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World Wildlife Crime Report

Trafficking in protected species

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World Wildlife Crime Report:
Trafficking in protected species

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Foreword

I am proud to present this UNODC report, our very first to delve into the global dimensions of wildlife and forest crime. I thank our partners in the International Consortium on Combating Wildlife Crime, in particular for their support in this considerable undertaking.

The need to protect our planet's flora and fauna from the predations of transnational organized crime has become a major priority for the international community in recent years.

In 2013, the United Nations General Assembly proclaimed 3 March, the day of signature of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as UN World Wildlife Day.

In 2015, the General Assembly unanimously adopted a resolution on "Tackling Illicit Trafficking in Wildlife", which sets a powerful framework for collective action.

The Sustainable Development Goals launched this year include specific targets to combat poaching and trafficking of protected species, including by helping local communities to pursue sustainable livelihoods.

There is increasing recognition of the dangers wildlife and forest crime pose not only to the environment but to the rule of law and stability, and of the potential for the criminal proceeds to fuel conflict and terrorism.

The desperate plight of iconic species at the hands of poachers has deservedly captured the world's attention, and none too soon.

Animals like the tiger, feared and revered throughout human history, are now hanging on by a thread, their dwindling numbers spread across a range of states that are struggling to protect them. African elephants and rhinos are under constant pressure.

But the threat of wildlife crime does not stop with these majestic animals.

Nearly 7,000 different species have been accounted for in more than 164,000 seizures affecting 120 countries.

One of the critical messages to emerge from this research is that wildlife and forest crime is not limited to certain countries or regions. It is not a trade involving exotic goods from foreign lands being shipped to faraway markets.

From fashion to furniture, food to pets, the products of wildlife and forest crime may be hidden in plain sight – part of our everyday lives, all over the world. We are all potentially complicit, and we all share a responsibility to act where we can.

As we have seen time and again with all forms of organized crime and trafficking, criminals exploit gaps in legislation, law enforcement and the criminal justice system.

CITES regulates the trade in more than 35,000 species; however, there remain millions more that are endangered but not covered by the Convention. There are species protected under specific national legislation that are not restricted in international trade.

If we want to get serious about wildlife and forest crime, we must shore up our collective responses and close these gaps.

Range countries must be supported to strengthen capacity to protect their natural heritage. International trade must be monitored and controlled to ensure that illegally acquired wildlife does not enter legal commercial streams. Unsustainable demand for wildlife products must be reduced. Corruption must be addressed throughout the supply chain. All these efforts must be coordinated for optimal strategic effect.

UNODC is working on the ground to help countries do exactly this, through our Global Programme for Combating Wildlife and Forest Crime, as well as the Container Control Programme and other means that have been successfully employed to mount a comprehensive response to transnational organized crime.

We support governments to take advantage of the tools offered by the conventions against transnational organized crime and corruption. And through the Wildlife and Forest Crime Analytic Toolkit developed with our ICCWC partners, we are assisting law enforcement and criminal justice bodies, wildlife and forestry administrations and other relevant agencies to review and strengthen national responses to wildlife and forest crime.

Now this report, which represents two years of comprehensive research, based on the latest and best available data, seeks to inform and support further urgent action by the international community.

We must stop the plundering or risk irreparable loss of our planet's precious biodiversity. I urge all governments to make full use of this report and the support UNODC provides to take decisive steps towards ending this crime.

Yury Fedotov
Executive Director

United Nations
Office on Drugs and Crime

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Acknowledgements

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Glossary

Agarwood	A fragrant, resinous wood formed in response to injury in certain species of trees, particularly *Aquilaria* species
ASEAN-WEN	Association of Southeast Asian Nations Wildlife Enforcement Network
Caiman	A type of alligator indigenous to Central and South America, of subfamily *Caimaninae*
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
ITTO	The International Tropical Timber Organization
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
Oud	See "agarwood" above
Padauk	"Rosewood" generally, particularly of *Pterocarpus* genus, and especially *Pterocarpus macarocarpus*, a fragrant hardwood marketed as "rosewood"
Pangolin	Several species of scaly anteater found in Africa and Asia
Peccary	A New World pig of the family *Tayassuidae*.
PIKE	Proportion of Illegally Killed Elephants
Range state	A country in the natural range of a species
Raptor	Bird of prey
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
Tamalan	*Dalbergia oliveri*, a fragrant hardwood marketed as "rosewood"
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	World Wildlife Seizure database

Mandate for this report

Momentum for international action on wildlife crime has been growing for some time. Starting in 2001, the Economic and Social Council (ECOSOC) has issued several resolutions that urged Member States to:

- adopt the legislative or other measures necessary for establishing illicit trafficking in protected species of wild fauna and flora as a criminal offence in their domestic legislation;
- cooperate with UNODC with a view to preventing, combating and eradicating trafficking in protected species of wild fauna and flora;
- promote international cooperation in preventing and combating illicit international trafficking in forest and wildlife resources; and,
- consider making illicit trafficking in endangered species of wild fauna and flora a 'serious crime'.[1]

More recently, in 2013, the Commission on Crime Prevention and Criminal Justice (CCPCJ) adopted a resolution, which was later taken up by ECOSOC (E/RES/2013/40), which strongly encouraged Member States, "…to take appropriate measures to prevent and combat illicit trafficking in protected species of wild fauna and flora, including the adoption of legislation necessary for the prevention, investigation and prosecution of such trafficking."

1 ECOSOC Resolution 2001/12, Illicit trafficking in protected species of wild flora and fauna; ECOSOC Resolution 2003/27, Illicit trafficking in protected species of wild flora and fauna; ECOSOC Resolution 2008/25, International cooperation in preventing and combating illicit international trafficking in forest products, including timber, wildlife and other forest biological resources; ECOSOC Resolution 2011/36 Crime prevention and criminal justice responses against illicit trafficking in endangered species of wild fauna and flora.

In 2014, the CCPCJ adopted Resolution 23/1, strongly encouraging Member States to make illicit trafficking in forest products, including timber, a serious crime. It also urged them to promote enforcement, research, and technical assistance measures to combat the illicit trafficking of these products.

Both resolutions acknowledged and supported the United Nations Office on Drug and Crime's (UNODC) Global Programme for Combating Wildlife and Forest Crime, which, since 2013, has delivered technical assistance activities to prevent and combat wildlife and forest crime, raising awareness of wildlife and forest crime among different stakeholders to reduce the demand of protected wild fauna and flora, and improving cooperation, law enforcement and the preventive capacity of Member States to address this crime.

The 2013 ECOSOC Resolution included research and asked UNODC, "… in consultation with Member States and in cooperation with other competent intergovernmental organizations … to undertake case studies that focus on organized crime networks involved in the illicit trafficking of specific protected species of wild fauna and flora, their parts and derivatives…"[2] A mechanism for cooperating with "other competent intergovernmental organizations" was found through the International Consortium on Combating Wildlife Crime (ICCWC), launched in November 2010 and bringing together the Convention on International Trade in Endangered Species of Wild Fauna and Flora Secretariat (CITES), the International Criminal Police Organization (INTERPOL), UNODC, the World Bank and the World Customs Organization (WCO).

2 E/RES/2013/40, para 13

In 2015, the General Assembly called upon UNODC, in line with previous mandates and in cooperation with Member States, to "continue to collect information on patterns and flows of illicit trafficking in wildlife and to report thereon," (A/RES/69/314).[3]

This report is in conformity with these mandates. It takes stock of the present wildlife crime situation with a focus on illicit trafficking of specific 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. It was conducted in cooperation with partners in ICCWC.

The quantitative analysis has required the construction of a World Wildlife Seizure database (World WISE), rooted in seizure data provided to the CITES Secretariat by its Parties and to the WCO by its membership. These data were circulated to Member States 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. If maintained and supplemented with a broader programme of research and longitudinal assessments, it could provide the international community with the means to better understand and address an otherwise clandestine market.

3 http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/69/314

Key outcomes of the research

- Wildlife trafficking involves many distinct markets, each with its own drivers and dynamics. This report focuses on eight case studies, involving some of the largest illegal flows, with an eye to the commonalities and differences between them.
- Some illegally traded forms of wildlife feed primarily into illegal retail markets, such as ivory; others, such as rosewood, are mainly retailed though legal outlets, despite their illegal origin.
- Case studies show that when illegally traded wildlife is introduced into legal commercial streams, criminals have access to a much larger source of demand than they would have had on the black market alone.
- There are millions of species for which international trade is not regulated, and certain cases reviewed for this report suggest that these species can be legally traded internationally, even when harvested or exported contrary to national law.
- Similar to other sensitive products such as firearms, pharmaceuticals, or antiquities, protected species can be legally traded internationally if accompanied by the appropriate paperwork; permits for around 900,000 legal shipments of protected wildlife products are issued annually, and case studies show that permits acquired through forgery, fraud or corruption have been used to traffic wildlife.
- Seizure data show that most enforcement activities to combat international wildlife trafficking take place at ports of entry, rather than in domestic markets, and thus customs agents form the front line of enforcement in many parts of the world.
- Cases reviewed for this report indicate that informal harvesting practices can allow internationally protected wildlife to be illegally introduced into commercial streams before being legally exported.
- Case studies suggest that some wildlife farms, captive breeding operations, or even zoos may play a role in laundering illegally acquired wildlife.
- Some high value species reviewed for this report appear to have become the object of speculation, where price becomes detached from retail demand, complicating generalised demand reduction campaigns.
- Volatility affects some key wildlife commodities, making it extremely difficult to calculate the criminal revenues associated with wildlife trafficking as a whole.

Summary policy implications

- Illegal trade could be reduced if each country were to prohibit, under national law, the possession of wildlife that was illegally harvested in, or illegally traded from, anywhere else in the world.
- The current international controls regulating trade do not extend into national markets, so domestic environmental laws should be expanded to provide protection to wildlife from other parts of the world.
- Research and monitoring should be further strengthened and used as the basis for conservation policy and enforcement strategy.
- While the illegal harvesting of wildlife can only be addressed by national authorities, the international community can support local law enforcement through various forms of technical assistance and capacity building, including the coordination of international operations.
- Technical and financial assistance to range states should be further enhanced to strengthen their criminal justice responses to wildlife crime, including tracing and recovering the proceeds of crime.
- Commercial traceability mechanisms should be strengthened to ensure supply chain integrity from source to destination markets.
- Profiling and targeting mechanisms for suspicious shipments and persons should be further mobilized to improve risk management systems and promote their active use.
- The increased use of wildlife forensic science can contribute to the identification of species and the design of targeted law enforcement responses.
- Mechanisms and procedures for the disposal of seizures can encourage further interdiction.
- Good stockpile management practices can help prevent leakage of stores into illicit markets.
- The international community should support the establishment of new protected areas in order to address habitat loss.
- Implementing measures to prevent and combat corruption among rangers, wildlife investigators, and other relevant officials would help reduce illegal harvesting and trade.
- Where public servants are implicated in facilitating trafficking, the United Nations Convention on Corruption should be utilized.
- A thorough understanding of the main issues relating to wildlife and forest crime and the effectiveness of preventive and criminal justice responses at the national level is essential; the use of tools such as the ICCWC Wildlife and Forest Crime Analytic Toolkit and the ICCWC Indicator Framework for Wildlife and Forest Crime are helpful in this regard.

Summary and Overview

The trafficking of wildlife is increasingly recognised as both a specialised area of organized crime and a significant threat to many plant and animal species. In response to this growing awareness, UNODC has been mandated to build a Global Programme on Wildlife and Forest Crime, and research is a key part of this Programme. This report represents the first global wildlife crime assessment conducted by UNODC, with the support of the International Consortium on Combating Wildlife Crime (ICCWC), making use of the global seizure database "World WISE".

A work in progress, the World WISE database currently contains over 164,000 seizures from 120 countries. It is rooted in data submitted by the parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, known as CITES. These data were shared with UNODC through ICCWC. Another ICCWC partner, the World Customs Organization, contributed data from its Customs Enforcement Network (CEN). These CEN seizures are often made due to CITES violations, so most of the data in World WISE involve CITES listed species.

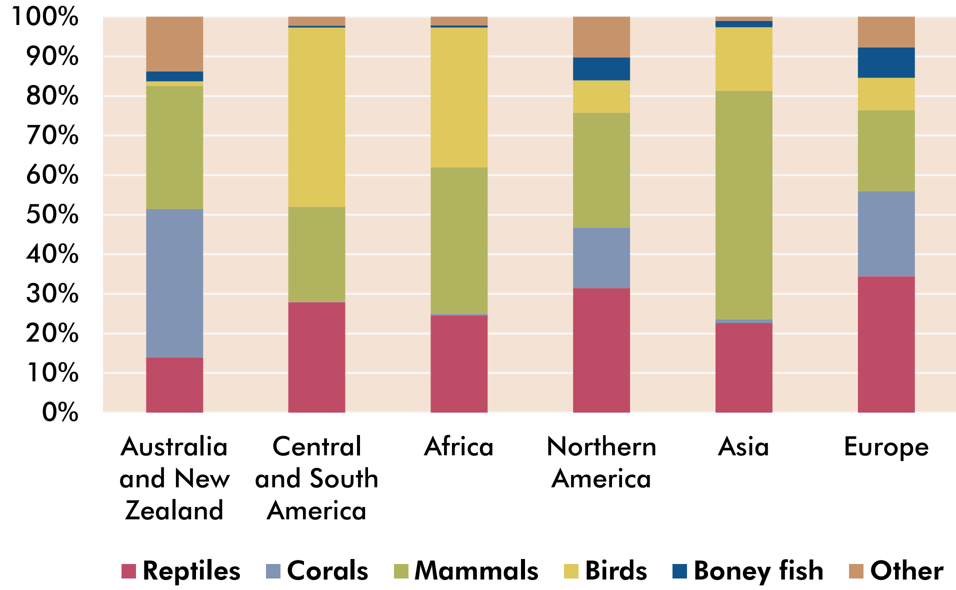
The nature of this data source affects the scope of this report. CITES lays out rules for trade in over 35,000 protected species, and it requires its parties to penalise trade in violation of these rules. But there are many crimes affecting wildlife that have nothing to do with these species. For example:

- 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;
- ***domestic markets*** for wildlife are also beyond its jurisdiction, 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. In addition to these core data, however, additional research was performed for this report by a range of species experts. 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, "wildlife crime" refers to ***harvesting and trade contrary to national law***, particularly, but not exclusively, the national laws implemented in fulfilment of CITES obligations.

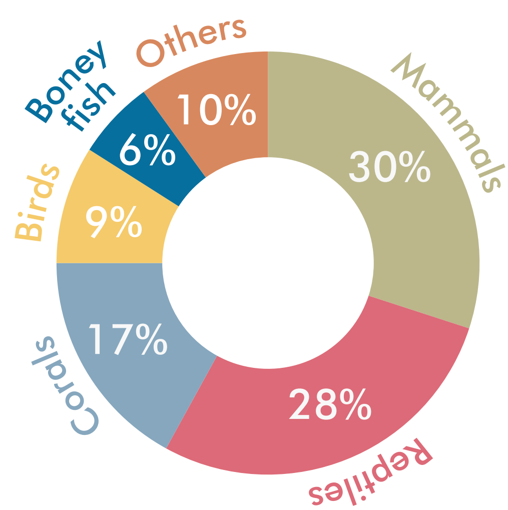
The World WISE database is still under development, and there remain gaps in its geographic and temporal coverage. In addition, there are inherent limitations on the uses of seizure data, and not all seizure data are of equal quality. With these limitations in mind, World WISE is used cautiously in this report.

Fig. 1 Share of all seizure incidents in World WISE by taxonomic class and region, aggregated 1999-2015



Source: World WISE

Fig. 2 Share of taxonomic class among total aggregated seizures in World WISE by region, aggregated 1999-2015



Source: World WISE

That said, even a cursory analysis of World WISE illustrates the diversity of wildlife crime. Nearly 7,000 species have been seized, including not only mammals but reptiles, corals, birds, and fish. No single species is responsible for more than 6% of the seizure incidents. Virtually every country in the world plays a role, and no single country is identified as the source of more than 15% of the total number of seized shipments captured in the database. Suspected traffickers of some 80 nationalities have been identified, illustrating the fact that wildlife crime is truly a global issue.

All regions of the world play a role as a source, transit, or destination for contraband wildlife, although certain types of wildlife are strongly associated with each region. Birds are most strongly associated with Central and South America; mammals with Africa and Asia; reptiles with Europe and North America; and corals with Oceania.

While wildlife crime occurs across the world, some species and regions are more affected than others. To prioritise the use of limited resources, some quantification of the threats posed by wildlife trafficking flows is necessary.

And while looking at the number of times a particular species or region is implicated can give some general insights, 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 tourist. Plumbing the depths of these data requires an additional element, something that takes into account the scale of the seizure.

Interpreting seizures

Like a pixel in a snapshot, wildlife seizures can be misleading in isolation, but when combined in great numbers can yield penetrating insight into a hidden world. 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 the trafficking or shed much light on law enforcement capacity.

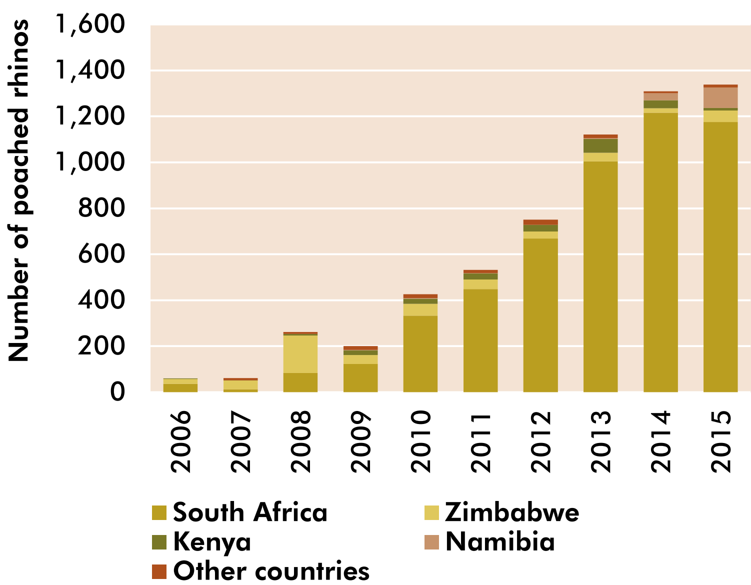
The real value of seizure data comes not from what they say about the country making the seizure, but what they say about the rest of the trafficking chain. Most CITES-related wildlife seizures are made when the goods are being transported, and the source and destination of the shipment are specified in the vast majority of recorded seizure incidents. Rich detail can be culled concerning the routes and techniques used by the traffickers, and even which interdiction strategies are most successful. Triangulated with qualitative research, they can provide a key data source for understanding the mechanics of wildlife crime.

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 discussed in Chapter 2 and fully explained in an on-line methodological annex to this report. These values are not presented as a proxy for the true black market price, but they can act as a yardstick, giving a sense of the relative value of a seahorse to a rhino horn to a rosewood log.

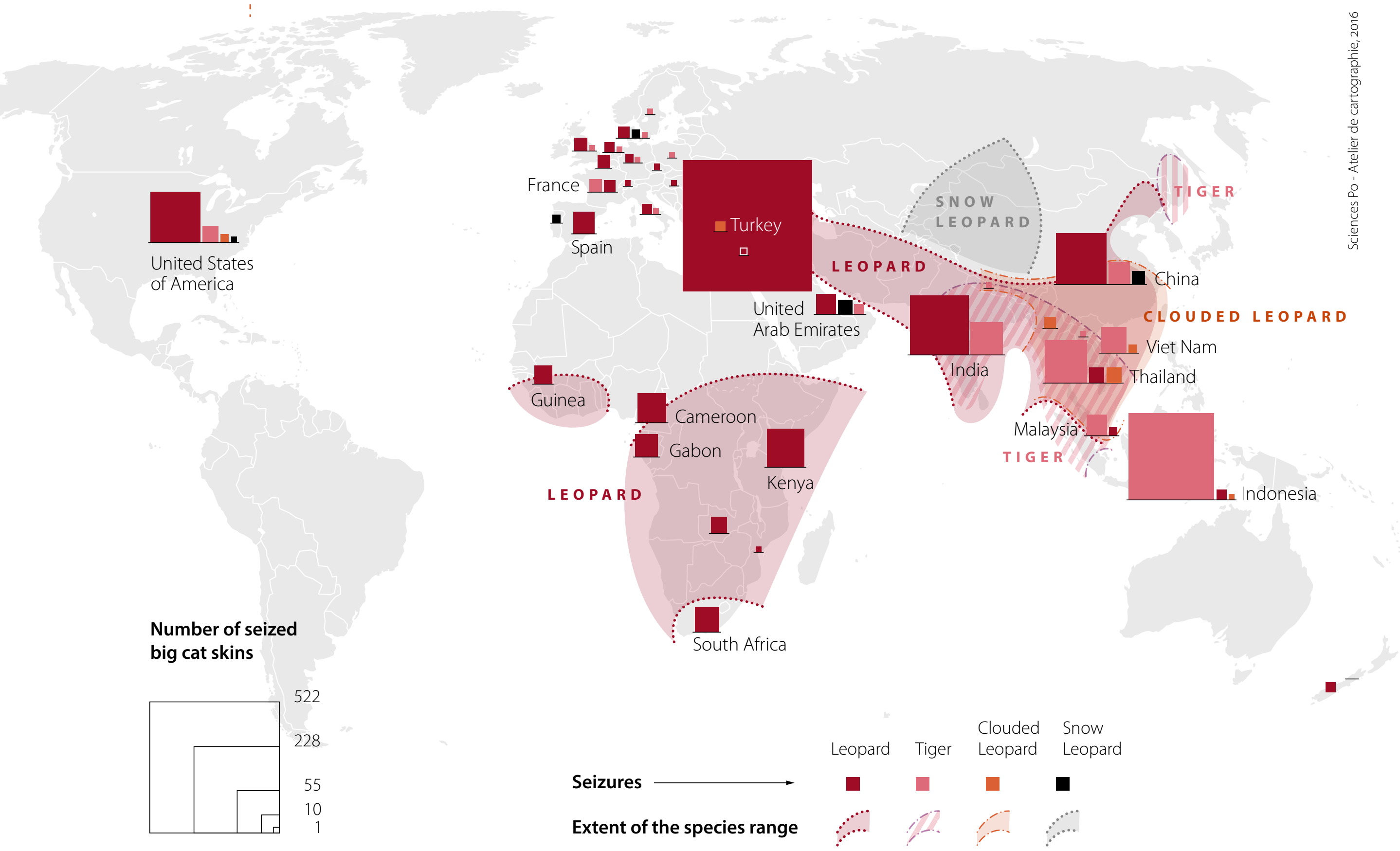
Finally, for a number of reasons, seizures of individual species of wildlife are highly volatile. For example, the average year-on-year variation in the total weight of ivory seized globally between 1997 and 2011 was 33%, with increases and decreases equally represented. Changes in both national and international regulations can have dramatic impact, as goods that were previously legal suddenly become subject to strict regulation. As a result, discussion of trends on a species basis is difficult, and the clearest trends are seen where poaching is documented in a species with a small and concentrated population, such as rhinos in South Africa (Chapter 7).

Number of African rhinos poached by country, 2006-2015



Source: Emslie et al 2016

Map 1 Seizures of big cat skins, by species, aggregated 2005-2014



Sources: World WISE and IUCN Red list

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

The approach taken in aggregating seizures in this report is different from the one that would be needed if the purpose of the analysis were to measure conservation impact. To do this, each seizure would need to be converted into live equivalents, and this number compared to estimates of the remaining population, taking into account the reproductive prospects of the species. For example, World WISE includes 380 tiger skin seizures between 2005 and 2014, worth only about US$4 million. But there are only perhaps 3,000 tigers left in the wild, so the ecological impact of these 380 skins is much more than their monetary value (see Chapter 5).

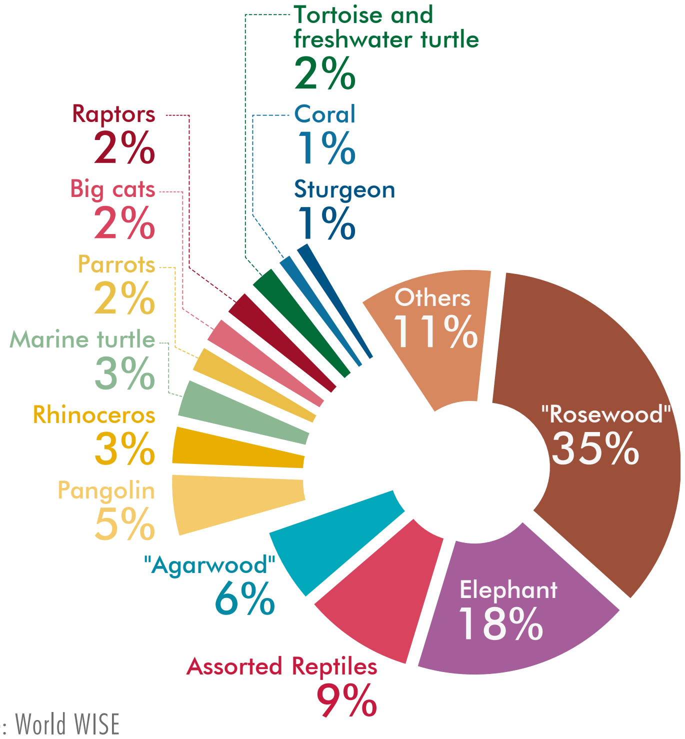
Once the relative significance of each seizure is taken into account, a range of comparisons can be made. For example, the most significant species in trade, from a criminal markets perspective, can be identified. Together, just a few types of wildlife can account for just under 90% of the total.

A review of the data indicates that illegal wildlife markets do not correspond neatly to biological categories. Some markets make use of multiple species, while some species feed multiple distinct markets. For example, as is discussed in Chapter 5, the illegal exotic leathers trade makes use of a range of reptiles – including various species of python, crocodile, and lizard – poached for their skins. At the same time, pythons are illegally harvested not only for their skins, but their meat is eaten, their gallbladders are used in traditional medicine, and they are kept as pets. These different uses may see the same animal feeding into several criminal markets, sometimes in different parts of the world.

Keeping this diversity in mind, 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. For example, ivory, rhino horn, and pangolin scales have been detected in the same shipment on multiple occasions. But these seizures are the exception rather than

Fig. 3 Share of type of wildlife among total seizures (aggregated on the basis of standard value*) 2005-2014



Source: World WISE
*see online methodological annex for details

the rule, and most seizures in World WISE involve shipments 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.

In the end, it may be best to think of the international illegal wildlife trade as a series of related but distinct illicit markets, each of which must be independently assessed for its unique characteristics. To better understand these markets, the most significant species in the seizure record were sorted into seven large industrial sectors that make use of wild sourced inputs:

- Seafood
- Pets, zoos, and breeding
- Food, medicine, and tonics
- Art, décor, and jewellery
- Cosmetics and perfume
- Fashion
- Furniture

As explained further below, some wildlife trafficking flows primarily feed illicit retail markets, while others feed into the licit trade. These legal industries can be contaminated by the introduction of illegal supply, and this vulnerability must be assessed to understand the criminal market. Key species-products for each sector are explored as case studies. Some secondary examples are also considered briefly.

Each case study lends special insights into the ways wildlife trafficking is perpetrated, suggesting the drivers and dynamics of the criminal trade. The following is a summary of key findings about the role of transnational organized crime in the markets for these internationally protected species.

Vulnerability to organized crime

The benefits of regulating licit trade of wildlife have been discussed on many occasions. The parties to CITES have asserted that commercial trade may be beneficial to the conservation of species and ecosystems, and to the development of local people. The aim of this research is not to discuss such benefits, but rather to analyse the nature of illicit wildlife markets and assess the ways in which illicit trade interacts with licit trade. 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. For example, products made of elephant ivory can be legally bought and sold

Table 1 Wildlife trade sectors, case study species-products, and other markets discussed

FURNITURE	ART, DÉCOR, JEWELRY (INVESTMENT)	FASHION	COSMETICS AND PERFUME	FOOD, MEDICINE, TONICS	PETS, ZOOS, BREEDING	SEAFOOD
Rosewood	Ivory	Reptile skins	Agarwood	Pangolin	Parrots	Caviar
		Big cat skins		Rhino horn	Freshwater turtles and tortoises	Marine turtles
				Bear bile	Great apes	

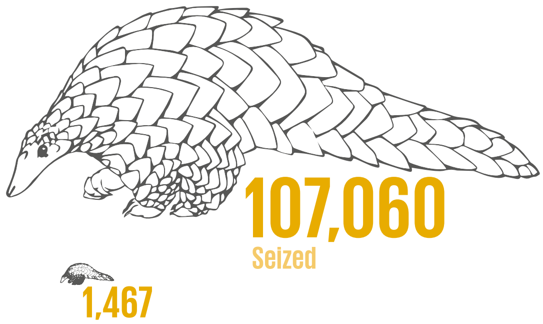
in many countries. Most countries allow for the sale of antique ivory, such as pianos with ivory keys, because the elephants were killed before international controls were in place. There are also countries where dealing in freshly-taken ivory is allowed, including countries where elephants naturally range.

But these legal markets appear to be rather small in the amount of ivory they consume. Researchers have been cataloguing the items offered for sale in various national markets for decades, and the number of individual items counted rarely exceeds 20,000 objects. In contrast, based on population and poaching surveys, as well as seizure and forensic data, it appears hundreds of tons of illegal ivory are trafficked each year. Because the known legal demand is much smaller than the estimated illegal supply, it appears that the primary retail market for illicit ivory is itself illicit, and only a small share could be laundered through the legal markets (see Chapter 4).

Similarly, there is hardly any legal international market for Asian pangolin products today, yet tons are seized each year. The tiny legal international trade could not be providing cover for what is clearly a massive illegal one. Rhino horns are another product without a legal market – zero trade is permitted for commercial purposes and there is no domestic market in range states (for both markets, see Chapter 7). These markets are entirely illegal.

In some cases, however, it appears a large share of the illegally acquired wildlife is ultimately sold in a legal market. By introducing illegal products into licit markets, traffickers have access to a much broader pool of potential buyers. For example, the legal markets for wood and seafood are vast, and most of the world's fish and timber continues to come from wild sources (Fig. 5 and 6). Research conducted for this report has found that some species of fish (sturgeon) and some species

Fig. 4 Number of pangolins legally traded and seized as contraband globally, aggregated 2007-2013



Source: For legal trade, CITES Trade Database; for seizures, World WISE

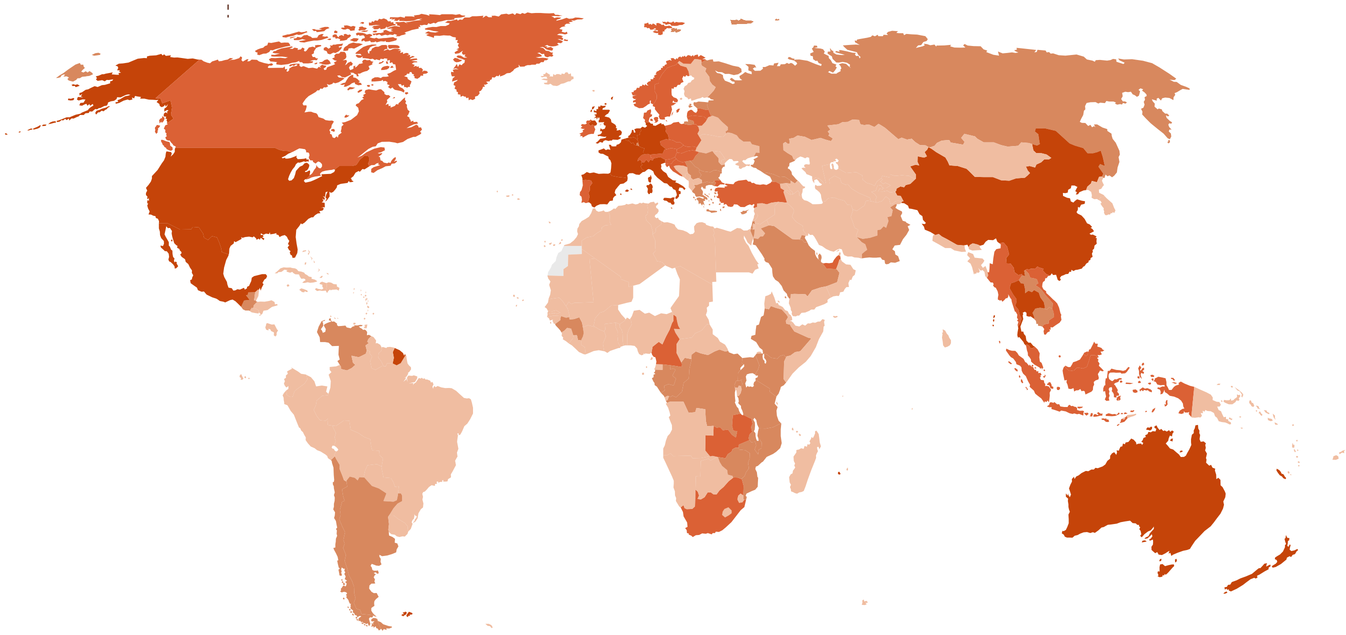
of timber ("rosewood" species, and those producing agarwood) may be illegally sourced yet sold in licit markets. These commodities have access to legal demand, because the buyers may be unaware of the illegal origin of the product.

The case studies conducted for this report indicate that certain markets are vulnerable to the infiltration of illegally sourced or trafficked wildlife:

- ***Where there is no international regulation***. If the species involved are not CITES listed, such as certain species of rosewood, illegally sourced wildlife products can be freely traded internationally once they have departed their country of origin.
- ***At wild source***. In the source country, illegally acquired wildlife may be introduced into the legal supply chain before export, if harvest controls are weak, as appears to be the case with reptiles in some parts of the world.
- ***Farm laundering***. Captive breeding, or farming, operations can be used to launder illegally wild-sourced products, as indicated in the analysis of agarwood markets.
- ***Trafficking between two legal markets***. Where possession is uncontrolled in both source markets and destination markets, as in the case of African grey parrots, these two legal

The World Wildlife Seizures (World WISE) database

Map 1 Total number of seizures reported by country, 2004-2015



Map 2 Total number of seizures, by countries identified as source, 2004-2015

To better understand wildlife crime, UNODC resolved to compile a global database of seizure incidents. The following chapter gives a brief explanation of the way the World Wildlife Seizure database (World WISE) was assembled and structured. For a complete description of the database and the methodology of this study more generally, please see the online methodological annex to this report at: http://www.unodc.org/unodc/en/data-and-analysis/wildlife.html

Given the variety of ways wildlife crime can be defined, compiling a global database of seizure incidents would appear to be a daunting task. Fortunately, an international mechanism for reporting wildlife seizure data already exists: the Annual and Biennial Reports submitted by CITES parties. As UNODC and the CITES Secretariat are partners in the International Consortium on Combating Wildlife Crime (ICCWC), it was possible to secure access to these public data.[1]

Another ICCWC partner, the WCO, also gathers some wildlife seizure data, through its CEN database, and access was granted to harvest this information. WCO-CEN data are a large component of the seizure database of the European Commission Enforcement Working Group, known as EU-TWIX, and permission was received from the Working Group to include the EU-TWIX data. This base was enhanced through the collection of data assembled by other regional Wildlife Enforcement

Indicators of organized wildlife crime

By its nature, organized crime is clandestine, so the evidentiary base of policy discussion is often weak. Indicators of organized crime take many forms, some very specific to the crime involved. Those involving the trafficking of contraband do hold one indicator in common, however: the seizure incident.

A seizure is made when contraband is detected by law enforcement authorities. Like a pixel in a snapshot, these incidents can be misleading in isolation, but, when combined in great numbers and triangulated with other information, can yield penetrating insight into a hidden world. Seizure data can be easily misinterpreted, however, and often mean the opposite of what might be supposed. The seizure of contraband is reliant on two factors:

- The presence of contraband in the jurisdiction of the seizing authority;
- The proactive effort to detect and interdict that contraband.

Thus, the quantity of seizures indicates both the presence of a problem and the initiative of the relevant authorities in addressing it. Countries that dedicate the most effort to fighting trafficking may have higher seizure totals than similarly situated counterparts. High-performing countries are often transit countries, neither the source nor the destination of the illicit flow. High levels of seizures are not necessarily an indicator of culpability, and are often precisely the opposite.

In contrast, to avoid detection, traffickers favour those countries with limited interdiction capacity. Even countries with a good law enforcement capacity do not inspect their exports the way that they inspect their imports, so contraband sourced in countries with weak capacities is highly unlikely to be seized at origin. Furthermore, corruption is essential to many contraband flows, and seizures are not made where the relevant officials are complicit.

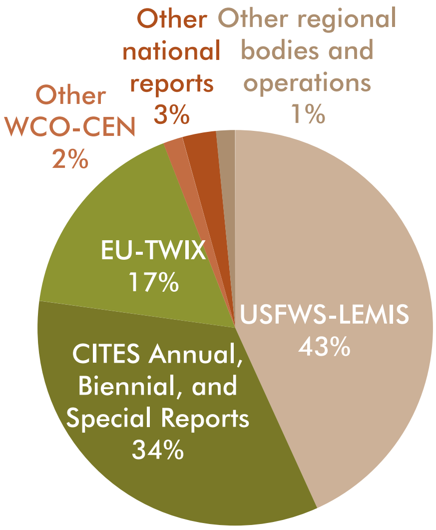
Fortunately, seizure data are not just spots on a map. Each seizure incident can provide multiple pieces of information on the nature of an illicit market. Whether transported by sea freight, air freight, personal courier, or post, it is often possible to determine where the contraband originated, transited, and was destined. Each seizure incident, therefore, has the potential to reflect on the entire trafficking chain, including the role of states 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. By linking each seizure to onward processing through the criminal justice system, it is possible to determine which approaches are most effective in convicting traffickers. By noting the enforcement authorities responsible, resources can be allocated to those best positioned to interdict contraband flows.

That said, the quality of seizure data vary 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 comparable products. There is a clear need for international standardisation of these records, and capacity building for those who collect them.

Thus, 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. Combined with research on the underlining criminal markets, they help inform, and challenge, our understanding of wildlife crime.

Fig. 1 Share of data sources in total World WISE seizure incidents, aggregated 2005-2014



Source: World WISE

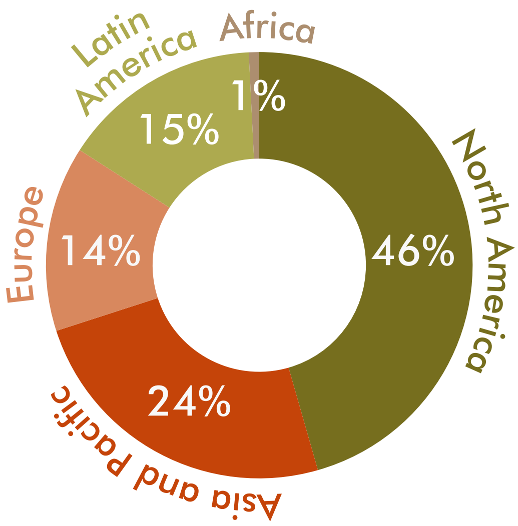
Networks (including the Association of Southeast Asian Nations' Wildlife Enforcement Network, ASEAN-WEN, and the Lusaka Agreement Taskforce), operational data, national reports (particularly the LEMIS system of the United States Fish and Wildlife Service) and other sources.[2]

The entire World WISE database held over 164,000 seizures at the end of October 2015, the time at which analysis for this report was initiated. These data come from seizures dating back as far as 1999, however. The earliest years of the database are not internationally representative. Most contributors were able to give data from about 2005, and therefore most of the analysis in this report is based on the decade from 2005 through 2014; the database holds 132,144 seizures from 120 countries for this period.

At present, World WISE is based mainly on existing data sources, and while it includes a number of countries that had not previously submitted wildlife seizure data, there remain significant gaps in both geographic and temporal coverage. Future work would be needed to address these gaps, including the collection of retrospective seizure data.

