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UNODC Research

World Wildlife Crime Report

2024

UNODC, World Wildlife Crime Report 2024: Trafficking in Protected Species (Vienna: United Nations publications, 2024).

NOTE: the Trafficking in Protected Species subtitle isn't used in endnote citations.

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Notes:

References to tons are to metric tons, unless otherwise stated.
References to dollars ($) are to United States dollars, unless otherwise stated.
Interview codes used in references and details of the interviews conducted for the production of this report are provided in the Annex.

Illustrations: MstNasrinAktar, Mahdi, zolotons, sergio34, byrdyak, Elala 9161, mastapiece, Rizal, Anada77, lemonaredass / Adobe Stock .com

UNITED NATIONS PUBLICATION
Sales No. 24.XI.4
ISBN: 9789211064582
ePUB ISBN: 9789211064599
Print ISSN: 2521-1412
Online ISSN: 2521-6155

UNITED NATIONS OFFICE ON DRUGS AND CRIMES
Vienna

WORLD WILDLIFE CRIME REPORT

TRAFFICKING IN PROTECTED SPECIES

2024

UNODC
United Nations Office on Drugs and Crime

Preface

I am pleased to present the third edition of the UNODC World Wildlife Crime Report, which aims to provide a tool to assess and improve responses to this hugely damaging form of criminal activity. The present report covers trends in the illicit wildlife trade, analyses harms and impacts, probes driving factors, and takes stock of responses.

Wildlife crimes are diverse and often devastating in their impact and consequences. They hamper conservation efforts, damage ecosystems, and contribute to undermining our planet's capacity to mitigate climate change. They also infringe on the essential needs, income opportunities, and cultural rights of local communities, and corrode governance and the rule of law.

Global recognition of this damage has grown steadily, and after two decades of concerted action, there is some cause for optimism. There has been tangible success against trafficking of some iconic species, while cross-border cooperation and criminalization of wildlife crime have both improved.

Nevertheless, the magnitude of this illegal trade remains immense, affecting thousands of species of animals and plants and spanning more than 160 countries and territories. Much more work is urgently needed to tackle challenges both chronic and emerging.

Seizures are not enough to understand the problem, nor to end it, and wildlife traffickers are quick to adapt in their methods and their trafficking routes, exploiting gaps in regulation and legislation and pouncing on market trends.

Organized criminal groups remain heavily involved in wildlife crime and play important roles across the trafficking chain, from source to end market, while corruption continues to hamper regulation and enforcement efforts, and new technologies provide traffickers with better access to global markets.

Disrupting and dismantling this criminal enterprise requires multifaceted interventions at both the supply and demand ends, including through policy engagement, law enforcement and market suppression. Responses must be agile, targeted, and harmonized, benefitting from robust international cooperation.

It is also important to always keep communities and their well-being front and centre. They are the custodians of nature's treasures, and we must raise their awareness, partner with them, and protect their interests.

To enable such comprehensive responses, interventions must be informed by strong scientific evidence. This report speaks to the growing body of evidence on wildlife crime, just as it speaks to the need to expand this body even further, by investing more in building data and analytical capacity, in researching impacts and risks, and in monitoring developments in illegal wildlife markets.

I hope that this report will generate greater momentum for more effective interventions, more coherent policy commitments, and more attention to the great damage caused by this vast criminal industry.

Ghada Waly
Executive Director
United Nations Office on Drugs and Crime

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Acknowledgements

The third edition of the *World Wildlife Crime Report* was prepared by the Research and Trend Analysis Branch, Division for Policy Analysis and Public Affairs, United Nations Office on Drugs and Crime (UNODC), under the supervision of Jean-Luc Lemahieu, Director of the Division for Policy Analysis and Public Affairs, and Angela Me, Chief of the Research and Trend Analysis Branch.

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Environmental Investigation Agency, TRAFFIC, UN Environment Programme World Conservation Monitoring Centre and Wildlife Justice Commission.

Review and comments

The *World Wildlife Crime Report 2024* benefited from the invaluable contributions by UNODC colleagues in all divisions. Particularly, the support provided by Sinead Brophy, Giovanni Broussard, Hanny Cueva-Beteta, Jenna Dawson-Faber, Leopoldo Fernandez Herce, Nicole Quijano-Evans and Zhiqiang Tao from the UNODC Global Programme on Crimes that Affect the Environment and by Adrianna Collins, Tanya Wyatt and Sonya Yee from the UNODC Research and Trends Analysis Branch is gratefully acknowledged.

The Research and Trend Analysis Branch acknowledges the invaluable contributions and advice provided by members of the World Wildlife Crime Report Scientific Advisory Committee: Debbie Banks, Renata Cao, Hyeon Jeong Kim, Moenieba Isaacs, Pia Jonsson, Andrew Lemieux, Manuel Medina, Jacob Phelps, Cynthia Ratsimbazafy, Scott Roberton, John M. Sellar OBE, Rohit Singh and Xu Ling.

Thanks are also due for inputs into and reviews of case studies: Sharon Baruch-Mordo, Melanie Butler, Dan Challender, Jenny Feltham, Sarah Foster, Chris Morris and Dan Stiles.

Research for this Report benefited from the expertise and invaluable contribution by the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Also, other partner members of the International Consortium on Combating Wildlife Crime (ICCWC), the International Criminal Police Organization (INTERPOL), the World Bank and the World Customs Organization (WCO), supported the development of the report. Input was also provided by the United Nations Environment Programme (UNEP).

All Member States that supported UNODC field research in their country are also gratefully acknowledged.

The preparation of this report benefited from the financial contributions of Germany, United Kingdom of Great Britain and Northern Ireland and the United States of America.

Summary, conclusions & policy implications

Key Messages

1. Wildlife trafficking persists worldwide despite two decades of concerted action at international and national levels—more rapid and measurable progress could be achieved if interventions were informed by stronger scientific evidence.

2. With thousands of wildlife species affected and a diverse range of distinct markets driving multiple environmental and societal harms, interventions to reduce wildlife trafficking need to be prioritized and more strategic.

3. Corruption undermines regulation and enforcement while technology accelerates the capacity of traffickers to reach global markets—criminal justice responses should be modernized, strengthened and harmonized from source to end markets.

4. Wildlife crime is interconnected with the activities of large and powerful organized crime groups operating in some of the most fragile and diverse ecosystems from the Amazon to the Golden Triangle—addressing wildlife trafficking in these circumstances requires a broader strategy to address organized crime as a whole.

