Chapter 2

Characterizing wildlife crime
Scope of this report

As for the previous two editions of the World Wildlife Crime Report, this report is focused on crime associated with wildlife trafficking, the harvest of and trade in wildlife species contrary to national law, including, but not exclusively, legislation enacted in fulfilment of CITES obligations.\(^1\)

Precisely which acts constitute crimes in this context depends on the terms of the applicable national legislation, which vary greatly between and sometimes within countries. They may encompass taking from the wild, distributing, transporting, importing, exporting, selling, buying or possessing live specimens, parts or products of wildlife species listed under or otherwise designated by applicable legislation. In some cases legislation may completely prohibit such acts, in others their legality may depend on where or when they take place or whether they have been licensed by relevant authorities.\(^2\)

Wildlife trafficking impacts a very wide range of species of wild animals, plants and fungi, traded locally for domestic use and to international markets. It encompasses a diverse range of commodities, including those used for food, medicine, construction, adornment, display and keeping as live specimens. It includes trafficking in contravention of laws governing large volume and high value natural resource trade sectors, such as those producing timber and fisheries goods. Although sometimes perceived as somehow distinct from other wildlife trade sectors, most food fisheries still come from wild sources, and most timber comes from natural forests rather than plantations, including from illegal sources (Box 2.1). In practice, most of the analysis in this and previous editions of the World Wildlife Crime Report focuses on the trafficking of species subject to trade regulation under CITES. This is partly because these violations,
The global timber trade involves very large flows of goods for domestic use within countries and in international trade. Declared global exports of the main categories of unprocessed timber (roundwood, wood pellets and sawn wood) in 2020 were estimated by the Food and Agriculture Organization of the United Nations (FAO) as totalling over 300 million m\(^3\), with an estimated value of $51 billion.\(^5\) Various attempts using different calculation methodologies have been made to estimate how much of this trade is in contravention of relevant national legislation and/or international agreements. Reflecting on strengths and weaknesses of earlier estimates, a study applying an import source method estimated that the value of international trade in roundwood and sawn wood at high risk of illegality was approximately $6.3 billion in 2014.\(^6\)

Global trade in products from wild-capture fisheries has similar characteristics. Most of this commerce involves species and products outside the remit of CITES, but where sourced from waters under national jurisdiction, fisheries trade is often subject to various national legal restrictions on access, catch and trade. In some cases, importing countries require proof of compliance with the national law in source countries, a prominent example being the European Union regulation to prevent, deter and eliminate illegal, unreported and unregulated fishing (in short: the IUU Regulation) entered into force on 1 January 2010. \(^7\) In addition, there is a complex array of international agreements governing harvest and trade from the high seas, some also from coastal waters. Once again, some countries have adopted legislation requiring proof of compliance with such agreements for landings or trade from international waters.\(^8\) Similar to timber trafficking, it can be difficult to work out precisely what constitutes illegal fishing and trade.\(^9\)
characterizing wildlife crime

Many of the wildlife trafficking participants described in this report would fit the United Nations Convention against Transnational Organized Crime (UNTOC) definition of an “organized crime group”, which essentially encompasses any structured group conspiring to commit crime for financial or other material gain. This is very different from the popular notion of organized crime, which centres on mafia-type organizations: groups of professional, violent offenders, working in a strict hierarchical structure who engage in a range of profitable crimes and seek power over territory or business sectors.

Wildlife trafficking operations by contrast may include diffuse but connected roles, with participants engaged to different degrees in criminality.

Case studies of groups involved in wildlife crime often look more like networks of business-like associations than mafia-type groups. UNODC research in Indonesia (Box 2.2, also the methodological annex) and the case studies on the illegal trade in orchids and seahorses in chapter 7 of the current report provide examples. In several trade chains, the wildlife originates in remote areas where local people find income opportunities from involvement in illegally harvesting wildlife with little or no connection to an organizational structure. Trade facilitators exploit business contacts and corrupt relationships as trafficking networks form along the trade chain. Online intermediaries may play important roles in establishing connections between those involved in illegal sourcing and trading as crime networks develop. A recent UNODC organized crime threat assessment for Nigeria found this to be the prevalent scenario. Participant interviews indicated that wildlife crime appeared to be primarily opportunistic, perpetrated by loosely connected logisticians/businesspeople who broker consolidation and transport logistics for both legal and illegal trade of goods and cash in on lucrative products to trade. They finance local people to source wildlife products and then use their existing transport infrastructure to supply international investors. A possible exception to this general rule was the timber trafficking market where well-financed armed groups were believed to be involved. Generally, it seemed that wildlife traffickers in the

The nature of wildlife trafficking

The illegal wildlife trade differs from other contraband markets, such as the illegal drug trade, in several respects. Unlike many illegal drugs, most wildlife products are legal to possess in many countries around the world. Whether trade in wildlife goods is legal or illegal in one place usually pertains to how they were sourced elsewhere, in another province or country, or whether they were legally transported across national or international jurisdictional borders.

