integration*, 25(4), 627-643, December 2010.

e Anderson, J. E. and van Wincoop, E., 'Trade Costs', *Journal of Economic Literature*, 42, pp. 691-751, September 2004.

f Miron, D., Miclaus, P., and Vamvu, D., 'Estimating the Effect of Common Currencies on Trade: Blooming or Withering Roses?', Procedia Economics and Finance, 6, pp. 595-603, 2013.

g To see more about contextual factors, see Financial Action Task Force (FATF), Methodology for Assessing Compliance with the FATF Recommendations and the Effectiveness of AML/CFT Systems, updated October 2019.

h See Asia-Pacific Group on Money Laundering, World Bank and Financial Action Task Force, *FATF Guidance: Anti-Money Laundering and Terrorist Financing Measures and Financial Inclusion*, June 2011.

i See Asia-Pacific Group on Money Laundering, World Bank and Financial Action Task Force, *FATF Guidance: Anti-Money Laundering and Terrorist Financing Measures and Financial Inclusion*, June 2011.

resulting IFF can be. The illegal trade in ivory – larger in volumes and with (presumably) longer supply chains - generate a broader possible range of IFF than the illegal trade in rhino horn. However, compared to overall volumes trafficked, rhino horn has a large potential for IFF.

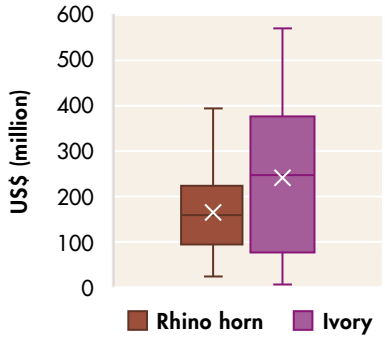
To illustrate the effect of complexity on IFF with an example, case study 6. is used. The case study includes few details but may represent a short supply chain. Namibia is a source country for rhino horns. Assuming that the suspect obtained rhino horn from residents in Namibia and sold it directly to wholesalers or retailers in a destination country (China or Viet Nam), a single illicit financial flow would have occurred from the destination country (outflow) to Namibia (inflow).

The case study could be part of a more complex scenario, too. Residents in Namibia could have purchased the rhino horns from residents of a nearby country (for example, South Africa or Mozambique) and then sold the horns onwards to the suspect in Namibia. Further trafficking could involve the suspect selling the products to wholesalers in South-East Asia who then sold it onwards to Chinese or other end consumers (see, for example, Mid-level traders in Namibia.). In addition, bribes would be paid to customs officers in transit countries who are resident in other jurisdictions.

In addition to the complexity of the supply chain, the locations of the specific actors can strongly affect the overall IFFs. If wholesalers and retailers are in different jurisdictions (see, for example, Case study 3), the overall amounts of IFF are much larger, since the mark-ups between these two levels are much higher than for the other levels. The overall IFFs are less affected if poachers and intermediaries are not in different jurisdictions since the volume of transactions between these actors is smaller.

The very broad range of possible IFF volumes could be narrowed down with better information on the distribution networks (number of cross-border transactions). More precise estimates would be achieved by incorporating country level price data, and country level demand and supply data. Such data could help to formulate more precise model assumptions, which lead to a smaller range of possible outcomes.

Fig. 15 Annual IFF Resulting from for the trafficking of ivory and rhino horn (US$ millions) 2016-2018



Note: based on ~14,000 possible scenarios. The depicted box shows the range of 50% of all values for each commodity; the whiskers show (here) the maximum and minimum values possible. The simulated lengths of the supply chain followed a truncated normal distribution with mean 3.5 for rhino horn and 4.5 for ivory (to account for the possibly more complex supply chains of the ivory trade), and a standard deviation of 2. The values were based on discussed prices multiplied by the estimated overall amounts trafficked (point estimates) between actors. At each trade level, a randomly chosen percentage between 20% and 80% of volumes transferred constituted an IFF with equal probability. Each IFF was only counted once, either as in- or outflow, and not twice. The minima reflect a situation when all rhino horn/ivory is purchased by foreign residents at poachers' prices, the maxima the situation when all transactions can cross borders and are 80 per cent IFFs. No additional flows from income management or intermediate expenditure such as bribes were considered. Including such flows would increase the IFFs accordingly.