Key Messages

Wildlife trafficking persists worldwide despite two decades of concerted action at international and national levels—more rapid and measurable progress could be achieved if interventions were informed by stronger scientific evidence.

- There are signs of progress in reducing the impacts of trafficking for some iconic species, elephants and rhinoceros, but UNODC's assessment of available evidence gives no confidence that wildlife trafficking overall is being substantially reduced.
- Lessons from where progress is being made indicate that multifaceted interventions at both demand and supply stages can reduce wildlife trafficking. While success is often measured in terms of arrests and seizures, these measures alone do not necessarily have long-term impact in reducing the criminal incentives that drive illicit markets.
- Wildlife traffickers are adaptable, adjusting their methods and routes in response to regulatory changes and to exploit differences between legal regimes, enforcement gaps and new market trends. Interventions to reduce wildlife trafficking need strong coherence and harmonization across the trade chain. Consideration should also be given to the social and economic dynamics affecting the illicit economy of broader sectors rather than single species. This requires strong international cooperation and a solid evidence base to guide design, implementation and evaluation of remedial action.
- Research on what works to address other crime types suggests that wildlife crime responses could be strengthened through better geographic and commodity targeting, predictive responses to species and geographical displacement, criminal behaviour forecasting, and focused deterrence.
- While there is a growing body of evidence around wildlife crime—as shown in the material presented in the current report and the rich scientific literature on wildlife crime—many knowledge gaps persist that limit a full evidence-based approach. More and better investment is needed on building data and analytical capacity at national and international level.

Corruption undermines regulation and enforcement while technology accelerates the capacity of traffickers to reach global markets—criminal justice responses should be modernized, strengthened and harmonized from source to end markets.

- While corruption is known to enable wildlife crime and undermine the criminal justice response, wildlife crime cases are seldom prosecuted through corruption offences. Greater consideration should be given to prosecution of those organizing or enabling wildlife trafficking under laws directly addressing corruption, which may provide stronger investigative powers and potential for higher penalties than applicable under environmental legislation.
- More attention is also warranted to sector-specific corruption vulnerabilities related to specialized public sector roles such as harvest, breeding and trade permit issuance, animal health and phytosanitary inspection, and control of specialized retail outlets.
- Deterring serious criminal engagement requires serious enforcement responses through more incisive investigation of major beneficiaries and targeting enforcement action to undermine the financial motivations for trafficking.

With thousands of wildlife species affected and a diverse range of distinct markets driving multiple environmental and societal harms, interventions to reduce wildlife trafficking need to be prioritized and more strategic.

- Wildlife crime encompasses a multitude of different actors, species, commodities and driving factors and it has different impact across environmental, social, economic development and governance aspects. No one single perspective, policy or programme can address this multi-faced crime. Effective responses require the prioritization of concerted efforts at national and international level.
- Assessment of the level of harm posed by the different forms of wildlife crime is one lens through which interventions can be prioritized and targeted. Among the 4,000 animal and plant species that are affected by recent wildlife trafficking, there are different risks for overexploitation, ecosystem disruption, and potential impacts on climate stability. Socioeconomic harms are also diversified, reducing the benefits derived from nature, threatening human security, health and livelihoods, and having a corrosive influence on governance and the rule of law.
- This wide range of interlinked environmental and societal harms is typically not explicitly recognized; resolving conflicting perspectives on their relative importance could help strengthen the prioritization and pursuit of remedial action.
- Another way to target and prioritize interventions is by assessing the diverse factors that drive criminal activity and the different actors operating at various stages of the wildlife trafficking chain, from illegal sourcing to end-market demand. Some communities at source pay the cost of protective regulations as the economic and social benefits of previously legal harvest and trade can vanish, while traffickers continue to enjoy the financial benefits of the illicit economy. Targeted and proportional responses are needed that address specific motivations for involvement in wildlife crime and reduce risks of unintended negative outcomes.

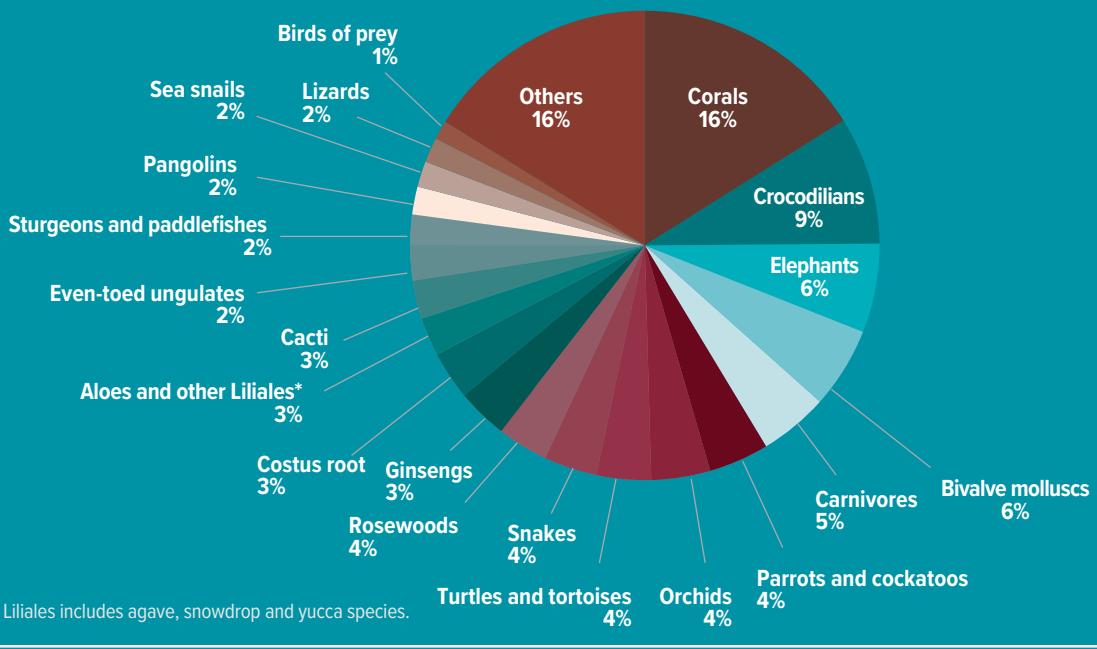
Wildlife crime is interconnected with the activities of large and powerful organized crime groups operating in some of the most fragile and diverse ecosystems from the Amazon to the Golden Triangle—addressing wildlife trafficking in these circumstances requires a broader strategy to address organized crime as a whole.