For some species, including many of those listed in CITES Appendix I, commercial trade is consistently outlawed across the trade chain from source to end markets. However, facts about legality are not immediately discernible to buyers when wildlife products are encountered on sale. Traffickers take advantage of this complexity by moving illegal wildlife goods towards markets where buyers are either uninterested in the legality of sourcing or find this difficult to verify. They also launder illegal goods into legal trade chains, exploiting weaknesses in shipment traceability requirements or through breeding operations or stockpiles with weak inventory control. As a result, many illegally sourced or traded wildlife products find their way into legal, though illicit, end markets. Although some consumers may knowingly buy illegal wildlife goods, in other cases the legality back to source may not be obvious.
country planned their activities like organize criminal groups in terms of risk and rewards, but the group structures were loose, hierarchies unclear, and most were not driven by criminal dynamics.10

Nevertheless, wildlife trafficking does sometimes attract the involvement of highly organized criminal groups. For example, studies in Mexico have examined how and why drug cartels became involved in illegal fishing and trade in totoaba swim bladders or maw, used for medicine and food in Asia and elsewhere.9 This diversification appears to have begun as a territorial power relationship with coastal communities involved in totoaba fishing then developed as a supplementary line of illegal business, employing established smuggling methods and routes with the associated corruption used by the criminal groups for their illegal narcotics trade.12

Similar connections between organized crime groups and trafficking in both illegal drugs and wildlife have been documented in relation to the abalone trade in South Africa.13,14 Additionally, research for the UNODC World Drug Report 2023 included an examination of the nexus between illegal drug trade and crimes that affect the environment in the Amazon Basin.15 It revealed evidence that drug trafficking organizations had been diversifying into new business lines, including trafficking in timber and other wildlife goods. Again, such activities were seen to be building on existing criminal structures of protection and extortion rackets, money-laundering and corruption.

Another recent example of convergence between wildlife trafficking and other crimes is demonstrated by findings of an INTERPOL-led international police operation, conducted under the joint UNODC-INTERPOL
Gender dimensions of wildlife crime

Crime associated with wildlife trafficking involves and affects different human population groups (e.g. genders, ethnicities, age groups or groups of different socio-economic status) in various ways. The UN Sustainable Development (SDG) Goal 5 puts special focus on gender by aiming to achieve gender equality and empowering women and girls, so research for the current report specifically sought insights into gender dimensions of wildlife crime. As gender-informed investigations into wildlife trafficking increase, it is becoming increasingly clear that gender influences the participants, practices, consequences, motivators and results of wildlife crime. However, in the context of wildlife trafficking, datasets are seldom gender or sex disaggregated nor consistently reported on even if collected. Most of the data analysed for this report are not gender disaggregated, i.e. have no information on the gender of the offenders or other participants. Information regarding the roles of actors in the illegal wildlife trade supply chain, whether men, women, indigenous populations or other traditionally underrepresented groups, is also of uneven quality.

With the aim of gaining further insights into gender-related aspects of illegal wildlife crime, UNODC undertook research in 2023 in Colombia, Ecuador and Peru to explore the roles that women and men play in both facilitating and preventing wildlife crime (Box 2.3). Overall, the study found a predominant male presence as primary poaching offenders. However, women also play roles along the entire trade chain: women hold an overrepresented role as sellers; are sometimes key actors in the transportation of illegal wildlife products; may actively or passively facilitate wildlife crime committed by men; may be coerced into supporting male-driven wildlife crime; and play important roles as processors and consumers of wildlife products. In addition, women may also be important advocates against wildlife trafficking.

Measuring illegal wildlife trade

As there are many independent markets for illegal wildlife goods, aggregating and comparing them to provide overviews at different geographic scales or other classifications is complicated. First, like all clandestine markets, it is impossible to measure this hidden activity directly. There is a strong reliance on the occasions when illegal wildlife trade is detected, usually when law enforcement seizes a shipment. For some commodities and locations additional information emerges through monitoring online and physical markets, but this is seldom systematic and long-term. Like seizures, such observations give a snapshot of the occurrence of certain wildlife goods at some point along the market chain, rather than a comprehensive indication of the illegal flow.

Counting the number of seizures made and reported is a useful indicator of where law enforcement is happening and at a crude level what is being discovered. However, seizure numbers alone do not offer great insights into the significance of what has been seized. A critical consideration is what is the purpose of an assessment based on aggregation of seizures for different wildlife goods? What makes one wildlife seizure more important than another? How is it best to add or compare seizures of e.g. logs and butterflies in a way that appreciates the relative importance of each? How can the significance of seizures in different geographic regions or for different years be compared?

Some commodities, such as corals, are frequently taken from tourists at airports in small amounts unlikely to be a threat to wild populations, while others, like totoaba fish swim bladders, are rarely encountered although illegal trade has serious implications owing to the species’ rarity and the threat of by-catch of Critically Endangered vaquita porpoises when totoabas are caught.
UNODC research in Colombia, Ecuador and Peru aimed to explore the roles that women and men play in both facilitating and preventing wildlife trade-related crime. Research carried out in 2023 included a survey of wildlife markets in 21 locations (mainly cities), interactions with 103 sellers from different backgrounds, and 62 semi-structured interviews with stakeholders (e.g. government officials, community representatives, non-governmental organizations), gender disaggregated seizure data analysis and a literature review.

Some key findings of this research are summarized here. Other findings have been included in the relevant sections of this report as gender aspects cut across the various themes discussed within it. The full research findings will be published separately in the form of a research brief.

- **Women** are the primary sellers of wildlife products (both legal and illegal), evidenced by both the surveys and interviews.

- **Medicinal markets**, driven by traditional Amazonian medicinal practices, exhibit distinct gender associations. **Women** are almost exclusively the keepers of traditional medicinal knowledge as well as being the actual practitioners and sellers. **Men** are reported as being the main extractors (often poaching) and processors of the wildlife products for medicinal use. However, the processing and preparation of other wildlife products was mainly reported as a role for women.

- **Artisan markets**, driven in part by tourism, play a significant role in driving demand for species in the Amazon region (teeth, bones, skins, from species such as bear, otter, dolphin, jaguar). Most of the artisans and sellers of these products are women, often from indigenous communities.

- The most visible demand for wildlife in markets in the Amazon region is for wild meat driven by domestic markets. Again, women comprise the majority of sellers of these products, and this trade chain involves interesting social drivers (e.g. gendered cultural practices, gendered economic factors) that warrant further research.