Case study 4: Mid-level traders in Namibia

A Chinese citizen was arrested in a town in north-western Namibia for dealing in illegal rhino horns in 2014. The man was arrested in a sting operation after police received a tip off from members of the public that a Chinese trader had sent out people to look for elephant tusks and rhino horns for him to buy. At the time of arrest, he was in possession of two rhino horns.

According to the police sources, locals were given an estimation of what they would be paid and contact details of the local link up. The going rate was said to be between US$640 and $1,300 per horn. The intermediary sold the horn for $3,200 to $5,100. The locals were paid in cash and the Chinese national did not use the banking system in Namibia. It was suspected that money was to be laundered through legitimate businesses and front companies in the construction, mining and tourism industries.

The case study also indicated that it was commonly accepted locally that the Chinese community does not make much use of the financial system. Their businesses are cash intensive.

Source: Republic of Namibia Financial Intelligence Centre, *Trends and typology report No 1 of 2017: Rhino and elephant poaching, illegal trade in related wildlife products and associated money laundering in Namibia*, 2017.

Endnotes

1 UNODC and the Asia/Pacific Group on Money Laundering (APG), *Enhancing the Detection, Investigation and Disruption of Illicit Financial Flows from Wildlife Crime*, 2017.

2 Ibid.

3 See Box 1

4 Every country protects its own animals, fish, timber and other plant life in different ways. There is no international agreement in defining wildlife crime. The UNODC World Wildlife Crime Report focuses on CITES-listed species, which alone include roughly 35,000 species, but there are species illegally traded that are not regulated by CITES.

5 See, for example, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Resolution Conf. 9.14. (Rev. CoP17), *Conservation of and trade in African and Asian rhinoceroses,* 2016.

6 UNODC, *World Wildlife Crime Report: Trafficking in protected species,* 2016.

7 Emslie, R. H. et al, *African and Asian Rhinoceroses – Status, Conservation and Trade*, a report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17), 2019.

8 Ibid.

9 For a detailed analysis of the latest trends in ivory and rhino horn trafficking see Chapter 3.

10 Percentages based on seizures where the destination of shipments was reported (see Chapter 3).

11 Supply chain actors and descriptions: Maggs, K. (2011) and Milliken and Shaw (2012) (both ibid.) and based on interviews with experts conducted during UNDOC background research. Within Africa, the scheme thought to have a pyramid structure, with many poachers, fewer brokers and only a small number of exporters.

12 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016; Milliken, T. and Shaw, J., *The South Africa – Viet Nam Rhino Horn Trade Nexus*, TRAFFIC, 2012.

13 Another distinction could be made between targeted poaching and killings in human/elephant conflict. The latter were found to be rare (see Hauenstein, S., Kshatriya, M., Blanc, J. et al. African elephant poaching rates correlate with local poverty, national corruption and global ivory price. Nat Commun 10, 2242 (2019). https://doi.org/10.1038/s41467-019-09993-2)

14 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG) op cit.

15 For elephant poaching, annual poaching rates were found to strongly correlate with proxies of ivory demand in China, between-country and between-site variation was strongly associated with indicators of corruption and poverty. Hauenstein, S., Kshatriya, M., Blanc, J. et al. op cit.

16 Milliken and Shaw (2012), op cit.

17 Ibid.

18 Milliken and Shaw, 2012, op cit; Stiles, D., *Elephant Meat Trade in Central Africa: Summary Report*, International Union for Conservation of Nature (IUCN), 2011.

19 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), op cit.

20 Republic of Namibia Financial Intelligence Centre, *Trends and typology report No 1 of 2017: Rhino and elephant poaching, illegal trade in related wildlife products and associated money laundering in Namibia*, 2017.

21 Emslie, R. H. et al, *African and Asian Rhinoceroses – Status, Conservation and Trade*, a report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17), 2019.

22 Processors could be another level in the supply chain. Processors obtain ivory and rhino horn from importers, process it into ornaments or medicine and sell it onwards to retailers. This level is omitted in absence of respective price data.

23 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016.

24 Moneron, S., Okes, N. and Rademeyer, J., *Pendants, powder and pathways: A rapid assessment of smuggling routes and techniques used in the illicit trade in African rhino horn*, TRAFFIC, 2017.