- Convergence of wildlife trafficking operations with other criminal businesses can drive rapid change in market circumstances, through dynamics such as exertion of territorial power, exploitation of corrupt relationships, access to illicit firearms and opportunities for money-laundering. When powerful organized crime groups are engaged in wildlife crime in the context of other larger illicit economies, they amplify the negative impact of wildlife crime on the environment and community.
- Organized crime is evident in various specialized wildlife trafficking roles, such as export, import, brokering, storage, keeping and breeding live specimens or handling the interface with processors. Traffickers can also actively manipulate demand in end markets to sustain or expand business opportunities.
- Investment in monitoring and analysing new developments in illegal wildlife markets and associated criminality on an ongoing basis is a prerequisite for effective adaptation of wildlife trafficking responses.

Key Figures at a Glance

Diversity of species recorded in seizures

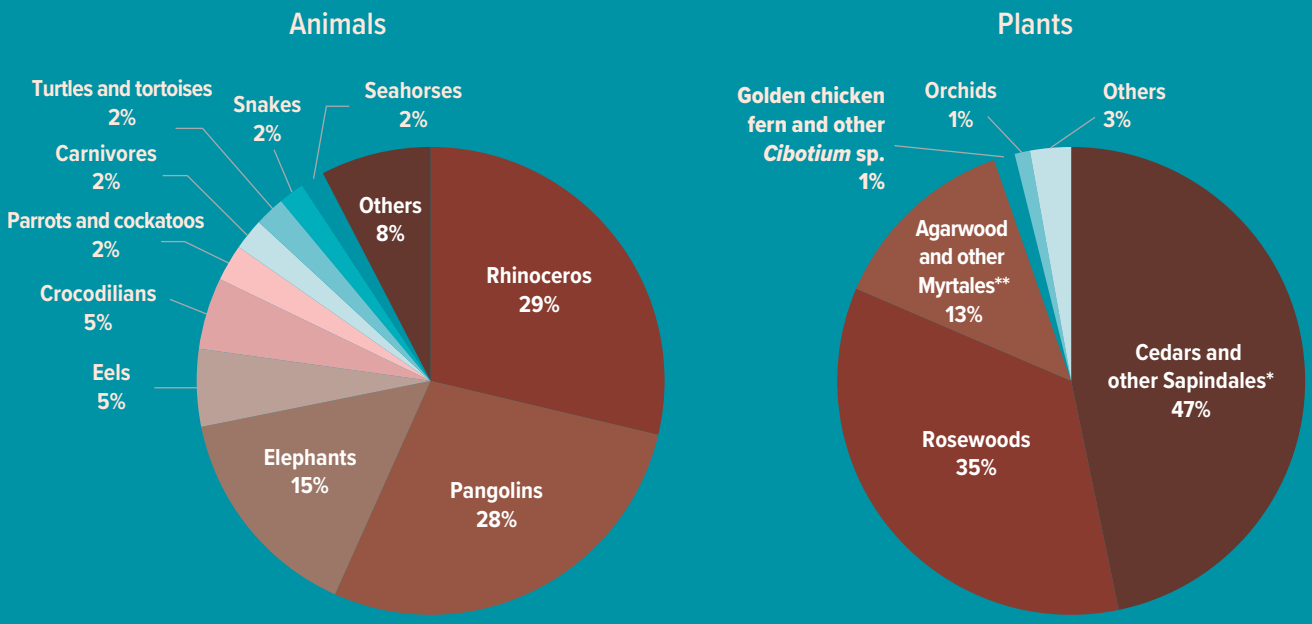
Percentage share of all seizure records by species group 2015–2021



* Other Liliales includes agave, snowdrop and yucca species.

Species most affected

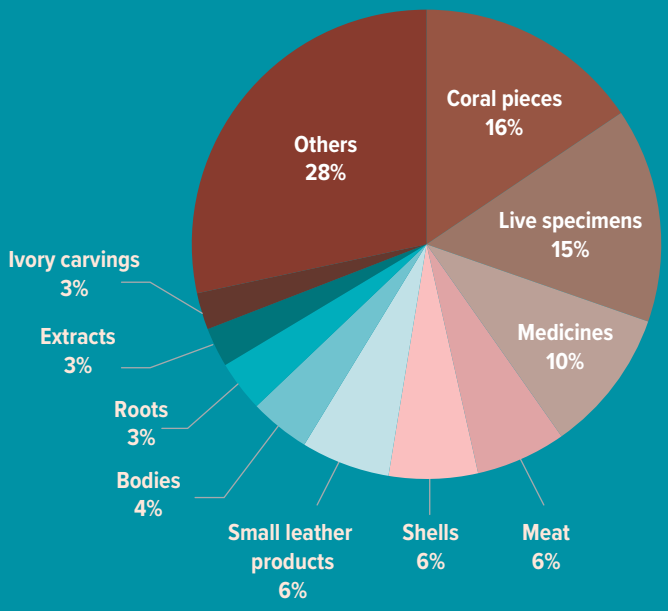
Just 15 broad markets comprised the bulk of the observed illegal wildlife trade during 2015–2021 based on standardized seizure index



* Other Sapindales species include mahogany, holy wood and *Guiacum*
** Other Myrtales species include ramin and eucalyptus