- **Poaching** is reportedly almost all done by men although women occasionally join in groups with families (e.g. children, grandparents, partners). Women may exhibit a higher degree of participation in poaching related to specific species. For example, women were more connected to poaching activities related to fishing (small fish for consumption and ornamental fish), marine turtle eggs, and live birds. Poaching/illegal collection from the wild was found to be carried out for multiple purposes such as the meat/food trade, medicinal use, the pet trade or for souvenirs and ornaments. Some of this trade occurs for local consumption, some have a wider international aspect, such as souvenirs. The species observed for sale at markets during the research and those reported in seizures included reptiles (e.g. turtles, snakes and crocodilians), birds (e.g. finches and parrots), mammals (e.g. agoutis, armadillos, jaguars and dolphins).

- Women often act as intermediaries in the live animal wildlife trade. They often become caretakers responsible for looking after live animals prior to sale or before the animals are moved on to other intermediaries.

- Knowledge of the existence of someone described as a high-ranking woman wildlife crime leader in the region was disclosed in five separate interviews during the study.

- **Indigenous women** play important roles as defenders of land, environment, and wildlife throughout the region. Findings from the study show that a mixed group of men and women land defenders was more successful and less confrontational when confronting poachers.

- **Women** have been reported to face different repercussions for defending territory, such as threats and acts of sexual violence and threats and acts of violence against their children.

- As consumers, the practice of keeping wildlife as pets is prevalent, with demand coming from both men and women in the Amazon region. However, it was widely perceived that women exhibited a greater interest in keeping wildlife as pets for companionship, with birds being particularly noted in this context. This may be because many women are obligated to stay at home to fulfil household and childcare duties. Pet keeping practices may have increased during the COVID-19 pandemic.

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**a. Markets surveyed included in Colombia: Bogota, Florencia, Leticia, in Ecuador: Coca, Limoncocha/Pompeya, Macara, Puyo, Quito, in Peru: Iquitos and Pucallpa.**

**b. To understand further the impact of wildlife crime on indigenous women, see UNODC, “Toolkit on Mainstreaming Gender and Human Rights” (Vienna, Austria, 2023).**
Furthermore, it is difficult to identify meaningful common units of measurement to aggregate and compare wildlife seizures. Measures of quantity reported in seizure records are sometimes expressed in terms of numbers of live animal and plant specimens along with counts of parts and derivatives, but sometimes quantities are expressed by units of weight, volume, or other dimensions. Using a single consistent unit of measure may be viable when trying to understand the importance of illegal trade flows for a single wildlife commodity, such as expressing how much elephant ivory might be in trade by weight as the average weight of tusks per elephant can be estimated, and this provides a basis for comparison with other data sources, such as population numbers and poaching incidents. However, when looking across a range of commodities, weight alone may not be an informative expression of significance. Logs are heavy and butterflies are light, but a single butterfly may bring more criminal profits than a stack of logs. Similarly, trade in a small number of rare orchids may pose a far greater risk of extinction to a species than the movement of hundreds of thousands of juvenile eels does to another. This is because different animals and plants have different population sizes, reproductive potentials and responses to harvest.

For some analyses in the current report, as in earlier editions of the *World Wildlife Crime Report*, a value-based index is used to facilitate aggregation of seizure records for different species and commodities. Properly caveated, assigning an economic significance to wildlife seizures gives a way of aggregating and comparing data that can serve several purposes. Particularly in the study of organized commercial-scale wildlife crime, it is the value of the wildlife that motivates key participants along the trade chain who break the law. Price is also often indicative of scarcity, so it bears some relation to the ecological significance of the seizures.

The *standardized seizure index* used by UNODC for some aggregated analyses of wildlife seizures employs declared import/export value data from the Government of the United States of America and price reference points from several other sources to create an expression of relative value for different species-product combinations. The index value is then used in combination with the reported quantity to calculate an analytical valuation for each seizure.

Further details are provided in the methodological annex to this report. This analytical method allows aggregation and analysis of seizure data for multiple commodities to indicate trends over time. However, comprehensive reliable reference values are not available for all species-product combinations covered by seizure records in the WWCR3 analytical dataset, so caution is required with the interpretation of analyses based on the standardized seizure index. It is also important to stress that the standardized seizure index is simply an aggregation methodology and is not intended for calculating total market value, a topic discussed later in this chapter. Therefore, absolute values for the standardized seizure index are not provided in this report, only trends and relative share.

**Insights from seizure data**

**What species are targeted?**

According to the WWCR3 analytical dataset, seizures during 2015–2021 involved illegal trade in around 4,000 wildlife species, approximately 3,250 of them listed in the CITES Appendices. The largest numbers of individual seizures reported during that period involved corals, crocodilians and elephants (Figure 2.1).

The same seizure data summed using the standardized seizure index shows the dominance of timber (cedar and rosewood) species (Figure 2.2).

Just 15 broad markets comprise the bulk of the observed illegal wildlife trade based on standardized seizure index analysis, split by animals and plants (Figure 2.3). However, the extent to which this analysis is representative of illegal trade overall is uncertain, owing to seizure-related biases and gaps in price index reference data.

**What commodities are illegally traded?**

Species groups are traded illegally in a range of forms, which provide insights into the motivations for their trade. These include uses as food, medicine, clothing, fuel, adornment, building material, decoration, entertainment, study and companionship.
During the period 2015–2021, based on the number of seizure records, coral pieces were the most frequently reported item in illegal wildlife trade followed by live specimens, which are generally part of the pet or ornamental plant trades although may also be used in medical research (e.g. monkeys) or processing into other products, like meat. They were followed by medicines, meat, shells and small leather products (Figure 2.4). Roots and extracts were also prominent in the dataset, which are likely used for medicinal purposes.