Combining national reports from 120 countries presented a number of methodological challenges, which are discussed in the on-line methodological supplement to this report. One

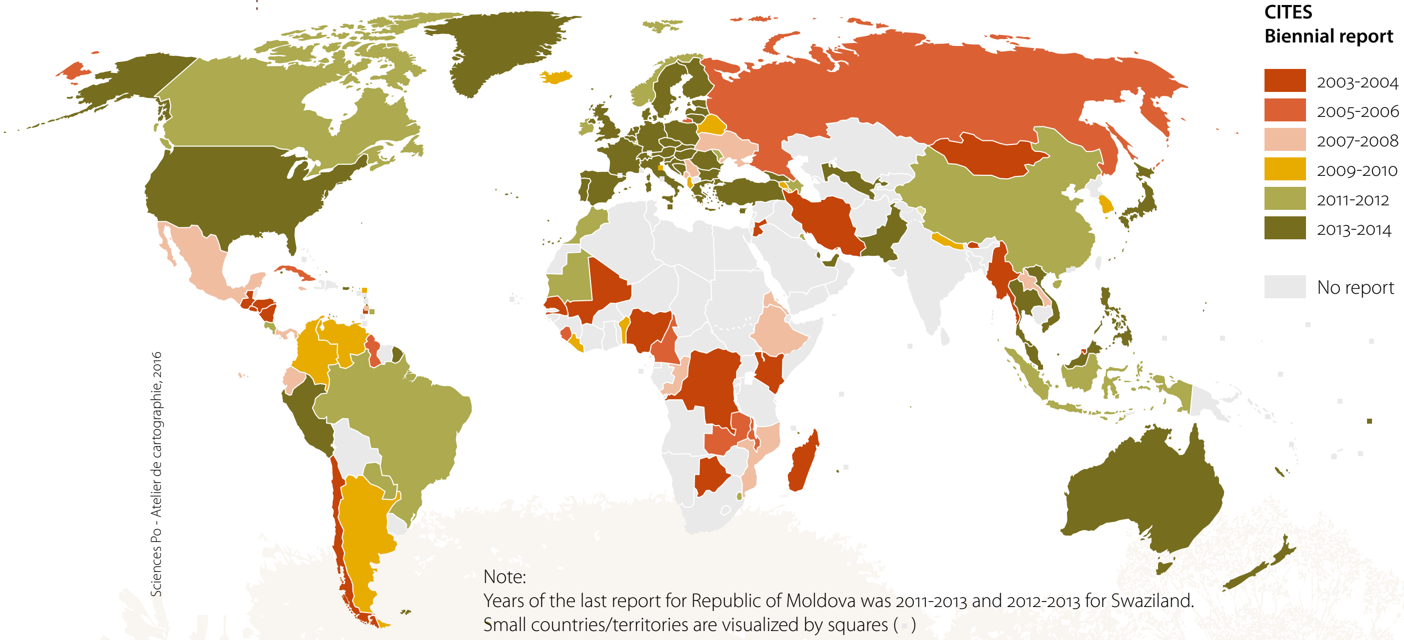
Fig. 2 Share of total seizure incidents in World WISE by region, aggregated 2005-2014



Source: World WISE

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,

Map 3 Latest Biennial Report submitted to CITES by country and year, 2003-2014[3]



Note:
Years of the last report for Republic of Moldova was 2011-2013 and 2012-2013 for Swaziland.
Small countries/territories are visualized by squares ( )

Sources: CITES

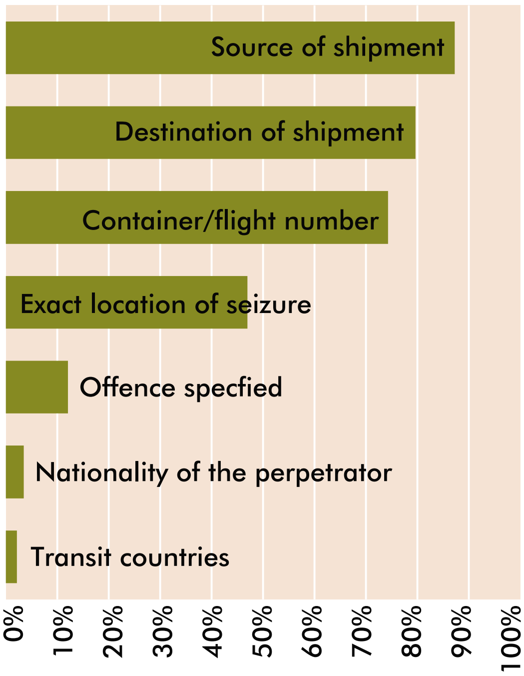
Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

The variable availability and quality of seizure data

Within the CITES Management Authorities, there appears to be considerable variation in the capacity to collect seizure information. Some appear to be poorly placed to request data from those branches of government likely to seize wildlife, such as customs, relying instead on the relatively limited interdiction capacity of the environmental ministry in which they typically sit. In states where enforcement is conducted at both national and local levels of government, there may be no mechanism for transmitting local seizures to national authorities. The agencies that collect data on "wildlife" are often different from those collecting data on fisheries or timber, so some databases have no marine species or wood seizures. It can be difficult to distinguish between states that fail to report due to lack of capacity to assemble the data, and those that have little enforcement activity to report.

There is also considerable variation in the quality of the data compiled. The most vital information – the date and location of the seizure; the species; the product; the quantity; and the source and destination of the shipment – may be lacking in some respect. Product codes are often misapplied, and a wide variety of measurement units specified.

Fig. 3 Percentage of seizure incidents in World WISE that include specific data fields, aggregated 1999-2015



Source: World WISE

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 and in the online methodological annex.

The process of assembling these data has been instructive on many levels.

Data collection began with harvesting seizure data submitted to CITES. In the past, this has been done through two mechanisms. Every second year, parties to CITES have been requested to submit Biennial Reports containing information on efforts made to implement the Convention, including data on law enforcement, such as seizures. Unfortunately, not all CITES parties fulfil this obligation, and many that do respond do not present all requested information. Only a small share of Biennial Reports contain seizure data. Some parties include seizure data in their Annual Reports, which are meant to document information on legal trade and CITES permits issued.

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 (87%) and the destination of the shipment (80%). Those that did not include this information were often the result of domestic enforcement, so there was no "shipment" to speak of. Much less often, however, did the seizure data include information on the countries transited before the seizure (2%).

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.

Seizures are not the only evidence of wildlife crime, of course, and World WISE is very much a work in progress. In the future, the seizure data could be usefully supplemented with other criminal justice data, including information deriving from arrests, prosecutions, and convictions. Price data would also be extremely helpful in understanding the nature of wildlife contraband markets. But seizure data, properly interpreted, remain the single best indicator of wildlife crime, and efforts continue to consolidate and standardise this information.

Why wildlife crime needs a common unit

To discuss the global market in fruit, apples and oranges must be compared. To discuss the global market for wildlife contraband, it is similarly necessary to compare a wide range of dissimilar commodities. Is wildlife crime increasing? Where is the problem most acute? Which species are trafficked in the largest volumes? To answer these questions, data on wildlife crime must be aggregated, and this requires some standard unit of comparison.

If the objective is to measure the environmental impact of any given wildlife crime incident, then it would make sense to calculate the number of wild lives lost. Since some species are more threatened than others, measuring the impact of these lost lives would require an assessment of the share of the extant population lost in any given incident. To be more accurate, the ability of each species to recover through reproduction would have to be factored into the impact assessment. If all species were accorded equal intrinsic value, then some common unit of relative loss

"Medicinals"

Among the most frequently encountered product classes found in wildlife seizures are those termed "medicine" or "derivatives". The CITES definitions of these product terms are vague, and seem to be applied to a wide range of items in practice, from compounded raw materials to processed products. Supplements and cosmetics containing CITES-listed species, often in trace amounts as one of many ingredients, are commonly seized when they are shipped to consumers internationally without CITES paperwork. Examples include cosmetic face masks containing orchid extract of an unspecified species, dietary supplements with American ginseng, "caviar" face creams, and cobra venom analgesic salves.

There are several problems with including these seizures in wildlife crime analysis. While enforcement agents must seize non-compliant shipments, many of these incidents appear to be the result of ignorance or negligence, not criminal intent. The evidence for the presence of the controlled species is often limited to the labelling on the package, found alongside the name and address of the manufacturer. It is unlikely these items are being produced by criminal organizations making use of poached materials. Further, since these are processed products, often with fillers or other ingredients, it is unclear what share of the weight or value of the seizure can be attributed to the controlled species, if any. A recent study of herbal dietary supplements was only able to authenticate 48% of the products tested, and found that most (59%) of the herbal products tested contained species of plants not listed on the labels.[4]

could be aggregated across species to derive an overall assessment. This would be an exercise of considerable complexity, best suited to experts in the biology of the species concerned.

But if the objective is to measure transnational organized wildlife crime, a simpler metric is available: monetary valuation. Organized crime is crime committed for material gain. The material gain associated with any particular act of wildlife crime, therefore, captures its criminal significance.

The point of this valuation is not to calculate the true revenues accruing to criminals. It is to provide a common unit so that unlike specimens can be compared and aggregated. It is the relative value of each seizure that is most important. Of course, the value of any given specimen varies over time and between markets. But a rough relative value can be derived from prices in a single market from a set period of time. Once this relative value is established, it can be monitored for variation over time, as an index.

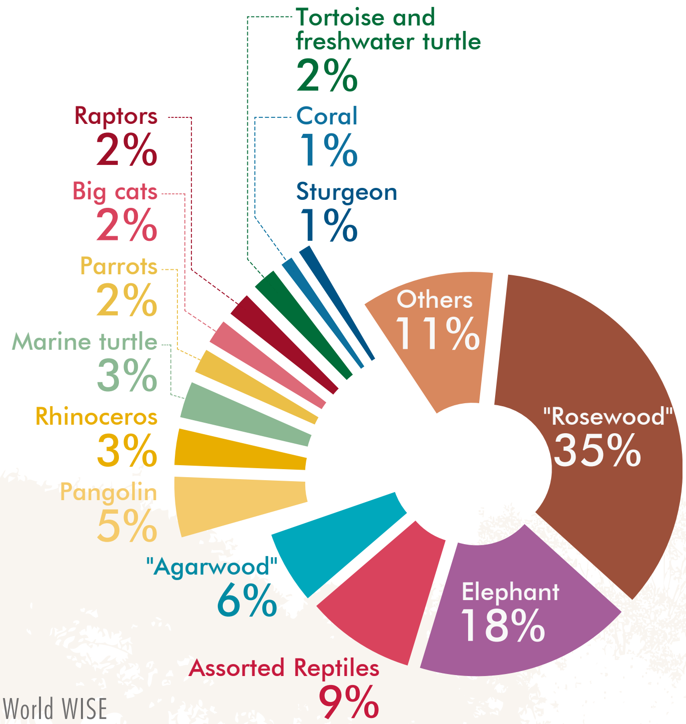
Unfortunately, it is not always possible to assign a price point to every seizure. Seizure data are often incomplete, and may be vague as to the quantity seized. Finished products may simply be counted rather than weighed, or the packaging weighed along with the wildlife material. The wildlife involved may be logged at a high taxonomic level, and there may be stark price differences between closely related species. Medicinal and cosmetic products are among the more problematic (see Box "Medicinals").

Resolving these complications is likely to require some time, and so World WISE remains a work in progress, particularly with regard to valuation. Nonetheless, it is possible to assign a value to close to two-thirds of the 164,000 seizures in the database by a method fully described in the online methodological annex to this report. Based on those seizures that can be priced, preliminary calculations can be made, and these figures provide an empirical basis for the focus of this study.

What are the biggest transnational wildlife contraband markets in the world?

Once the relative significance of each seizure is taken into account, a range of comparisons can be made. For example, the most significant species in trade, from a criminal markets perspective, can be identified. Given that some 7,000 species are trafficked, some sense of priority

Fig. 4 Share of type of wildlife among total seizures (aggregated on the basis of standard value*) 2005-2014



Source: World WISE
*see online methodological annex for details

Table 1 Wildlife trade sectors, case study species-products, and other markets discussed

FURNITURE	ART, DÉCOR, JEWELRY (INVESTMENT)	FASHION	COSMETICS AND PERFUME	FOOD, MEDICINE, TONICS	PETS, ZOOS, BREEDING	SEAFOOD
Rosewood	Ivory	Reptile skins	Agarwood	Pangolin	Parrots	Caviar
		Big cat skins		Rhino horn	Freshwater turtles and tortoises	Marine turtles
				Bear bile	Great apes	

is essential in order to target interventions, and looking at seizure values aggregated by species between 2005 and 2015, a number of clear leaders can be identified. Together, just a few types of wildlife can account for 90% of the total.

A review of the data indicates that illegal wildlife markets do not correspond neatly to biological categories. Some markets make use of multiple species, while some species feed multiple distinct markets. For example, as is discussed in Chapter 5, the illegal exotic leathers trade makes use of a range of reptiles – including various species of python, crocodile, and lizard – poached for their skins. At the same time, pythons are illegally harvested not only for their skins, but their meat is eaten, their gallbladders are used in traditional medicine, and they are kept as pets. These different uses may see the same animal feeding into several criminal markets, sometimes in different parts of the world.

Keeping this diversity in mind, 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. For example, ivory, rhino horn, and pangolin scales have been detected in the same shipment on multiple occasions. But these seizures are the exception rather than the rule, and most seizures in World WISE involve shipments 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.

In the end, it may be best to think of the international illegal wildlife trade as a series of related but distinct illicit markets, each of which must be independently assessed for its unique characteristics.

To better understand these markets, the most significant species in the seizure record were sorted by seven large industrial sectors that make use of wild sourced inputs: seafood; pets, zoos, and breeding; food, medicine, and tonics; art, décor, jewellery; cosmetics and perfume; fashion; and furniture. These legal industries can be contaminated by the introduction of illegal supply, and this vulnerability must be assessed to understand the criminal market. Key species-products for each sector are explored as case studies. Some secondary examples are also considered in boxes.

These following chapters examine each of these industrial sectors, and their associated case study species-product, in some detail. The central question in each is whether and how illegally sourced wildlife may be feeding legitimate markets.

Endnotes

1 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

2 See the online methodological annex to this report for a complete description of the data sources.

3 See "Biennial Reports" at the CITES website: https://cites.org/eng/resources/reports/biennial.php

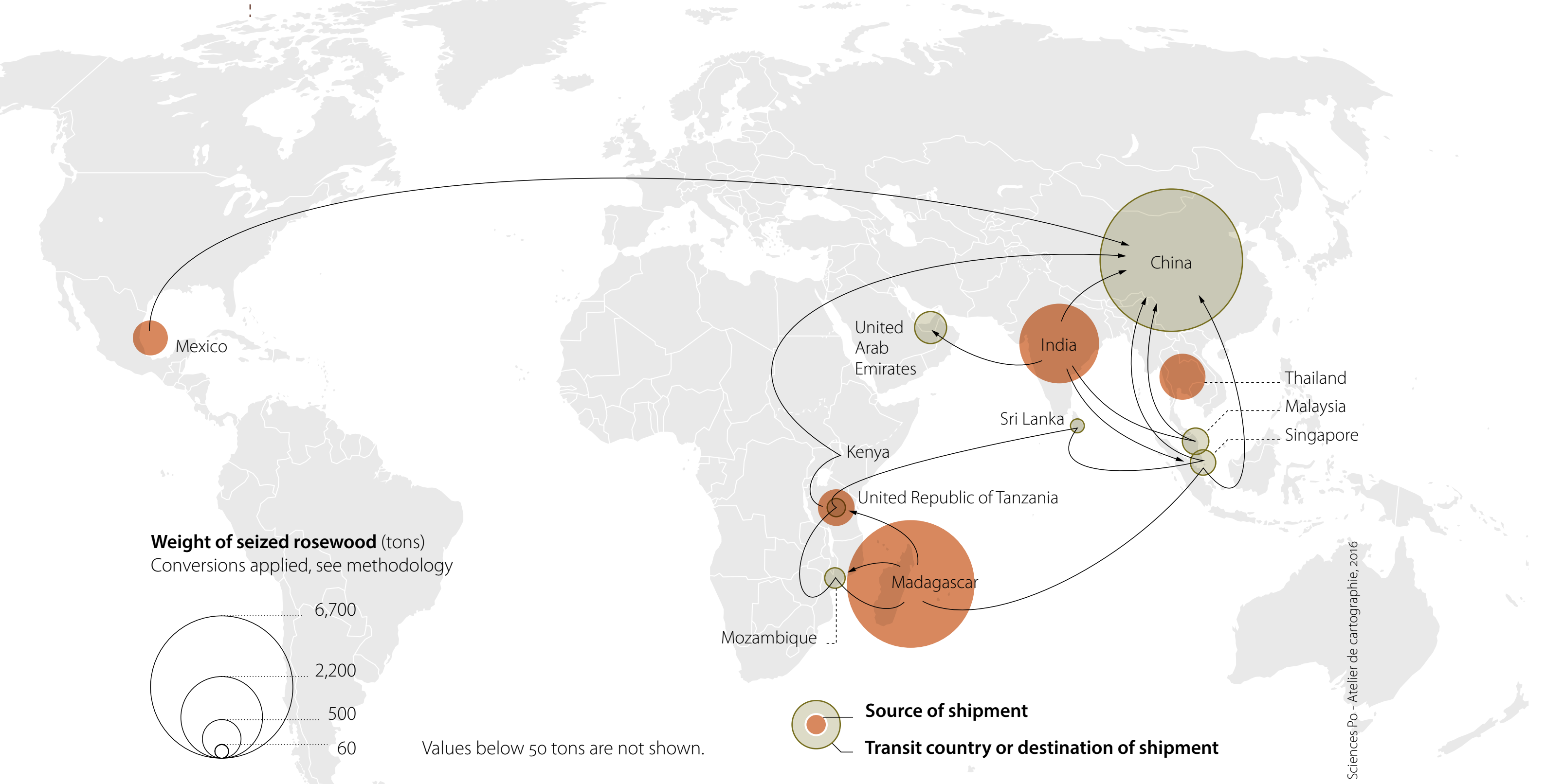
4 Steven G Newmaster, Meghan Grguric, Dhivya Shanmughanandhan, Sathishkumar Ramalingam and Subramanyam Ragupathy, "DNA barcoding detects contamination and substitution in North American herbal products." *BMC Medicine*, Vol 11, p 222, 2013.

FURNITURE

CASE STUDY: Rosewood logs

WILDLIFE AND THE TROPICAL HARDWOOD FURNITURE TRADE

Map 1 | Main flows of rosewood logs and timber seizures (tons), 2005-2015



Source: World WISE

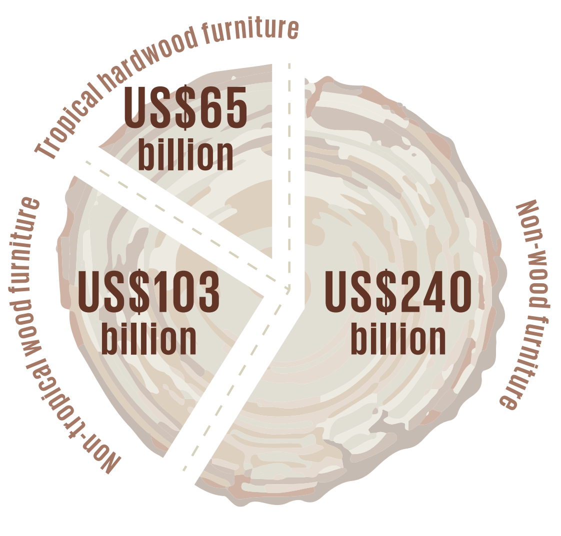
Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Illegal logging is one of the most destructive wildlife crimes, as it threatens not just a single species, but entire habitats. Much illegal logging involves cutting common or undifferentiated species for charcoal or pulp and paper, but where specific rare timber species are targeted, the object is often tropical hardwood furniture. This industry provides a prime example of the way that, outside the CITES regime, wildlife harvested or exported contrary to national laws in its source country can still be introduced into legitimate commercial streams in other countries.

The demand for the tropical hardwood is mainly driven by the furniture industry and the world trade in tropical hardwood furniture is immense.[1] Global production of all types of furniture was valued at over US$400 billion in 2012.[2] Of this, tropical hardwood furniture production was valued at approximately US$65 billion, representing about 39% of wooden furniture production and 16% of total furniture production by value (Fig. 1).[3] Some of the top producers of tropical hardwood furniture are also some of the top consumers, so only a fraction of production is traded internationally. Thus, the international trade in tropical hardwood furniture was only worth some US$19 billion in 2013, or about one-third of production.

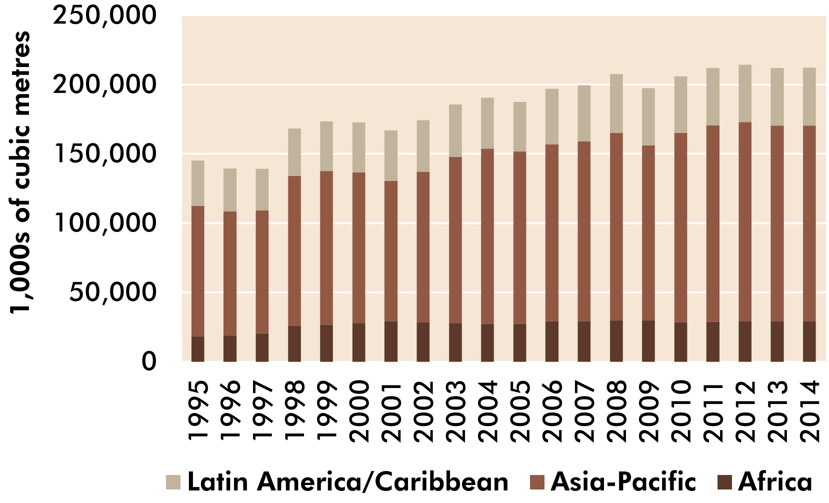
The primary source of tropical hardwoods is Southeast Asia and the Pacific, although African and Latin

Fig. 1 | Value of global furniture production by type of furniture, 2012



Source: Elaborated from data from EC 2014[4]

Fig. 2 Volume of tropical logs exported by selected regions (1000s of cubic meters), 1995-2014



Sources: ITTO Statistics Database; COMTRADE

American countries contribute about one-third of exports. Some of the poorer source countries have struggled to come to terms with the burgeoning trade in tropical hardwoods, as they lack the capacity to monitor forest loss and prevent excessive logging. Threatened with widespread deforestation, some source countries have imposed log export bans, protections for specific species, or even general logging bans. But with limited capacity to monitor and enforce these controls, exports may be vulnerable to the introduction of wood that is illegally sourced.

Log export bans and species-specific controls

National log export bans are generally designed to accomplish two objectives:[5]

- to retain a greater share of the value of the logs in the source country, as the timber must be processed before export;
- to slow the rate of extraction to the pace of the local sawmills.

Log exports can continue despite the bans. This can be documented by the import statistics of other countries, which identify the source of the logs. While these discrepancies can indicate real criminality, they may also be due to definitional differences around what constitutes a "log". Logs are often roughly squared, removing the sap wood and improving packing efficiency, and this can sometimes be mistaken for "worked timber". The same shipment may be exported as timber and imported as logs, so it can be difficult to reconcile trade statistics.

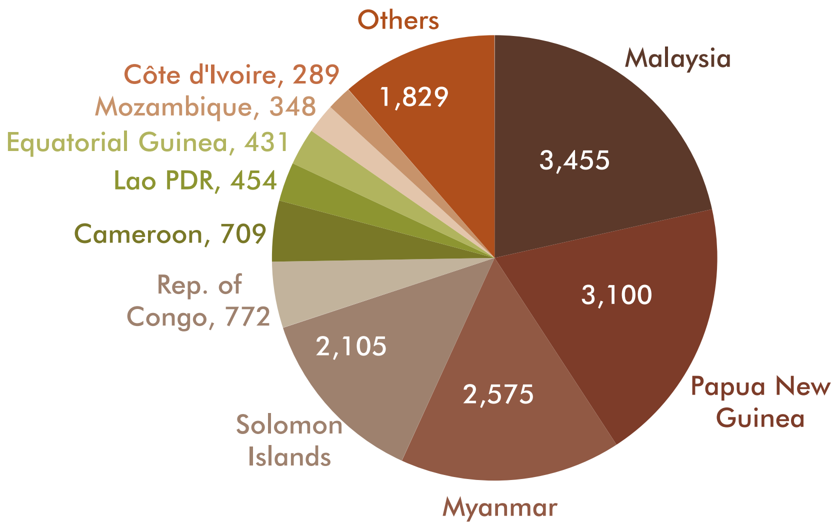
Bans on the trade and export of specific species can affect both logs and sawn wood. As these controls are usually based on executive decisions, officials have the discretion to make exceptions.[6] Exceptions are typically made for timber that:

- was felled prior to the controls;
- resulted from land clearance for development projects, timber thinning, or agricultural expansion (the "salvage" exception);
- was seized by government authorities as contraband. This is commonly later sold to private buyers at auction.[7]

In each case, the trees are felled and the damage to the environment is done. The state or private firms are saddled with large volumes of wood and have an interest in profiting off this valuable commodity. Illegally sourced timber can be introduced into legal markets when it is publically auctioned by the seizing state.

Generalized logging bans can give officials a basis for action at logging sites, but they do not provide a basis for challenging exports. This is true because even when no new wild harvesting is allowed, it remains possible that wood to be exported comes from stockpiles of timber felled prior to the ban, or that it was imported from another country without a logging ban. All of this creates a situation of considerable ambiguity as to the legality of any given export.

Fig. 3 Share of global exports of tropical logs by country of export (1000s of cubic meters), 2013



Source: Elaborated from International Tropical Timber Organization Statistics Database and United Nations United Nations Commodity Trade Statistics Database

The limitations of national control systems

To compound the confusion, all these national controls appear to have little power once the wood has actually been exported. Outside CITES, most destination countries lack a legal basis for refusing wood that was harvested or exported contrary to source country regulations. The US Lacey Act, the EU Timber Regulations, and the Australian Illegal Logging Prohibition Act are exceptional because they prohibit the import of any illegal timber, wherever the law was broken. For other destination markets, however, the local regulations of source countries are irrelevant, and the wood cannot be refused. In this way, illegally logged or exported timber can become part of legal tropical hardwood furniture in another national market.

The only basis for most countries to seize wood imports of questionable origin is the CITES agreement. There are currently over 600 tree species listed on CITES appendices, including 400 species that are commonly harvested for their timber. A small number of the tropical hardwoods used in fine furnishings are CITES listed, including mahogany (*Swietenia* species and *Cedrela* species), afrormosia *(Pericopsis elata),* and ramin *(Gonystylus* species). Several species commonly marketed as "rosewood" are also included.

"Rosewood" is an imprecise trade term associated with a wide range of richly hued, and often fragrant, tropical hardwoods. The term is most commonly equated with *Dalbergia* and *Pterocarpus* species, many of which are CITES-listed, and many of which are not. These species are primarily found in South and Southeast Asia, West and East Africa, and Latin America.

CITES-protected species

Supply of rosewood

The CITES-listed species make up only a small share of the species traded as "rosewood", and currently comprise a fraction of the rosewood timber market. As a result, both the trade data (based on CITES permits) and World WISE seizure data (which focus on CITES listed species) capture only a portion of the legal and illegal markets respectively. Only one rosewood species is on Appendix I and cannot be commercially traded: *Dalbergia nigra*, known as "Brazilian rosewood". Brazilian rosewood grows only in a relatively small area of Brazil, recent legal trade in this species has been extremely limited, and World WISE captures only a dozen seizures.

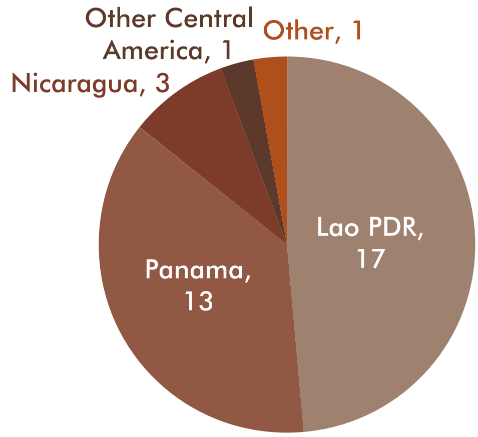
A number of species are listed on Appendix II and can be traded with the proper permits, but most of these were only added in 2013. The exception is *Pterocarpus santalinus* from India, a precious wood known as "red sanders", which has been listed on CITES Appendix II since 2007, and, as a result, comprises most of the seizures historically. Among the 2013 listings are all 48 *Dalbergia* species of Madagascar, which have held a zero export quota since 2013. Huge seizures have been made of Malagasy rosewood, particularly *Dalbergia louvelii*, suggesting Madagascar is where much of the trade in CITES-listed rosewoods is sourced. One of the highest value rosewoods is from Southeast Asia, *Dalbergia cochinchinensis* (Siamese rosewood). The remainder come from Central America, including 2013 listed Appendix II species *Dalbergia granadillo* (granadillo), *Dalbergia retusa* (cocobolo), and *Dalbergia stevensonii* (Honduran rosewood).

National populations from Guatemala, Nicaragua, and Panama have been included in Appendix III.[8] In 2016, an African species, *Pterocarpus erinaceus* was added to Appendix III by Senegal.[9] Export permits are required for species coming from the specified source countries, and other countries are required to issue certificates of origin when exporting these species.

Illegal trade

With regard to seizures of CITES-listed species, most have involved red sanders, Siamese rosewood, Malagasy rosewood, and Honduran rosewood.

Fig. 4 Share of global exports of CITES listed Dalbergia and Pterocarpus logs by country of export (thousands of metric tons), aggregated 2007-2015



Source: CITES Trade Database

The governments of China, India, Malaysia, and Singapore have seized multi-ton shipments of red sanders over the years. Detected shipments are mainly destined for China (particularly via Hong Kong, China), or the United Arab Emirates (mainly via Mumbai seaport).

Siamese rosewood has been seized by the Malay, Thai, and Vietnamese authorities. There are only three multi-ton seizures of Siamese rosewood captured in World WISE, all made in 2013:

- 30 tons seized in Bac Ninh province of Viet Nam on its way to China;
- 5.5 tons seized in Bukit Kayu Hitam, Malaysia on its way from Thailand,
- 9 tons in Phu Quoc Island, Kien Giang province of Viet Nam, coming from Cambodia.

The largest seizure of rosewood ever made, and possibly the largest seizure of wildlife ever made, was carried out by the Singapore authorities in 2014: some 3,000 tons of Malagasy rosewood. On 8 October 2015, acting on intelligence, Chinese Customs in Hong Kong intercepted a vessel from

Tanzania and found 1,100 metric tons of Malagasy rosewood.[10] Other remarkable recent seizures of Malagasy rosewood include:[11]

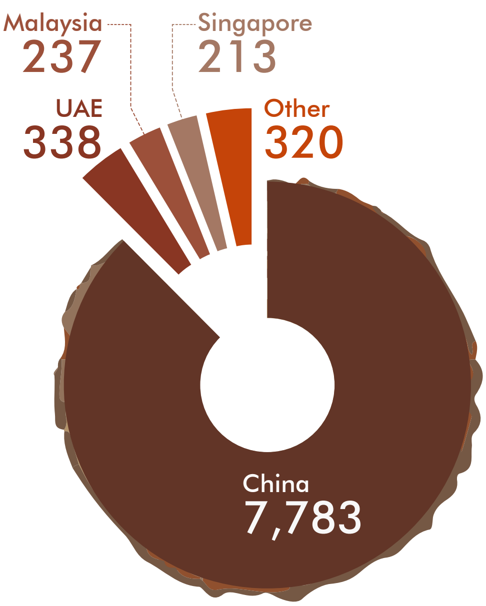
- In 2013 and 2014, the Malagasy government seized 14,894 logs in two seizures.
- Between February and May 2014, Mozambican authorities seized 1,087 logs and 90 metric tons of rosewood in two separate incidents.
- In February 2014, Tanzanian customs officers seized 781 logs of rosewood in six containers in Zanzibar.
- On 26 May 2014, the Kenya Wildlife Service seized 4,400 logs in 34 containers in Mombasa, which had been loaded in Zanzibar.
- On 2 April 2014, Sri Lankan authorities seized 3,669 logs from 28 containers, weighing 420 metric tons, which had also been loaded in Zanzibar.

World WISE data on seizures from Latin America are more limited, although a number of incidents involving between 10 and 30 metric tons were reported by Mexico. In addition, media reports contain several notable seizures:

- In April 2014, 13 containers (200 cubic metres) of cocobolo (*Dalbergia retusa*) were seized in Panama disguised as scrap on their way to Hong Kong, China.[12]
- Some 92 tons of Honduran rosewood (*Dalbergia stevensonii*) in four forty-foot shipping containers declared as rubber waste were seized in Hong Kong, China in December 2014.[13]

According to World WISE, the vast majority of CITES-listed rosewood seized was destined for China.

Fig. 5 Share of rosewood seizures by country identified as destination (metric tons), aggregated 2007-2015



Source: World WISE

Species under national control, but not currently CITES-listed

But while trade in CITES-listed rosewoods is relatively small, the rosewood furniture market is immense, often involving closely-related species of *Dalbergia* and *Pterocarpus* that are not yet CITES-listed. Three species in particular appear to have become prominent in the trade:

- Burmese rosewood (*Dalbergia oliveri*), or "tamalan", a mid-class wood from Southeast Asia;
- Burmese padauk (*Pterocarpus macarocarpus*), a slightly cheaper wood from Southeast Asia; and,
- African rosewood (*Pterocarpus erinaceus*), or "kosso", a low-end wood from West Africa.[14]

While not CITES-listed, the harvesting of these woods is either illegal or highly regulated in the source countries, out of keeping with large exports.

Most Southeast Asian countries have recognised the threat of deforestation and have taken measures to restrict or prevent logging of endangered woods. All logging of wild species has been banned in Thailand since 1989.[15] In Myanmar, both tamalan and padauk are reserved species, and harvest is illegal without permission of the Ministry of Environmental Conservation and Forestry.[16] In both Cambodia and Lao People's Democratic Republic, both tamalan and padauk are protected species.[17]

Kosso has been placed on CITES Appendix III by Senegal, effective 9 May 2016. It is also protected under national law in most West African source countries (Table 1). Its legal status is ambiguous in two countries in particular: Togo and Nigeria. At present, while Togo has a Forest Code (2008), it has not yet issued a list of protected species. As of 21 May 2015, however, the transport of kosso is prohibited by Minsterial Declaration.[18] In Nigeria, there appears to be a standing log export ban (1976), but log exports are recorded.[19]

The export data are complicated to interpret because in both Southeast Asia and West Africa, the exporting country is not necessarily the source country. For example, based on field work in the region, most of the rosewood exported from Gambia appears to be of Senegalese origin.[20] Similarly, about half of the rosewood exported from Benin appears to come from Nigeria.[21]

In addition to logging bans, most of the source countries for these woods have log export bans in place (Table 2). These bans were implemented due to concerns about the extremely rapid rate at which the species was being stripped from these countries. In response, timber brokers have repeatedly relocated their operations to neighboring states where bans were not yet in place. The logging of *Pterocarpus erinaceus* is particularly worrying because it is a fire-resistant and nitrogen-fixing species that grows in arid areas, without which desertification becomes a risk. In addition, in both Southeast Asia and West Africa, rosewood is sourced from areas where insurgents are active, and so may be seen as a source of conflict finance.

Southeast Asia

Southeast Asian countries have long been afflicted by illegal logging,

Table 1 Logging protections for kosso in some West African countries

SOURCE COUNTRY	PROTECTION	LEGAL FRAMEWORK
Benin	Felling prohibited	Décret No 96-271 *Portant modalités d'application de la Loi N093-009 du 2 Juillet 1993* (Article 25) (1996)
Burkina Faso	Felling prohibited	Arrêté 'No 2004-019/MECV (Article 44) (2004)
Gambia	Kosso protected under Schedule 2	Forest Regulations 1998
Ghana	Felling and export ban	Minsterial declaration, 23 July 2014
Guinea-Bissau	Logging moratorium	Ministerial declaration, 1 April 2015
Mali	Felling prohibited	Loi No 95-004 *Fixant les conditions de gestion des ressources forestières* (Article 17) (1995)
Nigeria	Determined by state	Varies by state; species specific protections or logging bans in some
Senegal	Kosso "partially protected": quota; for domestic use only	Décrète: TITRE I Du domaine forestier national ARTICLE R.63; Arrêté fixant les modalités d'organisation de la campagne d'exploitation forestière (2014-2015)
Togo	Transport of kosso prohibited	Note de Service No. 0251 MERF/SG/DRF, issued 21 May 2015

Table 2 Log export bans in top rosewood source countries

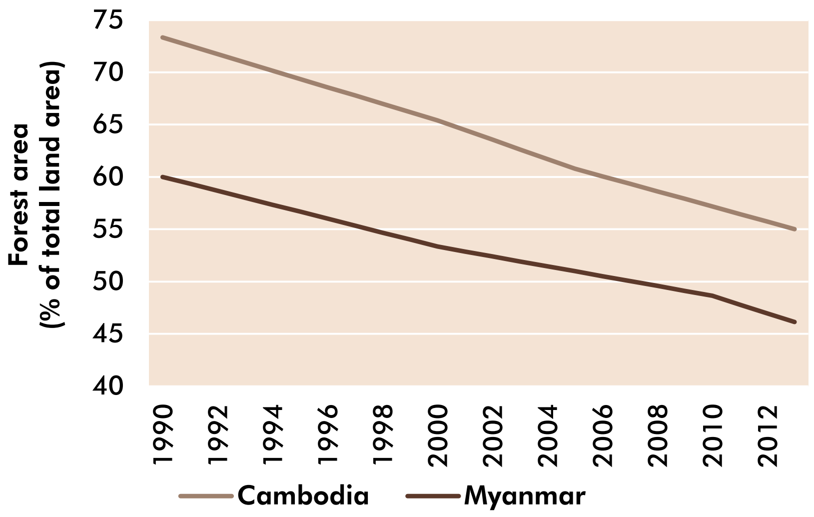
COUNTRY	YEAR OF LOG EXPORT BAN	ROSEWOOD SPECIES IMPLICATED
Cambodia	1992, 2006[22]	*Dalbergia oliveri* *Pterocarpus macrocarpus* *Dalbergia cochinchinensis*
Lao People's Democratic Republic	1999	*Dalbergia oliveri* *Pterocarpus macrocarpus* *Dalbergia cochinchinensis* *Millettia leucantha*
Myanmar	2014	*Dalbergia oliveri* *Pterocarpus macrocarpus* *Millettia leucantha*
Viet Nam	1992	*Dalbergia oliveri* *Pterocarpus macrocarpus* *Dalbergia cochinchinensis* *Dalbergia tonkinensis*
Ghana	1994	*Pterocarpus erinaceus*
Nigeria	1976	*Pterocarpus erinaceus*

which is why some log export bans extend back to the early 1990s. Based on the seizure data, it appears that Thailand and Viet Nam continue to be targetted for their high value species. In terms of volume, however, the primary source countries today appear to be the poorest in the region: Cambodia, Lao People's Democratic Republic and Myanmar. While Lao People's Democratic Republic remains widely forested,[23] forest cover has declined dramatically in Cambodia and Myanmar in the last 25 years (Fig. 6). The situation in Myanmar is complicated by the fact that large swathes of the forested area of the country are host to non-state armed groups.[24]

In recent years, attention has focused on the high-value, CITES-listed Siamese rosewood (*Dalbergia cochinchinensis*), which is found in Cambodia, Lao People's Democratic Republic, Thailand and Viet Nam. Harvesting of this species is prohibited under national law throughout much of its range[26] and it has become increasingly rare, however.[27] The harvesting of Burmese rosewood (*Dalbergia oliveri*) and Burmese padauk (*Pterocarpus macrocarpus*), which are not CITES-listed, seems to have filled the void. As noted above, these species are recognized as endangered, and so are protected under national law in all range states, but not under CITES.[28]

Illegal logging affects each country differently. In Cambodia, for example, rosewood may be harvested when

Fig. 6 Share of land area under forest cover, 1990-2013



Souce: World Bank[25]

land is cleared under Economic Land Concessions or other development projects. Several of these concessions were recently cancelled, in part due to illegal logging.[29] Legitimate salvage from development projects may be used to "launder" wood illegally harvested elsewhere.[30] There also appear to be issues around the auctioning of seized rosewood, a practice that has been banned in Thailand since 2007.[31] Illegal cross-border harvesting and the sourcing of timber from protected areas have been reported.[32]

Trafficking of tamalan and padauk contrary to national laws appears to have increased dramatically in recent years. For example, seizures of both species in Myanmar spiked in the financial year 2013-2014.[33] Crackdowns in the region appear to have resulted in a decline in exports around April 2014, based on import statistics of destination countries.

West Africa

The situation in West Africa is equally problematic. Demand for "kosso", *Pterocarpus erinaceus,* has taken the region by storm. Exports of logs from certain countries in West Africa went from nothing in 2010 to hundreds of millions of dollars by 2015.[34] The rapidity of this development has caught the region off guard, and many countries are still struggling to take account of it.