Commodities in trade

Top commodities by percentage of seizure records 2015–2021

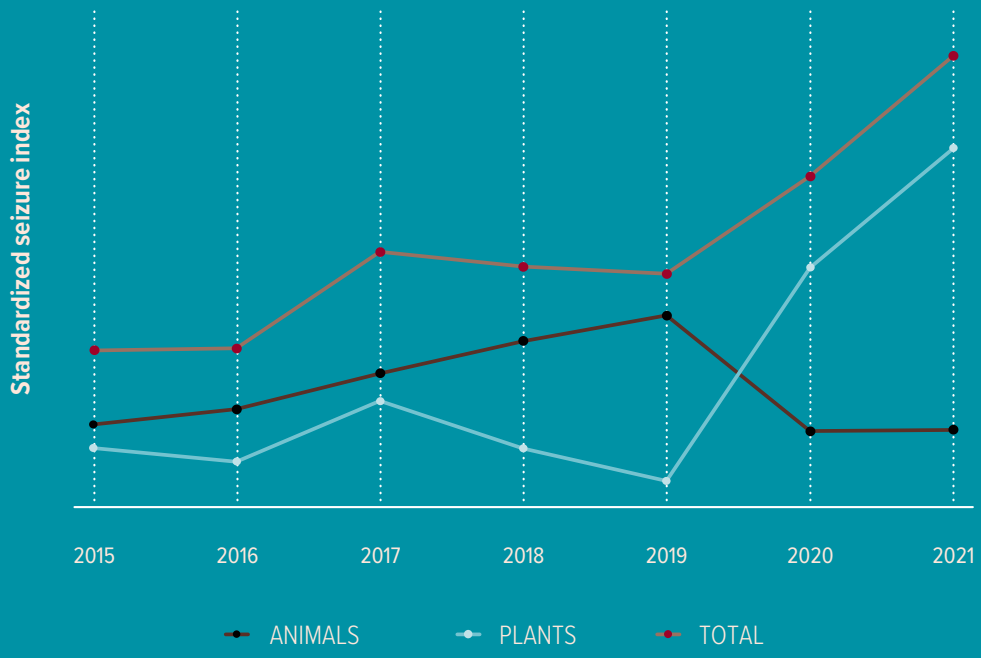


Demand sectors

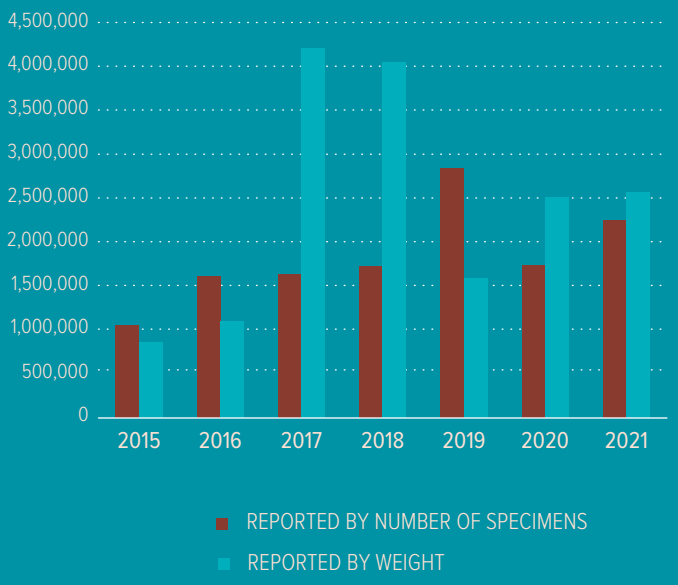
	Source of demand	Nature of commodities	Scale of demand	Examples of species in seizures used in this sector
	Food	Perishable and consumed	Mostly sought in bulk demand, some niche markets	Shark fins, pangolins, eels, sturgeons, abalone, orchid tubers
	Medicine	Often dried or processed into less perishable form and then consumed	Mostly sought in bulk	Pangolins, seahorses, big cat bones, costus root
	Mass market pets and ornamental plants	Live animals and plants dependent on care	Generally sought in bulk	African grey parrots, iguanas, cacti and orchids
	Specialist market for live animals and plants	Live animals and plants dependent on care	Rarity is at a premium	Orchids and succulents, reptiles, amphibians
	Exclusive market in goods for adornment, display and demonstration of status	Non-perishable and not consumed. Sometimes processed into manufactured goods	Rarity is often a selling point, but some sought in bulk for manufacture of high-value exclusive goods	Elephant ivory, rhinoceros horns, shahtoosh (wool from Tibetan antelopes), rosewoods

Key Figures at a Glance

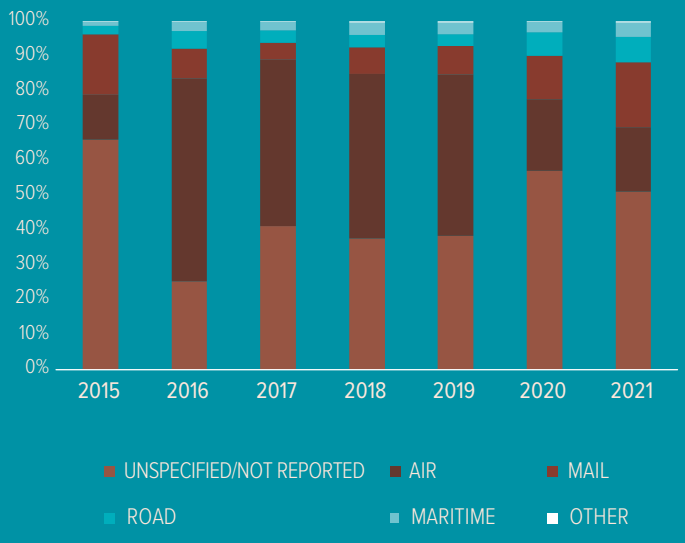
Trends in the standardized seizure index for all seizures and separately for plants and animals 2015–2021