Among the commodities represented in seizure records between 2015–2021, live specimens involved both animals (e.g. parrots and turtles/tortoises) and plants (e.g. cacti and orchids) (Figure 2.5). Medicine shipments involved mainly plants (costus root, aloes and orchids), while meat seized mainly involved crocodilians, queen conch and tri-
FIG. 2.3  Percentage share by species group (split by animals and plants) aggregated by standardized seizure index 2015–2021

Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
* Other Sapindales includes guaiacum, holy wood and mahogany species
** Other Myrtales includes eucalyptus and ramin species

 dacna clams. Items reported as “bodies” (whole dead specimens) represented a diverse group with seahorses, carnivores, corals, crocodilians and birds of prey all reported in seizures. Extracts mainly involved plants (cacti and aloes).

This seizure distribution illustrates the different forms in which the same species groups are illegally traded. For example, pangolins are illegally traded as scales, meat, bodies and also as live specimens; lizards are traded as meat, small leather products and live specimens; and orchids are traded as roots, medicines and live specimens.

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FIG. 2.4 Top commodities by percentage of seizure records 2015–2021

- Coral pieces: 16%
- Live specimens: 15%
- Medicines: 10%
- Shells: 6%
- Meat: 6%
- Small leather products: 6%
- Bodies: 4%
- Roots: 3%
- Extracts: 3%
- Ivory carvings: 3%
- Others: 28%

FIG. 2.5 Main species groups within each of the top commodities by number of seizure records 2015–2021

- Coral Pieces
- Live specimens
- Medicines
- Meat
- Shells
- Small leather products
- Bodies
- Roots
- Extracts
- Ivory carvings

Plants (e.g., cacti and orchids) (Figure 2.5). Medicine shipments involved mainly plants (costus root, aloes and orchids), while meat seized mainly involved crocodilians, queen conch and tridacna clams. Items reported as “bodies” (whole dead specimens) represented a diverse group with seahorses, carnivores, corals, crocodilians and birds of prey all reported in seizures. Extracts mainly involved plants (cacti and aloes).

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Recent global trends in illegal wildlife trade

Assessment of illegal trade trends through analysis of seizure data requires caution because changing levels of enforcement effort and reporting introduce biases to the results. Nevertheless, with appropriate caveats, useful insights can be gained.

The annual number of seizure records in the WWCR3 analytical dataset varied considerably during the period 2015–2021 (see Figure 1.1 in Chapter 1). The requirement to submit annual illegal trade reports under CITES began with data for 2016, therefore the number of records in the dataset for 2015 was lower at around 13,000. From 2016–2019 there were approximately 25,000 records per year followed by a drop to around 15,000 records per year in 2020 and 2021. This could reflect impacts of the COVID-19 pandemic, such as through decreasing poaching and trafficking activity, reduced enforcement control or obstacles to reporting or disruptions in transportation or any combination of these factors. Research by UNODC to assess the impact of the COVID-19 pandemic on different forms of crime has documented a clear reduction of law enforcement and criminal justice capacity during and shortly after the pandemic.28, 29

In terms of illegal trade volumes, trends can be examined for seizures reported by numbers of individual specimens and those reported by weight during the period 2015–2021 (Figure 2.6). For those reported by weight there was a significant peak in 2017–2018, a drop in 2019 and smaller increases again in 2020 and 2021. For transactions reported by total number of specimens (where no weight was reported) there was a peak in 2019. It is important to note that the volume of illegal trade in the same wildlife species can be reported by number of specimens or by weight or both and sometimes the reporting can shift between these inconsistently, without an actual change in the trade pattern. Therefore, some of the variation might be related to changes in reporting rather than actual changes in seizure patterns.30

![FIG. 2.6 Annual seizures reported by weight and by number of specimens 2015–2021](image1)

Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)30

![FIG. 2.7 Trends in the standardized seizure index for all seizures and separately for plants and animals 2015–2021](image2)

Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)30
UNODC is populating the indicator on progress to end trafficking of protected species of flora and fauna under the framework of the Sustainable Development Goals (SDGs). A SDG indicator 15.7.1 is based on a comparison of CITES legal trade records and seizure records from CITES annual illegal trade reports using the same aggregation method employed for the standardized seizure index explained above. The intent is to provide a proxy for the share of the total market that is known to be illegal, with the caveat that seizures measure an unknown percentage of illegal trade and the total volume of wildlife trade may vary over time due to a variety of factors, including economic cycles. A decrease in the index value would proxy a reduced proportion of global wildlife trade being illegal.

An initial estimate of the indicator suggests that globally the intercepted illegal wildlife trade as a proportion of all wildlife trade (legal and illegal) increased from 2017 onwards, reaching its highest levels during the COVID-19 pandemic in 2020-2021 (Figure 2.8a). Wildlife seizures made up around 1.4 to 1.9 percent of global wildlife trade in 2020-2021. Looking separately at the indicator trends for animal and plant trade shows that plant transactions were responsible for the elevated combined indicator for 2020 and 2021.