25 See for example, Vigne, L., and Martin, E., 'Consumption of elephant and mammoth ivory increases in southern China', *Pachyderm*, 49, 79-89, 2011; Gao, Y., and Clark, S. G., 'Elephant ivory trade in China: Trends and drivers', *Biological Conservation*, 180, 23-30, 2014.;

26 Stoner, S., Verheij, P. and Jun Wu, M., 'Illegal rhino horn trade in Nhi Khe, Viet Nam,' *UNODC Forum on Crime and Society*, Vol. 9, Nos. 1 and 2, 2018.

27 Xiao, Y., 'China's ivory market after the ivory trade ban in 2018', *TRAFFIC briefing paper*, September 2018.

28 The following calculations apply a three-year average to smoothen year-on-year variations and to make data comparable to price data.

29 Knight, M., 'African Rhino Specialist Group report', *Pachyderm*, 59: 14-26, 2018.and Emslie, R. H. et al, *African and Asian Rhinoceroses – Status, Conservation and Trade*, a report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17), 2019.

30 Pienaar, D. J., Hall-Martin, A. J. and Hitchins, P. M., 'Horn growth rates of free-ranging white and black rhinoceros', *Koedoe* 34.2: 97-105, 1991; Martin, E.B., 'Rhino horn weights', *IUCN Traffic Bulletin*, 5(2): 23, 1983.; Martin, E. B. and Ryan, T. C. I., 'How Much Rhino Horn has come onto International Markets since 1970?', *Pachyderm*, Vol 13, 1990.

31 Following Emslie et al. (2019, op.cit.), the average number of horns per rhino was assumed to be 1.98. Numbers are rounded, calculations were done with full precision.

32 Emslie et al. (2019, op. cit.) assumed recoveries in 9 per cent of rhino poaching cases.

33 Emslie et al. (2019 op cit.) provided estimates for the the reference period from January 2016 to December 2017; here the average was applied for 2018, too.

34 Analysis performed by George Wittemyer who updated and extended the estimates presented in Wittemyer et al. 2014 for the years 2010 to 2018 (paper made available to UNODC). A three-year average of 2016 to 2018 was the basis for the calculations. While outputs from Wittemyer et. al. 2014 relied on published birth and death rates for African savanna elephants, the present model was updated such that estimates for forest elephants were based on more recently published data on forest elephant demography (natural mortality and natality).

35 95 per cent confidence interval (rounded).

36 UNODC approximated illegal killing rates in West Africa by a weighted average of the subregions Central, Eastern and Southern Africa.

37 Thouless, C. R. et. al., 'African Elephant Status Report 2016: an update from the African Elephant Database', *Occasional Paper Series of the IUCN Species Survival Commission*, No. 60 IUCN / SSC Africa Elephant Specialist Group, IUCN, 2016, p. 3.

38 More precisely, it is 10.25 kilograms (1.88 tusks per elephant with 5.45 kilogram each); see Parker, I.S.C. and Martin, E.B. 1982. "*How many elephants are killed for the ivory trade?*" Oryx XVI, 235-239. An alternate tusk weight sometimes used is 6.9 kg per elephant, which would reduce volumes by one-third, but this figure is derived from an analysis of the average weight of a raw ivory piece in illicit trade, not a whole tusk weight; See Hunter, Nigel, Esmond Martin, and Tom Milliken. "Determining the number of elephants required to supply current unregulated ivory markets in Africa and Asia." Pachyderm 36. January–June (2004): 116-128.

39 Martin, R.B. et. al., *Decision-Making Mechanisms and Necessary Conditions for a Future Trade in African Elephant ivory: Final Report*, CITES document SC62 Doc. 46.4., 2012, p. 16. "The mean tusk weight for the male ivory in all age classes is 8.36kg and that for the females is 2.55kg. This results in mean tusk weight for both genders of 5.45kg, assuming an even gender spread."

40 See e.g. Chiyo, P. I., Obanda, V. and Korir, D. K., 'Illegal tusk harvest and the decline of tusk size in the African elephant', *Ecology and Evolution*, 5: 5216-5229, 2015. The authors found that severe ivory harvesting in the 1970s and 1980s may have had a lasting impact on tusk sizes, since it eliminated large tuskers among survivors and elephants born thereafter had smaller tusks. Poaching can also favour the prevalence of the genetic condition of tusklessness, see Jachmann, H., Berry, P. S. and Imae, H., 'Tusklessness in African

elephants: a future trend', *African Journal of Ecology*, 33: 230-235, 1995.