Seizures reported by weight and by number of specimens 2015–2021

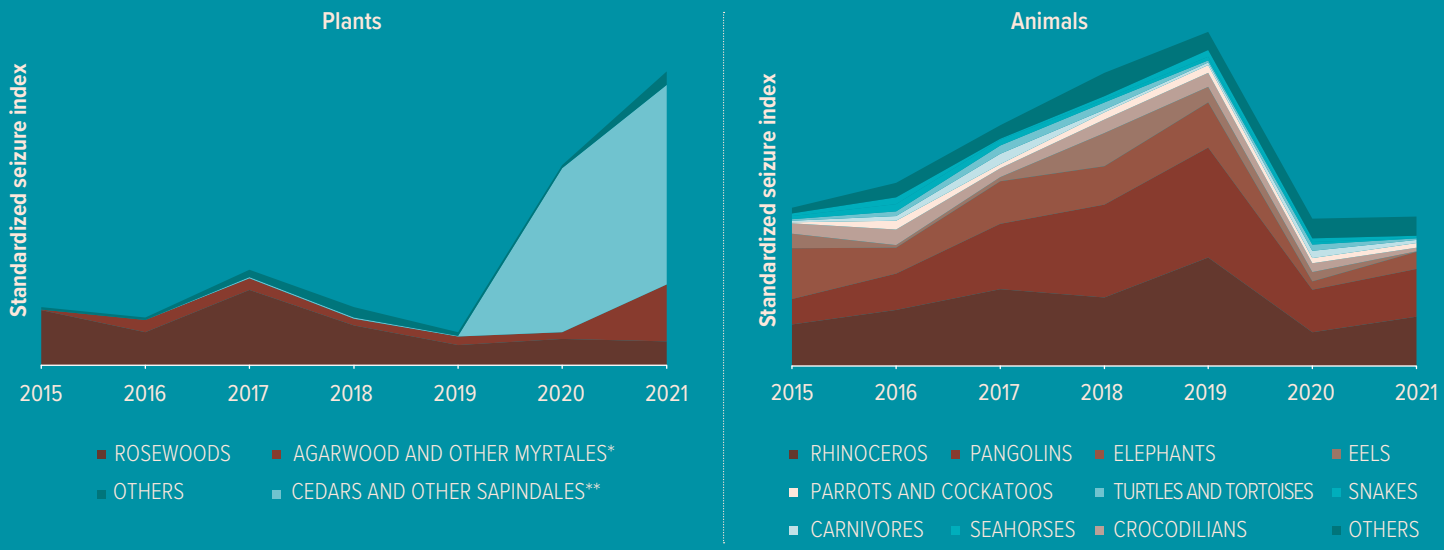


Percentage share of seizures in various means of transport, by number of seizure records, 2015–2021



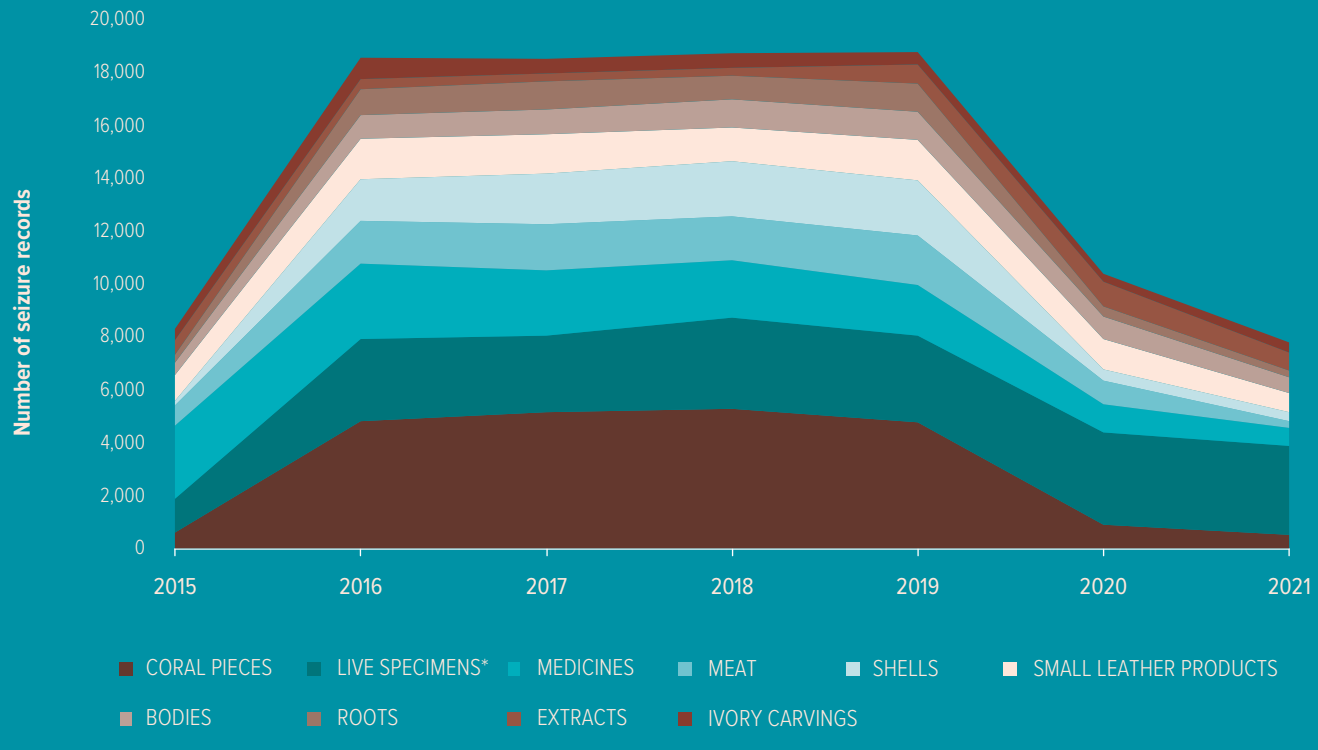
Recent trends

Aggregated standardized seizure index by species group for plants and animals 2015–2021



* Other Sapindales species include mahogany, holy wood and *Guiacum*
** Other Myrtales species include ramin and eucalyptus