Considering the seizure and legal trade index trends separately, the overall SDG indicator trend appears to be most influenced by an increase in the measure of seizures from 2020 onwards (Figure 2.8b). Examination of underlying records in the two datasets shows that the increase at the global level in wildlife seizures in 2020-2021 responds mostly to new regulation (CITES-listing) of high-value timber species from South America and related enforcement actions resulting in seizures. Global trends in the measure of legal wildlife trade are heavily affected by trade flows in Asia, which made up 50-70 percent of global legal trade annually during 2016-2021. Most regions saw a decline in legal trade in 2020 followed by a slight recovery in 2021.

b. The indicator is calculated for CITES-listed wildlife only, as CITES provides a common regulatory framework internationally together with systems for data collection on legal trade and seizures of CITES-listed wildlife. Seizure data only account for the portion of illegal wildlife trade that is detected. In addition, the listing of species on CITES changes over time. Therefore, caution should be practiced when interpreting the results.
Using the standardized seizure index to aggregate all seizures however reported, there is a generally upward trend during the period 2015–2021 (Figure 2.7). However, when illustrated separately for seizures involving animals and plants there is a significant difference. For seizures of animal species there is a gradual increase from 2015–2019 then a significant decline to a lower level for 2020 and 2021. By contrast, for seizures of plant species there is a small peak in 2017 and sharp increases in both 2020 and 2021. The former reflects some unusually large seizures of rosewood shipments in 2017 while the latter is heavily influenced by some very large seizures of cedar (Cedrela sp.) timber in one range state, possibly linked to implementation and enforcement action in relation to the recent listing of this tree genus in CITES Appendix II, which entered into force in August 2020.

Examining the top species groups reported by number of seizures per year during the period 2015–2021 shows that the share of coral species in seizures decreased significantly while the share of bird species increased over the same period (Figure 2.9). The former may reflect reductions in air passenger movements related to the COVID-19 pandemic as corals are often seized from passenger baggage.

Examining trends in species composition aggregated using the standardized seizure index rather than a simple count of seizure numbers, the pattern is rather different (Figure 2.10). For plant species, the dominant trends are the aforementioned 2017 peak in rosewood seizures and the upsurge in cedar seizures in 2020–2021. For animal species, seizures of rhinoceros, pangolin and elephant products dominate across the full period, with the decrease in the index in 2020 and 2021 being fairly consistent across all the illustrated species groups.

The share of commodity types based on the number of seizure records also changed over 2015–2021. The declining trend in corals from 2020 can be observed again, while the share of seizures of live specimens increased during the same period, which could perhaps reflect increased restrictions on the movement of live animals in the wake of the COVID-19 pandemic and concerns about the spread of zoonotic diseases (Figure 2.11).
FIG. 2.10 Aggregated standardized seizure index by species group for plants and animals 2015–2021

Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
* Other Myrtales includes eucalyptus and ramin species
** Other Sapindales includes guaiacum, holy wood and mahogany species

FIG. 2.11 Top commodity types per year based on number of seizure records 2015–2021

Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
* Both plants and animals
As explained earlier in this chapter, in addition to the general caution that needs to be applied when inferring illegal trade flows based on the partial view afforded by seizure records, aggregation across a wide range of species, commodities and reporting units presents important interpretation challenges. To examine trends in more detail, particularly the likely influence of the COVID-19 pandemic on wildlife crime, trends for four of the individual wildlife products addressed by case studies in this report were plotted as their percentage change in total weight reported from a 2015 baseline (Figure 2.12). Trends for the same four products were also plotted by absolute total weight, reported with an adapted scale to aid comparison (Figure 2.13).

As discussed in the individual case studies, seizure data could infer peaks in illegal trade and/or enforcement action for all these commodities between 2017–2019. For rosewood, seizure records appear to show a dip in illegal trade flows during 2018–2020, while for elephant ivory, rhinoceros horn and pangolin scales, a 2019 peak was followed by a significant drop in 2020. For all four commodities there was some increase in volumes reported for 2021, but well below the 2019 peak level. However, it is challenging to interpret the sudden changes as the result of reduced trafficking or a reduced capacity of countries to intercept trafficked commodities during the COVID-19 pandemic restrictions. An analysis that goes beyond seizures can help to understand better what happened before and during the pandemic.

**Did the COVID-19 pandemic have an impact on wildlife trafficking?**

Over the past decade, a range of interventions has been pursued to address illegal wildlife trade, including market closures, better coordination and pursuit of enforcement action, and consumer behaviour change campaigns. Hence changes observed before, during and after the COVID-19 pandemic could be the result of a combination of these factors and not simply down to disruption caused by it.

The UNODC research in the Amazon region of South America to explore the roles that women and men play in both facilitating and preventing wildlife trade-related crime also provided some
insights into local circumstances affected by the pandemic. According to many of the sellers surveyed, the pandemic catalysed a trend towards more rigorous enforcement and closures of wildlife markets. Many sellers reported not being able to trade wild animals and their derivatives openly during and immediately after the pandemic owing to stronger enforcement and fear of wildlife/animals as a source of disease transmission. Some of those interviewed said:

“**I have been working here for 50 years. Before animals were sold in the square, but since the pandemic it’s been prohibited.**”

**“Animals are no longer traded here because the mayor prohibited their sale after the pandemic since it was said that they could be sources of coronavirus transmission.”**

Despite not being able to sell or buy wildlife openly in markets, many sellers and interviewees in this study said that the demand for wildlife overall did not decrease. Instead, wildlife use increased as the availability of imported goods decreased during the pandemic, forcing local people to rely more heavily on wildlife products to sustain their livelihoods. According to one interviewee:

**“The markets have changed since the pandemic: you’re prohibited to sell a lot of products from the jungle now. If you want something you have to ask and then come pick it up later.”**

While another interviewee said that some illegal items continued to be available, albeit concealed:

**“You can get wild meat, it’s not as much as before and you might not see it but, is always in the market.”**

The United Nations Conference on Trade and Development (UNCTAD) statistics show a sharp downturn in global trade in 2020 as a consequence of border restrictions and other logistical disruptions resulting from the pandemic and a decline in global demand as health and economic crises unfolded. However, recovery began before the end of that year and the overall decrease in global trade in goods from 2019–2020 was less than 10 per cent. Global trade in goods in 2021 increased rapidly and reached a higher annual total than that reported in 2019 before the pandemic. However, within the global trend there were major differences in how the pandemic affected different types of merchandise.