41 To approximate the effects of selective poaching, simulation models can be applied that model the expected population structure based on various assumptions. The models investigated for this study indicated a decline of average ivory per illegally killed elephant from over 20 kg per animal prior 2007 to only some 4 to 6 kg per animals in 2016 (Martin, R., *Illegal killing of elephants and ivory production*, paper prepared for the United Nations Office on Drugs and Crime, 2019). There is, however, only limited empirical evidence that can validate the simulated outputs. In the subsequent analysis, the 'traditional' conversion ratio of roughly 10 kg per elephant is therefore used, while acknowledging the uncertainty and the potential bias behind this number. The underlying idea is that poachers face a trade-off between hunting time and tusk size: the less frequent elephants with large tusks become, the more likely it is that poachers seek out smaller elephants, which then reduces the average ivory outtake per poached elephant.

42 See e.g., CITES SC65 Doc. 42.2 and SC65 Doc. 42.7, Sixty-fifth meeting of the Standing Committee Geneva (Switzerland), 7-11 July 2014; and CITES SC69 Doc 51, Sixty-ninth meeting of the Standing Committee. Geneva (Switzerland), 27 November - 1 December 2017.

43 Paragraph 6. e) of Resolution Conf. 10.10 (Rev.CoP17) urges CITES parties to maintain inventories of government-held and where possible significant privately held stockpiles of ivory and inform the CITES secretariat of the level of this stock. CITES document SC70 Doc. 49.1 comments that the CITES secretariat is aware of a number of ivory thefts from government-held stockpiles, but "in order to avoid elevating potential security risks, it has not included details of the information that it has received from the Parties in [report SC70 Doc. 49.1]".

44 Cerling, T. E., et al., 'Radiocarbon dating of seized ivory confirms rapid decline in African elephant populations and provides insight into illegal trade,' *Proceedings of the National Academy of Sciences*, 113.47: 13330-13335, 2016.

45 Nkoke, S. C. et. al., *Ivory markets in Central Africa*, TRAFFIC, September 2017.

46 The UNODC *World Wildlife Crime Report* (2016) chapter on ivory explored the possibility that ivory became an object of speculation and was being kept in stockpiles.

47 Wastage of ivory in the carving process has been estimated to make up an average of 30 per cent (see Milliken, T., 'The Japanese trade in ivory: tradition, CITES and the elusive search for sustainable utilisation', in Cobb, S. (Ed.), The Ivory Trade and Future of the African Elephant, Ivory Trade Review Group, 1989).

48 Conversion ratios for numbers seized to seized weight were applied where needed.

49 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016.

50 This stems from the assumption that the shares of rhino horn seized outside of Africa and Asia reflect the shares traded outside of these regions. This is a strong assumption, as described in Box 3.

51 While seizure data is a valuable source of information, there are limitations as the information on the origins and destinations of shipments may not be reported in a systematic way, which potentially introduces bias.

52 Implying that stockpiles remain of the same size.

53 2018 was approximated with an 2016-2017 average.

54 These could be for local processing and markets, or these destinations could be merely way stops towards destinations outside the region. If the latter is the case for a significant portion of seized weight, the amounts reaching end-consumers would increase accordingly.

55 Fieldwork involved interviews with law enforcement agencies, experts on the illegal wildlife trade from academia and NGOs, and key informant interviews. During fieldwork, 52 interviews were conducted in Central, Eastern and Southern Africa, and numerous reference publications were studied. Additional price data was provided by the Wildlife Justice Commission (WJC) and the Environmental Investigation Agency (United Kingdom), who collated price data from investigations in destination countries.

56 Wildlife Conservation Society, In Plain Sight: An Analysis of Transnational Wildlife Crimes in Quang Ninh Province, Viet Nam. Hanoi: Wildlife Conservation Society Viet Nam Program, 2012.

57 Extended from Basu, Gautam. "*Concealment, corruption, and evasion: A transaction cost and case analysis of illicit supply chain activity.*" *Journal of Transportation Security* 7.3 (2014): 209-226.

58 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016.

59 Excluding potential income from selling the meat of the elephant.

60 Based on price data and average weights collected per animal.

61 Fenio, K. G., *Poaching rhino horn in South Africa and Mozambique: Community and expert views from the trenches*, U.S. Department of State, November 2014.