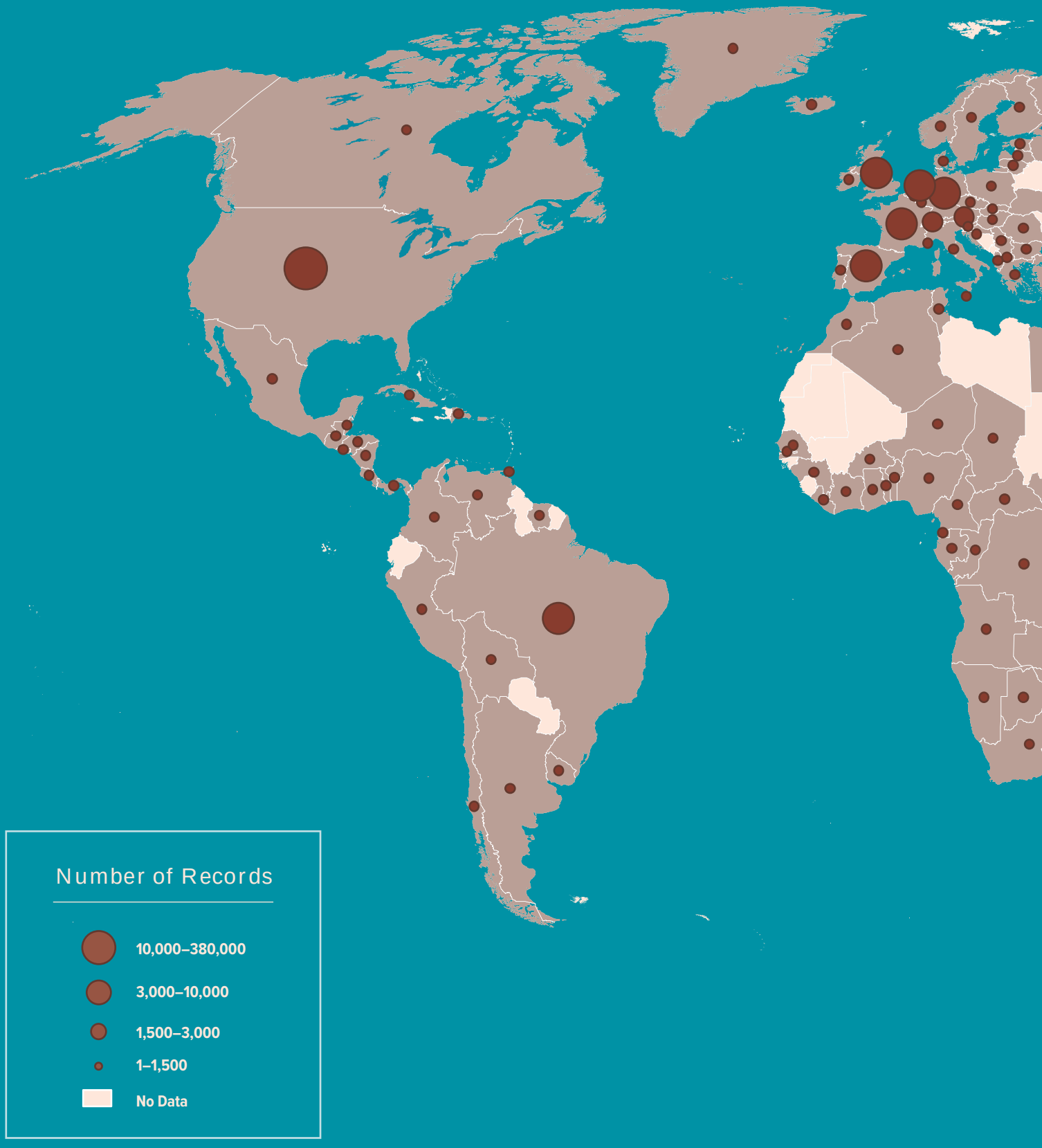
Top commodity types per year based on number of seizure records 2015–2021

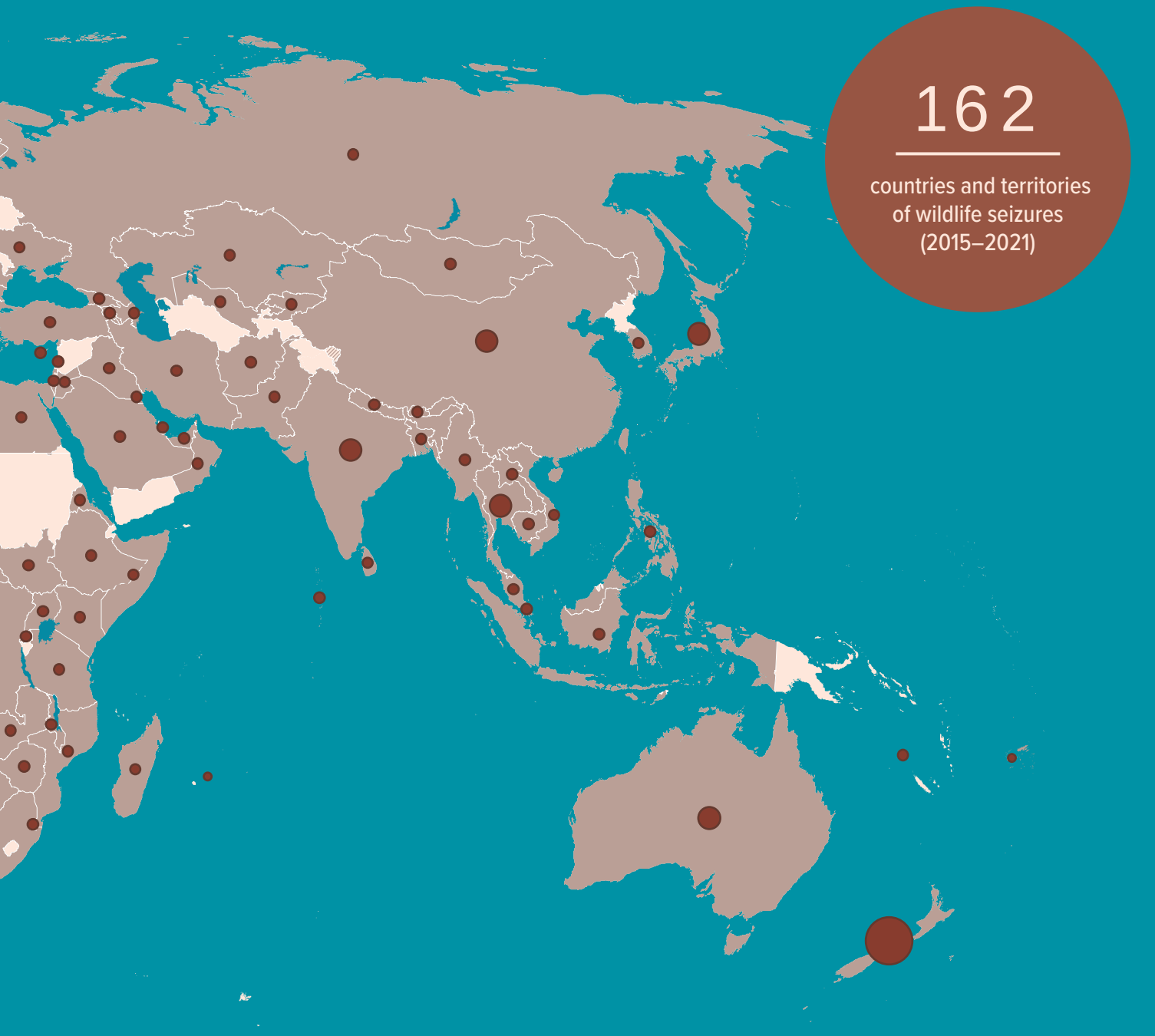


* Both plants and animals

Map

Number of seizure records in the WWCR3 analytical dataset per country/territory 2015–2021





The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

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).

Certain countries and their territories report separately under CITES. Dots therefore reflect both categories.