Looking in more detail at global transport trends, maritime container freight volume appears to have been little affected by the pandemic and annual air freight volume reduced in 2020 by around 15 per cent but bounced back to previous levels in 2021. The most marked change during 2020 was the reduction in air passenger numbers, down over 60 per cent compared to the previous year and recovering slowly in 2021 (Figure 2.14). This decrease may be reflected in the lower number of wildlife seizures in 2020 and 2021, although perhaps it is less significant in terms of trade volumes given bulk shipments are not moved in passenger baggage. It is also worth noting that both maritime and air freight costs soared during the pandemic.

Some reported wildlife seizures take place in markets or storage locations rather than during shipment. Even for those seized on the move, the mode of transport is not always reported so it is difficult to establish robust trends. However, from the limited information available on transport mode in the WWCR3 analytical dataset, the reported percentage of seizures linked to air transport decreased greatly in 2020–2021, likely reflecting the pandemic disruption to passenger travel (Figure 2.15). It is also noteworthy that the percentage of seizures from
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FIG. 2.14 Percentage variance from a 2015 baseline in air and maritime transport throughput 2015–2021

![Graph showing percentage variance from a 2015 baseline in air and maritime transport throughput 2015–2021](image)

Source: UNCTAD and International Civil Aviation Organization
Note: TEU = Twenty-foot equivalent units

Mail shipments increased during those years, which may be in part linked to the pandemic, the rapid development of courier shipping in general, and the increasing reliance on e-commerce.

As discussed in chapter 4 of the current report, demand driving illegal wildlife trade is segmented into several different use sectors with distinct characteristics. It is therefore unreliable to generalize about the possible impacts of the pandemic on levels of consumer demand for illegal wildlife goods. Instead, taking stock of global economic trends, it is noteworthy that a comprehensive index of consumer confidence showed a significant downturn in 2020, recovering to pre-pandemic levels by mid-2021.

To ascertain whether the reduction in some types of wildlife seizures during 2020–2021 might be a sign that enforcement effort had decreased owing to workplace restrictions or other factors, trends in reported seizures from other contraband markets were examined.

A review of available data indicated different trends have been observed in the global interception of various forms of trafficking. Records of cocaine, for example, reached global highs during 2020 and 2021 (Figure 2.16) and methamphetamine seizures in East and South-East Asia also remained high during the same period (Figure 2.17). However, the detection of victims of trafficking in persons, for the first time in 20 years, fell by 11 per cent between 2019–2020. It is unclear to what extent these contrasting trends during the pandemic period reflect differences between markets or variation in enforcement priorities.
**What is the overall scale of illegal wildlife trade?**

Although seizure data represent an unknown proportion of actual illegal trade flows, they do provide an indication of the minimum scale of wildlife crime. However, as explained above, calculating even this minimum volume is not straightforward. Wildlife commodities are recorded in seizures using different units of measurement appropriate to their individual characteristics. The majority of seizures are reported either by numbers of individual specimens (typically live animals and plants or manufactured items) and those reported by weight (typically bulk goods, such as timber or ivory).

Based on the WWCR3 analytical dataset, the total number of individual wildlife specimens reported by number during 2015–2021 was just under 13 million, or on average 1.84 million specimens per year (where no weight was reported). Summing the quantity of seizures for this period reported by weight (without any conversions) reveals a total of close to 17,000 tons, or on average 2,400 tons per year.

Another way to represent the scale of illegal wildlife trade during this period is to estimate its monetary value. Doing this in a meaningful way even for known seizures is remarkably difficult because the “value added” by a trafficker is in moving the product past enforcement barriers from its source to its destination market. Therefore, the value of contraband is highly dependent on where in the market chain it is encountered.

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**FIG. 2.15** Percentage share of seizures in various means of transport by number of seizure records

![Bar chart showing percentage share of seizures in various means of transport by number of seizure records](source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset))
One of the biggest problems with the prevailing estimates of the value of the illegal wildlife trade is definitional. It is often unclear what is being evaluated, or different types of valuation are mixed. Some estimates provide the monetization of the environmental cost related to wildlife trafficking together with lost governmental revenues from user fees or taxation. This type of estimates helps to recognize the harm and impact of wildlife crime on social, economic and environmental development, but it provides little information on the actual profits made by traffickers and the size of the actual financial resources that are exchanged when wildlife is trafficked.

From a crime perspective, it is useful to estimate a monetary value of the illegal wildlife trade to understand the size of the illegal profits generated and the related illicit financial flows. These aggregates help to assess the financial motivations associated with the illegal trade and the broad magnitude of illicit financial flows that are traded within and across borders. This can support law enforcement and financial institutions to appreciate the magnitude of the threat.

UNODC has undertaken studies for selected species to estimate the total value of gross illegal income generated by illegal wildlife trade across the entire supply chain, considering the markup price at each stage of the chain. Estimation of the potential profits made by traffickers involved subtraction of processing and handling costs and the calculation of a net-value income associated with trafficking.

The World Wildlife Crime Report 2020 looked at two of the best-known illegal wildlife markets—elephant ivory and rhinoceros horn—and estimated the illicit gross income associated with trafficking in these commodities. They were based on estimates of the annual supply to the market using CITES evaluations of poaching levels and price observations along the trade chain. The report also estimated associated illicit financial flows, the cross-border flows of resources that are illicitly generated, transferred or used, taking into account both income and costs at different steps along the trade chains for these commodities.