This windfall has not accrued to a single nation. It would appear that traders are moving from one West African country to another, adjusting their procurement as local supplies run out or once the relevant government increases regulation. Due to free movement within the Economic Community of West African States (ECOWAS),[35] the source country and the exporter may differ.

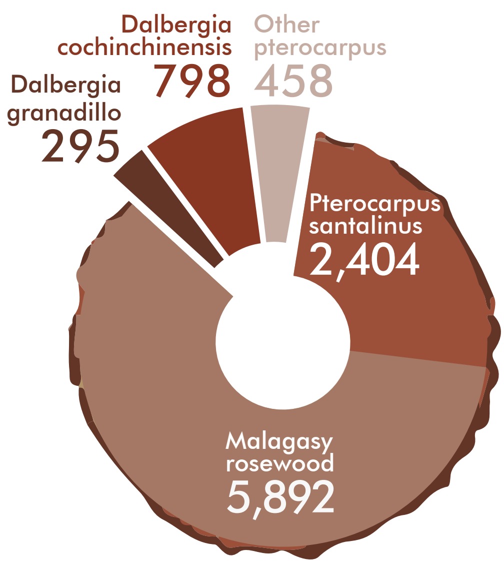
Between 2011 and the middle of 2013, Gambia, a country with little previous history of commercial forestry and no commercial forests left within its borders, began exporting large volumes of logs. The source of the wood appears to have been the Casamance region of Senegal, and since Senegal has a longstanding export ban, this timber was illegally exported to Gambia.[36] Exports fell back after a log export ban was imposed, and a series of West African countries stepped up to fill the void, most recently, Nigeria. As in Southeast Asia, it appears salvage permits are used to launder illegally felled rosewood.[37]

Since illegal timber trade on this scale is new to many countries in the region, some are only now mounting enforcement efforts. INTERPOL's Operation Log saw the seizure of over US$200 million in illegally harvested kosso and other woods in 2015.

Analysis

Estimating the size of the flow of illegal rosewood requires clarity on how illegality is defined. Looking strictly at CITES listed species, World WISE documents the seizure of almost 10,000 metric tons of protected rosewoods between 2005 and 2015.[38] Based on media reports, it appears that many seizures have taken place in Asia and possibly Latin America that are not recorded in World WISE,

Fig. 7 Share of global rosewood seizures by species (metric tons), aggregated 2005-2015



Source: World WISE

possibly because not all countries class timber as "wildlife". Based on media reports, it appears that many seizures have taken place in Asia and possibly Latin America that are not recorded in World WISE. Timber seizures are often recorded by a separate authority than other wildlife seizures, and so may be omitted in regular reporting.

Looking more broadly at illegally harvested or exported logs would produce a different result. Discrepancies in the trade data indicate that many countries are exporting rosewood logs of species not listed in the CITES appendices, contrary to their own national laws. The volumes involved could be much greater than the flow in CITES listed species.

Rosewood illustrates the limitations of a species-specific approach to wildlife protection. Timber traders evade CITES controls by finding substitute species, and the buying rush on these unprotected woods can devastate populations before controls can be put in place. Furthermore, it is very difficult for front line inspectors to distinguish different species of wood in the many forms it might appear, and misdeclaration of species has been detected.[39] At present, there is generally no legal basis for most importing countries to respect the laws of exporters, and thus large volumes of illegally sourced wood may be entering legal markets.

Endnotes

1 Under the Harmonized System, 'tropical wood' refers to the following trade names: Abura, Acajou d'Afrique, Afrormosia, Ako, Alan, Andiroba, Aningré, Avodiré, Azobé, Balau, Balsa, Bossé clair, Bossé foncé, Cativo, Cedro, Dabema, Dark Red Meranti, Dibétou, Doussié, Framiré, Freijo, Fromager, Fuma, Geronggang, Ilomba, Imbuia, Ipé, Iroko, Jaboty, Jelutong, Jequitiba, Jongkong, Kapur, Kempas, Keruing, Kosipo, Kotibé, Koto, Light Red Meranti, Limba, Louro, Maçaranduba, Mahogany, Makoré, Mandioqueira, Mansonia, Mengkulang, Meranti Bakau, Merawan, Merbau, Merpauh, Mersawa, Moabi, Niangon, Nyatoh, Obeche, Okoumé, Onzabili, Orey, Ovengkol, Ozigo, Padauk, Paldao, Palissandre de Guatemala, Palissandre de Para, Palissandre de Rio, Palissandre de Rose, Pau Amarelo, Pau Marfim, Pulai, Punah, Quaruba, Ramin, Sapelli, Saqui-Saqui, Sepetir, Sipo, Sucupira, Suren, Teak, Tauari, Tiama, Tola, Virola, White Lauan, White Meranti, White Seraya, Yellow Meranti. See http://www.wcoomd.org/~/media/WCO/Public/Global/PDF/Topics/Nomenclature/Instruments%20and%20Tools/HS%20Nomenclature%20Older%20Edition/2002/HS%202002/0944E.ashx?db=web

"Rosewood" is most frequently identified with padauk or palisander.

2 EC 2014. Economisti Associati, CSIL and Demetra for DG Enterprise and Industry, "Study on the EU furniture market situation and a possible furniture products initiative", European Commission, Brussels (November 2014). Available from http://ec.europa.eu/growth/tools-databases/newsroom/cf/itemdetail.cfm?item_id=7918&lang=en&title=Study-on-the-EU-furniture-market-situation-and-a-possible-furniture-products-initiative-. Accessed 30 January 2015.

3 Elaborated from EC 2014,op cit.

4 Ibid.

5 See, for example, M. Amoah, G. Becker and L. Nutto,"Effects of log export ban policy and dynamics of global tropical wood markets on the growth of the timber industry in Ghana", *Journal of Forest Economics*, vol. 15, No. 3 (August 2009), pp. 167–185.

6 See, for example, Derek Schuurman and Porter P. Lowry II, "The Madagascar rosewood massacre" *Madagascar Conservation and Development*, vol. 4, No 2 (December 2009), pp. 98-102.

7 Ibid, pp 99.

8 *Dalbergia tucurensis* of Nicaragua, *Dalbergia tucurensis* of Guatemala, *Dalbergia calycina* of Guatemala, *Dalbergia cubilquitzensis* of Guatemala, *Dalbergia glomerata* of Guatemala and *Dalbergia darienensis* of Panama.

9 See CITES notification:https://cites.org/sites/default/files/notif/E-Notif-2016-008.pdf

10 CITES Management Authority of Hong Kong China, *in litt*.

11 UNODC Wildlife Seizures Database.

12 Panama America, "Decomisan millonaria carga de madera 'cocobolo'", 8 April 2014. Available from: http://www.panamaamerica.com.pa/content/decomisan-millonaria-carga-de-madera-cocobolo

13 See press release, "HK Customs foils largest recent case of suspected wood logs smuggling," 17 December 2014: http://www.customs.gov.hk/en/publication_press/press/index_id_1270.html

14 See online methodological annex for details.

15 See CITES document CoP16 Prop. 60, entitled "Consideration for of proposals for amendment of Appendices I and II":https://cites.org/sites/default/files/eng/cop/16/prop/E-CoP16-Prop-60.pdf

16 Nyi Nyi Kyaw, Director General, Myanmar Forest Department, 'Myanmar Timber Trade and Rosewood Policies', presentation to the International Workshop on Promoting Legal and Sustainable Trade and Investment of Forest Products, 26 March 2014, Shanghai.

17 See monographs of the Cambodia Tree Seed Project, a product of a bilateral agreement between the Royal Government of Denmark and the Royal Government of Cambodia: http://www.treeseedfa.org/doc/Monographs/Pterocarpusmacrocarpus.pdf; http://www.treeseedfa.org/doc/Monographs/Dabergiaoliveri.pdf; and the UNODC report: http://www.unodc.org/documents/southeastasiaandpacific//2014/10/trade-timber/Criminal_Justice_Responses_to_the_Illegal_Trade_in_Timber_in_South_East_Asia_v7.pdf

18 Government of Togo, Note de Service No. 0251 MERF/SG/DRF, issued 21 May 2015.

19 As per the document "National export bans and restrictions" of the Forest Legality Alliance, a multi-stakeholder initiative led by the World Resources Institute:http://declaration.forestlegality.org/files/fla/Export_bans_restrictions_2012_06.pdf

In Nigeria, the forests are administered by the state in which they fall, and there is great diversity in the policies between Nigerian states. For example, in Taraba State, kosso is a protected species and logging is forbidden. In Kogi State, kosso may be logged under license, but there was recently a moratorium on kosso logging. In Cross River State, all logging is forbidden, while in other states, only a license is required.

20 See online methodological annex for details of this research.

21 Ibid.

22 Royal Government of Cambodia (2006) Sub-Decree No. 131 on Specific Forest Products-By-products or NTFPs, Article 3, http://www.cambodiainvestment.gov.kh/content/uploads/2012/03/Sub-Decree-131-on-Forest-and-Non- Timber-Forest-Products-Allow-For-Export-andImport_061128.pdf

23 See World Bank on-line data: http://data.worldbank.org/indicator/AG.LND.FRST.ZS

24 See the work of the United Nations Office for the Coordination of Humanitarian Affairs: http://www.unocha.org/myanmar

25 See World Bank on-line data: http://data.worldbank.org/indicator/AG.LND.FRST.ZS

According to the World Bank definition "Forest area is land under natural or planted stands of trees of at least 5 meters in situ, whether productive or not, and excludes tree stands in agricultural production systems (for example, in fruit plantations and agroforestry systems) and trees in urban parks and gardens."

26 According to CITES document CoP16 Prop. 60, entitled "Consideration for of proposals for amendment of Appendices I and II": https://cites.org/sites/default/files/eng/cop/16/prop/E-CoP16-Prop-60.pdf (page 6): "D. cochinchinensis is listed as Category A (general restrict): restricted timber No. 53 by Thai Forest Act, B.E. 2484. In Thailand, logging of natural forest trees has been prohibited nationwide since 1989. No harvest of the species is legal in Thailand. Harvesting this species is also banned by Cambodian Forestry Law 2002 No.35. In Lao P.D.R, the Prime Ministerial Order No-17/PM of 2008 explicitly

prohibits harvesting all domestic *Dalbergia* species. In addition, Prime Minister's Order No 010/PM of 2011 bans the exploitation, trading and export of *D. cochinchinensis* wood. In Vietnam, *D. cochinchinensis* was listed as group IIA protected species under Forest Law in 2006.
Later, it has been placed in danger of extinction at level EN A1a, c, d in 2007. As a result, it is prohibited to exploit, dispatch or store the wood, according to Vietnamese government decision 32/2006/ND-CP.

27 According to the Governments of Thailand and Viet Nam: "Due to its vulnerability to extinction from over-exploitation of the natural population, D. cochinchinensis has become rare and the species is disappearing from most of its natural habitat. As few efforts have yet been made for commercial plantation, all the trade timbers are from illegal logging of wild populations." See CITES CoP 16 Prop 60 op cit: https://cites.org/sites/default/files/eng/cop/16/prop/E-CoP16-Prop-60.pdf (page 2).

28 See, for example, the Cambodian Forestry Administration's monograph on padauk: http://www.treeseedfa.org/doc/Monographs/Pterocarpusmacrocarpus.pdf

And for Myanmar, *ITTO Tropical Timber Market Report*, Vol 18 No.8, 16th-20th Apr 2014.

29 See A/HRC/21/63/Add.1, Report of the Special Rapporteur on the situation of human rights in Cambodia, Surya P. Subedi, Addendum: A human rights analysis of economic and other land concessions in Cambodia. 24 September 2012. The report also notes (paragraph 148), "Illicit logging continues, due to the granting of land concessions… High value trees, mostly endangered species such as various species of rosewood, have disappeared from some areas."

30 See, for example, the Twenty-second Report of the International Environmental and Social Panel of Experts, Nam Theun 2 Multipurpose Project, 8th May 201, and previous reports.

31 See CITES CoP 16 Prop 60 op cit: https://cites.org/sites/default/files/eng/cop/16/prop/E-CoP16-Prop-60.pdf

32 For example, see Sarinda Singh, 'Borderland practices and narratives: illegal cross-border logging in northeastern Cambodia'. *Ethnography*, Vol 15, No 2, 2014, pp. 135-159.

33 Kyaw 2014, op cit.

34 This can be seen in UN COMTRADE data, as captured by International Trade Centre Trade Map database, product: 440399 Logs, non-coniferous nes and product: 440349 Logs, tropical hardwoods nes.

35 ECOWAS is comprised of Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

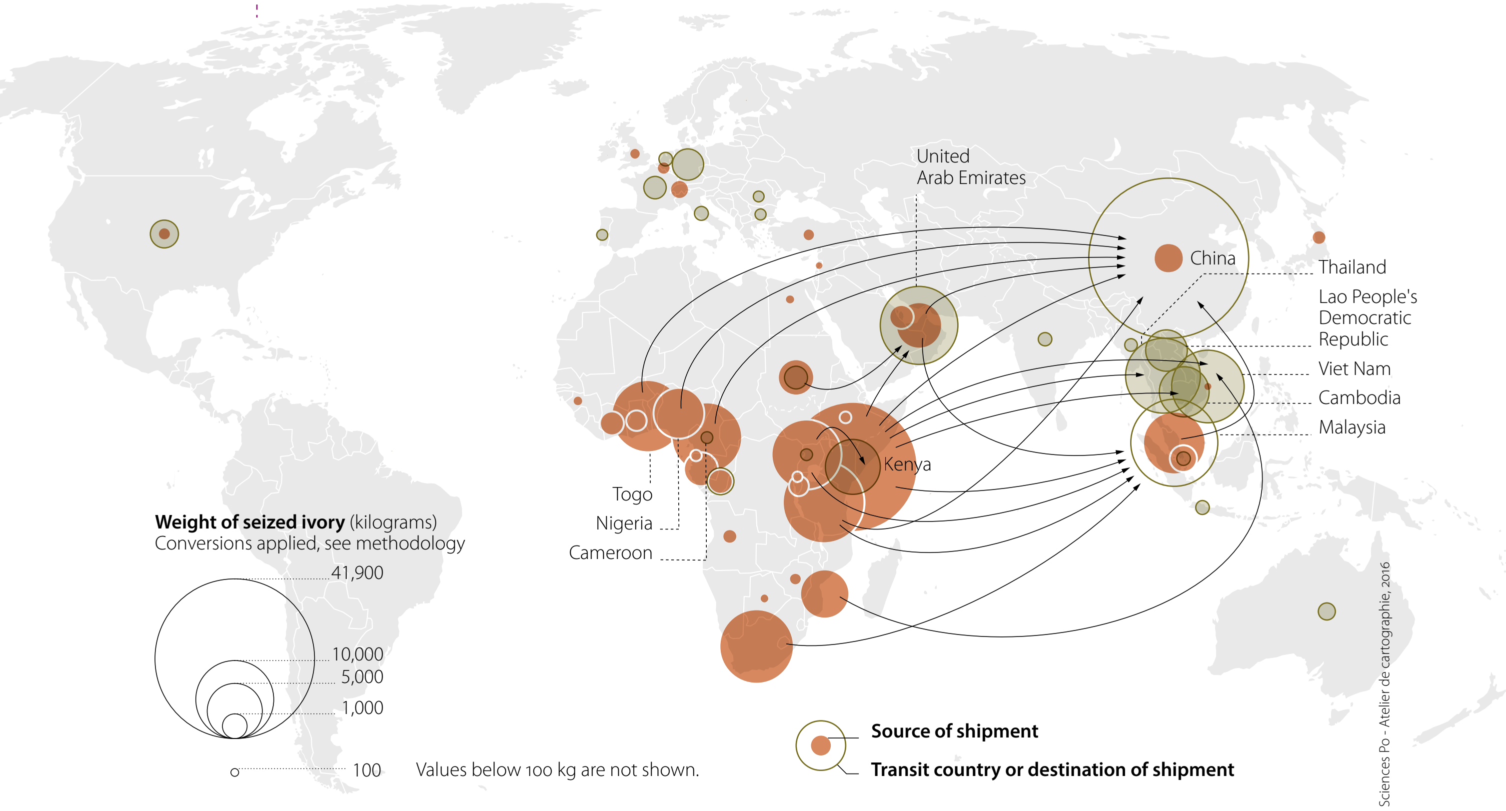
36 Based on fieldwork in 2015 conducted for this report in six West African countries. See online methodological annex for details.

37 See, for example, Government of Ghana, Ministry of Lands and Natural Resources, "Felling, Harvesting And Exportation Of Rosewood Banned.": http://ghana.gov.gh/images/documents/ban_on_rosewood_harvesting.pdf

38 See online methodological annex for details.

39 For example, World WISE captures over 100 incidents in which Siamese was seized in Thailand over the years due to misdeclaration of species. In addition, Chinese Customs reports arresting 10 people in two cases in 2014 for misdeclaring the species of some 1700 tons of red sanders as unprotected woods: See the statement of the Government of China: http://www.customs.gov.cn/publish/portal0/tab69398/info733528.htm

Map 1 Main flows of raw ivory seizures (kg), 2007-2014



Source: World WISE

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Some wildlife products have attained such status and scarcity that their value has become detached from any practical uses they had historically. Today, they have taken on a role as value stores, hedges against the vagaries of interest and exchange rates in emerging markets.[1] These materials may be fashioned into jewellery, décor items, or objects of art, with the craftsmanship serving as the vehicle for the precious goods to be conspicuously displayed. But just as the price of gold is not reliant on the state of the jewellery market, the value of certain wildlife products may be based more on what speculators will pay for them than on any real consumer demand.

The products that lend themselves well to this role tend to combine two key factors: they are traditionally recognised as precious and their supply is inherently limited. In emerging markets, the cachet of traditional use can also provide a vehicle for the nouveau riche to display their cultural credentials.[2] For this reason, high value art objects make excellent gifts, especially for the upwardly mobile.[3] Where these products are under strict international control, their possession may also serve to demonstrate the political connections of the owner. In other words, they convey prestige precisely because attaining them legally is difficult.

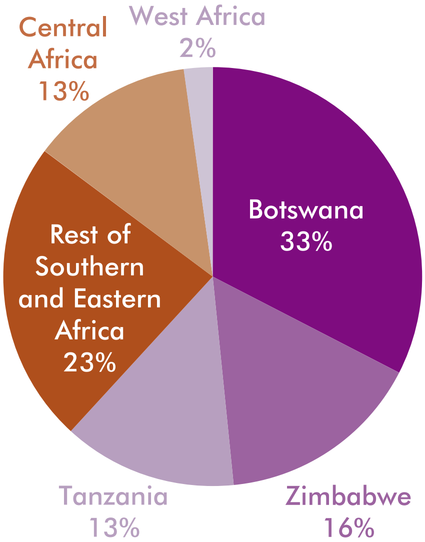
This chapter explores the possibility that ivory has become one of these assets. Even when there were many more elephants in the world, ivory was recognised as a precious commodity, a medium of which high art was made. With growing market restrictions, this exclusivity has been enhanced. This sort of recognised inherent value is extremely valuable in a world of currency fluctuations and rapid economic change.

Evidence that raw ivory has become the object of speculation comes from several sources. Most broadly, it is difficult to reconcile what is known about supply with what is known about demand. No charted ivory retail market, licit or illicit, can explain the scale of poaching and trafficking that has taken place in recent years. This suggests there may be some additional reason, other than immediate use, to acquire ivory, and, as discussed below, speculation remains one possibility.

The raw ivory supply

There are about half a million elephants left in Africa (range 433,999 - 683,888),[4] although there remains considerable uncertainty about their numbers.[5] Based on the most recent estimates (2013), elephants range over 37 African countries, but over 60% of the known and probable populations reside in just three: Botswana, Zimbabwe and the United Republic of Tanzania. One-third appear to reside in northern Botswana alone. Estimates are only available for about half of the elephant range, however, and data are especially weak for the forest elephants of Central Africa.[6]

Fig. 1 Share of countries and regions in total African elephant population ("definite" and "probable") (count), 2013[7]



Source: IUCN/SSC/AFESG African Elephant Specialist Group

In addition to uncertainty about elephant numbers, it is also unclear how much ivory, on average, each elephant carries today.[8] The yield figure most frequently used has been 1.8 tusks per elephant and about 5.5 kg per tusk.[9] Since this is about 10kg of ivory per elephant, rough calculations can be made by simply adding a zero to the elephant population estimate. Thus, the ivory of all 500,000 African elephants in the wild today would weigh about 5 million kilograms, or 5,000 metric tons.

In addition to this total, stockpiles of tusks in source, transit, and destination countries exist, some held by governments and some in private hands. Ivory has gone missing from government stockpiles in the past.[10] These stockpiles accrue due to a number of factors, including pre-convention purchases, natural elephant mortality, elephant population management, and seizures of contraband. If the natural mortality rate were about 3%,[11] which may be on the high side, then up to 150 tons of ivory could accumulate in these stocks annually, if it were all found.[12] While small in comparison to the total live ivory supply, leaks from these stocks could be a significant source of illicit trade.

Poaching

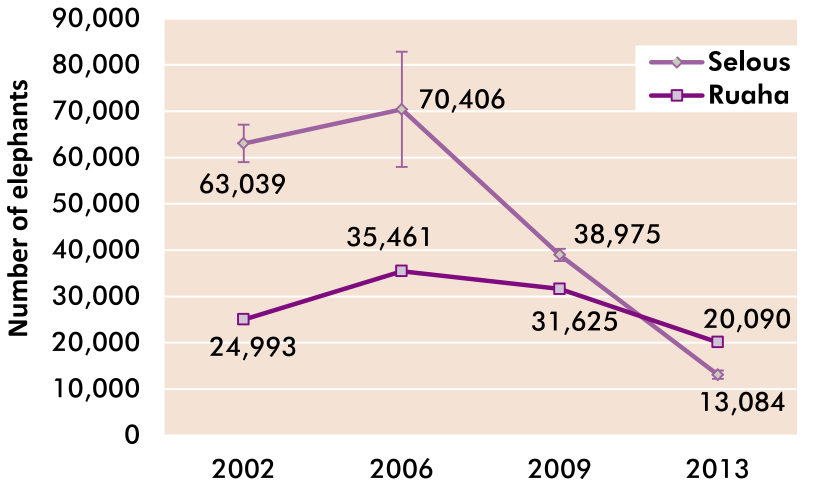
Elephants are one of the few species for which good poaching data are available, although even these data highlight the difficulties of tracking the illegal harvesting of wild species. Elephants die of many causes, and many die in places where their carcasses will never be discovered. As a result, a simple count of the number of poaching incidents detected would be a misleading indicator of poaching levels. Instead, the CITES Secretariat assumes that poached elephants will be detected at an equal rate as those that died of other causes, and calculates the share of dead elephants detected by rangers that were illegally killed. This share is referred to as the Proportion of Illegally Killed Elephants, or PIKE for short. Based on population estimates, estimates of natural mortality, and the PIKE scores, the number of elephants poached can be estimated.

The PIKE score at about 60 designated sites is annually calculated by the CITES Monitoring the Illegal Killing of Elephants (MIKE) programme. In 2011, it was estimated that around 7% of Africa's elephants had been poached, with Central Africa, "…display[ing] the highest levels of elephant poaching in any subregion…"[13] Since elephant populations do not increase at rates much greater than 5% per annum, this suggests a net continental decline that year.[14] Continental PIKE scores have declined since 2011,[15] suggesting that it was the worst year for poaching.

The high PIKE scores in Central Africa are only one indicator of poaching incidence, however, and must be combined with population figures and natural mortality levels to estimate the numbers of elephants lost. Several sources of data suggest that Eastern Africa, and the United Republic of Tanzania in particular, has actually lost the most elephants in recent years. For example, based on elephant population surveys, the estimated probable number of elephants in the United Republic of Tanzania decreased from 136,753 in 2007 to 63,624 in 2013, a decline of over 50%, primarily resulting from losses in the Selous Game Reserve.[16] Taking into account natural population growth during that time period, over 100,000 elephants appear to have been lost between 2007 and 2013.[17] If so, the United Republic of Tanzania alone could have been the source of over 100 metric tons of illegal ivory annually for the past seven years.[18]

It is possible that the earlier surveys overestimated the number of elephants present, or that the current surveys have underestimated the number of elephants present, so the losses might not be as severe as they appear. But there are other sources of information that suggest the United Republic of Tanzania, and particularly the Selous and Ruaha reserves, has been targeted by poachers. Based on DNA samples taken from a number of large ivory seizures, it appears that the Selous Mikumi/Niassa Ecosystem (until 2013) and the Ruaha Rungwa Ecosystem (from 2013) have been two of the main sources of ivory trafficked internationally in recent years.[19] As discussed below, most of the ivory tested from seizures made between 2009 and 2013 departed from Kenya (particularly Mombasa) and the United Republic of Tanzania.

Fig. 2 Elephant populations in the Selous-Mikumi and Ruaha Rungwa ecosystems in Tanzania, as estimated by surveys, 2002-2013

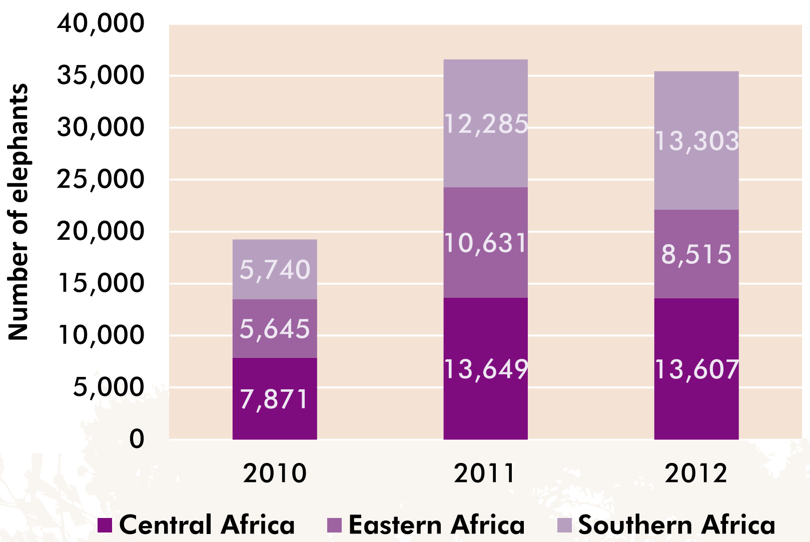


Source: Tanzanian Wildlife Research Institute 2013 (vertical lines represent 95% confidence intervals)

According to the DNA evidence, a second, but less well understood, source lies in Central Africa, at the juncture between Cameroon, the Republic of the Congo and Gabon. This area, known as the Tri-National Dja-Odzala-Minkébé (TRIDOM) trans-border forest, covers 178,000 km², or 10% of the Congo Basin rainforest, and includes 11 protected areas. The forest elephants that occur in this area are more difficult to survey than savanna elephants and, for this reason, the size of the population is unclear. But poaching levels are high, and much of the ivory exported from West Africa appears to originate in this area.[20]

Using the PIKE scores and assumed rates of natural mortality, it is possible to estimate the numbers of elephants poached. Using this method, it appears that poaching peaked in 2011 at around 37,000 elephants (Fig. 3),[21] and that the ivory supply declined the next year, due to a reduction in both the accessible population and in poaching rates.

Fig. 3 Estimated number of elephants poached in Africa by subregion, 2010-2013



Source: Wittemyer et al 2014(model based method)[22]

The people conducting this poaching cannot be described succinctly, as they range from opportunists to dedicated elephant hunters. For example, recent field research by UNODC in the Central African Republic has found at least three distinct groups who might target the remaining elephant population: local subsistence hunters; pastoralists from Sudan whose seasonal migration leads them through the region; and professional Sudanese poachers with a long lineage of dealing in ivory.[23]

Beyond these categories, the "groups of experts" assembled to guide the United Nations Security Council in monitoring sanctions have emphasised the role of the security forces of several countries in poaching activities.[24] Media have also reported incidents where rangers, charged with protecting wildlife populations, were found to be active in poaching.[25]

Although frequently alleged, the relationship between ivory poaching and insurgent groups is far less clear. While rebels commonly support themselves by extracting resources in the areas they control, most of the insurgent groups active today are operating in elephant-poor areas, depleted, in part, due to years of conflict (Fig. 4).[26]

Without direct links to the destination markets, these groups likely would be paid the poacher's rate for ivory, which, based on past research, is less than 10% the final retail price.[27] If insurgent poachers managed to kill all of the estimated 20,000 elephants in the countries where they are active, this would represent 4% of the African elephant population, and would earn them collectively between about US$10 million and US$40 million for that year. But these proceeds would need to be divided between the scores of armed groups active in these countries, and could never be collected again. Thus, at present, it is unlikely that poaching by armed groups in the areas they control threatens large numbers of elephants or constitutes a major source of threat finance.

Most of the ivory supply appears to be coming from countries at peace,

Fig. 4 Number of African elephants ("definite" and "probable" population estimates) in 11 countries with insurgency and 43 countries at peace[28]

Source: For population data, the IUCN/SSC/AFESG African Elephant Specialist Group

such as the United Republic of Tanzania, as indicated by elephant population surveys, PIKE scores, the seizure records, and DNA evidence. If these data sources correctly portray the extent of the population decline, then the losses from reserves such as Selous and Ruaha were immense and it seems likely that corruption played a key role.

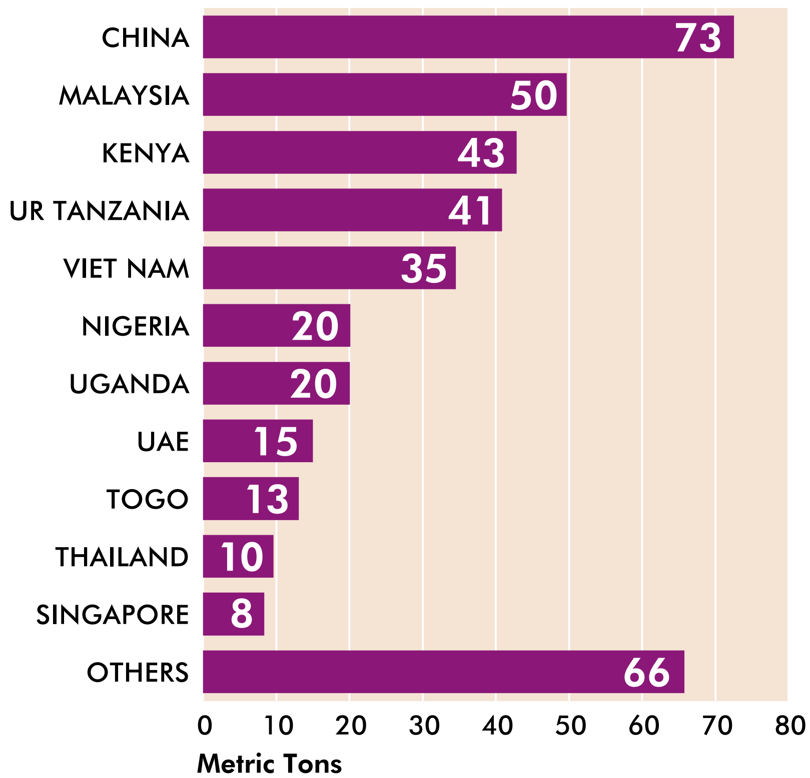
Trafficking

One of the most remarkable facets of the illegal ivory trade is the amount of contraband seized. Every year, law enforcement authorities in Africa and Asia make large ivory seizures, many measuring over 500 kg. The CITES Elephant Trade Information System (ETIS) collects ivory seizure data from CITES parties. Between 2009 and 2014 ETIS has recorded 91 such shipments, totalling 159 metric tons of ivory. This represents ivory from at least 15,900 elephants. Due to the considerable volumes of goods crossing international borders, it is likely that only a fraction of any contraband flow is seized. Poaching estimates suggest tens of thousands of elephants are illegally killed each year, producing hundreds of metric tons of ivory for export. Annual seizures on the order of tens of metric tons would seem commensurate.

It appears that most ivory trafficked from the African continent departs by sea in mass shipments of raw tusks. Over 70% of the ivory seized between 2009 and 2013 has been found in large shipments of raw ivory.[29] Eastern Africa acts as the maritime gateway to the East, where demand for ivory lies. About 70% of the ivory seizures between 2009 and 2013 reported to CITES emanated from Eastern Africa, principally Kenya and the United Republic of Tanzania.[30]

Based on the forensic evidence, elephant population surveys, and MIKE data reviewed above, the source of this ivory is likely the big reserves of the United Republic of Tanzania and, to a lesser extent, Kenya, Mozambique, and Central Africa. The container ports of Mombasa, Dar es Salaam, and Zanzibar are frequently associated with large ivory seizures. Large volumes of ivory seized by Uganda also indicates its use as a staging area. There appears to be trafficking within the region to Uganda and possibly Sudan, which serve as transit countries.[31] A second flow emanates from Western Africa, with seizures associated with departures from Nigeria and Togo. Much of this ivory comes from

Fig. 5 Weight of ivory of large-scale ivory seizures (>500 kg) by country identified in trade chains (as source, transit, or destination) (metric tons), aggregated 2009-2014



Source: CITES ETIS

Central Africa, particularly Cameroon, Gabon, and the Republic of the Congo (Brazzaville).[32]

Although air freight is sometimes detected, the main mechanism of international transport appears to be containerised sea freight. Based on the seizure records, key transit countries for containerised trafficking include Malaysia (particularly Port Klang), Viet Nam (particularly Da Nang and Hai Phong), Nigeria, Uganda, Togo, the United Arab Emirates, and Singapore. Air couriers have also been detected recently.[33] Some media report a trend towards mixed loads, in which ivory is detected alongside rhino horn, lion teeth, and pangolin scales, suggesting a confluence of these trafficking chains.[34]

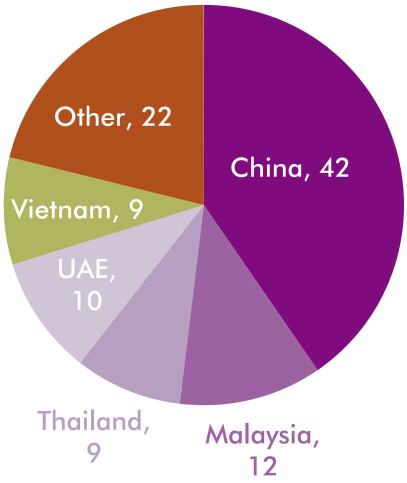
The predominance of large-scale seizures in the seizure total and the geographic concentration of poaching suggest a market controlled by a limited number of large players.[35]

The destination markets

Ivory is traded openly in a number of countries where domestic ivory trade is legal. These legal domestic markets are usually subjected to national regulations, which differ from country to country. Academic researchers have been documenting wildlife retail markets since the late 1970s, and many surveys have been done of the shops and stalls selling ivory in at least 29 countries around the world.[36] Since the surveys involved open retail establishments, the sale of these objects was legal, or at least tolerated.

Many of these surveys are quite dated, and the market is likely to have changed considerably since they were conducted, but they illustrate the fact that demand for ivory is not confined to a single country. Looking at only the most recent survey for each area, a total of just under 200,000 objects have been counted globally. These surveys typically document thousands of individual ivory objects for sale, but most of these objects are very small, such as bangles, buttons, and chopsticks.[37]

Fig. 6 Share of ivory shipments by country identified destination (metric tons), aggregated 2006-2015



Source: World WISE

Looking at these surveys, and other information about legal ivory production, it becomes clear that the known legal market for ivory is much smaller than the estimated illicit supply.[38] This fact calls into question whether the legal market for ivory has the potential to launder much illegally acquired ivory. Looking more broadly at all that is known about legal and illegal retail markets, the problem persists.[39] It is difficult to see where the ivory of tens of thousands of poached elephants is going.

According to analysis done under ETIS, the largest national destination market for detected ivory shipments appears to be China.[40] While not as complete as ETIS, World WISE documents over 800 raw ivory seizures between 2006 and 2015, for a total of just under 123 metric tons of ivory. For those seizures where the destination of the ivory was reported (104 metric tons), about 40% (42 metric tons) were directly destined for China.

Based on seizures reported to World WISE, the second most prominent destination for illegal shipments of ivory is Malaysia, a country where the domestic ivory market has not been formally assessed. Since seizures made in Malaysia tend to be both small in number and very large in volume, it is likely that a large share of this ivory was ultimately destined for another country. About 60% of the weight of the ivory seized in Malaysia was destined for China, according to the Malaysian authorities. The Southeast Asian region as a whole is the destination of 39% of the ivory seized. So, adding China (40%) to Southeast Asia (39%) indicates that this part of Asia is the destination of 79% of the seizures captured in World WISE. This conclusion is similar to that drawn by ETIS in 2007: at least two-thirds of the ivory seized is destined for East Asian markets.[41]

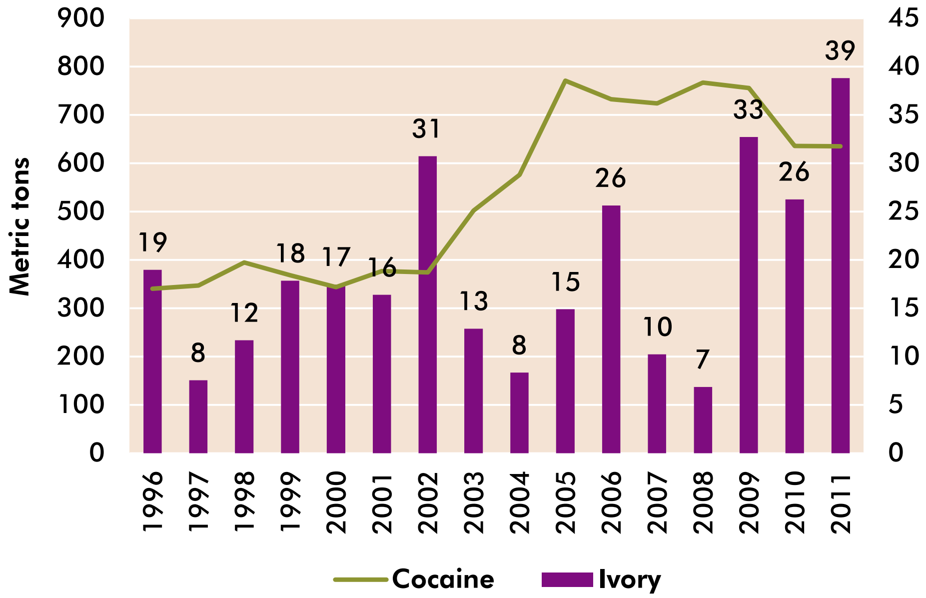
According to World WISE, one-third of the illicit ivory seized was destined for markets outside China and Southeast Asia, and the licit markets there have not been assessed recently. But there is no indication that they are bigger than those in Asia, and even with considerable turnover, it is difficult to account for the hundreds of tons entering the market annually. In addition to this central incongruity, there are several other reasons to suspect that speculation may be taking place, including discussion of ivory as an investment noted by those who monitor illicit markets; growth in demand from whole polished tusks; high volatility in reported ivory prices, and even research that has correlated poaching with changes in the investment climate.[42]

Analysis

This chapter has explored the possibility that ivory has become the object of speculation. The core evidence presented in this chapter is the incongruity between the amount of ivory being generated and any charted retail demand.

There may be issues with the way the data are being gathered or interpreted, leading to an overestimation of supply or an underestimation of demand. In particular, there may be a large and uncharted retail trade somewhere, including internet sales of small items. One possibility is that large numbers of small objects are being sold in illegal

Fig. 7 Total weight of large-scale (>500 kg) ivory seizures recorded by ETIS versus global cocaine seizures



Source: For ivory CITES ETIS; for cocaine, UNODC

venues not currently monitored. Bangles and chopsticks can be produced by machine, and lower quality figures and pendants do not require master carvers.

Another venue for illicit retail sales is the internet, including the dark web, and a number of studies have monitored on-line sales of alleged ivory products. It seems likely that buyers and sellers of ivory meet electronically, as they do for all other forms of merchandise today, but the volume of charted retail sales of finished products detailed in these studies still would not account for the hundreds of tons of ivory entering the market each year.

It is also possible the charted retail demand may be larger than suggested in this chapter, due to back-room dealing, high rates of turnover, or other factors. But the large and continuous flow of raw ivory, teamed with rapid price changes and touted investment value, suggest that speculation might indeed be occurring. More research would be required to test this possibility, which has important implications for policy.