Summary
conclusions & policy implications

About this report

This third edition of the *World Wildlife Crime Report*, like its predecessors published in 2016 and 2020, probes trends in the illicit trafficking of protected wildlife species. It also presents systematic analyses of wildlife crime harms and impacts, probes the factors driving wildlife trafficking trends, and takes stock of current knowledge about the effectiveness of the different types of intervention being pursued to resolve this problem.

The records of government wildlife seizures that help inform global and thematic analyses in the current report are significantly more comprehensive than was the case for previous UNODC analyses. This is largely due to the availability of national Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Annual Illegal Trade Reports, first submitted in 2016 and accessible through 2021 for the current report. These records, together with supplementary seizure data collated by UNODC from diverse sources and verified with Member States, form the WWCR3 analytical dataset for thecurrent report. It includes over 140,000 records of wildlife seizures reported to have taken place between 2015–2021. In assessing trends over the period 2015–2021, it is notable that the annual number of seizures reported for 2020 and 2021 was around half the number reported for each of the preceding four years. It is not possible to be sure to what extent this reflects reduced reporting,[1] less enforcement action, a genuine reduction in trafficking levels, or shifts to new modes of marketing and moving illegal wildlife shipments more likely to avoid detection. As discussed below, any of these factors could have been attributed to COVID-19 pandemic disruptions. Such data in any

Shipment routing: a partial view of illegal wildlife trade flows

Sometimes a seizure may include information on the alleged country of departure and/or destination of a shipment, which may provide greater insight into the trade route involved. Triangulation with other records may give some indication whether the country of seizure was the actual origin, a point of transit or an end market.

case cannot provide a full representation of illegal wildlife trade over this period because there are geographical gaps in seizure recording, a strong focus on species listed in the CITES Appendices,[2] and an unknown volume of illegal trade that evades enforcement interventions.

Understanding wildlife crime through seizures and other indicators

Since seizure data can provide only a partial picture of actual wildlife trafficking flows and trends, the current report also draws from a wide variety of additional sources. These include results of new fieldwork by UNODC examining specific wildlife trafficking challenges, supplementary market data, new studies developed in response to CITES decisions, and review of growing academic literature in this field. It also benefits from consultation with a wide range of experts working on related topics. Triangulation of these different sources helps to reveal important insights into the scope and scale of global wildlife trafficking.

Wildlife trafficking continues as a worldwide concern

Findings

The diversity and geographical scope of wildlife trafficking remain enormous

Analysis in the current report demonstrates that the global scope and overall scale of wildlife trafficking remain substantial. Seizures document illegal trade in 162 countries and territories during 2015–2021 affecting around 4,000 plant and animal species, approximately 3,250 of them listed in the CITES Appendices. As a crude depiction of scale, these seizures involved 13 million items reported by number and over 16,000 tons reported by weight during these seven years. This illegal trade flows into a wide range of end use sectors, including food, medicine, live animal and plant keeping, and "luxury" goods. Actual wildlife trafficking levels are of course far greater than the recorded seizures and it is important to keep in mind that there are important gaps in seizure-based evidence of trafficking in timber, fisheries and some other large trade sectors.

Progress to meet the SDG target to end wildlife trafficking is not on track

For the first time in 2024, UNODC has populated an indicator on progress towards target 15.7 to end trafficking of protected species of flora and fauna under the framework of the Sustainable Development Goals (SDGs).[3] An initial estimate of the indicator trend for 2016–2021 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 and 2021, when wildlife seizures made up around 1.4–1.9 per cent of global wildlife trade.[4] For comparison, this proportion had varied between 0.5–1.1 per cent during the previous four years. These estimates give no reason for confidence that SDG target 15.7 is on track to be met by 2030.

The upward indicator trend during the pandemic reflects a sustained reduction in the measure of legal trade after peak years in 2017 and 2018, coupled with an increase in the measure of seizures after 2019. The seizure trend was heavily influenced by a few very high-value timber seizures made in South America in 2020 and 2021, likely reflecting increased regulatory and enforcement effort. Without this influence, a decline in the measure of seizures of both plant and animal species was apparent in those years. Other global measures providing insights into wildlife trafficking trends during this period also show considerable variation. The volume of wildlife commodities reported in seizures by weight and the volume reported in terms of number of specimens (where no weight was reported) did not vary consistently. This underlines a critical point that wildlife trafficking is not homogenous and encompasses a considerable range of distinct market segments for which trends may vary greatly.

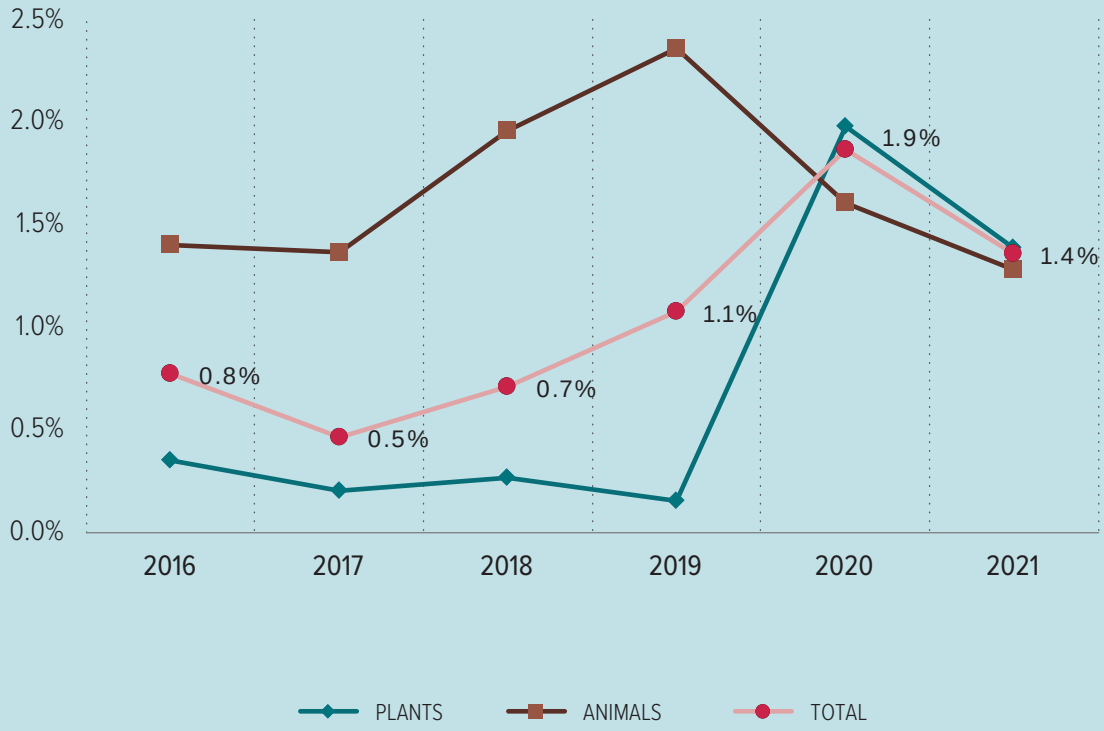
The COVID-19 pandemic partly reshaped but did not stop wildlife trafficking