The report estimated annual illicit gross income from elephant ivory trade of $400 million (range $310–570 million) during 2016–2018. For rhinoceros horn the annual illicit gross income during the same period was estimated as $230 million (range $170–280 million).

Within the total valuation of an illegal wildlife market, it can be useful to look at the illicit income made at each stage of the supply chain as different actors may be involved and each stage may require a different response. Values of wildlife commodities at the retail stage can greatly vary depending on factors such as the amount being bought (e.g. larger quantities sold at a lower price), differences in the quality of the actual batch (e.g. the same timber species could produce very different quality timber depending on the circumstances in the habitat of harvest) or the characteristics of the given market (e.g. the same products can be sold for different prices at various markets). Some markets that have been monitored, like the price of ivory in Asia, have shown price variations of 250 per cent over three years.

The nature of illegal wildlife trade is that goods traded illegally as raw materials may subsequently enter legal processing industries and retail markets. In such cases, although clearly still associated with illegality upstream in the supply chain, profits linked to value added in the legal market may have limited significance for gaining insights into criminal motivations. In such cases, the size of the wholesale market may provide greater insights into the profit motivations for criminals organizing the illegal supply.

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Considering a range of possible scenarios and numerical simulations, average estimates of associated annual illicit financial flows were $240 million for elephant ivory and $163 million for rhinoceros horn.

For the different stages of the supply chain, it was calculated that for ivory, within the total of $310–570 million annual illicit income, $260–490 million was generated at retail level, $38–60 million from international trafficking, $7–11 million by runners and brokers, and $8–13 million by poachers. For rhinoceros horn it was calculated that within the total of $170–280 million annual illicit income, $120–160 million was generated at retail level, $28–79 million from international trafficking, $7–15 million by runners and brokers, and $6–43 million by poachers.
While it may be very difficult to give an accurate estimate of the size of the market overall, estimates of the value of illegal trade flows can be made for some of the best-known markets, such as those for elephant ivory and rhinoceros horn (Box 2.6). This is because knowledge of population losses to poaching can be used in combination with seizure data to estimate likely trafficking flows. Availability of price information from defined points on the trade chain allows estimation of market size. Such estimates can be summed in a “bottom-up” approach to gain a basic insight into the scale of illegal wildlife trade flows.

The elephant ivory and rhinoceros horn markets are among the most prominent in the illegal trade in CITES-listed species. Using the calculations summarized above, proceeds from international trafficking of unworked rhinoceros horn and ivory may have totalled between $66–139 million a year during 2016–2018. This is a substantial sum, although bear in mind that this represents gross income to traffickers rather than net profit. It is also apparent that significant additional value associated with this trafficking is generated through subsequent illicit retail sales. As shown in Figure 2.2, together these two commodities constitute just under 20 per cent of reported wildlife seizures based on the standardized seizure index comparison.

For context, an analysis of legal trade in CITES-listed species during 2016–2020 estimated an average annual value of approximately $1.8 billion for trade in all CITES-listed animal species and approximately five times this figure, $9.3 billion, for CITES-listed plant species.45 As this calculation was based on declared import values and wholesale market prices, it is roughly comparable to the estimates for the international trafficking stage in the ivory and rhinoceros horn trade value analysis.

Finally, when comparing these figures with other estimates of global illegal wildlife trade, it is critical to recall that there are very large sectors of the market, or gross criminal profits, lost governmental revenues, lost value to the economy, loss of ecosystem services, or some other metric. Some estimates may combine these unlike measures.

One analysis that attempted to measure and evaluate the size of the illegal wildlife trade concluded: “Measuring it is challenging (if not impossible) to do with accuracy, and there are no available methods that can produce a global estimate of the species and quantities involved.”44 Despite this, some estimates exist (Box 2.5). These estimates cover different domains: wholesale or retail revenues generated, net
such as illegal flows of timber and fisheries products derived from species not regulated by CITES, for which seizure records are not currently available in the analytical dataset.

**Geographic variation**

Wildlife seizures in the WWCR3 analytical dataset were recorded as having been made in 162 countries and territories during 2015–2021, with an additional 82 countries and territories implicated in the trade chain for these transactions. Together they demonstrate the global nature of illegal wildlife trade (Map 2.1).

For some records, information on the country of shipment and next destination are provided, but in many cases this is unknown or unreported. Even when reported, it is often unclear whether the country of shipment is the actual country of origin where wildlife was harvested or whether the shipment destination is believed to be the intended end market for the goods seized.

In international wildlife trade, commodities are moved from source countries to consumer countries sometimes via multiple transit points and seizures can be made at any point in the trade chain. Therefore,
any pattern shown by region in this section must be treated with some caution as it is not necessarily clear from the data at which point of the trade chain the seizure was made and so what the role of that region in the chain may be. Also, some regions are more consistent in reporting seizures than others, therefore Figure 2.18 and Map 2.1 likely do not provide a strong indication of where wildlife crime occurs. Based on the number of seizure records in the WWCR3 analytical dataset, the African region was the location of the smallest number of records for 2015–2021. The uneven geographic distribution must be taken into account when interpreting the data at the regional or global levels. About half of the recorded seizures were made in Europe and Oceania for the period 2015–2021. However, when seizures are analysed on the basis of the standardized seizure index, Asia and Africa emerge as the most significant regions where seizures took place (Figure 2.18).

Again, aggregated by standardized seizure index, seizures in Asia were distributed across sub-regions as follows (percentage of global total): South Asia 9 per cent; South-East Asia 4 per cent; East Asia 3 per cent. Virtually all the seizures reported for Africa (19 per cent) were made in the sub-Saharan subregion. In terms of global trade...
flows, a majority of seizures between 2015–2021 was made up of shipments from sub-Saharan Africa and South Asia, based on seizures where the shipping origin was specified (44 per cent of all the records) (Figure 2.19).