If ivory has become an investment commodity, this dramatically changes the rules by which the market operates. Speculation limits the prospects for generalised demand reduction, because the value of the commodity is effectively de-linked from end use demand. Unlike cocaine or heroin, there is an absolute limit on the amount of ivory that can be produced, so there is a danger of a vicious cycle ensuing, where each elephant poached increases scarcity, and thus the incentives for poaching another. Paradoxically, interdiction and destruction of ivory stocks would also serve to limit supply, further enriching those invested in ivory. For these reasons, the illicit markets for investment-grade wildlife products will require a specialised approach.

How great is the illicit ivory flow? Between 2009 and 2013, an average of about 30 metric tons of ivory were intercepted in large-scale shipments annually, according to ETIS (Fig. 7). ETIS argues that these shipments, which exceed 500 kg, are indicative of organized crime activity. The annual seizure totals are highly volatile, however, making it extremely difficult to estimate what share is captured, let alone correlate these totals to other variables (Fig. 7). This is very different from other illegal commodities, like cocaine or heroin. In fact, the standard deviation of annual changes of seizures in ivory over the 1996-2011 period is almost eight times as high as the standard deviation of annual changes in either heroin or cocaine seizures.[43] It is also true that a half dozen ivory seizures can make up more than half the annual total, which would be impossible with cocaine or heroin. The analysis below uses a five-year average of some 30 tons, but given the level of volatility, these figures should be viewed with caution.

Between 2010 and 2012, model-based estimates derived from the PIKE data indicate that some 30,000 elephants were poached, which would generate about 300 metric tons of illicit ivory each year.[44] This suggests that, on average, about 10% of the ivory flow is seized, although this share varies quite a bit from year to year. It also suggests that at least 270 tons of ivory reached destination markets annually during this period.

Endnotes

1 Yufang Gao and Susan G. Clark, "Elephant ivory trade in China: Trends and drivers", *Biological Conservation*, vol. 180 (December 2014), pp. 23–30. Gao and Clark's findings on the use of ivory as an investment were confirmed at a UNODC expert workshop convened in Nairobi, Kenya in February 2015.

2 Julie Ayling, "What Sustains Wildlife Crime? Rhino Horn Trading and the Resilience of Criminal Networks", Journal of International *Wildlife Law & Policy*, vol. 16, No. 1 (2013), pp. 57-80. African Wildlife Foundation, "Tackling Poaching & Illegal Wildlife Trafficking in Africa", (2014), p.5.

3 According to media sources, gifting of ivory became so popular recently in China that state officials urged a ban on the practice. See Yang Yao, "Call to ban ivory give and take", China Daily, 6 April 2014. Available from http://www.chinadailyasia.com/life/2014-04/06/content_15129145.html.

4 Based on the 2012 estimates of the International Union for Conservation of Nature/Species Survival Commission/African Elephant Specialist Group (IUCN/SSC/AfESG), there are definitely 433,999 and could be as many as 683,888 elephants in Africa. See the 2013 Provisional African Elephant Status Report available from: http://www.elephantdatabase.org/preview_report/2013_africa_final/Loxodonta_africana/2013/Africa

In contrast, estimates for wild Asian elephants are in the low tens of thousands, less than 10% of the African population, and only the males have proper tusks. Asian elephants are not currently considered a significant source of supply, although they were in the past and still contribute to some markets.

5 Surveys of elephant populations use a range of methodologies, so it is difficult in some cases to come up with clear population estimates or trends at the national, sub-regional, or continental level. The existing population estimates are continually being updated by the IUCN/SSC/AfESG. Only about half the known elephant range has been recently surveyed, so there remain many populations for which no estimates currently exist.

6 The African Elephant Database incorporates estimates with a range of uncertainties, and thus does not give a single population estimate. Rather, it gives a series of four non-overlapping population estimates graded according to their basis: known, probable, possible, and speculative.

7 This graph reflects the 2013 estimates in the "known" and "probable" categories. See IUCN/SSC/AfESG 2013 op cit.

8 Poaching may influence the age profile of the population, and thus decrease average tusk size. For example, if the share of younger elephants in the population grows, the average amount of ivory per elephant would decrease. Poaching can also favor the prevalence of the genetic condition of tusklessness. See H. Jachmann, P. Berry and H. Imae, "Tusklessness in African elephants: A future trend", *African Journal of Ecology*, vol. 33, No.3 (1995), pp. 230–235.

9 See CITES SC62 Doc. 46.4 Annex, R. Martin, and others, "Decision-Making Mechanisms and Necessary Conditions for a Future Trade in African Elephant ivory: Final Report", (CITES Notification No. 2011/046) (24 May 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. An alternate tusk weight sometimes used is 3.66 kg per tusk, which would reduce volumes by one-third, but this figure is actually derived from an analysis of the average weight of a raw ivory piece in illicit trade, not a whole tusk weight.

10 See CITES SC65 Doc. 42.7 "Disposal of Ivory Tusks": https://cites.org/sites/default/files/eng/com/sc/65/E-SC65-42-07.pdf; and CITES SC65 Doc. 42.1 "Elephant conservation, illegal killing, and ivory trade": https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-47-01.pdf.

11 For a discussion of elephant mortality rates, see the online methodological supplement to George Wittemyer and others, '"Illegal killing for ivory drives global decline in African elephants", *PNAS*, vol. 111, No. 36 (2014): http://www.pnas.org/content/suppl/2014/08/14/1403984111.DCSupplemental/pnas.201403984SI.pdf#nameddest=STXT

12 That is, 0.03 (mortality rate) x 500,000 (elephant population) x 10 kg (ivory per elephant) = 150 metric tons.

13 See CITES CoP16 Doc. 53.1: Monitoring the illegal killing of elephants: https://cites.org/eng/cop/16/doc/E-CoP16-53-01.pdf, p 2.

14 Ibid.

15 See CITES SC66 Doc. 47.1 "Elephant conservation, illegal killing, and ivory trade": https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-47-01.pdf., p. 19.

16 Based on the 2007 and 2013 African Elephant Specialist Group definite and probable population: http://www.elephantdatabase.org/

17 If the 2007 population were to experience a net growth of 5% each year until 2013, then the population would have been 183,262 in 2013. Instead, it was 63,624, and the difference between these two figures is almost 120,000 elephants.

18 That is 120,000 (poaching losses) x 10 kg (ivory per elephant) / 7 (years 2007-2013) = 171 metric tons of ivory per year.

19 The elephants in the Selous system in southern Tanzania intermix with the Nyasa reserve in northern Mozambique, so these two populations cannot be readily genetically distinguished. See S. K. Wasser, L. Brown, C. Mailand, S. Mondol, W. Clark, C. Laurie, and B. S. Weir. 'Genetic assignment of large seizures of elephant ivory reveals Africa's major poaching hotspots'. *Science*, 18 June 2015.

20 Ibid.

21 Wittemyer et al, 2014, op cit.

22 Ibid.

23 Research conducted for UNODC, April 2015. See online methodological index for details.

24 See, for example, the 2014 Final report of the Group of Experts on the Democratic Republic of the Congo to the Security Council, S/2014/42.

25 For example: http://www.theguardian.com/environment/2013/mar/27/ranger-corruption-impeding-fight-poaching; https://www.savetherhino.org/latest_news/news/977_corruption_threatens_kenyan_conservation_efforts; http://www.standardmedia.co.ke/?articleID=2000108222&story_title=national-park-where-rampant-poaching-thrives-as-rogue-kws-officers-go-scot-free&pageNo=2

26 The exceptions are Garamba National Park in the north-eastern Democratic Republic of the Congo and the Jonglei Ecosystem in northeastern South Sudan. In Garamba, half a dozen armed groups are competing for a population of elephants last estimated at 1,708 in 2012. Though tragic, this stock represents less than four –tenths of one percent of the African elephant population, and insurgent groups are likely to lose out to the formal militaries operating in the area. The Jonglei population was last assessed in 2007 at 5,462 elephants, but the population today remains uncertain.

27 In 2010 the poachers' price in the region was estimated to have been approximately US$21 to US$67 per kilogram, when the illicit wholesale price of ivory was around US$750 per kilogram. See Dan Stiles, Esmond Martin and Lucy Vigne, "Exaggerated ivory prices can be harmful to elephants", *SWARA: Journal of the East African Wildlife Society*, vol.34, No.4, (October-December 2011), pp. 18-22, accessed at: http://www.rhinoresourcecenter.com/pdf_files/132/1322692493.pdf [3 December 2015].

28 Countries with insurgencies include those affected by Boko Haram (Cameroon, Chad, Niger, and and Nigeria,), the Lord's Resistance Army (Central African Republic, Democratic Republic of the Congo, and Sudan), the South Sudanese civil war, the Central African Republic civil war, the Somali civil war, and the various insurgent groups active in the DRC, Ethiopia, and Burundi. While it has been alleged that Al Shabaab is deriving income from poaching in Kenya, very little evidence has been marshalled to defend this claim. See Tom Maguire and Cathy Haenlein, *An Illusion of Complicity: Terrorism and the Illegal Ivory Trade in East Africa*, London: Royal United Services Institute for Defence and Security Studies, 2015.

https://rusi.org/sites/default/files/201509_an_illusion_of_complicity_0.pdf

29 Fiona Underwood and others, "Dissecting the illegal ivory trade: an analysis of ivory seizures data", Public Library of Science One 8(10): e76539, 2013. doi:10.1371/journal.pone.0076539 doi:10.1371/journal.pone.0076539

30 According to ETIS data. About 86 metric tons of 120 metric tons where the origin or exporting country was known between 2009 and 2013.

31 Based on UNODC field research: see online methodological annex for details.

32 In a six-year period (2009-2014), almost 100 seizures of over 500 kilograms were made, accounting for the bulk of the ivory seized. At 2014 prices, a 500 kilogram shipment of raw ivory is worth over US$1 million, and DNA analysis indicates that a

large share of this came from Tanzania via Mombasa. It appears the traffickers are well resourced and make use of proven trade routes.

33 Wasser et al 2015 op cit.

34 CITES SC66 Doc 47.1 https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-47-01.pdf., p. 7.

35 See, for example: http://vietnamnews.vn/environment/275067/eight-tonnes-of-smuggled-wildlife-products-seized.html

36 See online methodological annex for details.

37 Ibid.

38 Ibid.

39 Ibid.

40 See CITES CoP16 Doc. 53.2.2 (Rev. 1) "ETIS Report of TRAFFIC": http://www.cites.org/eng/cop/16/doc/E-CoP16-53-02-02.pdf, p. 14.

41 See CITES CoP14 Doc. 53.2 "Monitoring of Illegal Trade in Ivory and other Elephant Specimens": https://cites.org/eng/cop/14/doc/E14-53-2.pdf, p. 42.

42 Brendan Moyle, "The raw and the carved: Shipping costs and ivory smuggling", Ecological Economics, vol. 107, Issue C (2014), pp. 259–265.

43 For ivory, s = 1.09 over the 1996-2011 period, compared to s = 0.14 for heroin or cocaine seizures. See online methodological annex for details.

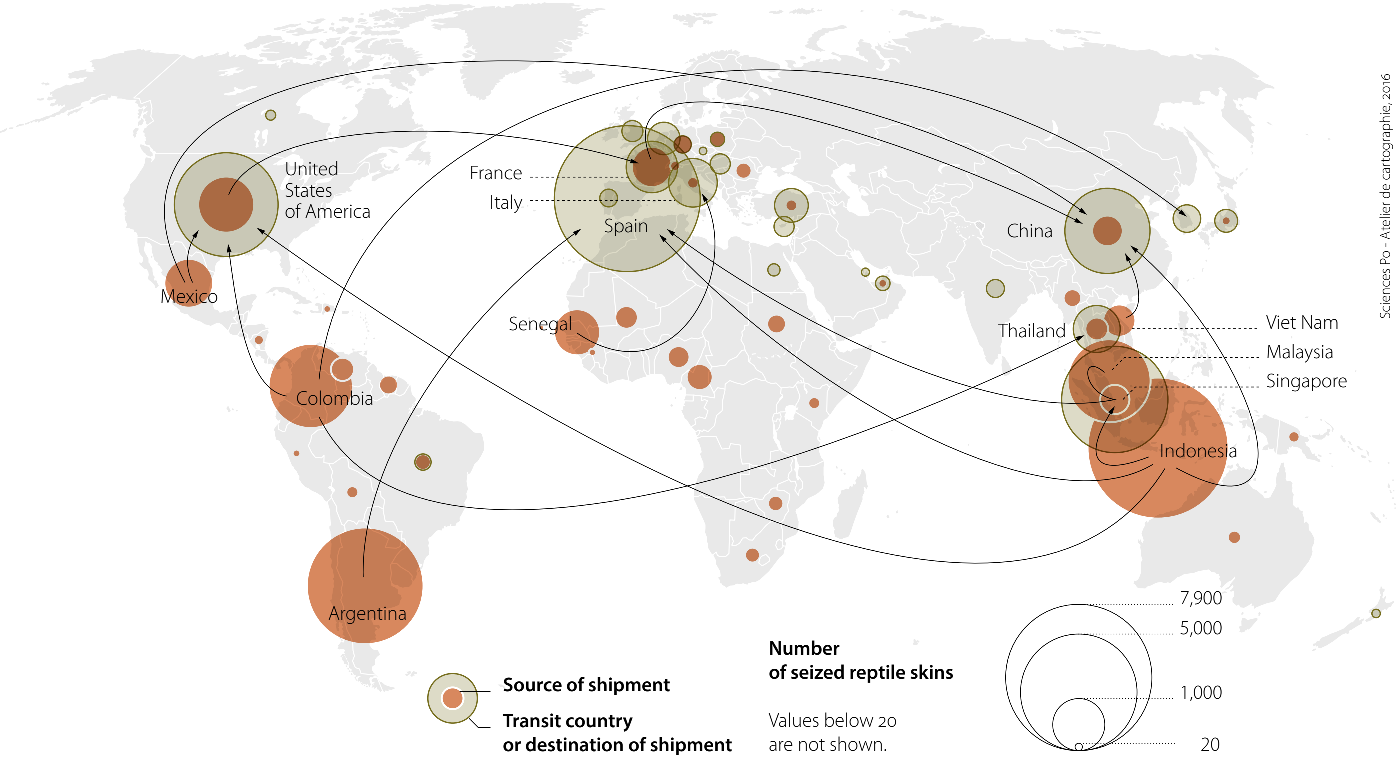
44 Wittemeyer et al 2015 op cit.

FASHION

Case study: Reptile skins

WILDLIFE AND THE FASHION INDUSTRY

Map 1 | Main flows of reptile skin seizures, 2005-2014



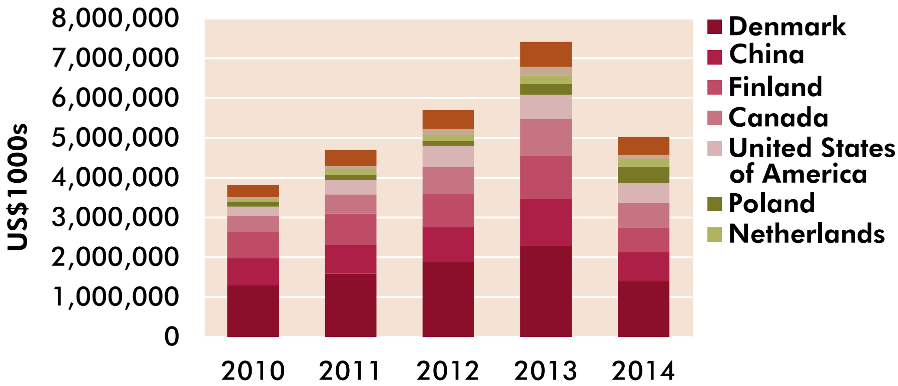
Source: World WISE

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Few animal products have attracted more controversy than the use of skins and furs in the fashion industry. Animal rights advocacy groups have campaigned to reduce demand in key markets, and some countries have banned fur farming outright.[1] But wild sourcing of pelts and skins remains a source of livelihoods for rural people in parts of the world where the source species are abundant, including areas where hunting is enshrined as a right of indigenous people.

Demand appears to be growing in many key sectors. For example, according to COMTRADE data, global exports of raw fur skins topped US$7 billion in 2013 (Fig. 1). CITES continues to record large exports

Fig. 1 | Value of global exports of raw fur skins and pieces suitable for furriers' use by country of export (US$1000s), 2010-2014

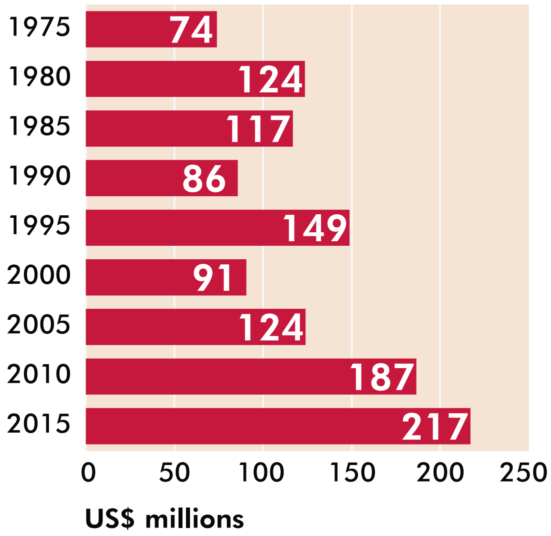


Source: International Trade Centre Trade database, making use of COMTRADE data

of wild-sourced skins of protected species. In 2013, the CITES Trade Database documented wild-sourced exports of close to 70,000 bobcat skins,[2] 50,000 river otter skins,[3] 32,000 brown fur seal skins,[4] and almost 27,000 peccary skins,[5] as well as many finished garments made of these species.[6]

While the skins of some animals, such as the tiger (Box "Asian big cat skins"), are primarily used decoratively, the main market for most animal skins today is the fashion industry. Fashion is, by its very nature, subject to trends and change: materials fashionable this season may not be fashionable in the next. As a result, demand for wildlife products feeding this industry can be volatile. For example, the mink farming industry is a well-established one, and it is no longer necessary to draw minks from the wild. The value of total production can vary by more than 40% year-on-year, however, and the industry has experienced many booms and busts over the course of the past four decades (Fig. 2).

Fig. 2 Annual value of mink pelts produced in the United States (US$ millions), selected years 1975-2015



Source: US Department of Agriculture[7]

The volatility of the fashion trade can make farming skins and furs of exotic animals a risky economic proposition. Wild sourcing, in contrast, requires less investment. In 2013, one-half of the CITES permits issued for skins, feathers, and hair came from wild sources. When the target species are solitary animals, wild sourcing is often carried out informally and opportunistically by rural communities. When the collectors are not directly employed by the exporters, this increases the vulnerability of supply chains to illegal sourcing. The reptile skin trade provides a case in point.

While the international fur trade has been active for centuries, the use of reptile skins for clothing, shoes, and accessories appears to be a relatively recent innovation.[8] Crocodile farming dates back to the early 19th Century,[9] and the trade in snakes and lizards seems to have taken off only a century later. By the mid-1930s, however, millions of reptile skins were being harvested annually in India, Indonesia, and throughout the tropics for use in manufacturing shoes, handbags, and other leather products.[10] The use of crocodile skins in the West appears to have peaked in the late 1950s to early 1960s, but demand persists today, and farming is widespread, with at least fourteen countries having registered captive breeding operations for Appendix I crocodile, alligator and caiman species.[11] The more recent trade in snake and lizard skins remains relatively fragmented, as described below.

The scale of the reptile skin industry is immense and growing. In 2013, over 3,500 metric tons of reptile skins, worth almost US$650 million, were legally imported internationally,[12] more than twice the inflation adjusted total a decade before. Depending on the species mix, 3500 metric tons of skins could represent between two million and 50 million individual reptiles.[13]

While the value of the trade in alligator and crocodile skins is large enough to sustain farming in wealthier countries, the trade in smaller reptile skins is less lucrative, making wild sourcing more attractive. Recent research on pythons suggests an export value of US$100 per raw skin.[14] Still, it takes time, care, and feed to raise a carnivorous reptile to harvestable length. For example, a Burmese python reportedly requires four years to reach harvestable size.[15]

Due to the scale of the industry, relatively low value per specimen, and limited regulatory capacity in some countries, the primary criminal threat appears to be laundering of wild caught specimens through the legal trade. Although many of the reptiles in legal trade are admittedly wild sourced, quotas are generally set for this harvest, which could provide an incentive for misdeclaration.

Reptile skins

Reptilia is a taxonomic class with over 10,000 species,[16] but less than 10% are CITES listed. There are 80 reptile species and five subspecies in Appendix I, 673 in Appendix II, and 40 in Appendix III. Reptiles and related products comprise a large share of the seizures in World WISE, but this total is made up of many products, ranging from live creatures to medicinal preparations. Skins and skin products also feature prominently, although most of the value derives from high-end products, such as handbags and shoes. Any of these products could have come from illegally sourced reptiles, but some are so far from the illegal source that links to criminality are difficult to discern. This analysis focuses on the relatively low value raw and tanned skin trade, where the connections are clearer.

According to the CITES Trade Database, permits were granted for the export of over 24 million individual reptile skins between 2005 and 2013. The main CITES-listed species traded for their skins can be divided into three groups: crocodilians, snakes, and lizards:

Crocodilians:

- The Mississippi alligator
- Three species of caimans
- Four species of crocodiles

Snakes

- Three species of pythons
- The Indian rat snake
- The Javan spitting cobra

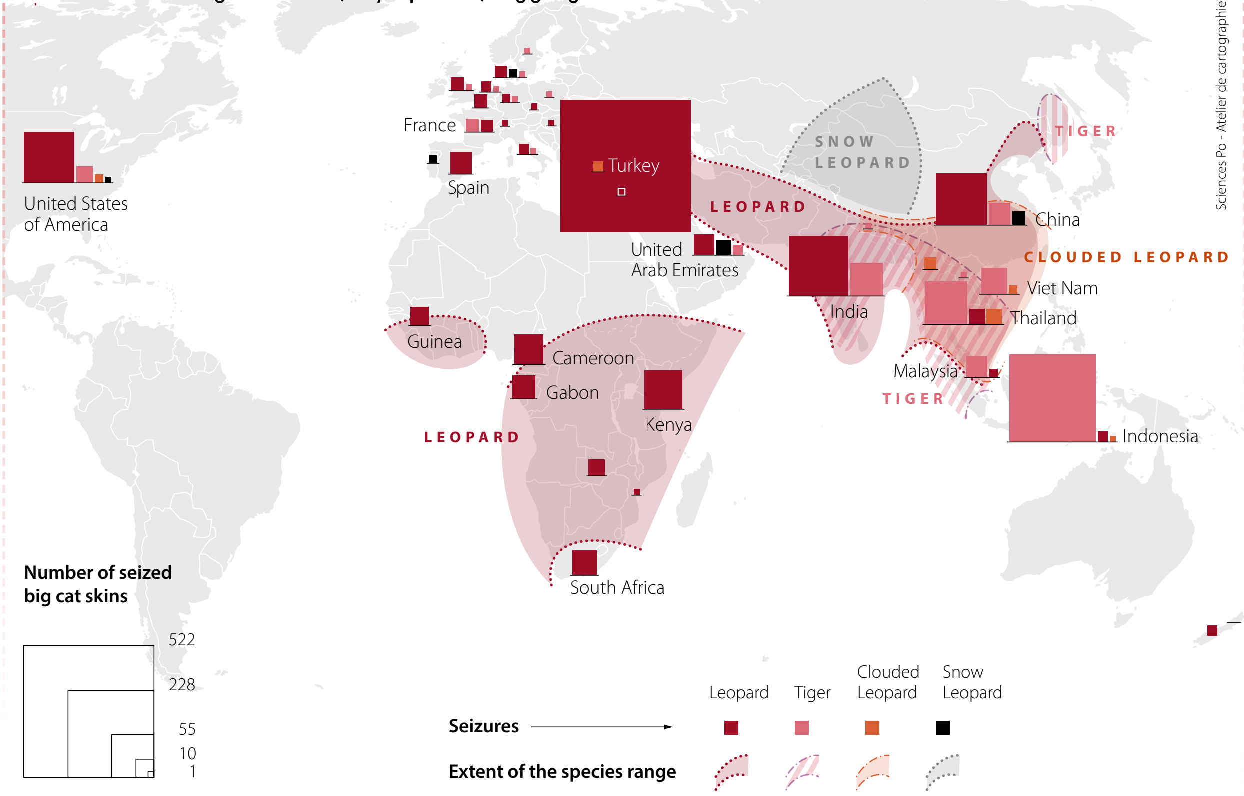
Lizards

- Two species of monitors
- Two species of tegus

Over half of the legal CITES listed reptile skins exports during 2005 to 2013 came from wild sources. This share has decreased, however, from

Asian big cat skins

Seizures of big cat skins, by species, aggregated 2005-2014



Sources: World WISE and IUCN Red list

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

All Asian big cats – including tigers, snow leopards, clouded leopards, leopards, and Asiatic lions – are listed on Appendix I. There are believed to be as few as 3,200 wild tigers remaining across their Asian range, more than a 95% decline from just over 100 years ago.[17] Almost 70% of these are found in India. The other Asian big cats together number approximately 10,000.[18]

Up until 2006, Asian big cat skins were widely used to decorate traditional Tibetan costumes, known as "chupa". For a period this was a major driving force behind the poaching of tiger, leopard, and otter skins in India and Nepal. Following an appeal from religious leaders, the use of Asian big cat skins for that particular use has declined significantly. This example illustrates the power of culturally-tailored demand reduction.

Today, Asian big cat skins are used for ornamental purposes. Skins are sold as rugs for luxury home décor and are also purchased as prestigious gifts. Stuffed and mounted tigers are also favoured as luxury items and status symbols.. Almost every part of a tiger has a market. World WISE contains seizures of tiger claws, fat, genitals, hair, heads, oil, teeth, whiskers, medical preparations and derivatives, and other products. Bones are used to make traditional medicines as well as wine, which is marketed as both a tonic and as a virility product, depending on location.[19]

The international illegal trade in Asian big cat skins reflects many of the characteristics indicative of organized criminal activity.[20] Since 1999, the CITES Secretariat has highlighted the role of organized criminal activity in the trade.[21] Authorities in India for example, are targeting organized networks of Asian big cat poachers, processors, city-based dealers connected to international buyers involved in trafficking from India to China, often via Nepal or Myanmar.[22]

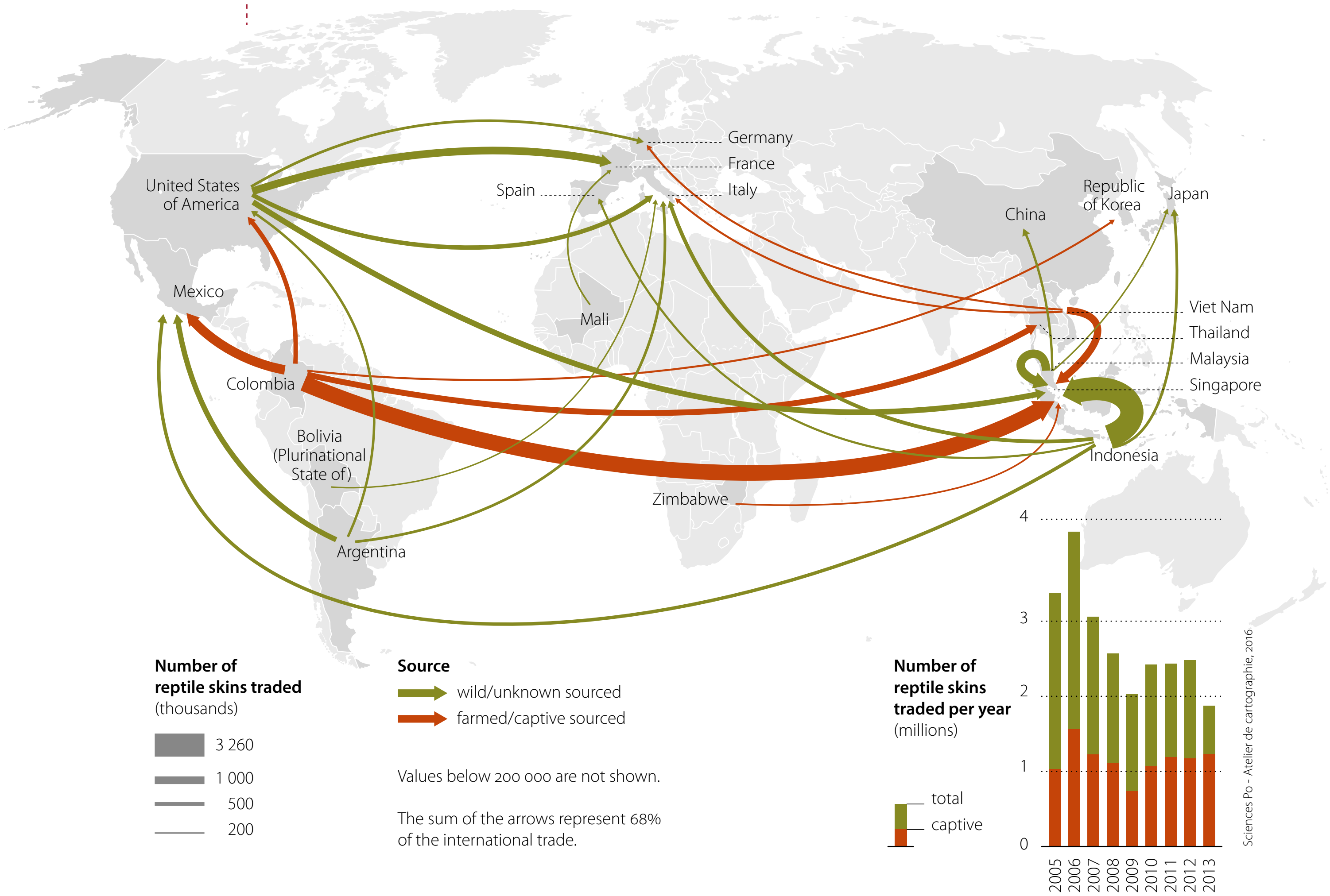
63% between 2005 and 2009 to 49% between 2010 and 2013. Still, this amounts to over 14 million wild-sourced protected reptiles traded in about a decade.

Many of these species appear to be traded in relatively well-managed markets, where there is a long history of sustainable breeding or where wild populations are abundant. Others, however, have been the object of enquiries in the past and feature prominently in the World WISE seizure database. These species include:

- The reticulated python (*Python reticulatus*)
- The brown caiman (*Caiman crocodilus fuscus*)
- The Indian rat snake (*Ptyas mucosus*)
- The common water monitor (*Varanus salvator*)
- The blood python (*Python brongersmai*)

Species of python, caiman, rat snake, and monitor lizard make up over 90%

Map 2 | Main flows of reptile skins trade based on CITES export permits, 2005-2013



Source: CITES Trade Database

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

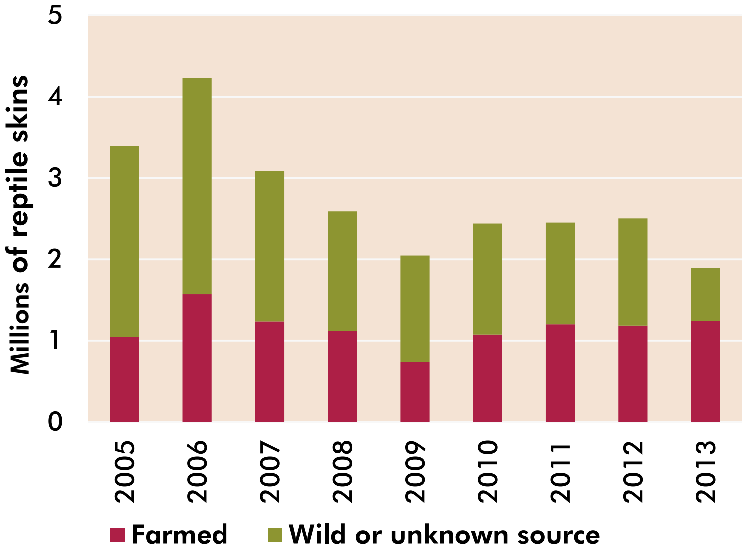
of the reptile skin seizures recorded in World WISE. In terms of legal CITES trade, water monitors, reticulated pythons, blood pythons, and Indian rat snakes are primarily sourced from the wild in Southeast Asia, while brown caimans are primarily sourced from farms in South America.

Source of reptile skins

Reptile skin suppliers exist on five continents: Africa, Asia, Australia, North America, and South America. Just two countries – Colombia and Indonesia – issued half the CITES export permits granted in the last decade or so, however.

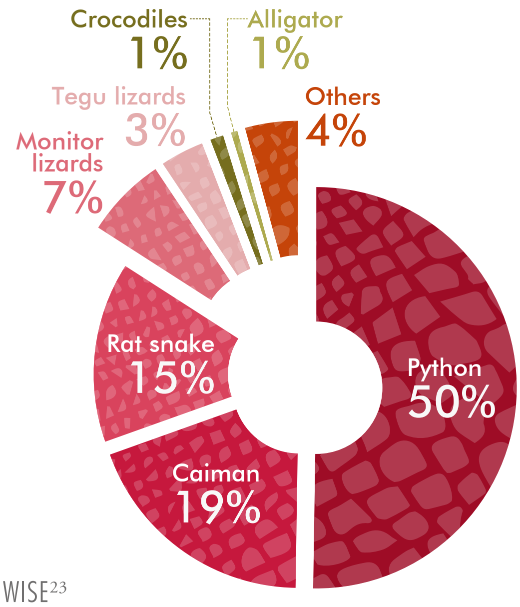
Of the top six source countries for legal reptile skins, five are also the top source countries from which illegally

Fig. 3 | CITES-listed reptile skins legally exported by source (millions of reptile skins), 2005-2013



Source: CITES Trade Database[22]

Fig. 4 Share of total reptile skins seizures by type of reptile, aggregated 2005-2014



Source: World WISE[23]

traded reptile skins recorded in World WISE originate: Indonesia, Argentina, Colombia, the United States, and Malaysia. The volumes detected in illegal trade over the past decade are much smaller, however: on average, for every 1,000 skins legally traded, one illegally traded skin is recorded in World WISE. Given the unknown rate of detection, the recorded seizures may not be reflective of the underlying illegal market.

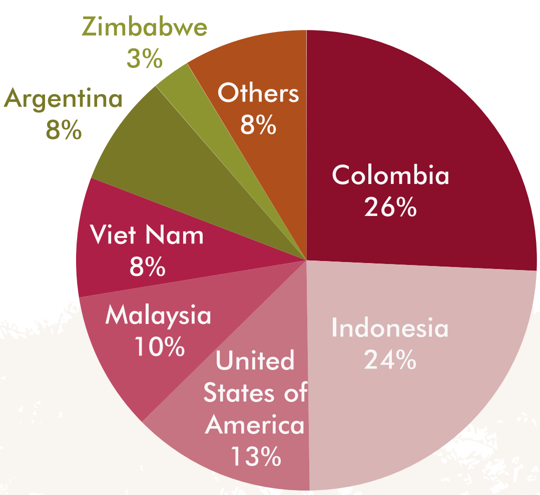
There could be several reasons why relatively few reptile skin seizures are reported. Reptile skins are relatively low value,[25] decreasing their attraction for traffickers, and it may take several live specimens to make up a kilogram of skin. There may also be an under-reporting of seizures. World WISE seizure data are weak for some key source regions, particularly Latin America, so seizures made in the region may not be included in the database. And if illegally sourced skins are being introduced to the supply chain before export, they would be recorded as legal trade.

The relationship between the legal and illegal trades varies by species and region. The seizure record is dominated by two regions (South America and Southeast Asia) and types of reptile (pythons and caimans).

Colombia reported exporting more CITES-listed reptile skins than any other country. The trade involves caimans, particularly brown caimans (*Caiman crocodilus fuscus*). Very few brown caiman skin exports are reported as wild-sourced, although Colombia lies within its natural range. The caiman farming industry in Colombia was initiated in 1987 and has been described as "extensive and sophisticated."[26] Aside from production quotas, the country has imposed skin size limits on exports to exclude wild-caught adults being exported as captive-bred.[27]

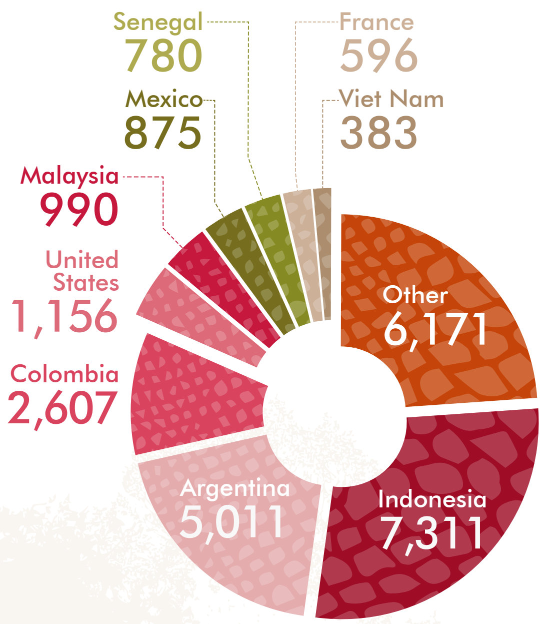
Nonetheless, crocodile trade experts have expressed concerns that farms were exaggerating their production capacity in order to secure large export quotas, and then filling these quotas with wild-caught caimans. Larger skins were allegedly trimmed to export length.[28] In 2016, the IUCN Crocodile Specialist Group estimated 30% of the caiman exports from Colombia since 1990 were of wild

Fig. 5 Share of CITES-listed reptile skin exports by country of export, aggregated 2005-2013



Source: CITES Trade Database[24]

Fig. 6 Reptile skin seizures by country identified as source (number of skins), aggregated 2005-2014



Source: World WISE

origin, harvested contrary to Colombian law, suggesting some four million illegal skins have entered trade since that time.[29]

In contrast to the caiman farming industry, according to the CITES Trade Database, most of the legal python skin exports from Southeast Asia were reportedly wild-sourced, and their collection represents a significant livelihood for rural people. To better understand this market, field research was carried out in Indonesia and Malaysia, the two largest wild-sourced reptile exporters, in 2015. This research found that although there is a comprehensive system for monitoring reptile skin exports, there are serious challenges to implementing the quota system for harvesting. It appears that this system may still be fed by illegally gathered reptiles, and a parallel system of illegal exports also exists. The following discussion is based on this field research.[30]

Indonesia has a complex system for monitoring and regulating the harvest and export of reptile skins. A national quota for wild harvest is determined, and provinces and districts are assigned a share. Exporters are allowed access to 90% of this quota, and 10% is reserved for domestic consumption. Before export, these skins must be processed at a local tannery; in 1986, the Indonesian Ministry of Trade banned the export of raw skins, in order to retain the value added for the local economy.[31] While this system is sound in theory, the extremely decentralized nature of wild sourcing makes enforcement problematic, particularly at the gathering stage.

In 2010, it was estimated that there were almost 200,000 people involved in the reptile skin trade in Indonesia, mostly collectors.[32] The harvesting of most reptiles, especially snakes, occurs during the rainy season when they are breeding, roughly corresponding with winter in the Northern Hemisphere. While licenses to gather are required under law, it appears that a good deal of the harvest is carried out opportunistically by rural people, and whole communities may engage in reptile gathering as a secondary source of income during times of peak availability. When demand is high, collectors may be commissioned and given advance payment to collect some species.[33]

Field research in 2015 indicates collectors are paid about US$4 for a live reticulated python, depending on the size of the snake. This is the highest value paid for a single reptile, money that represents a windfall for opportunistic collectors, but licensed collectors must collect large volumes if they pursue snakes as a full time profession. The low price per wild skin also makes it difficult to see how python farming could be economically viable.

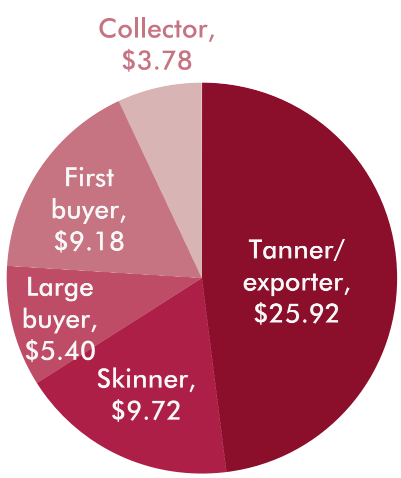
The way that the inputs of opportunistic collectors are consolidated seems to differ by region. In most of Indonesia, the collectors either sell to local middlemen or, if they live close enough, directly to reptile slaughterhouses. Middle-men typically double or triple the price paid when they sell it on to larger buyers or the slaughterhouses. Larger buyers may also travel to collection sites themselves.