62 An interviewee in Fenio 2014 (ibid.) reported that in their village, 7-10 people all use (rent) one rifle and purchase ammunition for hunting rhinos. The respondent named police officers as possible source for the rifle.

63 Fenio 2014 (ibid.) reported the widespread use of "high-tech 4x4" vehicles by poachers.

64 Milliken, T. and Shaw, J., *The South Africa – Viet Nam Rhino Horn Trade Nexus: A Deadly Combination of Institutional Lapses, Corrupt Wildlife Industry Professionals and Asian Crime Syndicates*, TRAFFIC, 2012.

65 Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016. The rhino subsequently dies either from an overdose of tranquillizers or bleeds to death, usually after the poachers are gone. It is said to take less than seven minutes to bring down the animal.

66 Leggett, T. and Salgueiro, J., 'The motivations of elephant poachers in the Central African Republic,' *UNODC Forum on Crime and Society*, Vol. 9, Nos. 1 and 2, pp. 1-16, 2018.

67 Moreto, William & Lemieux, A. (2015). Poaching in Uganda: Perspectives of Law Enforcement Rangers. Deviant Behavior. 36. 1-21. 10.1080/01639625.2014.977184.

68 Ibid.

69 Leggett, T. and Salgueiro, J., 'The motivations of elephant poachers in the Central African Republic,' *UNODC Forum on Crime and Society*, Vol. 9, Nos. 1 and 2, pp. 1-16, 2018.

70 In subsistence poaching, if nothing else is available, even a very low expected return may motivate some to engage in poaching.

71 Case Study 1 referred to services provided by this group of actors as "Dragon" service.

72 UNODC World WISE Database, based on 350 analysed cases.

73 UNODC World WISE Database, based on 600 analysed cases.

74 Republic of Namibia Financial Intelligence Centre, *Trends and typology report No 1 of 2017: Rhino and elephant poaching, illegal trade in related wildlife products and associated money laundering in Namibia*, 2017; Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), *A Special Typology Report on Poaching and illegal trade in wildlife and wildlife products and associated money laundering in the ESAAMLG region*, 2016.

75 Further information on the 2030 Agenda – including all goals, targets and indicators – is available at the United Nations Sustainable Development Goals knowledge platform: https://sustainabledevelopment.un.org/

76 This target calls on countries to: "*[b]y 2030, significantly reduce illicit financial flows and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organised crime*". Progress towards SDG target 16.4 (IFF) is measured by indicator 16.4.1, "*Total value of inward and outward IFFs in current United States dollars*". The United Nations Conference on Trade and Development (UNCTAD) and the United Nations Office on Drugs and Crime (UNODC) are the custodian agencies of the indicator and have worked jointly on a statistical definition and a measurement framework for the indicator, which was published in the SDG indicator metadata repository on the SDG website of the United Nations Statistics Division: https://unstats.un.org/sdgs/metadata/files/Metadata-16-04-01.pdf.

77 Cross-border bartering - the exchange of (here illicit) goods and services for other goods and services that is a common practice in illicit markets - is also considered as IFF.

78 A resident of a country has their centre of economic interest within the country. This definition is different from a legal one and follows the international Balance of Payments statistics, see International Monetary Fund (IMF), *Balance of Payments Manual*, Fifth Edition, 2005, para. 58. If a resident of country A pays a resident of country B in cash, it is an IFF even if both parties are at the same location.

79 Economists distinguish between spending for acquiring utility (consumption of goods and services) and spending for acquiring future income, which is investment. Savings (e.g., in bank accounts for gaining interest) are part of investments.

80 There may be cases where all the net income from trafficking is available to the trafficker, for example, if all daily consumption needs are covered by other, legitimate businesses. However, on average, some of the net income will stay in the country where it has been generated.

81 See, for example, Case Study 2.

82 A Monte Carlo simulation calculates the potential outcomes of a large number of hypothetical scenarios. Its results reflect possible IFFs depending on different model inputs.

83 In the supply chain model used, both markets have a theoretical maximum value of IFF transactions when all 6 different trade levels are in 6 different jurisdictions and if all transactions between the actors are IFF. The resulting maximum IFF are an annual US$540 million for rhino horn and $720 million for ivory. The maxima presented in the paragraph are the maximum model outputs.

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