In 2015–2021, elephant, carnivore and pangolin items were all in the top five species groups seized in Africa and Asia (Figure 2.20). However, while these was a large share of rosewood timber seizures in Asia, there was a smaller proportion in Africa where it did not make one of the top five species groups seized. Coral, crocodilian and snake items were more prominent in the other three regions, with parrots and cockatoos prominent in the Americas and bivalve molluscs in Oceania. Plants also comprised a significant proportion of the records in Europe (e.g. aloes and cacti) and in Oceania (e.g. costus root and ginseng).

Differences in the charts by number of seizure records (Figure 2.20) and aggregated by standardized seizure index (Figure 2.21) can be observed for the same regions. For example, in Asia the share of rosewood seizures aggregated by standardized seizure index was over 35 per cent for 2015–2021 but by number of seizure records, only 17 per cent. In Europe, eels did not feature in the top species groups based on number of seizure records, but they represented 29 per cent by aggregated standardized seizure index. These examples illustrate the importance of interpreting the data from multiple perspectives and understanding which aspect of the data is useful to look at depending on what the interest is.
FIG. 2.20  Percentage share of seizure records by species group for each region 2015–2021

FIG. 2.21  Percentage share of seizures by species group for each region aggregated by standardized seizure index 2015–2021

Sources: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

* Other Liliales includes agave, snowdrop and yucca species

** Other Sapindales includes guaiacum, holy wood and mahogany species
Across the regions significant differences can be observed in the share of wildlife species groups seized between 2015–2021 based on the standardized seizure index analysis. In Asia, a large share of seizures involved timber followed by pangolin items. In Africa, pangolin, rhinoceros and elephant items together made up over 95 per cent of all seizures. In Europe, eels led followed by agarwood. In the Americas, timber (cedar) was by far the top taxonomic group using this metric (79 per cent), followed by crocodilian and rosewoods (5 per cent and 3 per cent respectively). In Oceania, the top taxonomic groups involved crocodilians, costus root, snakes, ginsengs and cacti in order of importance.

The main wildlife commodities seized between 2015–2021 based on the number of seizure records and standardized seizure index were also analysed (Figures 2.22 and 2.23 respectively). Live specimens constitute an important group in both analyses by making it into the top five in four regions by both metrics. By number of seizure records (Figure 2.21), three regions had medicines in their top five: Americas, Europe and Oceania. Aggregated by standardized seizure index (Figure 2.22), horn seizures were in the top five for three regions: Africa, Asia and Europe. Similarly, seizures of small leather products also featured prominently in three regions: Americas, Europe and Oceania.
FIG. 2.23  Percentage share of seizures by commodity type for each region aggregated by standardized seizure index 2015–2021

Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
Endnotes

1 The term “wildlife crime” is sometimes used to cover a wider scope of concerns than those addressed by the current report, such as illegal persecution, killing, poisoning, or poaching of wildlife for reasons not related to trade, as well as the unauthorized alteration or destruction of habitats in contravention of environmental law. For example https://stopwildlifecrime.eu/.


3 Article 8 (1) of the Convention requires, “The Parties shall take appropriate measures to enforce the provisions of the present Convention and to prohibit trade in specimens in violation thereof. These shall include measures: (a) to penalize trade in, or possession of, such specimens”.

4 CITES Appendix II lists species that are the most endangered among CITES-listed animals and plants. CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial, for instance for scientific research. Article VII of the Convention provides for a number of exemptions to this general prohibition.

5 Article 2(a) of the Convention defines “organized crime group” as “A structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes or offences established in accordance with this Convention, in order to obtain, directly or indirectly, a financial or other material benefit.” Serious crime is further defined as crimes punishable by four or more years in prison, which would include many forms of wildlife crime in some of the largest markets in the world. The crimes articulated in the Convention include conspiracy, money laundering, and corruption, all crimes commonly associated with wildlife crime. See: https://www.unodc.org/documents/treaties/UNTOC/Publications/TOC%20Convention/TOCebook-e.pdf.


7 For example, in 2022, UNODC interviewed 11 people incarcerated in Indonesia for poaching activities, of whom five reported not being aware that their activities were illegal. See the online methodological annex for details of this research. Similarly, many species protected under CITES Appendix II feed into large legal markets, like the seahorse case study detailed in this report, where many retailers may not know of the illegal origins of their products.


10 Ibid.


12 Ibid.


26 Import/export declared value data published by the Government of the United States are supplemented by UNODC wholesale price estimates for some commodities and market price information for plant species compiled by UNEP-WCMC.

27 Price index reference points were applicable to approximately 52 per cent of seizure records in the dataset (approximately 56 per cent for animals and 40 per cent for plants). This is in part because index values are excluded for many manufactured goods, such as packaged medicines, because reported quantities are unreliable. For example a report of one item could be a single medicinal pill or a package containing hundreds of individual pills.


30 Notes: reported number of specimens includes all description codes whether live, parts, derivatives or products. The annual illegal trade report template allows for reporting both weight and other quantities (e.g. number of specimens or volume). In this figure, weight was presented in the chart whenever weight was reported, while the number of specimens totals include only records where weight was not reported to avoid double-counting.

31 CITES Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. It also includes so-called “look-alike species”, i.e. species whose specimens in trade look like those of species, listed for conservation reasons. International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate if the relevant authorities are satisfied that certain conditions are met.


33 A report of the findings of the UNODC research on gender dimensions of wildlife crime in Colombia, Ecuador and Peru will be published separately in future.

34 S43

35 S41

36 S27

37 S56


43 UNODC, “Global Report on Trafficking in Persons 2022.”