The slaughterhouses are generally small and medium enterprises, and, in some areas, may consist of a single specialized skinner. In addition to the skins, slaughterhouses produce meat, which is used for local consumption, fish bait, or crocodile feed. Python meat is also exported: according to CITES trade data, Indonesia and Malaysia together exported an average of 22 metric tons of python meat per year between 2009 and 2013, although this only represents perhaps 2,000 to 4,000 snakes.[34] Python gall bladders are also harvested for traditional medicine, and may be exported. All these products are additional sources of income for rural communities, but are secondary in economic importance to the skin trade. To maintain collection networks, slaughterhouses may continue to buy reptiles even after annual export quotas are reached, with the extra skins being applied to the next year's quota. As with many wildlife products, stockpiling of skins in source and transit countries may be problematic, as it makes accounting more difficult and offers opportunities for laundering illegally sourced skins.

Although quotas are announced for harvest, those licensed to gather are not assigned an individual quota, and many of the collectors are not licensed at all. It is those who turn the reptiles into saleable skin products that hold the permits for harvest. After a national quota on wild harvest is established, tanneries are allocated a share. Tanneries and exporters arrange to have harvest permits issued to slaughterhouses (who are registered with the local wildlife department offices). These larger companies accrue most of the proceeds of the skin trade (Fig. 7). The decentralized and informal nature of the collection process creates considerable legal ambiguity in the market. Collectors and even slaughterhouses may sell to processors and exporters who may feed legal or illegal markets.

For the most part, the lack of accountability in the gathering of pythons, and perhaps other reptiles as well,

Fig. 7 Average distribution of proceeds within Indonesia from the export of a reticulated python skin typically sold at US$54



Source: Field research in 2015 (see online methodological annex for details) allows processors and exporters to remain blind to the illegal sourcing of their raw materials. It is difficult for a tannery to know whether the skins they are processing have been sourced from a protected area, for example. In contrast, all registered exporters are required to have integrated tanneries, as the export of raw skins is currently prohibited. Some fully integrated producers – who control the supply chain from collection to retail – do exist. Some even export overseas, but these are exceptional.[35]

Field research also indicates that illegal exporters exist, but, for some reason, the number of skins recorded in World WISE remains low. It is also clear that the volumes being traded (both domestically and internationally) often exceed the harvest quotas set as part of the regulatory system.

Malaysia differs from Indonesia in that those gathering the snakes appear to be more tightly controlled. The collectors are more likely to be licensed and sell directly to a limited number of slaughterhouses. Licensed collectors receive a greater share of the export value than their informal Indonesian counterparts, as much as US$60 per skin, of which they must pay a small portion as a license fee. Although some collectors report capturing as little as one python in a week, others say they have caught as many as ten in one day. Gathering can be profitable, so much so that some collectors are professional wildlife hunters. Licensed hunting does have its burdens, however: record keeping requirements for collectors are extensive and failure to comply can result in imprisonment.

After Indonesia's ban on raw skin exports in 1986, Malaysia began supplying specialized tanners overseas, who prefer to conduct the tanning themselves. It is possible that some of the raw skins exported currently may be sourced from other countries.

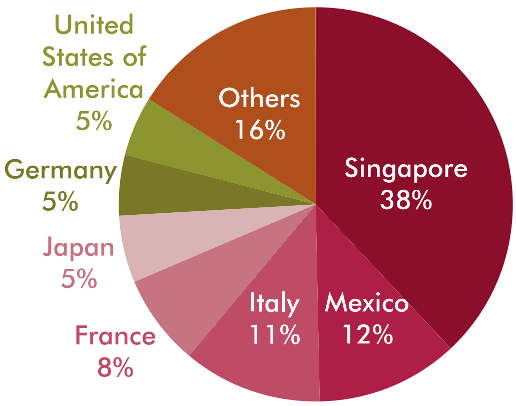
Destination markets

The destination of 38% of the reptile skins for which CITES permits were issued between 2005 and 2013 was Singapore. Singapore is recognized as having some of the finest reptile leather tanneries in the world,[36] and is a significant re-exporter. Europe, Japan, and North America are also hubs for the trade.

Singapore was also the destination of 16% of the reptile skins seized between 2005 and 2014, second only to Spain (Fig. 9).

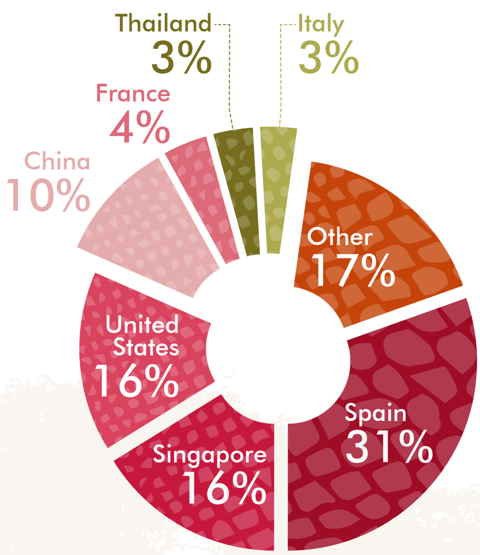
Most of the value of the reptile skin products industry appears to lie in the final production and retailing of fashion items. Data are not available for the breakdown of proceeds in destination markets, although designer reptile skin products can retail for tens of thousands of dollars. Data are available for those who produce and export finished python skin products from Indonesia, such as handbags, however. Finished product manufacturers claim almost three-quarters of the export value of the product, while collectors receive only about 3%.

Fig. 8 Shares of CITES-listed reptile skin exports by country of import, aggregated 2005-2013



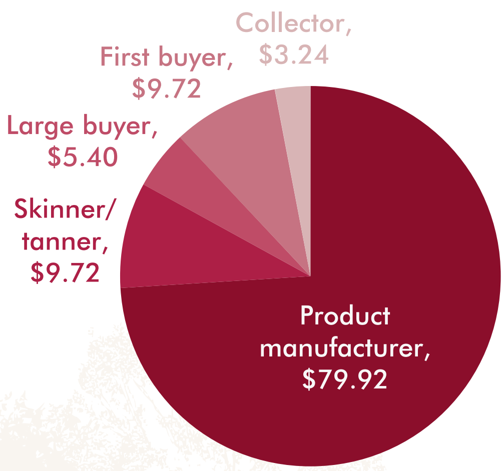
Source: CITES Trade Database[37]

Fig. 9 Reptile skin seizures by country identified as destination (number of skins), aggregated 2005-2014



Source: World WISE

Fig. 10 Average distribution of proceeds within Indonesia from the export of a reticulated python skin finished product typically sold at US$108



Source: Field research in 2015
(see online methodological annex for details)

Analysis

Compared to other species-products, the large-scale smuggling of reptile skins appears to be a relatively uncommon practice, or at least a relatively undetected one. Rather, illegally caught reptiles may be introduced into legal supply chains within the source country when field collection is not directly monitored, allowing them to be exported as legal trade. Reptile skins are particularly vulnerable to this practice because of several characteristics of the species and the market that makes use of them.

The income-generating activity of collecting reptiles for the skin trade presents low barriers to entry. The CITES-listed reptiles most targeted in the skin trade – reticulated pythons and water monitors – are found in both rural and urban areas. They are relatively easy to transport, and require no special equipment to acquire. Since almost anyone can participate, regulating collection is challenging.

The nature of the market also promotes informality in production. Because demand is linked to fashion, it comes and goes, and, in places like Indonesia, most reptile skins are worth too little on an individual basis for farming to make much sense or for wild sourcing to be a full time profession. In these cases, reptiles are essentially "crowd sourced": the word goes out that certain buyers will purchase live snakes, and the collectors organize themselves. This decentralized and episodic sourcing is extremely difficult to control in a country the size of Indonesia. Regulation is conducted further downstream, where the flow of skins consolidates at tanneries and points of export.

Variable demand can also be of benefit to enforcement, however, since it tends to promote consolidation of international trade chains. For example, pythons, particularly reticulated pythons, are a highly vulnerable species. They are the most seized species among the reptiles according to World WISE, and almost two-thirds of regulated exports of reticulated python skins are wild-sourced. Since illegally sourced pythons can enter licit trade, it is important to compare legal exports to sustainable production, and this is easier to do when the legal market is relatively simple. Almost three-quarters of legal exports of reticulated python skins between 2004 and 2013 came from Malaysia and Indonesia, and more than half were shipped to Singapore. Careful monitoring of this trade chain could help secure the species at relatively little cost.

Aside from the field research, there are other reasons to believe that illegally sourced reptiles are entering the legal supply chain prior to export. According to COMTRADE, close to 4,000 metric tons of reptile skins were reportedly legally imported in 2013. The volumes reported seized in World WISE were much smaller: about 2,600 skins on average per year. Seizures of large volumes of illicit skins – comparable to shipments seen in the legal trade – are rare.[38]

This low volume of detected illegal trade could be due to some weakness in enforcement particular to reptiles; other protected species illegally traded in the region are detected in much larger volumes. But it is more likely that illegally sourced reptiles are simply introduced into the legal supply chain before export. Since farming of some species for the skin trade does not appear to be viable in some areas, given the low value paid for wild sourced animals, it seems likely that sources are commonly misdeclared. The fundamental vulnerability, however, seems to be limited control over the harvesting of wild reptiles in the field.

Endnotes

1 Including Austria, Croatia, and the United Kingdom.

2 *Lynx rufus*

3 *Lontra canadensis*

4 *Arctocephalus pusilus*

5 *Pecari tajacu and Tayassu pecari*

6 Based on export data in the CITES Trade Database: http://trade.cites.org/#

7 Based on data released on 24 July 2014, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture (USDA): http://furcommission.com/wp-content/uploads/2014/07/NASS-mink0714.pdf

8 Grahame Webb, Charlie Manolis and Robert Jenkins, "Improving International Systems for Trade in Reptile Skins based on Sustainable Use", UNCTAD/DITC/TED/2011/7. United Nations Conference on Trade and Development, 2011.

9 IUCN Crocodile Specialist Group, "Farming and the Crocodile Industry": http://www.iucncsg.org/pages/Farming-and-the-Crocodile-Industry.html

10 Martin Jenkins and Steven Broad, "International Trade in Reptile Skins: A Review and Analysis of the Main Consumer Markets, 1983-1991", (Cambridge, TRAFFIC, 1994).

11 See the CITES website "List of Species": https://cites.org/eng/common/reg/cb/species.html

12 Based on COMTRADE data. This is the total declared value for HS codes 410320: Reptile skins, raw; 410640: Tanned/crust hides and skins of reptiles; 411330: Leather further prepared after tanning/crusting of reptiles; 410721: Reptile leather, vegetable pre-tanned and 410729: Reptile leather, other than vegetable pre-tanned.

13 Skin weights vary substantially, but trade figures suggest a weight of around 0.07 kg for skins of smaller lizards like Varanus salvator and Tupinambis *species* on the one hand, and 1.5 kg for a crocodile skin on the other. Ines Arroyo-Quiroz, Ramon Perez-Gil and Nigel Leader Williams, "Mexico in the international reptile skin trade: A case study", Biodiversity Conservation, vol. 16 (2007), p. 933.

14 Alexander Kasterine and others, "The Trade in South-East Asian Python Skins," (Geneva, International Trade Centre, 2012).

15 Ibid, p. 21.

16 Peter Uetz and Jiri Hošek(eds.) *The Reptile Database*, http://www.reptile-database.org (accessed 24/08/2015)

17 See the documents of the Global Tiger Recovery Program (GTRP), endorsed in the St. Petersburg Declaration on Tiger Conservation at the International Tiger Forum ('Tiger Summit'), held in St. Petersburg, Russia 21-24 November 2010: http://www.globaltigerinitiative.org/download/St_Petersburg/GTRP_latest.pdf

18 Based on estimates in the IUCN Red List database: http://www.iucnredlist.org

19 See the description of "use and trade" at the *panthera tigis* listing on the IUCN Red List: http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T15955A50659951.en

"Illicit trafficking in protected species of wild flora and fauna and illicit access to genetic resources: Report of the Secretary-General": https://www.unodc.org/documents/commissions/CCPCJ/CCPCJ_Sessions/CCPCJ_12/E-CN15-2003-08/E-CN15-2003-8_E.pdf

20 CITES SC.42.10.4 "Issues relating to species: Tiger – Technical missions": https://cites.org/sites/default/files/eng/com/sc/42/42-10-4.pdf

https://cites.org/sites/default/files/eng/cop/11/doc/30rev1.pdf

21 UNODC, Transnational organized crime in East Asia and the Pacific: A threat assessment (2013): http://www.unodc.org/documents/southeastasiaandpacific//Publications/2013 TOCTA_EAP_web.pdf

22 Where the shipment was defined in meters of skin, these figures were converted to number of skins using an average length of *Python molurus* (5 m) and *Python reticulatus* (4m). "Farmed" includes a small number of exports declared as "ranched" (sourced as eggs or juveniles from the wild but reared in a controlled environment) as well as those reported "born or bred in captivity".

23 Based on import data. Includes re-exports of previously seized skins, which may have been taken in an earlier time period.

24 Includes re-exports.

25 Dividing the COMTRADE-declared value by volume gives an average value of less than US$200 per kilogram.

26 Grahame Webb and others, "Predicting Total Lengths of Spectacled Caiman (Caiman Crocodilus) from Skin Measurements: A Tool for Managing the Skin Trade", *Herpetological Conservation and Biology*, vol. 7, No.1 (2012), pp. 16-26..

27 Ibid.

28 See CITIES Standing committee 66 Inf.20: *Concerns about the Production and Trade in Brown Caimans (Caiman crocodilus fuscus) from Colombia.* https://cites.org/sites/default/files/eng/com/sc/66/Inf/E-SC66-Inf-20.pdf

29 Ibid, paragraph 5.

30 See online methodological annex for details on field research.

31 Indonesian Ministry of Trade, Decree No. 306 of 1986.

32 CITES Animal Committee 25, Country Report of Indonesia: Snake Trade and Conservation (Jakarta, 2011).

33 Vincent Nijman and others, "Over-exploitation and illegal trade of reptiles in Indonesia", *Herpetological Journal*, vol. 22 (2012), pp. 83-89.

34 If each python produced about 10 kg in meat. A survey of slaughterhouses found an average weight of reticulated pythons averaged 8.44 kg. Mark Auliya, "Exploited for the international fashion industry: The Trade in the Reticulated Python Python reticulatus in Peninsular Malaysia", Unpublished report for TRAFFIC Southeast Asia, Petaling Jaya, Malaysia, 2010.

35 For example, the Indonesian handbag manufacturer Raflo:http://www.raflo.co.id/

36 IUCN Crocodile Specialist Group op cit.

In 2011, LVMH Moët Hennessy Louis Vuitton reached an agreement to jointly own and control Heng Long, one of the world's leading reptile skin tanneries, based in Singapore. See http://www.businesswire.com/news/home/20111007005525/en/LVMH-jointly-control-Heng-Long-world%E2%80%99s-leading

37 Where the shipment was defined in meters of skin, these figures were converted to number of skins using an average length of *Python molurus* (5 m) and *Python reticulatus* (4m).

38 For a fuller description of the methods, see the online methodological annex.

Map 1 Main flows of agarwood seizures (kg), 2007-2014

Map 2 Main flows of agarwood trade based on CITES export permits (tons), 2005-2013

Wild plants and animals have long formed the basis of cosmetics and perfumes. Exotic animal products like musk and ambergris have largely been replaced with synthetic alternatives, but demand for wild-sourced plant inputs for the cosmetics and perfume industries remains strong. For many of these plants, cultivation is an alternative, but illegal wild sourcing remains a risk where this is not cost-effective.

The global trade in essential oils, perfumes, cosmetics, and toiletries was worth just under US$112 billion in 2014.[1] That year, Europe alone imported 89,000 metric tons of essential oils, 40,000 metric tons of plant extracts, and 194,000 metric tons of raw plant material for the cosmetics trade, worth around 2.5 billion euros.[2] It is estimated that over 70% of the European trade volume in medicinal and aromatic plants comes from wild collection.[3]

Wild plant populations are generally less well documented than animal populations, complicating the determination of sustainable offtake of plants. Increases in demand can lead to rapid overharvesting and when the species in question is slow to recover, as is the case with many tree species, the impact can be severe. The overharvesting of *Aquilaria* species in South and Southeast Asia, due to the exploitation of a product sometimes referred to as "oud", provides a prime example.

Oud

Oud, also known as agarwood, jinkoh, or gaharu, does not refer to a particular species of tree. Rather, it is the name given to a highly aromatic, resin impregnated wood found in a number of species of the *Thymelaeaceae* family. The complex fragrance of this unusual resin has been used in perfumery and incense across a wide range of cultures for millennia. It has also been ascribed medicinal and cosmetic benefits, used in both Chinese[4] and Ayurvedic therapies. Its role is prominent in religious observance, especially in Muslim, Hindu, and Buddhist traditions.[5]

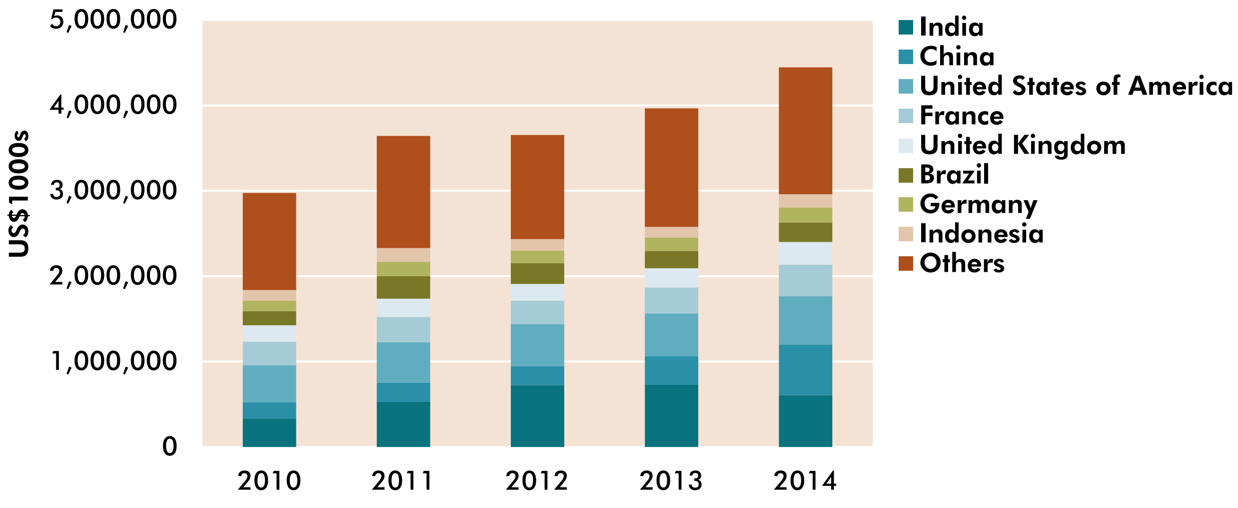
Oud is produced in trees of six genera, primarily the *Aquilaria* genera, and, to a lesser extent, *Gyrinops* and *Gonystylus* (ramin) species. The primary agarwood producing species indicated in trade, *Aquilaria malaccensis,* was placed on CITES Appendix II in 1995, while the other species were listed a decade later. The primary threat to these species is illegal harvesting for the agarwood trade, because a single kilogram of high quality oud chips can be worth hundreds of thousands of dollars.[6] It is likely the single most value-intensive wildlife commodity.

Only a very small share of *Aquilaria* trees actually manifest oud and the resin impregnated wood cannot always be detected externally, leading to many trees being felled fruitlessly. The resinous wood is produced as a defensive reaction when the tree is damaged but its incidence is rare and difficult to predict. In the past, source trees were used sustainably by local communities, but commercial pressure has led to widespread illegal logging.

Similar to wine, the value of agarwood is subjectively determined and prices can vary greatly between ostensibly similar products. Agarwood connoisseurs can differentiate between the scent profiles of oud wild-sourced in particular regions, and the quality of extracts is greatly dependent on the skill of the manufacturer. As particular regional stocks are harvested to extinction, there is evidence that speculative buying is taking place.[7] The growing demand for this highly valuable wood has led to both a looting of the wild material (as evinced in the seizure data), and the launch of many large-scale cultivation operations across the region (as documented below).

Rival buyers are engaged in a race to acquire the few remaining wild stocks. Local communities in the traditional source areas are generally aware of the

Fig. 1 Value of global exports of "essential oils, resinoids, and terpenic by-products" by country of export (US$1000s), 2010-2014



Source: International Trade Centre Trade Map, using COMTRADE data value of agarwood and scout for these buyers. As a result of this intensive prospecting, protected areas contain some of the few remaining specimens in the wild.[8]

While *Aquilaria* species grow well in plantations, production of high quality oud from cultivated stock has been elusive. *Aquilaria* species require up to a decade to reach maturity and current harvesting techniques, both wild and in cultivation, involve destroying the entire tree. The process of inducing oud production has not been well understood until recently and the industry has been fraught with secrecy and misinformation. For example, in the past, it was thought infection with a specific fungus (such as *Cytosphaera mangiferae*) was necessary for resin production but this does not appear to be the case.[9]

As a result, present capacity to produce cultivated oud is unclear, and claims of high-volume production should be scrutinized. There remains a risk that wild sourced agarwood may be laundered through firms involved in cultivation, particularly those that are vertically integrated with firms producing items for sale. The value of the wood is so great that the possible extinction of some *Aquilaria* species in the wild as a result of high demand remains a matter of serious concern.[10]

Based on CITES trade data, there are three principal ways that pure oud is traded internationally:

- Resinous timber and wood chips
- Distilled oil for perfume
- Exhausted powder for incense

Raw agarwood, usually in the form of chips, can be an end use product. The highest quality wood is burned as whole chips for its fragrance, while somewhat lesser quality wood is reserved for oil extraction. Lower grades of wood may also be carved into objects, like sculptures and beads, that retain their aromatic qualities for years, although it appears that most beads in circulation are actually lesser woods soaked in oud oil.[11]

Oil extraction techniques are considered proprietary and often closely guarded. Good technique is said to drastically increase both quality and yield with most production today.[12]

Once the oil has been extracted, the remaining wood still retains some aromatic qualities, and is generally reduced to powder for use in incense or *bakhoor*, bricks burned in censers in some Arabic countries. It can also be pressed into small statues, often of religious significance. For statistical purposes, these three product categories are combined into raw agarwood equivalents in the analysis below, based on conversion rates.[13]

Source of agarwood

Although all the known agarwood producing trees are found in broader South and Southeast Asia, there have been no recent, global population assessments for these species. Even the number of species within the six genera has not been scientifically resolved. Trade data suggest that most agarwood exports involve *Aquilaria* species, but *Aquilaria* are seen across a very wide area, and not all species produce oud. For example,according to IUCN, *Aquilaria malaccensis* grows wild in a number of countries in the region, including Bangladesh, Bhutan, India, Indonesia, the Islamic Republic of Iran, Malaysia, Myanmar, the Philippines, Singapore, and Thailand.[14]

Legal trade

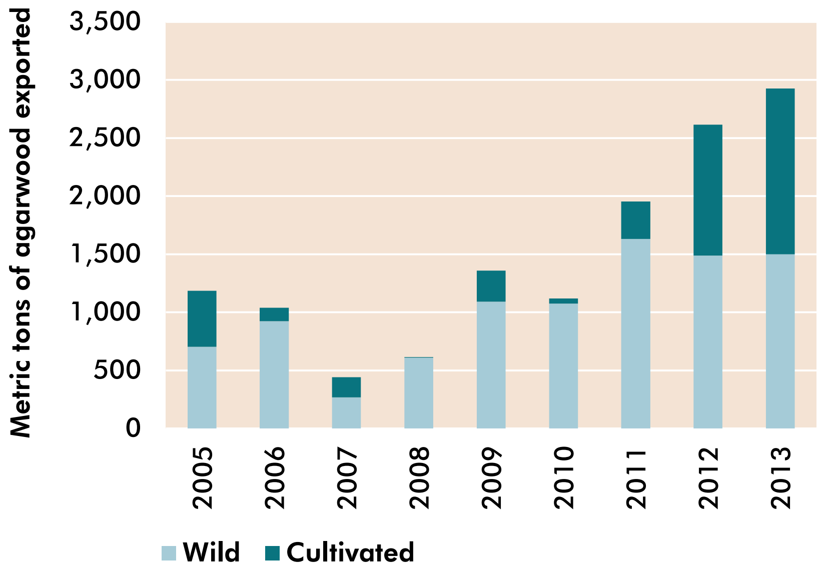
The value of agarwood, and its scarcity in the wild, has been recognized since the early 20th Century, so cultivation occurs in a number of range states. Based on CITES trade data, however, between 2005 and 2013, only 30% of agarwood exports by volume were from cultivated sources (Table 1). While several countries reported cultivated exports (including Bangladesh, Indonesia, Lao Peoples Democratic Republic, Myanmar and

Table 1 Known agarwood populations in selected countries

COUNTRY	KNOWN POPULATION	EXPORTS
Bangladesh	6,000 ha on government plantations	About 124 tons of chips from private growers in 2014
Bhutan	About 23,000 trees cultivated[15]	None
China	About 130,000 trees in the wild	Negligible in 2012-2015[16]
India	About 10 million trees in plantation	None, just re-exports
Indonesia	3.5 million in plantation	700 tons in 2013, about 80% low quality
Malaysia	Just under 1 million trees in plantations	200 tons quota
Myanmar	34,475 trees in home gardens; 680 ha in plantations	None
Thailand	Unknown	8 tons of oil, 15 tons of chips in 2013
Viet Nam	18,000 ha in plantations; 1 million trees in home gardens	300 tons of wood exported 2009-2014

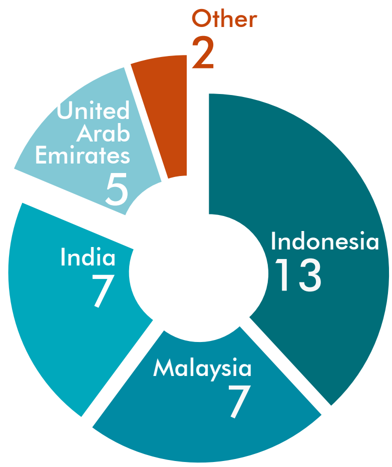
Source: ITTO[17]

Fig. 2 CITIES-listed agarwood legally exported by wild or cultivated source (metric tons), 2005-2013



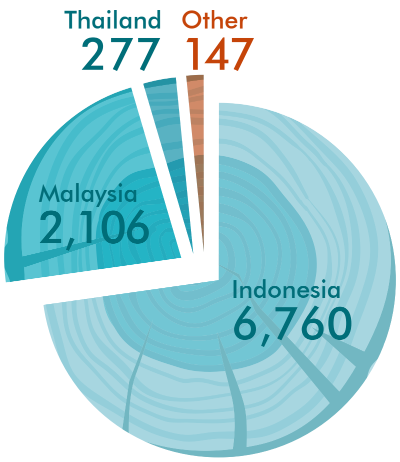
Source: CITES Trade Database

Fig. 4 Share of total agarwood seizures by country identified as source (metric tons), aggregated 2005-2014[21]



Source: World WISE

Fig. 3 Share of wild-sourced agarwood exports by country of export (metric tons), aggregated 2005-2014[18]



Source: CITES Trade Database

Viet Nam), more than three-quarters of the cultivated exports during that period were reported by Thailand.

Legal wild-sourced exports more than doubled between 2005 and 2013. The volume in 2013 was 591 tons of chips, about 218 liters of oil, and 875 tons of powder were declared exported from the wild.

The primary legal exporters of wild-sourced agarwood today are Indonesia and Malaysia. Between 2005 and 2013, Indonesia reported exporting almost 7,000 tons of wild sourced agarwood. If each *Aquilaria* tree yields a half a kilogram of agarwood,[19] for example, this could be the equivalent of approximately three million trees.

The value of this trade is highly uncertain, as high quality products can cost hundreds of times as much as their low quality equivalents.

Illegal trade

The volume of illegal agarwood seized amounts to approximately a half percent of the volumes in legal trade. It is likely, however, that a very small share of the illegal trade is detected, since the product can assume many forms, and awareness of this among enforcement officers is often very low. High quality agarwood is so valuable that it can be couriered by passengers on commercial air flights, a technique with a low chance of detection. Given questions about the ability of plantations to produce high quality agarwood, it also appears likely that some wood exported as cultivated was, in fact, wild sourced.[20]

Still, even the volumes seized are significant in terms of both value and environmental impact. The two countries listed as primary sources of detected illegal shipments are the same two countries reporting the greatest volumes of wild-sourced legal exports: Indonesia and Malaysia. In addition India, which is within the range but which may also be serving as a conduit for shipments from Bangladesh, features prominently in illegal detections. In the Arabian Peninsula, the United Arab Emirates has been detected as a re-exporter.

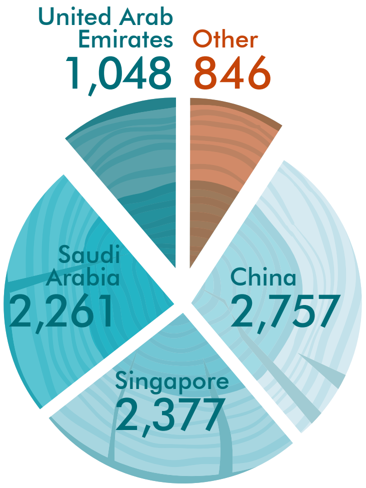
Destination markets

Based on CITES trade data and seizure data, at least four distinct destination markets can be identified for agarwood:

- the Arabic market for oud oil, high quality chips, and lesser quality products for *bakhoor*;
- the Asian market for exhausted powder, used for making joss sticks;
- the Asian market for small solid wood products, such as prayer beads and small sculptures;
- The Asian market for medicinal agarwood products.

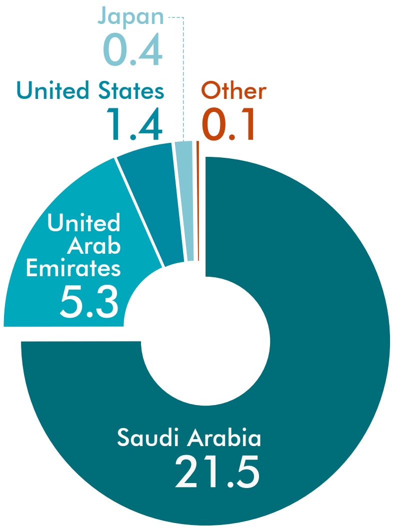
The primary importers of legally traded wild-sourced agarwood today are China, Singapore, Saudi Arabia,

Fig. 5 Share of CITIES-listed wild-sourced agarwood legally imported by country of import (metric tons), aggregated 2005-2014[22]



Source: CITES Trade Database

Fig. 6 Share of agarwood seizures by country identified as destination (metric tons), aggregated 2007-2014[23]



Source: World WISE

and the United Arab Emirates. Most of China's imports appear to be exhausted powder moving from Indonesia to Taiwan Province of China, used in incense manufacture. Only a relatively small amount (about two tons per year on average) is imported directly to mainland China. Singapore appears to be both a consumer and a re-exporter of agarwood products. The Arabic market is also clearly indicated in the legal import data.

With regard to seizures, the most prominent destination is clearly the Arab peninsula, with over 90% of the seizures by weight indicating Saudi Arabia or the United Arab Emirates, when the destination was known.

Analysis

Interviews with traders in the field suggest a perilous situation for the *Aquilaria* species. Attempts to cultivate agarwood have produced very mixed results, and connoisseurs will pay outrageous amounts for the most sought-after wild strains. This has produced a kind of gold rush in the woodlands of Southeast Asia, where prospectors scour the wild in the hope of a lucky find, and specialised distillers feel obligated to buy what they can, rather than allowing the last of this precious commodity to fall into less skilled hands. These suppliers are competing for a limited number of volume buyers, who may be willingly blind to the source of their stock. Laundering of wild-gathered product through plantations appears to be occurring.[24]

World WISE contains data on seizures of about 35 metric tons of agarwood between 2005 and 2014, which could be the result of the illegal harvest of up to 70,000 trees. Agarwood chips made up the largest share of these seizures by estimated value, although large volumes of powder and some oil were detected. There are several reasons to regard this as a serious underestimate of the scale of the illegal trade, as clearly not every illicit shipment was seized. World WISE contains only 230 agarwood seizure records, so most of the value comes from a small number of large interdictions. As a result, the seizure record is extremely volatile. Given that wood worth thousands of dollars can be carried in a pocket, it is highly likely that "ant" trafficking takes place across borders of Southeast Asia. Some of the key countries in the contraband flow, based on seizures made in other countries, have never reported an agarwood seizure. It is also possible that a share of the legal exports were illegally sourced – at present, the legal trade (about 10,000 metric tons 2005-2014) is over 300 times the size of the detected illegal trade (about 30 metric tons in the same period).

Furthermore, it is likely that agarwood, like other forms of timber, is under-detected because of the difficulties in distinguishing between wood species. To those unfamiliar with it, the chips appear as rather unremarkable, although fragrant, bits of wood. As an oil, it can be bottled like other perfumes or cosmetics. As a powder, it is essentially saw dust. The high quality wood and oil are value-intensive, and personal couriering on commercial air flights appears to be an issue. Finally, the current exceptions to CITES requirements could allow resinous powder to be exported as exhausted powder, and other products to be packaged for retail sale before export, so evading import regulations.

Endnotes

1 According to Trade Map statistics: http://www.trademap.org/Country_SelProduct_TS.aspx Netherlands,

2 Netherlands, Ministry of Foreign Affairs, Natural Ingredients for Cosmetics in Europe (The Hague, 2015).

https://www.cbi.eu/sites/default/files/trade-statistics-europe-nic-natural-ingredients-cosmetics-2015.pdf

3 Belgium, Belgian Development Agency, "Wild-Collected Botanicals and the EU Market" (Brussels, 2015), p. 27.

4 As "Chen Xiang"

5 Angela Barden and others, "Heart of the Matter: Agarwood Use and Trade and Cites Implementation for Aquilaria Malaccensis" (2000), retrieved on 21 September 2015 from https://portals.iucn.org/library/efiles/documents/Traf-072.pdf. Retrieved 21 September, 2015.

6 ITTO, "Report of the Asian Regional Workshop on the Management of Wild and Planted Agarwood Taxa", (Guwahati, Assam, India, January 2015).

7 Interviews with agarwood traders contacted in connection with this report, May-October 2015. See online methodological annex for details.

8 According to agarwood traders interviewed for this report: see online methodological annex for details.

9 Robert Blanchette and Henry Heuveling van Beek. 2005. *Cultivated Agarwood*. US Patent 6,848,211; Robert Blanchette, Joel Jurgens and Henry Heuveling van Beek, "Growing Aquilaria and Production of Agarwood in Hill Agro-ecosystems", in *Integrated Land Use Management in the Eastern Himalayas,* K. Eckman and L. Ralte, eds., (New Delhi, Akansha Publishing House, 2015), pp. 66-82.

10 For example, *Aquilaria malaccensis* is deemed critically endangered in India and its export is prohibited. http://www.iucnredlist.org/details/32056/0

11 Based on interviews with agarwood traders conducted for this report: see online methodological annex for details.

12 Most extraction today involves one of three broad methods:

- hydro-distillation;
- pressured steam distillation; and
- super critical CO2 extraction.

Hydro-distillation is perhaps the oldest and most labor intensive of the three and involves soaking the wood, boiling it in water and removing the oil from the water surface. Yields can be as little as 0.1%. Pressurized steam is faster but risks scorching the wood and may include wood extractives which corrupt the primary products demanded by the market. The two techniques may be used by the same producer to bring out different qualities of the wood. The use of carbon dioxide as a solvent is less common but has the potential to produce greater yields. Again, however, the process often extracts waxes and other tree derivatives which can adulterate the final product. Many other techniques are currently being reviewed in the quest for higher yields and quality. These include solid liquid extraction, microwave assisted extraction, spinning band distillation, ultrasonic assisted steam distillation and ultrasonic assisted hydro-distillation.

13 Although the resin content of agarwood varies, as does extraction efficiency, in the figures below oud oil is converted at the ratio of 143 kg of agarwood to one liter of oil. "Powder" can connote either exhausted powder or resinous powder; because of this ambiguity, these figures are not converted. All shipments of agarwood chips and timber remain as reported. See online methodological annex discussion of conversion rates for details.

14 See IUCN Red List entry for *Aquilaria malaccensis*: http://www.iucnredlist.org/details/32056/0

15 2,341 trees in the wild, 2,487 trees in plantations, 827 in research, 15,000 in nurseries and 2,443 in home gardens.

16 Based on CITES Trade Data.

17 ITTO 2015, op cit. The countries listed were the countries providing data at this meeting.

18 Oil exports converted to agarwood equivalents at a ratio of 1:143.6. Powder exports are assumed to be resin-infused and so are deemed equivalent to chip or timber exports. See the official conversion figures used by the UAE as cited in Marina Antonopoulou, and others, "The Trade and Use of Agarwood (Oudh) in the United Arab Emirates," (Cambridge, TRAFFIC, 2010)

19 Based on interviews with agarwood traders conducted for this report: see online methodological annex for details.

20 UNODC field research, for more details see online methodological annex.

21 Antonopoulou, and others, 2010, op cit.

22 Ibid.

23 Ibid.

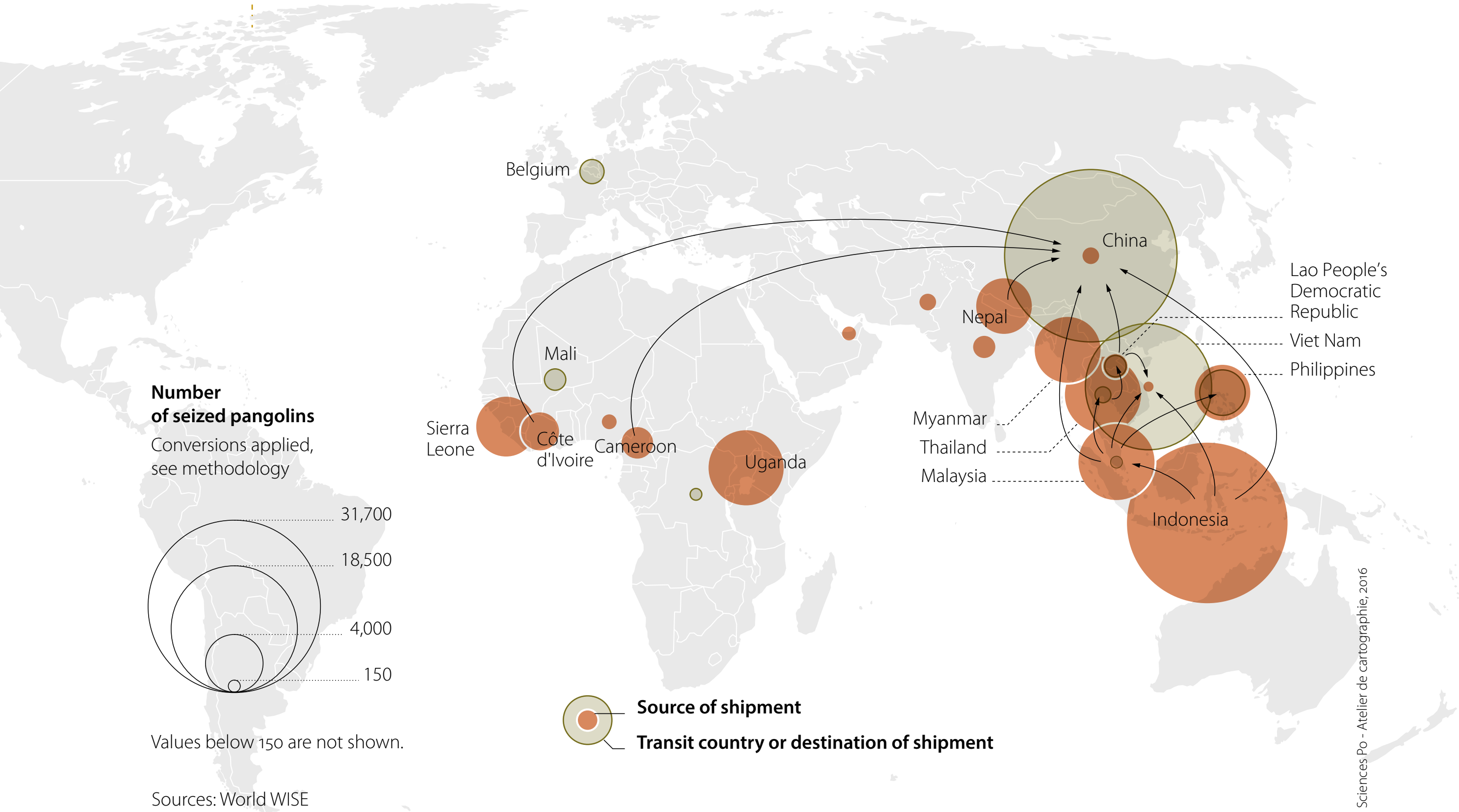
24 Based on interviews with agarwood traders conducted for this report: see online methodological annex for details.

FOOD, TONICS, AND MEDICINES

Case study: Pangolin and rhinos

WILDLIFE AS FOOD, TONICS, AND MEDICINE

Map 1 Main flows of pangolin seizures, 2007-July 2015



Sources: World WISE

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Wild sourced animals and plants continue to serve as an important food source for people around the world, even where cultivated alternatives are plentiful. The use of wildlife as food and the use of wildlife as medicine are closely related, because in some countries, there is a persistent belief that consumption of wild products is beneficial for health. There are very few popular foods, either animal or plant, that cannot be cultivated. Even rather exotic meats are commercially farmed to meet niche demand. But wild-sourced foods may be valued precisely because they come from the wild.

A range of wild-sourced products can also be found that are not truly medicines but which are consumed as supplements or tonics. These products are often believed to confer some qualities of the animal or plant from which they come. Even for those who do not subscribe to this belief, use of wild tonics may have a place in tradition that makes them difficult to ignore. In practice, the same species are often used for food, tonics, and medicine. Even when cultivated alternatives are available, as is the case with bear bile (Box), they may not be regarded as efficacious as the wild-sourced alternative.

Some people depend on wild meat for their annual protein supply because they have no other source ora cannot afford alternative sources.[1] Rural cuisines often call for wild products. As a growing share of the world's population moves to urban areas, demand for these products persists, and may be

Bear bile

Ursodeoxycholic acid (UDCA), the active ingredient in bear bile, is a recognized drug in both Western and Traditional Chinese Medicine (TCM), and is currently a recommended treatment for a liver disease known as primary biliary cirrhosis.[2] Although a synthetic form of UDCA has been developed and both herbal and other animal substitutes are available, wild bear bile is still preferred by some consumers. Five bear species are typically targeted for the bile trade: Asiatic black bears, brown bears, sun bears, American black bears, and sloth bears. The Asiatic black bear and the brown bear appear to be preferred, possibly due to higher UDCA levels, but the American black bear is also considered a good source of bile.[3] According to one study, one kilogram of wild-sourced bear bile requires the killing of 118 bears.[4]

seen as a way of preserving traditions that would otherwise be homogenized in the city mix.

Traditional use often involves the entire animal, and those parts which cannot be regarded as foods are often used as medicines. Food is at the root of culture, as are beliefs about health, so consumption of wildlife can be seen as a way of expressing ethnic and national identity. In some parts of the world, indigenous people have secured recognition of their cultural right to hunt as their ancestors did.

Aside from cultural motivations, there may be practical reasons why wild harvesting persists. When demand for a food product grows, cultivation surely follows, but medical demand may remain too small to justify farming. For example, the toxins of certain animals are extremely valuable for research and pharmaceutical use, but demand may not be of a scale or predictability to justify commercial production. Some toxins, such as that of the poison dart frog, are reliant on the creature consuming its natural wild diet.[5] Under 1,000 medicinal plant species are cultivated, with fewer than 400 on a commercial scale.[6] The base material for many niche medicines is therefore reliant on wild collection.

Pangolins

The pangolin, or scaly anteater, is an example of a creature that is consumed as both a meat and a medicine. Despite their scaly appearance, pangolins are mammals, and are unrelated to the armadillos, aardvarks, and anteaters who they resemble in some respects. They are insectivorous, subsisting almost entirely on ants and termites, which they eat with their elongated tongues. Due to long claws on their forelimbs, they walk on their knuckles, and one species even ambles on its rear two legs. They occur over a wide range, and are both nocturnal and solitary. These characteristics make population estimates somewhat challenging, and no current estimate of their numbers exists. They give birth to a single offspring after an extended gestation, and so are vulnerable to overexploitation.

There are eight species of pangolins, four species in Africa and four species in Asia. They have been consumed traditionally as food in both regions, and their scales are also used in traditional medicine. Pangolins are difficult to breed and mortality rates amongst pangolins in captivity is known to be very high.[7] Aside from a few zoos,[8] there are no known captive breeding facilities for any pangolin species.

Of the four Asian pangolin species, two are classified as "Critically Endangered", and two as "Endangered" by the IUCN. All four African species are classified as "Vulnerable" by the IUCN.[9] Some species have been CITES listed since 1975, and the entire genus (*Manis*) was put on Appendix II of CITES in 1994. At the meeting of the CITES Conference of the Parties in 2000, zero export quotas for wild-caught Asian pangolins were agreed. The Asian species are protected under national law over most of their range.[10]

Legal and illegal trade

Since its CITES listing in 1975, most legal trade in pangolin has involved animals sourced in Indonesia, Malaysia, Thailand, and Viet Nam. According to the CITES trade data, pangolin have been used for three main purposes in the past:

- Their skins were used in the exotic leather trade.
- Their scales were used in traditional medicine.
- Their meat was consumed as a food.

Each of these markets has its own characteristics. Due to the variety of products available, the trade flows and seizures described below are often converted to whole pangolin equivalents, based on field observations published in the academic literature.[11]

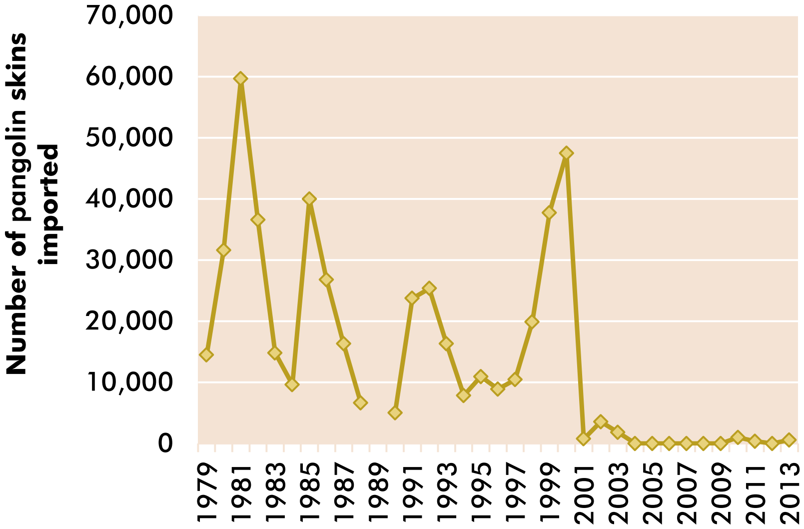
The legal international pangolin skin trade used to be big business, but little of this remains today. Tens of thousands of wild-sourced pangolin skins were traded in the past, but this stopped abruptly in 2000 when the zero export quota for Asian pangolins was imposed (Fig. 1). As with reptile leather, Singapore appears to have been a major player in the pangolin skin trade. Between 1980 and 2000, Singapore imported over 50,000 pangolin skins, mostly from Malaysia, and exported over 150,000 skins, mainly to Japan and the United States of America. The imposition of zero quotas precipitated a spike in trade, with Singapore alone buying some 21,000 skins that year. After that, the traders involved in this niche market appear to have moved on to other things.

Pangolin scales, used in traditional medicine in both Africa and Asia, are another matter entirely. In Africa, particularly West Africa, they are used to treat a wide range of physical and spiritual maladies.[12] In Asia, whole scales are sold, raw or fried, from traditional medicine retailers. These scales have multiple uses in traditional medicine: to cure skin diseases, improve blood circulation, and to stimulate milk production in lactating women.[13]

Oddly, the legal trade in pangolin scales is only first recorded in 1994, nearly 20 years after export permits were required. In terms of live animal equivalents, the legal scale trade has never risen to the level of the skin trade. In illegal trade, however, some 20 metric tons of scales are documented in World WISE between 2007 and 2015, equivalent to about 54,000 live pangolins.[14] In addition to whole scales, pangolin is also used in processed medicines. Like other medicinal preparations, however, the quantity of pangolin contained in a derivative product, if any, is unknown, and so these have been excluded from the analysis.

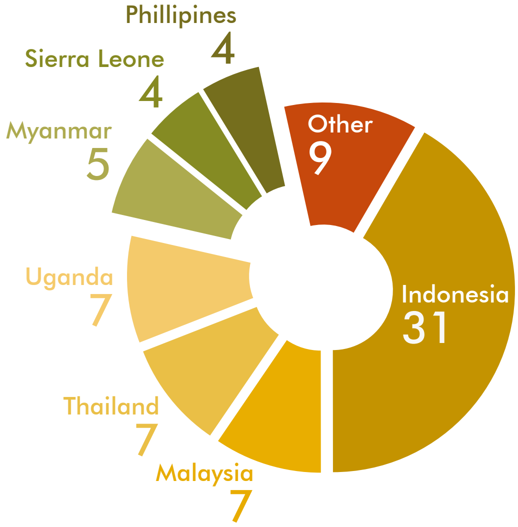
Pangolins are also consumed as food in both Africa and Asia, despite being protected through much of their range. Their international trade

Fig. 1 Number of pangolins skins legally imported, 1978-2014



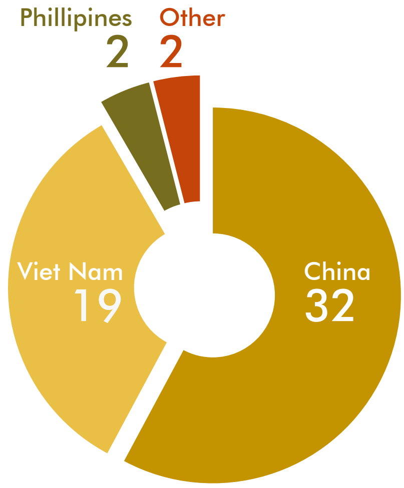
Source: CITES Trade Database

Fig. 2 Share of seized pangolins by country indicated as source (thousands of whole pangolin equivalents), aggregated 2007-2015



Source: World WISE

Fig. 3 Share of seized pangolins by country indicated as destination (thousands of whole pangolin equivalents), aggregated 2007-2015



Source: World WISE

for this purpose is almost entirely illegal, however, as very few permits have been issued for the shipment of live pangolin or pangolin bodies to countries that consume pangolin. In some Asian culinary traditions, pangolins are presented live before being slaughtered for the meal, so the illegal live trade of pangolins is commonly seen. Whole frozen pangolins are also shipped for use as meat. Almost 13,000 live pangolins were seized between 2007 and 2015, as well the equivalent of 33,000 more live pangolins in the form of meat.[15] Together, pangolins seized that were destined for culinary use accounted for about 55,000 pangolins.

World WISE records seizures equal to more than 120,000 live pangolins between 2007 and 2015.[16] Asian countries were the source of the bulk of all the pangolin products seized, although Uganda and other African countries accounted for 20% of all seizures. Many of the seized pangolin scales originating from Africa were found in mixed consignments, alongside rhino horn or ivory. Most (92%) of these shipments were destined for China or Viet Nam.

Supply of pangolins

Since the animal is nocturnal and reclusive, Asian pangolin hunters often make use of traps and snares, or trained dogs. The price per animal is low enough, and the species is rare enough, that few hunters make a living off the trade. The profits appear to be concentrated close to the retail end of the supply chain. In Nepal, for example, hunters receive US$7 to US$13 per kilogram, with the price doubling with each resale up the trafficking chain. In border areas, the price rises to over US$500 per kilogram.[17]

Seizures made in Africa often involve traders in multiple species. When meat is seized, it is almost always destined for the domestic market. The primary pangolin export appears to be scales, commonly shipped illegally in large grain bags. The volumes involved, often upwards of 100 kilograms at a time, suggest networks capable of accessing and processing thousands of individual pangolins. Traffickers from Asian destination markets have been arrested in Africa. In Nigeria, whole pangolins (depending on the size) can range in price from US$7 to US$15.[18] Their scales alone would sell for as much as US$250 per pangolin in destination markets, so the profit incentive is clear.[19]

Pangolin species are not uniformly protected throughout their African range, so their harvesting may be legal in many instances. As African species of pangolin are also not protected in some destination markets, their consumption could be legal once past the border in destination countries. Between these markets, the only protection these pangolins experience is their CITES listing. The criminal elements connecting these two legal markets are those traffickers who evade this protection.

Demand for pangolins

As noted above, the seizure data illustrate that the primary destination market for illegal international trade in pangolin is Asia, particularly China and Viet Nam. These two countries have documented markets for pangolin as a medicine and a food.

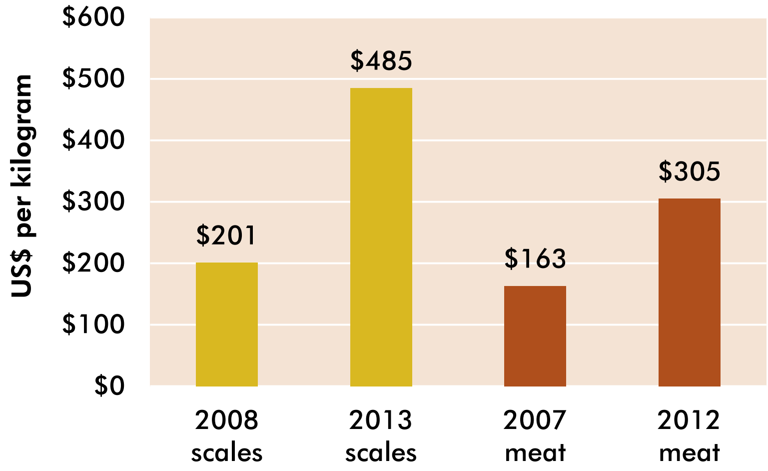
Semi-structured interviews in China and Viet Nam have provided some insight into the demand for scales and meat. Scales are sold through traditional medicine shops in both countries. Pangolins have been deemed commercially extinct in China.[20] A survey of 18 high-end restaurants in Viet Nam found that pangolin meat was available in all of them, and in 16 of them, it was the most expensive item on the menu. Rising demand for pangolin products is evinced in rising prices in Viet Nam (Fig. 4).[21]

Analysis

Pangolin is different from many other species in the sharp distinction between legal and illegal markets. The zero export quotas for the Asian range states appear to have decimated the market for pangolin skins. In contrast, the market for pangolin meat appears to be almost entirely illegal, and many metric tons of contraband pangolin have been seized destined for this market.

As is the case with elephants and rhinos, buyers appear to be turning to the four African species of pangolin that do not enjoy protection in Asian destination markets. Very little legal trade in pangolin occurs today, and its value is dwarfed by the value of the seized shipments alone. According to World WISE, between 2007 and 2013, an average of over 15000 live pangolin equivalents were seized annually. This is likely a fraction of the actual illegal trade.

Fig. 4 Price paid for pangolin products in Viet Nam (US$/kg), selected years



Source: Challender, Harrop, MacMillan 2015[22]

Fig. 5 Number of pangolins legally traded and seized globally (live pangolin equivalents), aggregated 2007-2013

Source: For legal trade, CITES Trade Database; for seizures, World WISE

Endnotes

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The IUCN Red List of Threatened Species 2014: e.T12764A45222544; L. Lagrada, S. Schoppe and D. Challender, *Manis culionensis.* The IUCN Red List of Threatened Species 2014: e.T136497A45223365; C. Waterman and others, *Phataginus tetradactyla*. The IUCN Red List of Threatened Species 2014: e.T12766A45222929; C. Waterman and others, *Phataginus tricuspis.* The IUCN Red List of Threatened Species 2014: e.T12767A45223135; C. Waterman and others, *Smutsia gigantea.* The IUCN Red List of Threatened Species 2014: e.T12762A45222061; D., Pietersen and others, *Smutsia temminckii*. The IUCN Red List of Threatened Species 2014: e.T12765A45222717..

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12 M. Boakye and others, "Knowledge and Uses of African Pangolins as a Source of Traditional Medicine in Ghana", *PLoS ONE*, vol. 10, No 1 (2015)..

13 Challender, Harrop, MacMillan, 2015, op cit.

14 For an explanation of conversion figures, see the online methodological annex.

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19 Most pangolin species carry about half a kilogram of scales, which, at US$485 per kilogram in Viet Nam in 2013, would be worth about US$250. See online methodological annex for details.

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Case study: Rhino horn

WILDLIFE AS FOOD, TONICS, AND MEDICINE

Rhinoceros horn has historically been used in traditional medicine in Asia to treat fever and cerebrovascular disease. More recently, belief its efficacy in treating other ailments, from hangovers to cancer appear to have increased demand. The prices that it currently commands – usually cited in the tens of thousands of dollars per kilogram[1] – are disproportionate to any medical utility it might have. Rather, it appears to be conspicuously consumed as a status symbol. Recent surveys of markets indicate a growing demand for rhino horn jewellery and décor items, including traditional libation bowls.[2]

The present rhino population is a fraction of what there once was. As recently as 1960, there were estimated to be 100,000 black rhinos in Africa.[3] Due to heavy poaching from the late 1970s through the mid-1990s,[4] there are less than 5,000 black rhinos today. Indeed, there are less than 28,000 rhinos of any species left in Africa and Asia. About 70% of the remaining population are southern white rhinos living in the eastern provinces of South Africa, descendants of a population of less than 100 that has been protected there since the 1900s.[5]

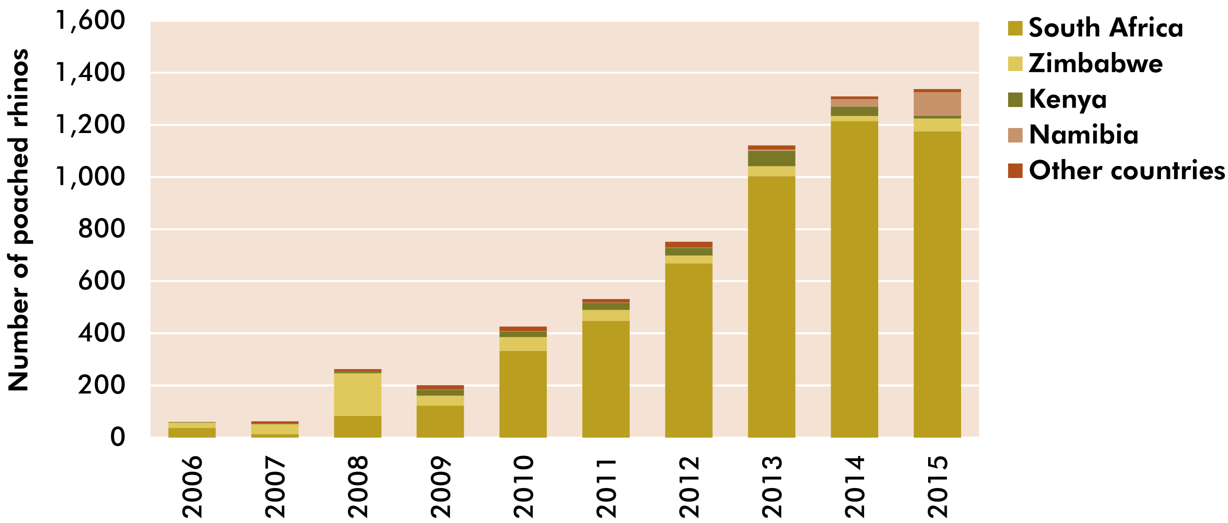
Each rhino carries a small amount of horn,[6] the global total of which is about 130 tons. Government stockpiles account for at least another 27 tons,[7] and it is unclear how much is privately held. Demand for this horn has grown greatly over the past 10 years, driving an escalating wave of poaching. In 2014, most (94%) of the poaching in Africa took place in South Africa, and most (68%) of the rhinos poached in South Africa were taken from Kruger National Park, which is contiguous with Limpopo National Park in Mozambique. Many of these rhinos were taken by Mozambican poachers crossing between the two parks.[8]

In addition to traditional poaching, the high value of rhino horn has driven a peculiar means of evading CITES controls. The white rhino, which is both the most prevalent species and which carries the largest amount of horn, has been on Appendix I since 2005 throughout its range, besides South Africa and Swaziland. In these two countries, it has been placed on Appendix II for the exclusive purpose of allowing international trade in live animals (for zoos and the like) and hunting trophies. The latter exception spurred a practice known as "pseudo hunting", in which staged hunts were held so that horn could be exported to illicit markets.

Beginning around 2006, the number of rhino sport hunting applications for rhinos in South Africa began to increase.[9] Less than 75 applications were received in 2004 and 2005, but this increased to more than 150 in 2006 and to over 200 in 2007. Between 2007 and 2010, an average of 116 rhinos were hunted in South Africa each year, as compared to between 35 and 70 per year previously.[10]

It also became clear that these applications were coming from people with no prior hunting experience, particularly citizens of Viet Nam, a country from which applications had not been received before. The number of sport hunting applications by Vietnamese nationals increased from 84

Fig. 6 Number of rhinos poached by selected countries, 2006-2015



Source: Emslie 2016[11]

(out of 111 applications) in 2009, to 116 (out of 166) in 2010, declining to 112 (out of 222) in 2011.[12] To address this abuse, the South African government took the extraordinary measure of suspending the issuance of hunting licenses to Vietnamese nationals in 2012.[13]

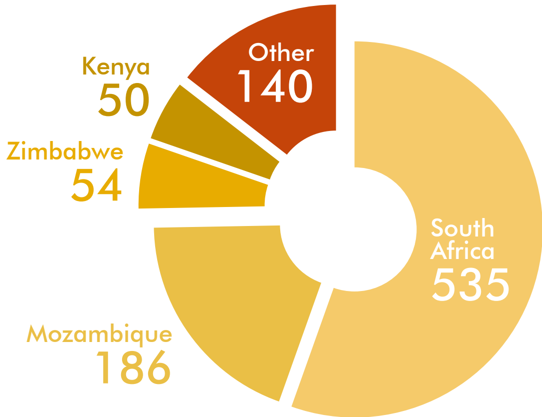
According to CITES documents, in 2011, authorities in the Czech Republic also became aware of hunting applications from other countries not historically associated with the rhino trophy hunting.[14] The investigation revealed that Vietnamese traders (with Czech mediators) had been recruiting Czech citizens to participate in pseudo rhino hunts for several years.[15] During the investigation that followed, at least 24 horns were detected and 16 people in the Czech Republic were indicted.[16]

Further investigations revealed an even wider range of participants. In 2012, a Thai national pled guilty to organizing 26 "fake" rhino hunts and acting as an agent for import and export groups and companies in Thailand and Laos.[17] In 2014, citizens of the United States were charged with conspiracy to sell illegal rhino hunts in South Africa, money laundering and trafficking of rhino horns.[18] The investigation has resulted in the arrest of almost three dozen individuals.[19]

The value of rhino horn became such that professional criminals with no history in the wildlife trade and no connection to source or destination markets began to explore the market. According to media sources, during 2011 and 2012 members of the Rathkeale Rovers, an Irish Traveler group, raided museums and auction houses and stole rhino horns worth a reported sum of 57 million pounds.[20]

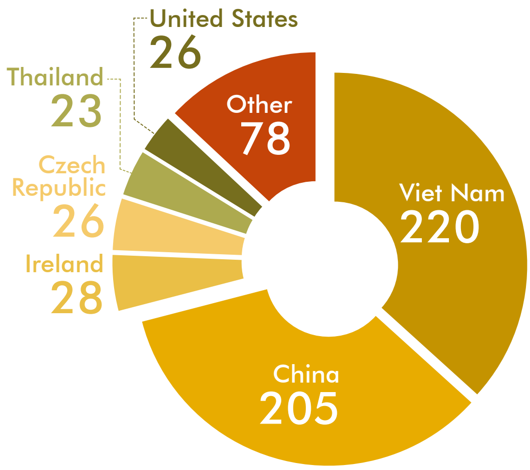
According to World WISE, in order of importance, South Africa, Mozambique, Zimbabwe and Kenya are the main sources of seized shipments (Fig. 1). The United Arab Emirates and European countries (including Slovakia, the Czech Republic, Belgium, Italy and Germany) are indicated as transit countries. And, in order of importance, Viet Nam, China, Ireland, Czech Republic, United States and Thailand[21] are indicated as destination countries (Fig. 2).

Fig. 7 Share of seized rhino horns by country identified as source (kilograms), aggregated 2006-2015



Source: World WISE, conversions applied

Fig. 8 Share of seized rhino horns by country identified as destination (kilograms), aggregated 2006-2015



Source: World WISE, conversions applied

Endnotes

1 Fieldwork at the end of 2015 has indicated a whole horn retail price of about US$26,000 per kilogram. See online methodological annex for details.

2 See online methodological index for details.

3 According to IUCN: https://portals.iucn.org/library/efiles/documents/1999-049.pdf

4 Tom Milliken and Jo Shaw, *The South Africa – Viet Nam Rhino Horn Trade Nexus: A deadly combination of institutional lapses, corrupt wildlife industry professionals and Asian crime syndicates.* (Johannesburg, TRAFFIC, 2012).

5 Richard Emslie, 2012. *Ceratotherium simum*. The IUCN Red List of Threatened Species. Version 2015.2. <www.iucnredlist.org>. Downloaded on 26 August 2015.

6 Some species of rhino have two horns, and some only one. White rhinos, which have two, also have the largest horns, and carry an average of 5.88 kg of horn per rhino. As a result of their size and larger numbers, white rhinos carry 88% of the live rhino horn today. Black rhinos carry 2.65 kg apiece. D. Pienaar, A. Hall-Martin and P. Hitchins, "Horn growth rates of free-ranging white and black rhinoceros", Koedoe, vol. 34, No. 2 (1991), pp. 97-105. All Asian species carry less than one kilogram apiece. See Esmond Bradley Martin and T. Ryan, "How Much Rhino Horn has come onto International Markets since 1970?" *Pachyderm*, vol 13, (1990).

7 In 1994, CITES Resolution Conference 9.14 urged all range States to register, mark and store all horns found (whether from natural mortality, dehorning operations or illegal activity) in a secure location. See

CITES Res. Conf. 9.14 (Rev. CoP15). At the 2011 IUCN/SSC AfRSG meeting, several range States provided estimates of rhino horn stockpiles, which totaled close to 23,700 kg. See CITES Cop16 Doc. 54.2 Annex. In 2013, Zimbabwe reported 4,961 kg of rhino horn in stockpiles (See SC65 Doc. 43.2 Annex 2). Leaks from these stockpiles can (and have recently been) a source of illicit trade. Thefts from museums and illegal sales from private stockpiles are also on the rise. South Africa Department of Environmental Affairs, *Progress Report: rhino poaching*. Portfolio Committee Meeting, 13 November 2012.

8 South Africa Department of Environmental Affairs, *Progress Report: rhino poaching. Portfolio Committee Meeting*, 13 November 2012.

9 See CITES CoP16 Doc54.2. (Rev 1) "Report of the Secretariat": https://cites.org/eng/cop/16/doc/E-CoP16-54-02.pdf

10 Ibid and CITES CoP16 Inf. 38. "Rhino Conservation, the Illegal Killing and Hunting of Rhinoceros in South Africa and Comments on the Proposal Submitted by Kenya to Place a Zero Quota for the Export of Hunting Trophies of White Rhinoceros": https://cites.org/sites/default/files/eng/cop/16/inf/E-CoP16i-38.pdf

11 Richard H Emslie, Tom Milliken, Bibhab Talukdar, Michael H Knight and Susie Ellis (in prep.) 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. CoP15) (2016).

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13 CITES CoP16 Doc54.2. (Rev 1) "Report of the Secretariat": https://cites.org/eng/cop/16/doc/E-CoP16-54-02.pdf

14 CITES SC66 Doc. 51.1 Annex 6 "Report of the Secretariat": https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-51-01.pdf

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17 The Supreme Court of Appeal, 2014. *Lemthongthai v S* (849/2013) [2014] South African Supreme Court of Appeal 131 (25 September 2014).

18 Indictment in United States v. Dawie Jacobus Groenewald et al.: https://www.fws.gov/southeast/news/pdf/RhinoIndictment.pdf? and https://www.justice.gov/opa/pr/owners-safari-company-indicted-illegal-rhino-hunts

19 United States Department of Justice "Operation Crash": https://www.justice.gov/sites/default/files/press-releases/attachments/2014/10/23/operation_crash_summary_october_2014.pdf

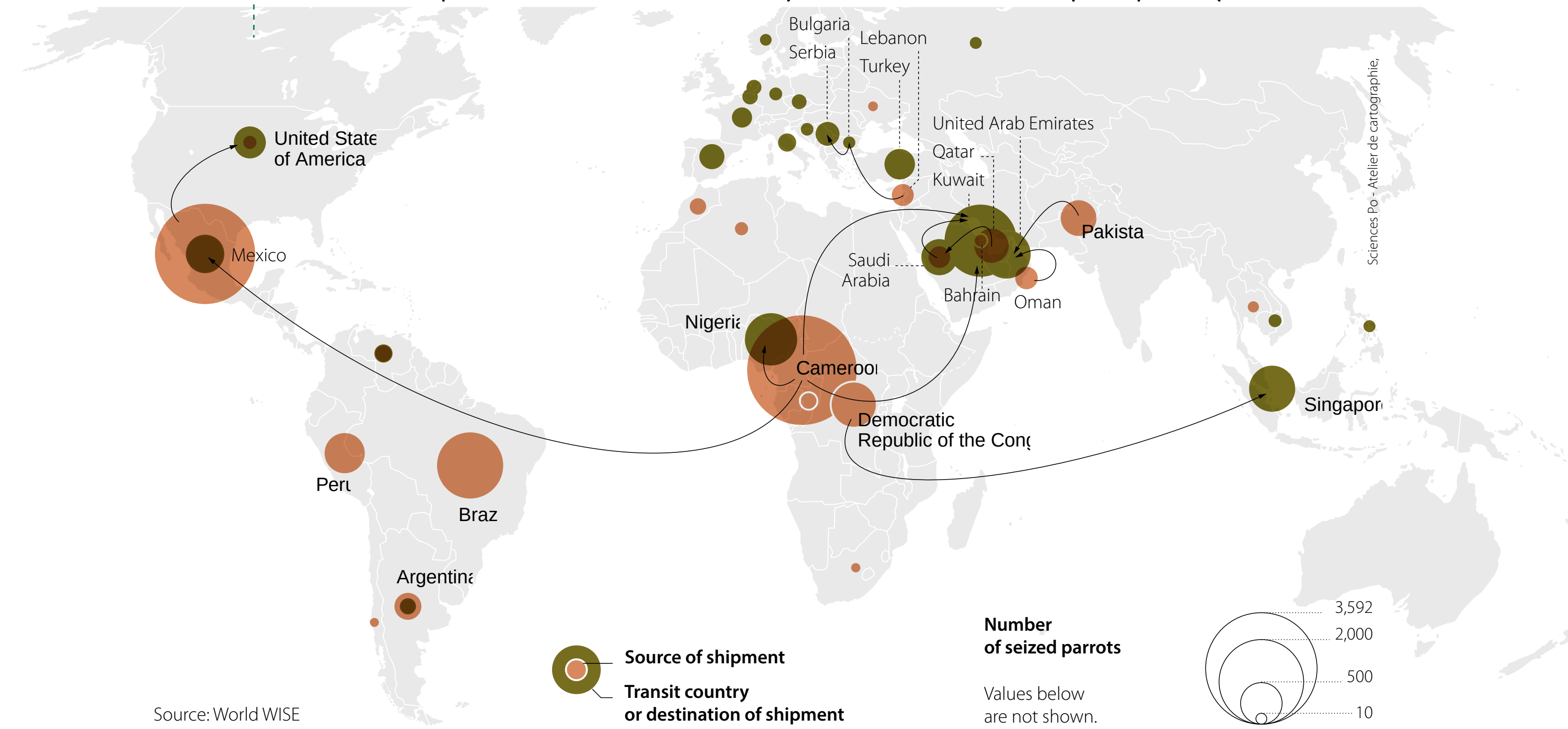
20 BBC News, Museum raids gang guilty over Chinese art and rhino thefts, 29 February 2016: http://www.bbc.com/news/uk-england-cambridgeshire-35667130

21 It is unclear whether the Czech Republic was a transit or a destination country. However, authorities indicated that suspects were connected to the Vietnamese community in the Czech Republic.

PETS, ZOOS, AND BREED

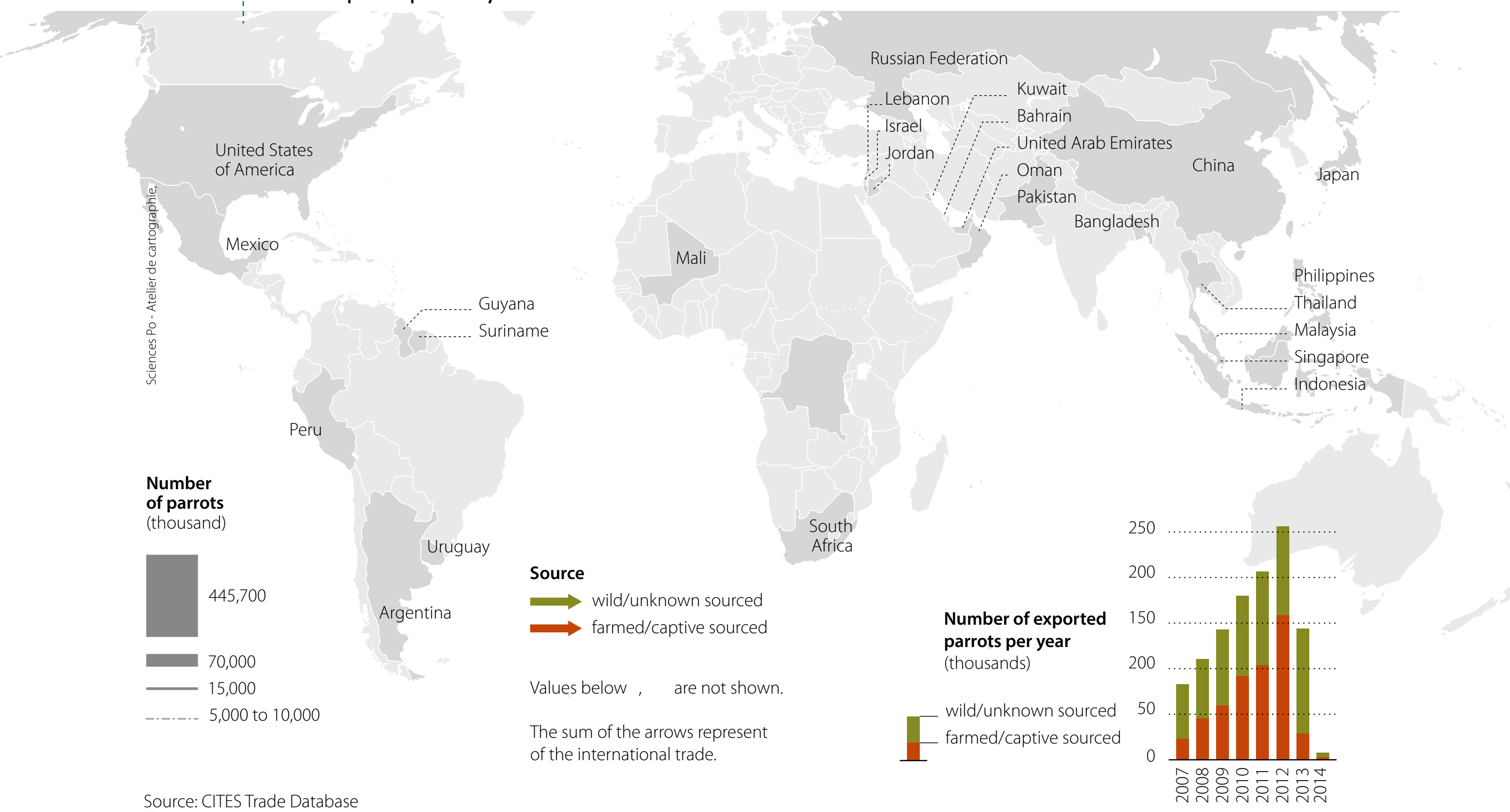
Case study: Live parrots

Map 1 Main flows of parrot seizures, 2007-2014 (New world and Afro-tropical parrots)



Source: World WISE

Map 2 Main flows of legal trade in parrots based on CITES permits, 2007-2014 (New world and Afro-tropical parrots)



Source: CITES Trade Database

Note: The boundaries shown on this maps do not imply o cial endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The nal status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 nal boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Republic of the Congo.[42] In 2016, a notification recommending suspension of trade was issued.[43]

Similar to reptiles, parrot trappers are often unlicensed and have little knowledge of CITES regulations, or even local laws.[44] The illegal market involves many of the same players as the legal market. Generally speaking, once local buyers get an order from exporters, they will place an order with trappers. The local buyers will then travel to the capture sites to prepare the birds for transport. In some cases, the local buyers will accumulate birds until the order is ready and ship them to the exporters. In the Democratic Republic of the Congo many trappers and buyers operate without valid permits and pay little attention to closed periods of capture. According to interviews with trappers and buyers, none of the people interviewed had any knowledge of CITES quotas and had little to no contact with CITES authorities.[45]

As with legally sourced wild parrots, African greys are often illegally sourced by rural people by raiding nests, but they are also taken as adults. Interviews with dealers in Ghana show a huge increase in local prices between the early 1990s and 2014, suggesting growing scarcity and, possibly, demand.[46] Interviews with former trappers in Ghana found that some had actually emigrated to countries with larger parrot populations (Cote d'Ivoire, Liberia and even DRC) when the livelihood became unsustainable in the 1990s.[47]

Trafficking of large volumes of African grey parrots has been detected on numerous occasions, usually with high mortality among the rescued birds. For example, in September 2010, 523 African grey parrots were seized in Kavumu in the Democratic Republic of the Congo on their way to being flown to Singapore, due to clearly fraudulent paperwork. They were sent to a nearby primate sanctuary, where they were held for about three months before they were physically removed by armed men.[48]

International parrot trafficker arrested in Senegal

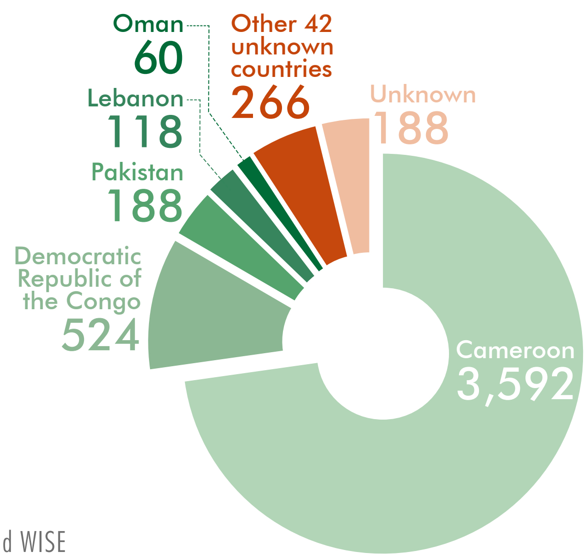
In 2015, an international bird trafficker was arrested by Senegalese police after a lengthy investigation. The trafficker was in possession of almost 800 parrots, 109 of which were African grey Timneh and 80 were Senegal parrots, both of which are CITES listed species. The African grey parrots were accompanied with CITES documentation of Malian origin and were destined for Jordan. Investigations revealed that, for several years, the bird trafficker and his associates had been active in the trafficking of African parrots into Europe, via Spain and Turkey.[49]

Similarly, in 2009, more than 1000 African grey parrots were seized at the Douala International Airport ready to be exported to the Middle East.[50] More recently, an international bird trafficker was arrested in 2015 with connections in African countries and Europe (Box "International parrot trafficker arrested in Senegal").

Following CITES recommendations from the Significant Trade Review, Cameroon developed a management plan for African greys in Cameroon.[51] This document raised concerns around what appears to be an international network involved in parrot trafficking.[52] Investigations revealed many of the international traffickers working with the Cameroonians came from other countries in the region. In northern Cameroon, they came from Chad. In eastern Cameroon, they came from the Central African Republic, Equatorial Guinea, and Gabon. In southwestern Cameroon they came from Nigeria and Ghana.[53] Smuggling of parrots was found to be common along the borders between Cameroon, the Central African Republic, Chad, Equatorial Guinea, and Nigeria.[54] When Cameroonian parrots arrived in a neighboring country, export documents would be prepared, falsely certifying a local origin. Shipping parrots by sea results in high mortality, so they were most often shipped by air. Most confiscations have occurred when the parrots are being transported. Following the moratorium on exports (due to recommendations from the CITES significant trade reviews), illegal trade appeared to increase in Cameroon.[55]

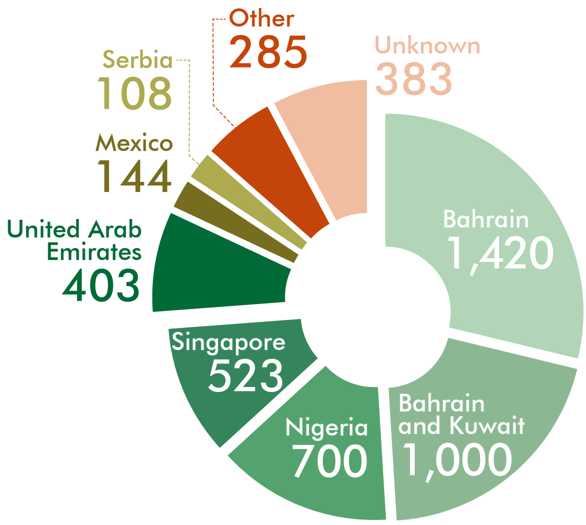
According to World WISE, the majority of African grey seizures indicated Cameroon or the Democratic

Fig. 11 Share of African grey parrots seizures by country identified as source (number of live parrots), aggregated 2007-2014



Source: World WISE

Fig. 12 Share of African grey parrots seized by identified destination country (number of live parrots), aggregated 2007-2014



Source: World WISE

Republic of the Congo as the primary source of shipment. The majority of parrots were destined for the Arabian Peninsula, with Singapore and Nigeria (likely transit countries) both representing a significant share (Fig. 12). Bahrain is the single largest national destination indicated.

Analysis

In 2013, some 325,000 CITES listed parrots were legally exported, of which over a third were reportedly wild sourced. In 2010, the export quota for wild-sourced African greys was 9,000 birds, and 2,701 were seized, according to World WISE records. The large seizure volume compared to legal trade suggests a highly criminalised market, rooted in Central Africa and destined largely for the Arabian Peninsula.

The trade in live animals, for pets or zoos, is especially challenging for wildlife traffickers, because the stresses of international movement often kill off a significant share of the shipment. Parrot species, which are commonly wild sourced in South America and Africa, are especially vulnerable to these shocks. Some of the largest markets for pet birds have banned the import of wild parrots, for health or conservation reasons, and breeders in these regions appear to have been able to satisfy demand, but demand for wild birds remains strong in other regions.

Endnotes

1 See, for example, Human Society of the United States "Pets by the numbers":http://www.humanesociety.org/issues/pet_overpopulation/facts/pet_ownership_statistics.html, and and Pet Food Manufacturers Association, "Pet Population 2013": http://www.pfma.org.uk/pet-population/

2 European Pet Food Industry "Facts and Figures": http://www.fediaf.org/facts-figures/

3 J. Refisch and I.Koné, "Impact of commercial hunting on monkey populations in the Taï region, Côte d'Ivoire", *Biotropica*, vol. 37, (2005), pp. 136-44.

4 D. Stiles and others, eds., *Stolen Apes: The Illicit Trade in Chimpanzees, Gorillas, Bonobos and Orangutans. A Rapid Response Assessment, (*United Nations Environment Programme, GRID-Arendal, 2013).

5 For example, the CITES Secretariat is currently working with the IUCN Primate Specialist Group and GRASP to prepare a report for the 17th meeting of the CITES Conference of the Parties in Johannesburg, (September 2016).

6 See CITES and UNEP "Great apes exported from Guinea to China from 2009 to 2011." January 2014: https://cites.org/sites/default/files/common/docs/CITES-Guinea-China-great-apes.pdf; and John Caldwell, Guinea – an analysis of recent wildlife trade: A confidential report prepared for the CITES Secretariat, April 2012: https://cites.org/eng/com/sc/62/Caldwell_Report.pdf; and SC61 Doc.30, "Enforcement matters": https://cites.org/eng/com/sc/61/E61-30.pdf

7 CITES Website "CITES Secretariat confirms the arrest of former wildlife director in Guinea and applauds national authorities' work": https://cites.org/eng/guinea_arrest_20150903

8 Dan Stiles and others, *Stolen Apes – The Illicit Trade in Chimpanzees, Gorillas, Bonobos and Orangutans.*United Nations Environment Programme, GRID-Arendal (2013).

9 The scale of the trade can be seen in the COMTRADE data and, for protected species, the CITES trade data.

10 For example, the United States' turtle farms annually produce 6-10 million hatchling sliders, map turtles and softshell turtles for the global pet trade and aquaculture. Chinese aquaculture facilities produce and rear millions of Chinese Softshelled Turtles (*Pelodiscus* spp.) for mainly domestic consumption. Peter Paul van Dijk, Director, Turtle Conservation Program at Global Wildlife Conservation, *in litt.*

11 See the IUCN Red List for these species.

12 In 1976, one family of parrots was listed in CITES (family listing of *Psittacidae* spp.). In 1981, all parrots were listed in CITES (parrot order *Psittaciformes* spp.), except four popular parrot species common in the pet trade: the *Agapornis roseicollis* (Rosy-faced lovebird), *Melopsittacus undulatus* (Budgerigar), *Nymphicus hollandicus* (Cockatiel), and *Psittacula krameri* (Rose-ringed parakeet). See CITES Species+ for details.

13 16 USC 4901-4916 "Wild Bird Conservation Act": http://www.fws.gov/le/USStatutes/WBCA.pdf

14 See Official Journal of the European Union, "Commission Implementing Regulation No 139/2013 of 7 January 2013 laying down animal health conditions for imports of certain birds into the Union and the quarantine conditions thereof": http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0139&from=EN

15 From 1985 to 2005, the *Passeriformes* order (perching birds) accounted for 54% and the *Psittaciformes* order (parrots) accounted for 43% of the CITES-listed trade. But in October 2005, the EU implemented a temporary import ban on live birds (due to health concerns) which ran until 2013. In 2007 many of the perching birds were de-listed. After the ban, parrots accounted for 91% of CITES-listed birds in trade; while *Passeriformes* trade dropped to less than one percent, according to the CITES Trade Database.

16 PhilipMcGowan 2008, CITES Non Detriment Finding.

17 Ibid.

18 J.R. Clemmons, *Status survey of the African grey parrot (Psittacus erithacus timneh) and development of a management program in Guinea and Guinea-Bissau*, report to the CITES Secretariat, (Geneva, Switzerland, 2003).

19 If considering the EU as a single exporting market, the EU comprised 6% of the global exports during 1981 to 1993. In such a case it would then be in the top five exporters (the Netherlands and Belgium accounted for 94% of the EU total). The top 10 exporting countries accounted for 84% of the global trade during 1981 to 1993 (Argentina 27%, Indonesia 15%, Tanzania 11%, Uruguay 7%, Senegal 5%, Guyana 5%, Netherlands 4% , Peru 4%, India 3%, and Cameroon 2%).

20 The top 10 exporting countries accounted for 74% of the global trade during 1994 to 2005 (South Africa 21%, China 13%, Netherlands 8%, Pakistan 6%, Senegal 6%, Cuba 5%, Guinea 4% , Argentina 4%,Cameroon 4%, and the Czech Republic 3%).

21 The monk parakeet is considered an agricultural pest and also an invasive species, thus some places have implemented eradication efforts while others have prohibited their import, sale or ownership. J. Newman and others, "Monk Parakeets: An expanding problem on power lines and other electric utility structures", prepared for the Environmental Concerns in Rights-of-Way Management 8th International Symposium, (Saratoga Springs, New York, 12–16 September 2004); C. van Ham, P. Genovesi and R. Scalera, "Invasive alien species: the urban dimension", case studies on strengthening local action in Europe. (Brussels, IUCN European Union Representative Office, 2013), p. 103. Also see the Global Invasive Species Database (2016) Species profile: *Myiopsitta monachus*. Downloaded from: http://www.iucngisd.org/gisd/species.php?sc=1021 on 05-05-2016.

22 The top five groups of New world and Afro-tropical parrots include the Monk parakeet (*Myiopsitta* sp.), African Grey (*Psittacus* sp.), Conures (*Aratinga* sp.), Amazons (*Amazonia* sp.), and the Macaws (*Primolius* sp., *Anodorhynchus* sp., *Ara* sp., *Diopsottaca* sp., *Cyanopsitta* sp., and *Orthopsittaca* sp.).

23 See CITES SC55 Doc.17 "Review of significant trade": https://cites.org/sites/default/files/eng/com/sc/55/E55-17.pdf

CITES AC22 Doc.10.2 "Review of significant trade: https://www.cites.org/sites/default/files/eng/com/ac/22/E22-10-2.pdf

CITES AC26/PC20 Doc.7 "Review of significant trade": https://cites.org/sites/default/files/eng/com/ac-pc/ac26-pc20/E-AC26-PC20-07.pdf and McGowan, 2008, op cit.

24 Nathaniel Annorbah, Nigel Collar and Stuart Marsden, "Trade and habitat change virtually eliminate the Grey Parrot *Psittacus erithacus* from Ghana", Ibis, vol. 158 (2016), pp.82-91.

25 BirdLife International. 2013. *Psittacus erithacus*. The IUCN Red List of Threatened Species 2013: e.T22724813A48141088. http://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T22724813A48141088.en. Downloaded on 18 December 2015.

26 D. Dennison, "A nutritional and financial evaluation of breeding Africa grey parrots (*Psittacus erithacus*)", thesis, University of Stellenbosch, 2004.

27 One study of the trade in wild-sourced African greys found the value of a single bird to grow from US$10 to US$18 for the trapper to US$1,000 for the wholesale buyer. In 2004, the Government of Cameroon issued licenses to individuals to capture and export parrots at a minimum price of US$16 per bird. In 2011, trappers in Cameroon would sell juvenile wild parrots for US$9.50 to US$11.40 (and middlemen would sell to exporters for USD19 to USD28.50. While in the DRC, trappers would sell parrots for US$15 to US$25. See Julius Chupezi Tieguhong, Ousseynou Ndoye and Thierry Ontcha Mpele, "Commodity-Chain Analysis for the Capture and trade in the African grey parrots (*Psittacus erithacus*) in Cameroon*"*, paper for the Eleventh Conference of the International Association for the Study of Common Property, Bali, June 2006; Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), "Strengthening Capacity for Monitoring and Regulation of International Trade of African grey parrot", report prepared by BirdLife Africa Partnership Secretariat, (Geneva, 2013); and CITES SC62.27.3 Cameroon report.

28 CITES SC62 Cameroon report.

29 Some notable differences were the reported imports of African greys originating from the DRC (45,633), the Congo (18,493), Central African Republic (6,183), Guinea (5,280), Cameroon (3,119) and other African countries (893).

30 CITES, Concerning the Democratic Republic of the Congo, Recommendation to suspend trade in African grey parrots, No. 2016/021 Geneva, 16 March 2016: https://cites.org/sites/default/files/notif/E-Notif-2016-021.pdf

31 A number of key African source countries have not yet submitted trade data for 2011 to 2013, thus the reported import data and export data may differ.

32 In April 2011, a group of porters with four crates of African grey parrots was discovered near the Mozambique/South Africa border. The authorities recovered 161 parrots, which were given to a South African parrot trader who claimed ownership. http://www.iol.co.za/saturday-star/state-hands-over-parrots-to-mozambique-1123416.

33 Stephen F. Pires and Gohar A. Petrossian, 'Understanding parrot trafficking between illicit markets in Bolivia: An application of the CRAVED model'. *International Journal of Comparative and Applied Criminal Justice*, Vol. 40, No. 1, 2016.

34 Ibid.

35 http://www.birdlife.org/datazone/sowb/casestudy/165

36 Stephen Pires and Gohar Etrossian,"Understanding parrot trafficking between illicit markets in Bolivia: An application of the CRAVED model", *International Journal of Comparative and Applied Criminal Justice*, vol. 40, No. 1 (2016).

37 Based on WorldWISE data.

38 Close to 300 other parrot species were also seized during this time. See CITES Biennial reports from Portugal.

39 Close to 360 other parrot species were identified during CITES interventions. See CITES Biennial reports from Spain.

40 Cameroon was subject to concern over excess of quotas and was subject to a zero quota for five years. In 2012, Cameroon finalized a population status and management plan for African greys. The zero quota has since been removed with Cameroon having an export quota of 3,000 parrots (2012-2015). African greys were reviewed prior to the establishment of a formalized review process (in 1988). Since that time the species has undergone additional reviews (1992, 2006, 2011). The 2011 review (post Cop15) was to assess those range states that did not already have recommendations in effect.

41 CITES AC26/PC20 Doc.7 Annex 5, "Review of significant trade": https://cites.org/sites/default/files/eng/com/ac-pc/ac26-pc20/E-AC26-PC20-07.pdf

42 CITES Notification Nos. 2013/51 and 2014/017.

43 CITES notification No. 2016/021, op cit.

44 CITESSecretariat (BirdLife), 2013, op cit.

45 Ibid.

46 Nathaniel Annorbah, Nigel Collar and Stuart Marsden, "Trade and habitat change virtually eliminate the Grey Parrot *Psittacus erithacus* from Ghana", *Ibis*, vol. 158 (2016), pp.82-91. Prices cited by seven dealers averaged US$230, but two dealers stated that Grey Parrots could sell for US$330–660 if bought by expatriates. Prices in an earlier study averaged US$8–12, and the birds were generally passed on from dealer to exporter usually for less than US$20.

47 Ibid.

48 In litt. LAGA and Eagle Network 2016. Also see IUCN press release: https://www.iucn.org/news_homepage/all_news_by_theme/protected_areas_news/?22006/Major-trafficker-of-African-parrots-arrested-and-89-threatened-Timneh-parrots-seized and Parrots Daily News http://www.parrotsdailynews.com/senegal-police-arrested-an-international-bird-trafficker/

49 Based on documents provided by Lwiro Sanctuary, DRC. Further information is available in the on-line methodological annex for this report.

50 The Last Great Ape Organization – January 2010 Report: http://www.laga-enforcement.org/Portals/0/Documents/Activity%20reports%202010/Activity%20Report%20-%20May%2010.pdf

51 See CITES docs SC57 Doc 29.1; AC26/PC20 Doc. 7, Annex 5 and SC62 Doc. 27.3, op cit.

52 S. Tamungang and R. Cheke, "Population status and management plan of the African grey parrot in Cameroon", (Ministry of Wildlife, Cameroon, 2012).

53 Ibid.

54 Ibid.

55 Ibid.

SEAFOOD

CASE STUDY: CAVIAR

THE SEAFOOD INDUSTRY

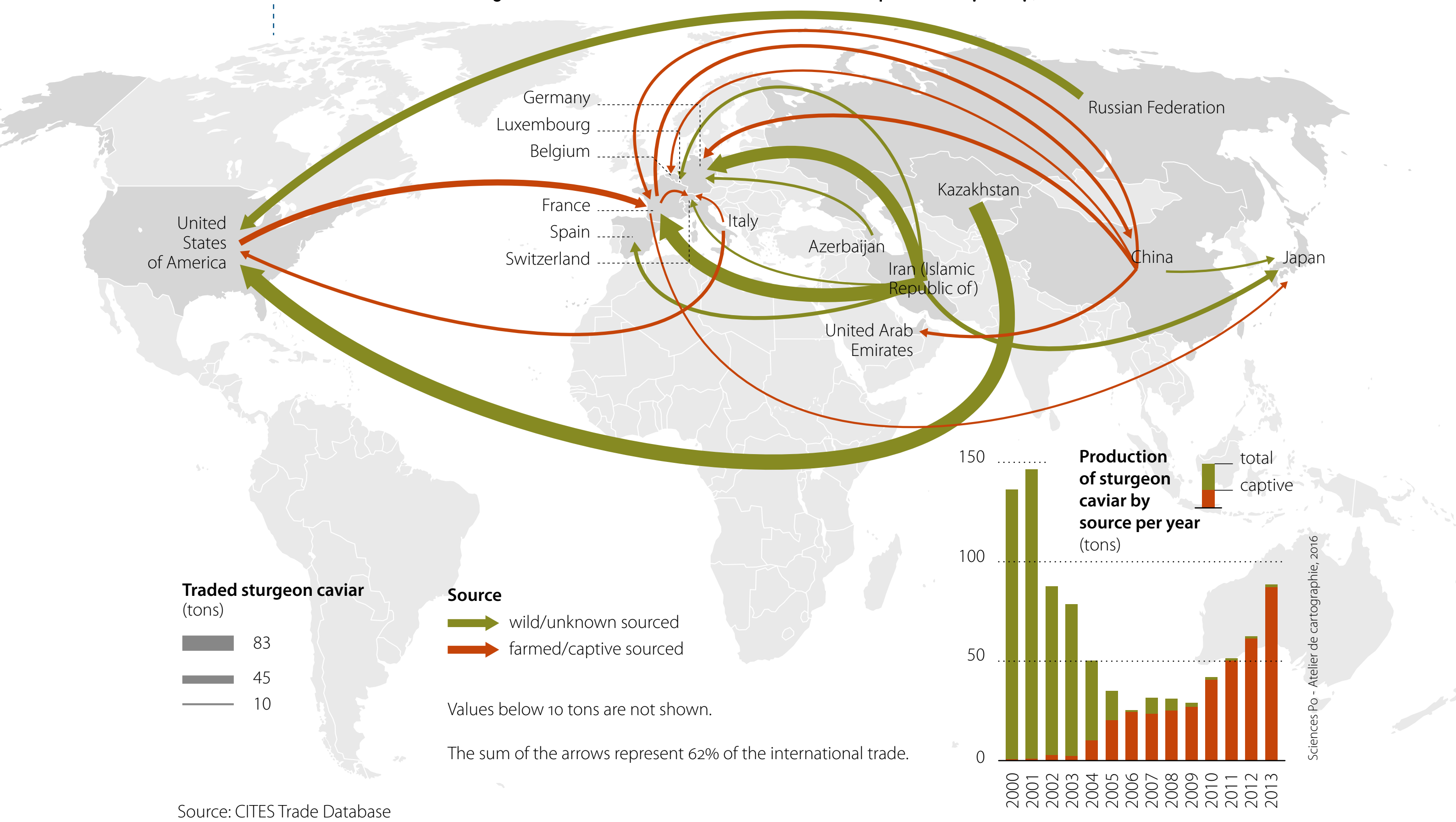
Map 1 Main flows of sturgeon caviar seizures (kg), 1999-2014

In common parlance, the word "wildlife" does not include fish, but this terrestrial bias has little rational basis. Marine species are born and live out their lives in an environment affected, but not controlled, by mankind. Their harvest makes use of a resource that is renewable, but only if not overexploited. And many marine species inhabit a global commons – the high seas – making their sustainable use an inherently international issue.

Aquaculture has grown rapidly, drawing heavily on wild fish for feed. As of 2012, however, most (57%) of the world's fish supply came from the wild (Fig. 1). This resource is of immense importance to humanity, as a source of both food and livelihoods. FAO estimates that 17% of the animal protein consumed by people globally comes from fish.[1] The global fishing industry generates more than 220 million jobs,[2] and direct employment in fishing has nearly doubled in recent years, from some 31 million fishermen in 1990 to 58 million in 2012.[3]

Fish are widely traded internationally, with most regions both importing and exporting large quantities of fish. For example, between 2008 and 2010,

Map 2 Main flows of Sturgeon caviar trade based on CITIES permits (tons), 2000-2013



Source: CITES Trade Database

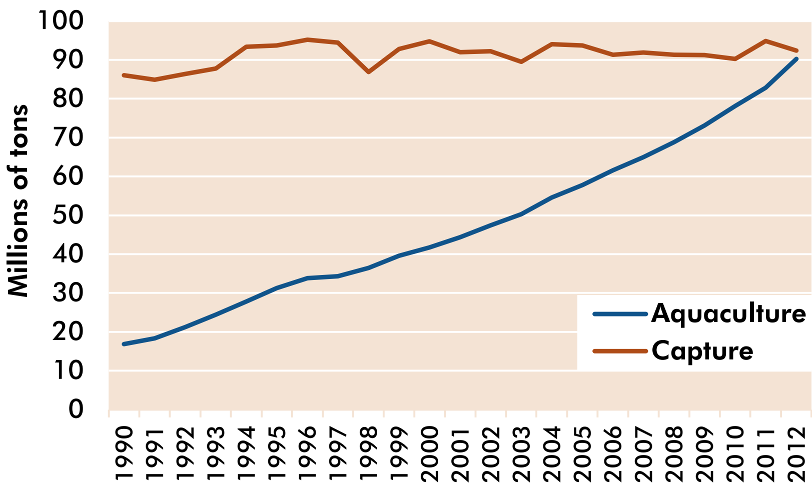
Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 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 final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Europe exported an average of US$6 billion worth of fish per year to Asia, while Asia exported US$8 billion worth of fish to Europe.[5] The world's leading fishing firms are multinational conglomerates – often catching fish in one region, processing it in another, and selling it in a third – but small-scale fishing remains important in many parts of the world.

Both consumption and trade have grown rapidly. People eat twice as much fish per capita today as they did in the 1960s.[6] In 2012, the world's supply of fish as food was over 19 kilograms per capita. In 1962, some 43 million tons of fish were consumed; by 2012, it was 158 million.[7] In 1976, the world fish trade was worth US$8 billion per annum. By 2012, it was worth $129 billion.[8]

Developing countries are especially dependent on fish as a resource. In some, fish provide more than half

Fig. 2 Volume of fish production by aquaculture and capture fisheries (millions of tons), 1990-2012



Source: FAO FIGIS[9]

of all animal protein consumed.[10] Exports of fish from developing countries grew from around US$9 billion in 1989 to more than US$35 billion in 2012, more than any other agricultural commodity.[11] Income can also be gained by selling fishing rights to countries better placed to exploit this resource, and these revenues can provide a significant share of government funding. For example, both Mauritania and Guinea-Bissau

What does "fully exploited" mean?

It is often reported that a large share of fish stocks globally are "fully exploited or over-exploited", but, in fact, only 29% of stocks were deemed overfished in 2011, less than in 2008.[12] "Fully exploited" actually means "optimally utilized", and the goal is to bring 100% of the world's fish stocks to this level of sustainable use. Under Article 62 of the Convention on the Law of the Sea, Member States are required to fully make use of their fish stocks, or provide others with the opportunity to do so.

The coastal State shall determine its capacity to harvest the living resources of the exclusive economic zone. Where the coastal State does not have the capacity to harvest the entire allowable catch, it shall … give other States access to the surplus of the allowable catch …[13]

Illegal, unreported and unregulated fishing (IUU fishing) confounds this objective, because if regulated offtake achieves maximum sustainable yield, all unregulated taking will, by definition, lead to overexploitation. Overexploitation, often involving illegal fishing, has led to fisheries collapse on many occasions.[14] Illegal offtake needs to be assessed when calculating how much fish can be harvested sustainably.

The technical challenge of establishing the allowable catch is another matter. Developing countries may lack the tools and resources to accurately make population assessments. While states that agreed to the 1982 Fish Stocks agreement are urged to be cautious,[15] commercial pressures may override environmental concerns where clear data are lacking.

are reported to derive more than 40% of their national revenues from the sale of fishing rights to the EU.[16]

Given the volume and complexity of this trade, it is not surprising that illegal fish are introduced into the supply chain. In a resolution adopted in November 2012, the UN General Assembly expressed its concern:

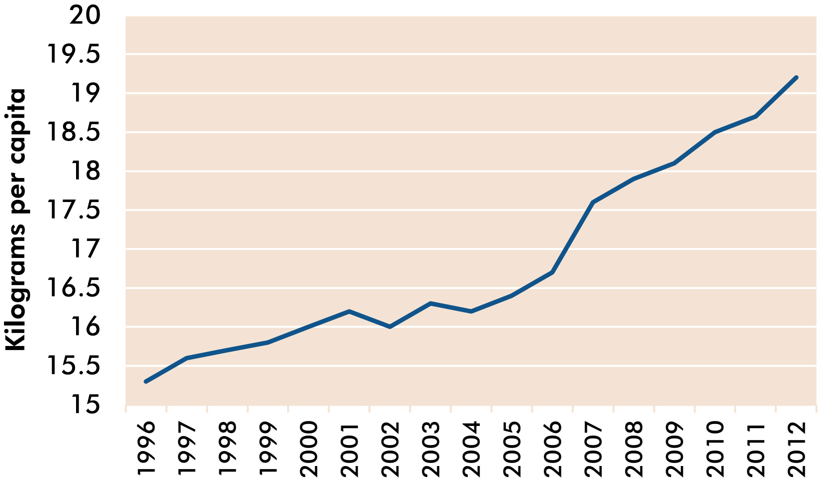
… that some operators increasingly take advantage of the globalization of fishery markets to trade fishery products stemming from illegal, unreported and unregulated fishing and make economic profits from those operations, which constitutes an incentive for them to pursue their activities.[18]

Understanding this terminology – "illegal, unreported and unregulated fishing", often referred to as "IUU fishing" – is key to understanding fisheries crime. The term has no standard definition, but the most widely accepted one is very broad, encompassing all activities that fall outside the mechanisms established for international regulation of fishing.[19] Criminal intent is not required.

For IUU fishing to be regarded as a criminal offence, it needs to be defined as such in the relevant national legislation. CITES implementation laws, which sometimes have criminal provisions, apply to specimens introduced from the high seas, as well as those traded internationally. Although the number of marine species covered under CITES was expanded in 2013,[20] relatively few fish species are CITES listed. Most of the marine species listed by CITES are not finned fish, and most of the fish species listed are not part of large-scale commercial fisheries.[21] The listing of most sturgeon species is exceptional in this regard.

As a result, this report does not touch on what is likely the largest component of illegal fishing: the unauthorized taking of commercial seafood from national waters by international vessels. While some of these vessels target specific species, their catch is generally destined for general consumption. The case study that follows, in contrast, focuses on caviar, a luxury product that has increased in value as the wild population has collapsed.

Fig. 3 Global per capita production of fish to be used as food (kg), 1996-2012



Source: FAO[17]

Case Study: Caspian sturgeon caviar

Caviar is made from the unfertilized eggs of the *Acipenseridae* family (sturgeon and paddlefish), a group of scale-less fish that have been around since the early Jurassic. They are diadromous, like salmon, meaning they live most of their lives in salt water but are born in freshwater, and return there to reproduce. They are one of the largest fish appearing in fresh water, capable of growing to over one metric ton during their lifetimes, which can exceed a century. There are 28 sturgeon and paddlefish species in the world, the bulk of which are

Marine turtles

Marine turtles are highly migratory and are found all over the world.[22] Some species can take up to 35 years to reach sexual maturity[23] and their survival rate to adulthood is quite low (about one egg out of 1,000).[24] One study of hawksbill turtles found that an adult female requires at least nine years of reproduction to replace itself.[25] These characteristics render them vulnerable to overexploitation.

All seven species are listed on CITES Appendix I, so commercial international trade of wild sourced marine turtles is not permitted. Domestic trade is permitted in some countries, however, particularly the harvesting and sale of eggs.

Prior to the international trade ban, Europe, Japan, and the United States were the primary markets for marine turtle products. Japan alone imported the equivalent of about 30,000 hawksbill turtles annually during the 1970s and 1980s.[26]

While the eggs and meat are consumed as food, the illegal international trade primarily consists of ornamental objects, including whole stuffed turtles, whole polished shells, and products made from the shell.[27] Poaching appears to be most problematic in the "Coral Triangle", particularly waters around Indonesia, Malaysia and the Philippines.[28] One hot spot for poaching appears to be the Derawan Archipelago of East Kalimantan, Indonesia. More recent seizures have been made in the South China Sea and Sulu Sea.[29] Multiple seizures have involved Chinese and Vietnamese nationals.[30] WorldWISE records the seizure of approximately 3,600 turtles and 31,500 eggs between 2005 and 2014, including domestic seizures.[31]

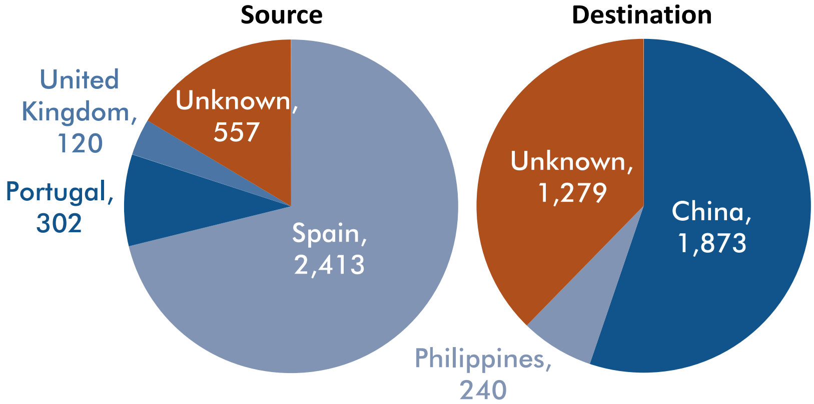
In addition to being slow to reproduce, marine turtles are not worth much on an individual basis. Eggs typically sell for around US$1.50 apiece and the value of a whole turtle shell averages between US$400 and US$600.[32] As a result, the prospects for commercial farming are not good and wild turtles are likely to be poached so long as a retail market for turtle products exists.

Glass eels

Eels are widely consumed as a food in Asia, particularly China and Japan. Breeding eels has proven problematic, so nearly all the global eel supply comes from wild sourcing. Most eels are captured during seasonal mass migrations as juveniles, before they acquire pigmentation. These "glass eels" are then grown to adult size at farms in Asia, particularly China.[33]

Japanese eels[34] were traditionally consumed, but when populations began to dwindle, European eel[35] imports increased. Today, Japanese eel is considered endangered and European eel critically endangered, according to the IUCN. In 2009, the listing of the European eel on CITES Appendix II came into effect, and in December 2010, the EU imposed even stricter measures, banning exports from the Union.[36] As a result, demand for American eel[37] and Philippine mottled eel,[38] began to rise, and large illicit shipments of European eel began to be regularly detected. According to World WISE, at least 3.4 metric tons of glass eel were seized between 2011 and 2015, accounting for millions of individuals and worth as much as US$7 million in destination markets.[39]

Share of glass eel seizures by country identified as source and destination (kilograms), 2011-2015



Source: World WISE and other sources[40]

Smuggling of glass eels from Europe involves direct movement from the main European Union source countries (France, Spain, and Portugal and the United Kingdom) to East Asia, primarily though air freight, often mislabeled as other fish products. The value of the glass eels – up to US$2000 per kilogram in destination markets – is such that air couriering has been detected.[41] Some detected shipments have transited Eastern European countries (including Albania, Bulgaria, Greece, Hungary, and the Former Yugoslav Republic of Macedonia), as well as Morocco and the Russian Federation.[42]

The Spanish Civil Guard has carried out several operations against eel trafficking, revealing cooperation between Iberian and Eastern European smugglers, making use of fraudulent documentation.[43] In 2011, working with the Bulgarian authorities, 14 people were arrested and 1.5 metric tons of eels were seized.[44] In 2014, authorities arrested 13 people seizing hundreds of kilograms of glass eels.[45] In 2016, more than 600 kilograms of glass eels were seized at international airports on at least 12 different occasions. Of these, 340 kilograms were seized by Chinese authorities in Hong Kong, China,[46] and 250 kilograms were seized in Spain.[47]

found in three broad areas,[48] all in the Northern Hemisphere:

- North America
- The Danube Basin
- The Caspian Sea and its tributaries

In the 19th Century, there was a period of time when most of the world's caviar came from the United States, but overexploitation led to the collapse of stocks.[49] There was a brief revival of this sturgeon and paddlefish harvesting in the 1980s, largely for the domestic market, as trade embargos cut off the traditional sources of supply.[50] The drastic decline of populations during this time led to strict controls, and although occasional poachers are detected, the United States is not an international source of wild caviar today.[51]

The Danube Basin is home to a number of sturgeon species prized for their caviar, including the famed beluga. Recent research has documented irregularities in the caviar markets of the region, although the extent of this activity is unclear.[52] The research does not exist to give a good estimate of the number of sturgeon in the Danube Basin, but it is generally regarded as much smaller than that of the Caspian. Due to these small numbers, illegal exploitation may have a severe conservation impact, but is unlikely to be a major source of criminal revenues.

As a result, this chapter focuses on what historically has been regarded as the source of the world's greatest caviars: the Caspian. Essentially a salt water lake, cut off from the oceans long ago, the Caspian provided a refuge in which the massive sturgeon could proliferate to great numbers. The countries bordering the Caspian Sea have long pursued the sturgeon for its roe, and, for most of this time, the resource seemed inexhaustible. At the turn of the 20th Century, close to 30,000 tons of sturgeon were harvested annually, and older accounts suggest even greater volumes. In the following decades, harvests have fluctuated, peaking again at close to 30,000 tons in the late 1970s and early 1980s, when over 90% of global landings were made in the Caspian.[53] The Caspian is home to the three most famed varieties of caviar:

- beluga (from *Huso huso*)
- osetra (from *Acipenser gueldenstaedtii* and *Acipenser persicus*) and,
- sevruga (from *Acipenser stellatus*)

Of these, the beluga sturgeon is largest, rarest, and most prized. Top grade beluga sturgeon caviar can retail for upwards of US$10,000 per kilogram,[54] and about 10% of the weight of a mature female sturgeon can be roe.[55] On a per animal basis, sturgeon is worth more than any terrestrial animal besides perhaps rhino. It is not surprising, then, that poaching has long been a feature of the global caviar market.

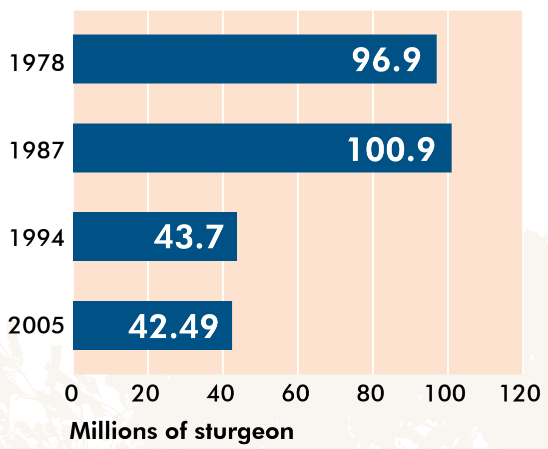
Supply

The current status of the Caspian sturgeon is uncertain. There have been no recent international population surveys. According to official estimates, the Caspian saw its population halved in the late 1980s and early 1990s.[56] Since that time, population declines have been reflected in decreasing catch volumes. In 1980, some 30,000 tons of Caspian sturgeon were landed, but reported catches have plummeted since that time.

In 1998, all species of sturgeon not previously listed were included in CITES Appendix II, and in 2000, export quotas were implemented.[57] This protection covers both sturgeon meat and caviar, which comprise distinct markets. The quota for exports of wild caught sturgeon declined until it became zero in 2011. During most of these years, exporters were not even able to meet their quotas, reflecting the scarcity of the species.

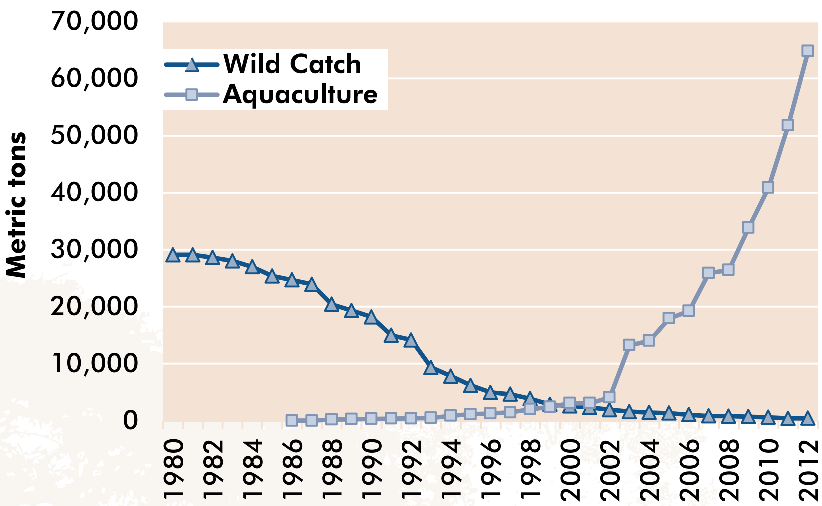
Poaching is just one of many reasons the stocks are declining, but it may be a pivotal one. The progressive

Fig. 4 Estimated Caspian Sea sturgeon population (millions), selected years



Source: Khodorevskaya, Ruban and Pavlov, 2009[58]

Fig. 5 Global sturgeon meat production by source (wild catch and aquaculture) (metric tons), 1980-2012



Source: FAO

obstruction of the fresh waterways feeding the Caspian has deprived the sturgeon of their spawning areas, and so the population today is dependent on restocking. Restocking efforts continue, but since they are often financed from revenues generated by the catch, they appear to be spiralling downward. The reduction in the share of breeding females in the population has led experts to proffer a pessimistic prognosis for Caspian sturgeon populations.[59] In 2010, the IUCN declared sturgeon to be more critically endangered than any other group of species.[60]

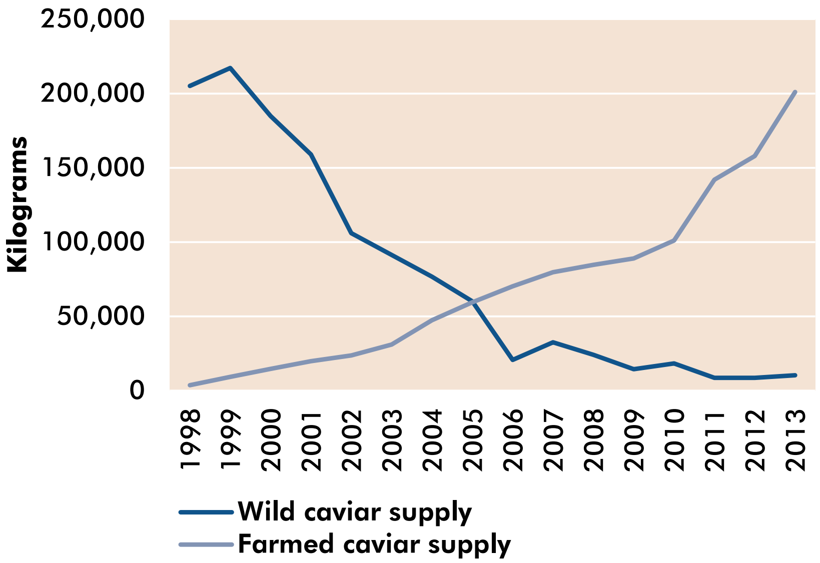
This progressive decline in the wild sturgeon catch prompted widespread aquaculture projects, aimed at producing both sturgeon meat and caviar, which became productive in the early 2000s. By 2012, aquaculture production was more than 60,000 tons of sturgeon meat, double what the catch had been in 1980. But while almost all the wild catch in the 1980s came from the Caspian Sea, exported by the former Soviet Union and the Islamic Republic of Iran, China produces most of the world's sturgeon today.

Caviar production is different from sturgeon production. Most sturgeon harvested for their meat are taken when they weigh about one kilogram, long before they are capable of producing roe. The premium varieties of caviar come from fish such as the beluga, which can take well over a decade to reach sexual maturity, so while farmed sturgeon production quickly surpassed the wild catch, it has taken more time for farmed caviar to fill the market gap. Exports of wild caught caviar declined from over 500 tons in the early 1980s to virtually nothing as CITES controls were implemented. This decline in availability caused a sharp rise in prices in the early 2000s, and a corresponding rise in trafficking.

Most farmed caviar production today comes from the Siberian Sturgeon (*Acipenser baerii*), which can mature in three to four years under the optimal conditions found in a sturgeon farm, with each fish reaching about eight kilograms and producing just under a kilogram of caviar apiece. The most commonly farmed sturgeon producing a premium caviar is Russian Sturgeon (*Acipenser gueldenstaedtii*), sourced of the famed osetra. Aquaculture production of all species combined reached 240 tons in 2014, which, if it were all exported, would restore the global caviar supply to levels last experienced in the late 1990s.[63] It appears that the price of caviar is already responding to this growing availability, and seizures of contraband have also declined precipitously.

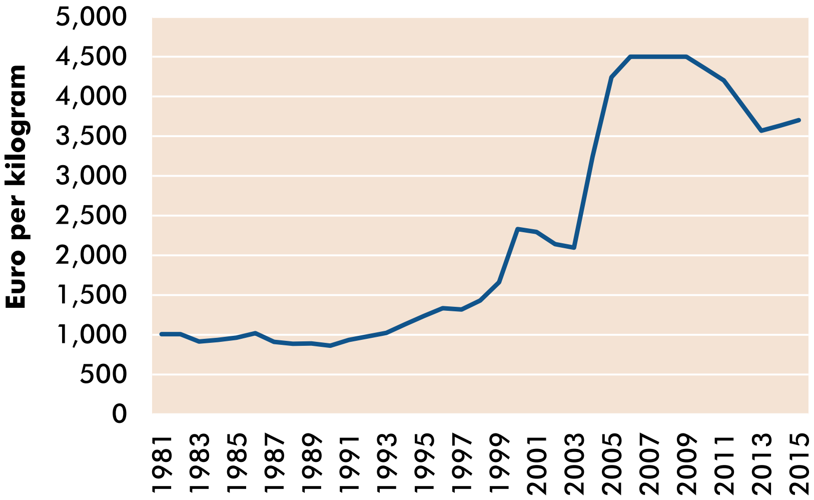
Although current estimates of the global sturgeon population are not available, it is likely the wild biomass today is considerably less than that of the farmed population, estimated to be on the order of 300,000 tons.[64] Thus, there are likely more sturgeon in captivity than in the wild today.

Fig. 6 Exports of wild-sourced caviar and aquaculture caviar production (kilograms), 1998-2013



Source: CITES Trade database, UNODC Research[61]

Fig. 7 Average retail price of osetra caviar in selected countries (euro/kg, current price), 1981-2015

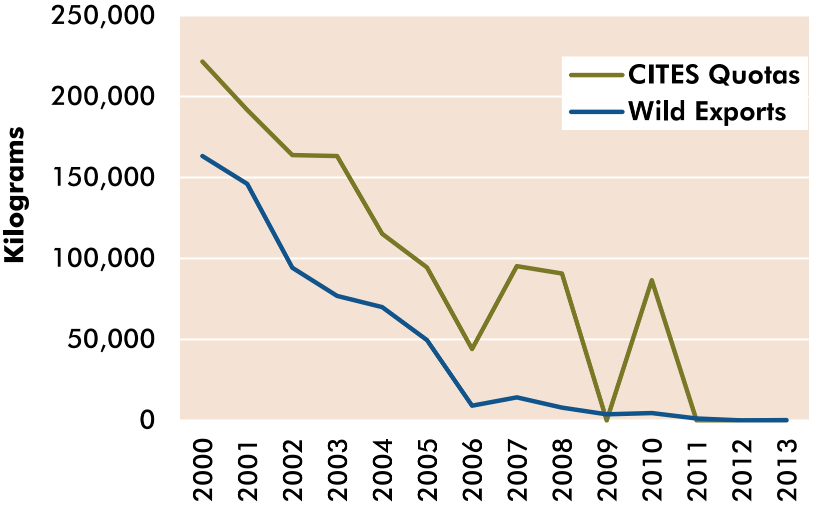


Source: Petrossian, A. 2006, and Jones, A. 2015[62]

Legal trade

As noted above, the legal international trade in caviar has been transformed in the last two decades, from one

Fig. 8 CITES Caspian caviar export quotas and CITES-listed exports of wild caviar (kilograms), 2000-2013



Source: CITES Trade Database

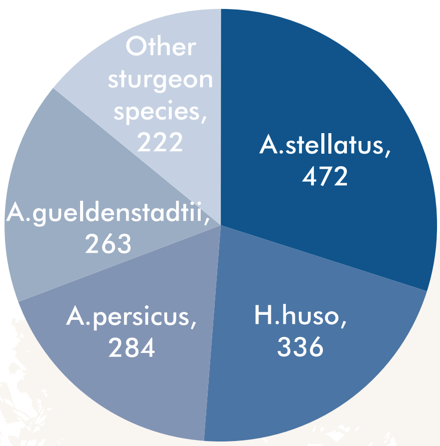
that was almost entirely sourced from the Caspian Sea catch to one that is almost entirely supplied by aquaculture. This transition led to a period when the legal caviar supply was much less than demand, presenting an opportunity for organized crime. In addition, four of the five Caspian Sea states were parts of the Soviet Union, where caviar had been a state monopoly. Organized crime developed in the interval between the collapse of the old regime in the late 1980s and the development of new regulatory systems to replace it.[65]

These dynamics are reflected in the price statistics. Despite the decline in the official production of wild-sourced caviar from over 600 tons in the mid-1980s to about 200 tons in 2000, the price of osetra remained fairly stable. This is precisely the time when the black market for caviar was at its height. The sharp spike in prices between 2002 and 2006 suggests a supply squeeze during this period, and the persistence of these high prices likely reflects continued scarcity relative to the 1980s. Prices began to fall as farmed production came on line in the mid-2000s, but are likely to remain higher than they were in the days when catches were plentiful.

From 1998 to 2013, CITES export permits show that the leading wild caviar exporting nations were the Islamic Republic of Iran, the Russian Federation, and Kazakhstan, all Caspian states, followed by the United States. Based on the trade statistics presented to CITES between 1998 and 2013, 80% of the wild sourced caviar exported during that period came from the three best known Caspian grades: beluga (from *Huso huso*) osetra (from *Acipenser gueldenstaedtii* and *Acipenser persicus*) and sevruga (from *Acipenser stellatus*).

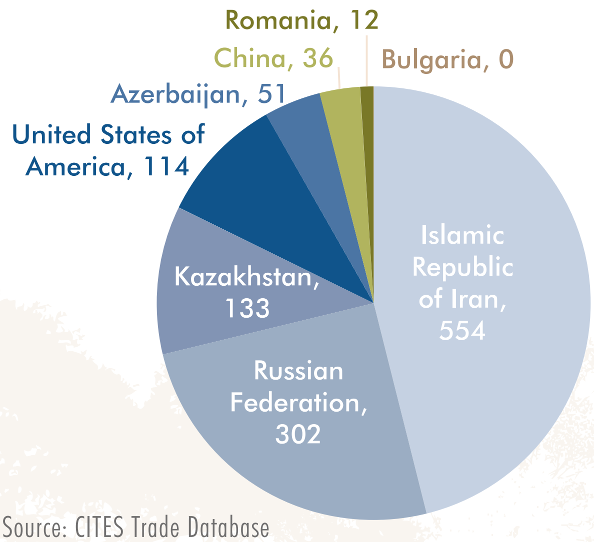
The CITES permits issued between 1998 and 2013 show the leading importers of wild sourced caviar to be the European Union, the United States, and Switzerland. Within the EU, France and Germany are the largest importers. Besides their role as consumers, France, Germany, and Switzerland are also important 'transit' points for caviar, re-exporting over half of the caviar they import. Some source countries, such as the US and the Russian Federation, consume a good share of the caviar they produce.[66]

Fig. 9 Share of CITES-listed legal wild s ourced imports of caviar by species (metric tons), aggregated 1998-2013



Source: CITES Trade Database

Fig. 10 Share of CITES-listed legal wild sourced imports of caviar by source country (metric tons), aggregated 1998-2013



Source: CITES Trade Database

Illegal trade

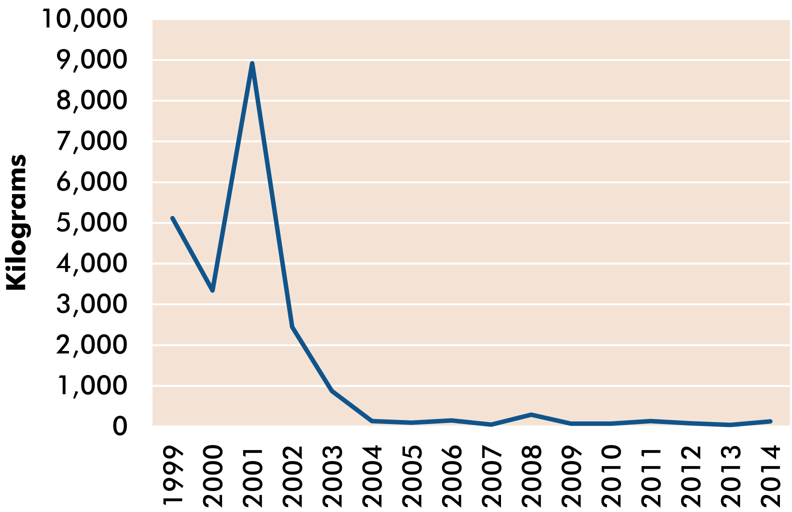
Perhaps not surprisingly, what is known about the illicit market in caviar closely parallels the licit market. As a delicate fresh food product, there does not appear to be a big international underground market for caviar today. Those willing to spend hundreds of dollars on a few ounces of roe want the prestige and quality guarantee associated with a brand name and a trusted retail outlet.

After a few notable prosecutions of major importers,[67] it appears few major labels are packaging or retailing illegally sourced caviar. CITES packaging standards have also proven effective, and have made an important contribution to improving the traceability of caviar in trade and facilitating enforcement of CITES provisions.[68] Forensic testing of caviar samples in the US show a decline in mislabeled caviar from 19% in 1995-1996 (before the CITES listing) to 10% in 2006-2008 (after international controls were in place). In the latter period, all of the fraudulent caviar was found on-line – none of the samples from retail outlets were mislabeled.[69] This level of compliance compares very favorably to forensic studies of other seafood products.[70]

Tracking this trend in the seizure data requires a broad time frame, stretching back to the late 1990s. Fortunately, World WISE incorporates data from the United States, which at the time was the leading legal market for caviar exports, extending back this far. In 2001, nearly nine metric tons of caviar were seized in the United States, including 16 seizures of over 100 kilograms. In 2013, less than 40 kg was seized, with the largest seizure being 16 kg. In addition, while large volumes of face cream allegedly containing caviar extract and lacking CITES permits have been seized, there have been very few notable seizures of caviar made in Europe in recent years.

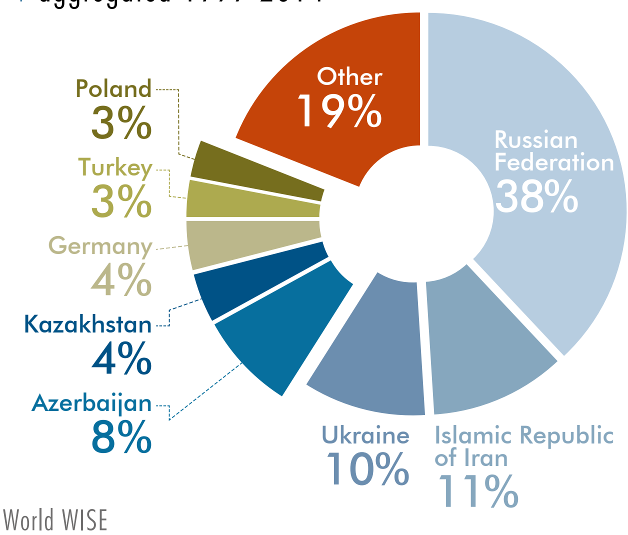
According to World WISE, the Caspian states, particularly the Russian

Fig. 11 Seizures of caviar in the United States (kilograms), 1999-2014



Source: US Fish and Wildlife, LEMIS data

Fig. 12 Share of caviar seizures by country identified as source, aggregated 1999-2014



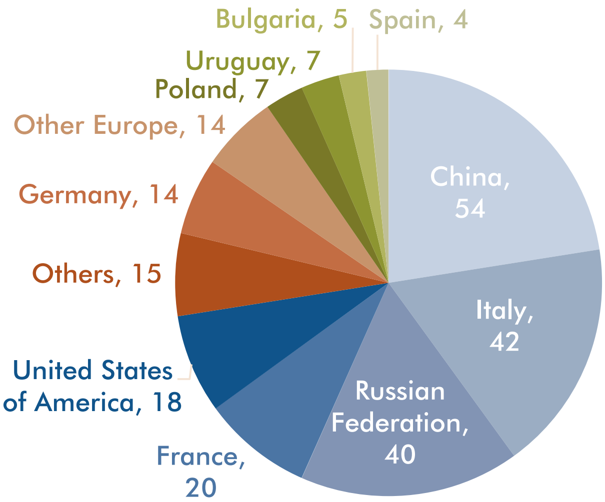
Source: World WISE

Federation, were the origin of most of the caviar seized during this broad time period, although some seizures indicated a Ukrainian origin. The provenance, or immediate source of the shipment, was also most frequently the Caspian source countries, but Ukraine, Germany, Turkey, and Poland were often within the trafficking routes. While there have been a few large seizures of caviar sent through the post, most recent seizures involved small quantities of commercially packaged caviar taken at airports.

It is possible, of course, that international caviar traffickers have responded to interdiction with increasingly sophisticated smuggling techniques, and that these methods have been successful in evading controls to the present day, though no evidence for this has been found. Another possible explanation is:

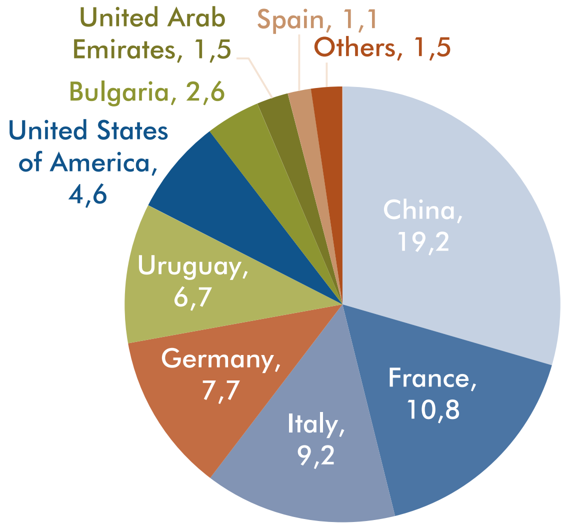
- wild-sourced Caspian sturgeon became so scarce that even criminals had a hard time getting hold of it;
- what they were able to find was distributed locally; and,
- the international illicit market was subsequently displaced by the growth of farmed sturgeon.

Fig. 13 Global farmed caviar production by country (metric tons), 2014



Source: Survey of caviar producers[71]

Fig. 14 Share of CITES-listed legal farmed caviar exports by country of export (metric tons), 2012



Source: CITES Trade Database

It also remains possible that wild-sourced caviar is being passed off as a farmed product. This "laundering" would be best detected by looking for anomalies in the legal trade, such as exports of large quantities of farmed caviar from countries without the capacity to produce this volume.

Based on a survey of registered producers,[72] some 240 metric tons of farmed caviar was produced in 2014, up from just over 200 metric tons the year before. China leads the world in farmed caviar production, with 54 metric tons of sales in 2014, followed by Italy and the Russian Federation. After accounting for domestic consumption, it might be expected that these three countries would lead the world in farmed caviar exports.

Recorded exports of farmed caviar account for about half estimated production in 2012 (65 out of 158 tons that year). All countries reporting large exports of farmed caviar have documented caviar farming capacity, although some clearly re-export caviar farmed in other countries. The Russian Federation and the Islamic Republic of Iran, formerly the two largest exporters of caviar, are not on the list of key exporters.

Analysis

The caviar story illustrates the way that the growth of farming can reduce demand for illegally sourced wildlife in international markets. International trafficking of caviar has clearly decreased since the late 1990s, as evinced in dramatically reduced seizures. Tighter trade controls and the availability of an affordable and comparable farmed product appear to have been effective in this respect.

On the other hand, reduced trafficking can also be attributed to dwindling stocks, which is tragic on several levels. Aside from the loss in the wild of a species that has thrived from pre-history, a distinctive wild-sourced product with an illustrious history – Caspian caviar – has all but disappeared from international markets. Countries that previously benefitted from billions in exports have lost this resource, as well as the livelihoods associated with it.

Media reports continue to highlight sturgeon poaching around the Caspian and paddlefish poaching in the United States, but in recent years, very little caviar has been seized while being trafficked across international borders. If there is poaching, the caviar appears to be destined for the domestic markets of the range countries. As discussed above, research has also indicated irregularities in the Danube Basin, which could be feeding markets within the European Union.[73] An additional concern is the potential for farming operations to launder wild-caught sturgeon, used either as breeding stock or directly as a source of roe.

What size is the illicit market today? In 1987, when caviar was a Soviet monopoly, the estimated sturgeon population in the Caspian was around 100 million, and the reported catch was just under 20,000 tons of sturgeon. This suggests a catch rate of one ton of fish for every 5000 sturgeon in the Sea. In 1994, after the dissolution of the Soviet Union but before the CITES listing of the main caviar species, the population was estimated at about 44 million and the catch was about 5000 tons, suggesting a catch rate of one ton for every 8800 sturgeon. As the population declined, it was clearly getting harder to find the remaining fish. In 2005, after the imposition of international controls, the official estimated population remained close to 44 million, but the harvest had dropped to only 770 tons, or one ton per every 57,000 sturgeon. The caviar export quota for 2005 was not met: some 98 metric tons were permitted, but only 54 were exported.[74]

For 2015, there is a zero export quota for caviar from wild-caught Caspian sturgeon, so the international market is entirely illicit.[75] A current population estimate is not available, but all indications are that the past decade has not been good for the Caspian sturgeon.

Without seizure or population data, poaching estimates are highly speculative. Comparing reported Caspian catches and caviar exports from 1998 to 2004, it appears between about 5% and 7% of the catch weight was exported as caviar, with an average of 5.6%. If this ratio held true today, and the catch declined as indicated above, then perhaps 20 tons of illegal caviar would have been taken in 2015. While this is not an insignificant amount of caviar, lack of international seizures suggest it is likely destined for domestic markets. Even if the actual catch was ten times this amount, the economic value of this criminal market would be relatively small compared to other illicit markets, although the ecological impact would not be.

Of course, it is possible that unknown changes in the illicit market have transpired, making it impossible to extrapolate trends from the old data. The catch rate could have been radically improved by technical innovations, and the broadening of the EU's borders in recent years may have provided novel, and yet undetected, methods for introducing illegal catch. Recent research on the Danube has indicated a large share of detected adult sturgeon are male, suggesting poaching during the upstream migration.[76] From a conservation perspective, every individual taken today poses a higher threat to the species than in the past, and so while the criminal markets are not large, anti-poaching efforts have taken on more importance than ever before.

Endnotes

1 "The state of the world fisheries and aquaculture", (Rome, FAO, 2014), p. 4.

2 FAO Statistical Yearbook 2013.

3 FAO, 2014, op cit.

4 FAO, "The state of the world fisheries and aquaculture," (Rome, FAO, 2012).

5 FAO, 2012, op cit.

6 According to FAO's 2014 State of the World's Fisheries, "World per capita apparent fish consumption increased from an average of 9.9 kg in the 1960s to 19.2 kg in 2012 (preliminary estimate)."

7 FAO, 2012, op cit.

8 FAO, 2014, op cit.

9 FAO fishery statistics, accessed at: http://www.fao.org/fishery/statistics/global-aquaculture-production/query/en; http://www.fao.org/fishery/statistics/global-capture-production/query/en

10 FAO Statistical Yearbook 2013.

11 FAO, 2014, op cit.

12 FAO, 2014, op cit, p. 7.

13 The United Nations Convention on the Law of the Sea: http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf, p. 46.

14 One of the best documented cases is the collapse of the Grand Banks cod fishery in the Northwest Atlantic. In a fishery that had consistently produced between 100,000 and 300,000 tons annually since the mid-nineteenth century, catches declined to almost nothing after massive overfishing in the 1960s and 1970s.

15 The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks: http://www.un.org/depts/los/convention_agreements/texts/fish_stocks_agreement/CONF164_37.htm

16 Swedish Society for Nature Conservation, "To draw the line: EU fisheries agreements in West Africa", (Stockholm, 2009).

17 FAO, "The state of the world fisheries and aquaculture", 2002, 2008, and 2014 editions.

18 United Nations General Assembly, "Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments" 21 November 2012 (A/67/L.22)

19 According to the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, illegal fishing refers to fishing activities:
(1) conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;

(2) conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or

(3) in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.

Unreported fishing refers to fishing activities:
(1) which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or

(2) undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.

Unregulated fishing refers to fishing activities:
(1) in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or

(2) in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State responsibilities for the conservation of living marine resources under international law. ftp://ftp.fao.org/docrep/fao/005/y3536e/y3536e00.pdf

20 The number of marine species covered by CITES was expanded by five species of sharks and all manta ray at the 16th Conference of the Parties in 2013, but the entry into force of these listings was delayed by 18 months to allow time for Parties to resolve related technical and administrative issues

21 Marine turtles and a number of marine mammal species have been listed, including some whales, some dolphins, some porpoises, some fur seals, and dugongs. In addition, some species of shark, ray, shellfish, and coral are included in the Appendices. Some oddities, such as seahorses, totoaba, and coelacanths are internationally protected as well. Attempts to list commercial fish species, such as bluefin tuna, have not been successful.

22 The most numerous of the species are thought to be the Olive Ridley, estimated at more than 1 million animals. This species is unique compared to other marine turtles in the fact their reproduction differs from other marine turtles where thousands to hundreds of thousands of female olive ridley turtles come ashore to lay their eggs at the same time, an event known as an arribada. The hawksbill turtle on the other hand is roughly estimated to be 22,000 to 29,000 nesting females. NOAA. (2014). Olive ridley sea turtle (*Lepidochelys olivacea*), 5-year review: Summary and evaluation. National Marine Fisheries Service office of protected resources Silver Spring, Maryland and U.S. fish and wildlife service southeast region, Jacksonville ecological services field office, 87 pp. Valverde, R.A., Orrego, C.M., Tordoir, M.T., Gomez, F.M., Solis, D.S., Hernandez, R.A.,

Gomez, G.B., Brenes, L.S., Baltodano, J.P., Fonseca, L.G., and Spotila, J.R. (2012). Olive Ridley Mass Nesting Ecology and Egg Harvest at Ostional Beach, Costa Rica. Chelonian Conservation and Biology. 11 (1). NOAA (2013). Hawksbill sea turtle (*Eretmochelys imbricata*), 5-year review: Summary and evaluation. National Marine Fisheries Service office of protected resources Silver Spring, Maryland and U.S. fish and wildlife service southeast region, Jacksonville Ecological Service office, 89 pp.

23 Age to sexual maturity varies depending on species. Kemp's ridley (smallest of the hard shelled marine turtles) range from 7-12 years; while loggerheads and greens can be as high as 30-35 years. For leatherbacks (not hard shelled) the largest of the marine turtles, sexual maturity can be reached between 13-14 years of age. N. Frazer, "Survival from egg to adulthood in a declining population of loggerhead turtles, Caretta caretta", *Herpetologica*, vol.42, No. 1 (1986), pp.47-55.

24 Ibid.

25 James Richardson, Rebecca Bell and Thelma H. Richardson, "Population Ecology and Demographic Implications Drawn From an 11-Year Study of Nesting Hawksbill Turtles, Eretmochelys imbricata, at Jumby Bay, Long Island, Antigua, West Indies", *Chelonian Conservation and Biology*, vol. 3, No 2 (1999), pp. 244–250.

26 The *Bekko* trade was the largest and most prestigious market, sourced primarily from hawksbill turtles due the thickness and the beautifully coloured patterns on the scutes. The grade (quality and price) of Bekko ornaments depend on its colour and markings. One hawksbill turtle is estimated to produce about 780g of Bekko. P. van Dijk and C. Shepherd, "Shelled out? A Snapshot of *Bekko* Trade in Selected Locations in South-east Asia", (Southeast Asia, TRAFFIC, 2004).

27 A. Bräutigam and K. Eckert, "Turning the Tide: Exploitation, Trade and Management of Marine Turtles in the Lesser Antilles, Central America, Colombia and Venezuela", (Cambridge, TRAFFIC International, 2006).

28 The Indian Ocean - South-East Asian (IOSEA) Marine Turtle Memorandum of Understanding Illegal take and trade of marine turtles in the IOSEA Region. Seventh Meeting of the Signatory States. Bonn, Germany 8-11 September 2011. MT-IOSEA/SS.7/Doc.10.1. T. Lam and others, "Market Forces: An Examination of Marine Turtle Trade in China and Japan", (Hong Kong, China, TRAFFIC East Asia, 2011).

29 Ibid.

30 Ibid.

31 A total of 249 seizures accounted for 31,516 eggs and a total of 515 seizures accounting for 3,611 turtles (52% Hawksbill and 15% Green turtles).

32 Items crafted from shell can sell for considerably more. See Lam, et al. 2011. op cit., 2011

33 H. Shiraishiand V. Crook, "Eel market dynamics: an analysis of Anguilla production, trade and consumption in East Asia", (Tokyo, TRAFFIC, 2015)

34 *Anguilla japonica*

35 *Anguilla anguilla*

36 Council Regulation (EC) No 338/97

37 *Anguilla rostrata*

38 *Anguilla luzonensis*

39 At a market price of about US$2000 per kilogram. See online methodological annex for details.

40 Customs press release for Spain, Hong Kong, CITE Biennial reports, European Commission. SWD(2016)38 doc, and Spanish CITES Authority.

41 European Commission. SWD(2016)38 - Analysis and Evidence in support of the EU Action Plan against Wildlife Trafficking accompanying the document: EU Action Plan against Wildlife Trafficking

42 European Commission. SWD(2016)38 - Analysis and Evidence in support of the EU Action Plan against Wildlife Trafficking accompanying the document: EU Action Plan against Wildlife Trafficking

43 Press releases of Government of Spain: www.guardiacivil.es/es/prensa/noticias/4047.html and www.guardiacivil.es/es/prensa/noticias/4975.html

44 Press releases of: www.guardiacivil.es/es/prensa/noticias/4047.html and www.guardiacivil.es/es/prensa/noticias/4975.html

45 Press releases of: www.guardiacivil.es/es/prensa/noticias/4047.html and www.guardiacivil.es/es/prensa/noticias/4975.html

46 See Hong Kong Customs and Excise Department Press press releases for 2016: http://www.customs.gov.hk/en/publication_press/press/index_id_1504.html; and http://www.customs.gov.hk/en/publication_press/press/index_id_1534.html; and http://www.customs.gov.hk/en/publication_press/press/index_id_1546.html; and

http://www.customs.gov.hk/en/publication_press/press/index_id_1556.html; and http://www.info.gov.hk/gia/general/201603/08/P201603080247.htm.

47 Data obtained from Spanish CITES Authorities.

48 The Amur River could perhaps be included, although historically caviar harvesting for the international market has been less prevalent from this source.

49 For a history of the caviar trade, see Richard Adams Carey, The Philosopher Fish. Cambridge: Perseus Books, 2005.

50 Ibid.

51 Based on World WISE and CITES Trade Database analysis.

52 A. Ludwig, D. Lieckfeldt, and J. Jahrl , "Mislabeled and counterfeit sturgeon caviar from Bulgaria and Romania." *Journal of Applied Ichthyology*. Vol 31, No 4, 587-591, 2015.

53 Based on FAO Yearbook statistics and G. Ruban and R Khordorevskaya, "Caspian Sea sturgeon fishery: a historic overview," *Journal of Applied Ichthyology*, vol. 27 (2011), pp.199-208.

54 See, for example, the prices of the Petrossian caviar retailer: http://www.petrossian.com/caviar-1-petrossian-special-reserve-caviar-509.html

55 Based on interviews conducted for this study with sturgeon farmers, a mature sturgeon can produce 15 to 20% of its weight in caviar, and mature belugas can weigh many hundreds of kilograms. See online methodological annex for details.

56 R. Khodorevskaya, G. Ruban and D. Pavlov, *Behaviour, Migrations, Distribution and Stocks of Sturgeons in the Volga-Caspian Basin*, (Neu Wulmstorf, World Sturgeon Conservation Society Special Publication, No. 3, 2009).

57 Two species had been controlled earlier. A.sturio was first listed in Appendix II and transferred to Appendix I in 1975. A.brevirostrum was listed in Appendix 1 in 1975. Harvest quotas were also attempted, but with limited success.

58 R. P. Khodorevskaya, et al 2009, op cit.

59 Ruban and Khordorevskaya, 2011 op cit.

60 See IUCN "Sturgeon more critically endangered than any other group of species", 18 March 2010: http://www.iucn.org/?4928/Sturgeon-more-critically-endangered-than-any-other-group-of-species

61 Exports represent those of Russia and Iran. See See Tom De Meulenaer and Caroline Raymakers, *Sturgeons of the Caspian Sea and the international trade in caviar*, (Cambridge, Traffic International, 1996).

62 Armand Petrossian, "The Traders Perspective". *Proceedings of the International Sturgeon Enforcement Workshop to Combat Illegal Trade in Caviar*. Prepared by TRAFFIC Europe for the European Commission, 2006, Brussels, Belgium. More recent prices from Alan Jones, see online methodological annex for details.

63 Research conducted for UNODC. See online methodological annex for details.

64 See online methodological annex for details.

65 Louise Shelley, "Post-Soviet organized crime: Problem and response", *European Journal on Criminal Policy and Research*, vol. 3, No. 4 (1995), pp. 7-25.

66 During the days when wild exports were permitted, the US was the leading destination of Caspian caviar. The Russian Federation, as the original source of the world's finest caviars, has always had a large market for the product. Although one of the largest producers of farmed caviar, producing 40 tons in 2014, it reported no exports. Similarly, the US produced 18 tons in 2014, but only exported around six metric tons.

67 United States Department of Justice, Caviar Convictions (since 1/1/2000), Accessed on 9 May 2016 at: https://www.justice.gov/sites/default/files/enrd/legacy/2013/08/30/CaviarConvictionsSince2001_new.pdf

68 Victoria Mundy and Glenn Sant, Traceability systems in the CITES context: A review of experiences, best practices and lessons learned for the traceability of commodities of CITES-listed shark species (2015) https://cites.org/sites/default/files/eng/prog/shark/docs/BodyofInf12.pdf

69 P. Doukakis and others, "Testing the Effectiveness of an International Conservation Agreement: Marketplace Forensics and CITES Caviar Trade Regulation", PLoS ONE 7(7): e40907. doi:10.1371/journal.pone.0040907.

70 See, for example, the tests conducted by Oceana: http://oceana.org/sites/default/files/National_Seafood_Fraud_Testing_Results_FINAL.pdf

71 Field research. See online methodological annex for details. For a slightly different assessment, see P. Bronzi and H. Rosenthal, "Present and future sturgeon and caviar production and marketing: A global market overview", *Journal of Applied Ichthyology*, vol. 30, No.6 (2014), pp 1536-1546.

72 See online methodological annex for details.

73 A. Ludwig, D. Lieckfeldt and J. Jahrl, "Mislabeled and counterfeit sturgeon caviar from Bulgaria and Romania", *Journal of Applied Ichthyology*, vol. 31, No. 4 (2015), pp. 587-591.

74 See CITES Secretariat, *Export quotas for specimens of Acipenseriformes species included in Appendix II for 2005* and exports from the CITES Trade Database.

75 The sturgeon quotas are published on the CITES web site: https://cites.org/sites/default/files/common/quotas/2015/SturgeonQuotas2015.pdf

76 See the annexes to the activity reports from the Galati Lower Danube River Administration: http://www.afdj.ro/en/content/romomed

Implications for policy

This report has documented the great lengths to which traffickers go to exploit loopholes in the international controls. This is a testament to the strength of the international controls. But it has also highlighted several significant gaps that, if addressed, could dramatically reduce the negative impact trafficking is having on wildlife. These gaps can be categorized under three headings:

- 1. Informational
- 2. Legislative
- 3. Operational

The first gap is ***informational***. Until recently, there was no real mechanism by which the illegal trade as such could be assessed. The recently mandated CITES Annual Illegal Trade Report requires, for the first time, that comprehensive seizure records be submitted by all parties.[1] Some parties may have trouble complying with this obligation, either because the information is not systematically gathered at this point or due to intra-governmental communication issues. In either case, some parties may require technical assistance to fulfill this reporting requirement.

Once in place, though, reporting on wildlife seizures only makes sense if it is complemented with qualitative research, as well as additional trade and criminal justice data. This information could be regularly assessed and reports issued to the international community. Targeted by the quantitative data, qualitative research could cost-effectively provide a diagnostic tool to policy makers, and even frontline law enforcement. If collected and disseminated on a real-time basis, it could also provide an agile early warning system.

Beyond attracting attention to issues and trends, the findings of this research could be used to provide the evidentiary basis for internationally coordinated wildlife crime prevention strategies. Strategic analysis requires an assessment of the tools available and their relative utility – in addition to researching the crime, it is necessary to separately research the capacity for response. For this assessment, the ICCWC Wildlife and Forest Crime Analytic Toolkit provides a good starting point.[2] Good research can focus international efforts on those portions of the trafficking chain where leverage is optimal.

It is also crucial for countries to be capable of measuring and monitoring the effectiveness of their own law enforcement responses to wildlife and forest crime. The ICCWC Indicator Framework for Wildlife and Forest Crime, which complements the Analytic Toolkit, is a valuable tool which enables a party to independently monitor performance over time to identify any changes in the effectiveness of its law enforcement responses, following a standardized approach.[3]

The second gap relates to ***legislation and regulations***. The greatest shortcoming in the current international system is best exemplified by the rosewood example, where trees illegally harvested or exported from one part of the world are legally imported and sold in another. The CITES regime is designed to prevent this from happening with protected species, but it has no mandate when it comes to non-listed species, including those general fishing and forestry operations where the species are not protected. In the current regime, countries seeking to slow the rate of general deforestation can impose log export bans, but other countries might not be able to refuse their logs. Perhaps they should be able to.

Countries could draft laws that recognize the illegal status of wildlife products that have been illegally harvested or trafficked from another country – even if what is illegal in one country is not illegal in another. There are many ways this objective could be accomplished, on a national, regional, or international basis. The point is to have a legal basis to seize wildlife illegally harvested or exported from other countries, without reference to international protected species lists.

It may also be possible to pursue these sort of prosecutions, under existing legal regimes. For example, the natural resources of many countries are deemed to be held under state stewardship, to be exploited for the benefit of the country as a whole. In these jurisdictions, the unauthorized taking of these resources could be regarded as theft of state property. In some cases, this theft could be covered under anti-corruption laws and, thus, under the UN Convention against Corruption. If the value of these resources were high enough, the crime is generally punishable by sentences of sufficient length to be categorized as "serious crime" under the UN Convention against Transnational Organized Crime. The recovery of these stolen assets could also be pursued under both conventions' mutual legal assistance provisions or via existing bilateral mutual legal assistance treaties.

Of course, many countries experience difficulties in simply implementing the present regime, let alone taking on the additional burden of adjudicating cases based on events that occurred on the other side of the world. But authorities, notified of illegal shipments, could address them at the border, and international cooperation to apprehend high profile offenders would be possible. At the very least, countries would know not to import logs from countries with log export bans. To facilitate such a system, an information sharing platform would be helpful – for example, an online forum for countries to post national wildlife regulations.

Another legal gap lies in the national environmental protection legislation of many countries, which was drafted for the purpose of protecting local species. In addition to prohibiting poaching, these laws often regulate the possession, use, or sale of products made from the most threatened species. But the threatened species lists in question are generally limited to domestic species, so there is nothing regulating the possession, use, or sale of the most threatened wildlife products from other parts of the world. Some countries do individually add some foreign wildlife species to their domestic protection lists, such as elephant ivory or rhino horn, on an ad hoc basis. Since protected species lists are dynamic, simply compiling them would seem to pose an insurmountable administrative barrier to extending local protections to foreign species.

While CITES Appendix I does provide an internationally agreed list of species in need of the highest protection, the CITES Convention is designed to regulate international trade, and has no role in domestic markets. In theory, CITES parties could detain those in possession of questionable Appendix I products, but, in most, the burden would remain on the state to demonstrate these products were imported illegally. It is possible, however, to reverse the onus, and to require those in possession of Appendix I species to maintain documented proof of their legality through, for example, retention of a copy of the import documentation, or registration in a national database.

Even with these protections in place, there will remain wildlife crimes that CITES does not directly address. Poaching, or the illegal taking of wildlife, generally takes place in a single country, and the damage is done whether or not the resulting product is exported. Poaching often takes place in remote areas of some of the poorest countries in the world, countries with limited capacity to protect wildlife. The international community can also assist with coordinated operations against poachers and their buyers if they extend across borders.

Another point of insertion is to influence the practices of those industries making use of wildlife products. This report has reviewed several of them, and they are different in character and consolidation. Still, good practices could be communicated and voluntarily adopted by those firms interested in responsible corporate environmental stewardship. Track and trace technology has been successfully applied to wild source industries like fishing. German buyers of fresh fish, for example, have access to a bar code that allows them to identify exactly where, when, how, and by whom their catch was landed. Similar approaches to other wildlife products could be adopted as industry standards, limiting the scope for the introduction of illegally sourced products. Trade bodies could self-police, since flouting industry standards could give an unfair advantage to competitors. Non-compliant merchandise would be immediately suspect, and avoided by legitimate wholesalers, retailers and consumers.

The final gap relates to the ***enhancement of law enforcement operational capacity***. Legislation can go some way toward enhancing the profile of wildlife crime, but law enforcement prioritization is the decisive factor. National agencies in source, transit, and destination countries will only prosecute wildlife crime if they have the tools to do so, and this is one area where the international community can assist.

Since it appears the bulk of international wildlife crime enforcement is conducted by customs agents, it is important that they are enabled and motivated to detect and prevent wildlife trafficking. Although value intensive items like rhino horn may be air couriered, most volume consignments of illegal wildlife are transported in shipping containers. Further training for customs officials to profile suspect shipments and identify the species within would greatly enhance interdiction capacity. Excellent work in both regards is ongoing, and needs continued support.

Another difficulty faced in international wildlife law enforcement is species identification. Since the existing controls are species-specific, whether a shipment is legal or not can come down to distinguishing species, and there is no easier way to evade the system than to simply claim a protected species is a non-protected lookalike. For this reason, the enhancement of forensic capacity is not only an essential part of law enforcement, but it is at the heart of wildlife protection. And as the examples of ivory, rhino horn, and caviar show, intelligent use of DNA analysis can yield penetrating insights into wildlife crime. A wide range of assistance, from the international use of specialized labs to the provision of reference texts and selected samples, can be provided to countries to strengthen response to these crimes.

Not every country encounters enough wildlife crime to justify a specialized lab, and universal provision of reference samples would be a major task. In some parts of the world, regional labs may make more sense. For some species, a single international facility could cover the forensic needs of global enforcement.

Once wildlife contraband is seized, the effective and universal implementation of international standards for the storage, stockpiling, and disposal of protected wildlife products and contraband is essential.[4] At present, the logistic problems associated with disposing of large illegal wildlife shipments has provided formidable disincentives to enforcement. For example, multi-container loads of rosewood have recently been seized in Hong Kong, China; Singapore; and Sri Lanka. Without the facility to store or dispose of this material, customs authorities will have little capacity to seize more. It is crucial that the provisions provided for in CITES Resolutions are drawn upon to the fullest extent possible to address the challenges that are often associated with large scale seizures, including by making legislative provision to require the guilty importer or the carrier, or both, to bear related costs.

In addition to species-specific protections, the international community should continue to contribute to the creation and defense of protected areas. Protecting and maintaining wildlife reserves can be an expensive project for developing countries. Simply setting aside the range has its opportunity costs, as the land could be used to improve the lives of growing populations. International bodies concerned with the preservation of these species should consider an expanded role in helping maintain them.

Finally, as this report emphasized at the outset, corruption plays an important role in wildlife crime. Because officials can transform contraband into legal product with a single piece of documentation, these documents have a large cash value. Officials authorizing imports and exports can similarly assure smooth passage, and once inside the destination market, most wildlife products can be sold without question. The officials who control these gateways bear a tremendous responsibility, and are therefore subject to considerable scrutiny. The use of audit and oversight techniques should be strengthened.

This report has shown that the markets for illegal wildlife are typically transcontinental, and consequently that addressing them is an inherently international affair. Without cooperation, criminals that know no boundaries can easily outmaneuver national law enforcement. Through research, information sharing, joint operations, legal coordination, and technical assistance, the international community can cooperate to protect threatened species, species that can never be replaced.

Endnotes

1 https://cites.org/sites/default/files/notif/E-Notif-2016-007.pdf.

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

3 https://cites.org/eng/prog/iccwc.php/Tools

4 See: https://cites.org/eng/res/10/10-07R15.php
https://cites.org/eng/res/10/10-10R16.php
https://cites.org/eng/res/09/09-10R15.php

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