Understanding the full impact of the economic and social upheavals of the global COVID-19 pandemic on wildlife trafficking remains challenging. It is clear from seizure trends and contextual information that there was a very large reduction in wildlife trafficking from personal baggage in air transport in 2020 and 2021 owing to restrictions on the movement of people in many countries and a massive fall in air passenger numbers. However, the impact of other possible influences of the pandemic on seizure trends, for example market restrictions, different consumer choices, changes in enforcement effort, and interruption of official reporting, require more careful interpretation. Annual wildlife seizure numbers were lower in 2020 and 2021 than in earlier years, but trends in seizure volumes and aggregated measures were not consistently downwards. For comparison, the interception of other illegal markets during the pandemic was also inconsistent. The number of detected victims of trafficking in persons decreased during the pandemic, while the levels of drug seizures did not show a similar decline.

Signs of progress for some wildlife commodities

Elephant ivory and rhinoceros horn trafficking are two examples for which the opportunity to triangulate data on illegal trade, illegal harvest and species population

Trends in the proportion of wildlife trade represented by seizures based on aggregated indices of legal trade and seizures 2016–2021 (SDG indicator on progress towards target 15.7 to end trafficking in protected species)



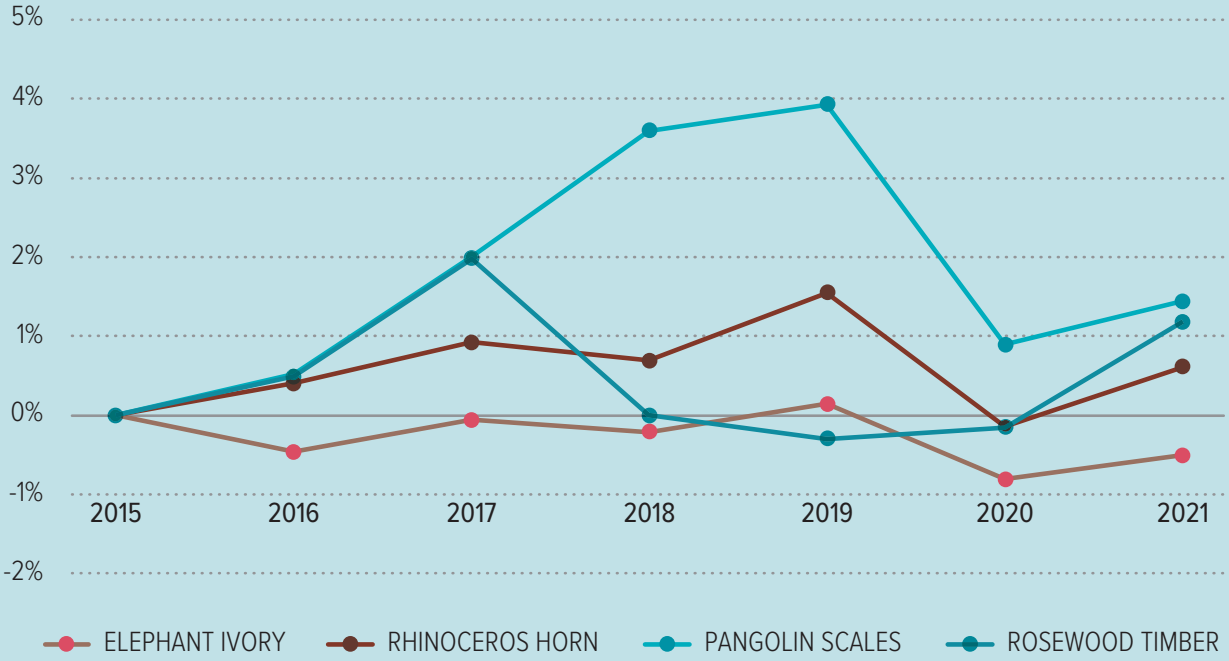
change are far stronger than is typical. Both have been subjects of case studies in past editions of the *World Wildlife Crime Report* and are revisited again in the current edition. The latest analyses provide grounds for some optimism that a combination of efforts from both demand and supply side with high-profile policy attention, greater market restrictions and targeting of high-level traffickers with law enforcement action may be returning positive results. Over the past decade, poaching, seizure levels and market prices have declined solidly for both commodities. However, sporadic large seizures of both elephant ivory and rhinoceros horn continue to occur and these markets have experienced significant declines and revivals in the past, so continued vigilance is warranted. Although far from resolved and requiring ongoing scrutiny, these examples do however demonstrate that substantial progress can be made.

Increased national, regional and international action to combat wildlife crime

Wildlife seizure records are not simply an indicator of trafficking flows, they also demonstrate that enforcement action has been taken. Although there are no reliable measures to assess if and to what extent enforcement and other actions have reduced wildlife trafficking, there are good indications that there has been a substantial increase of these actions globally over the past two decades. The evolution of regional wildlife enforcement networks since the late 1990s,[5] the establishment of the International Consortium on Combating Wildlife Crime (ICCWC) in 2010,[6] the series of four international illegal wildlife trade conferences held between 2014–2018,[7] and the adoption of six United Nations General Assembly resolutions on this subject between 2015–2023,[8] all reflect the growth

Seizure trends for four key commodities 2015–2021

Percentage variance in recorded weight from a 2015 baseline



in practical and policy attention. Many key countries have created specialized enforcement units, multi-agency teams and national strategies, and have recognized wildlife crime as a priority crime.[9] A forthcoming UNODC legislation analysis indicates that 164 Member States of the United Nations criminalize wildlife crime offences to some degree, with 86 of them having penalties that meet the United Nations Convention against Transnational Organized Crime (UNTOC) definition of a serious crime with a maximum custodial penalty of at least four years.[10] This is the highest level of criminalization across nine environmental crime sectors analysed. In addition, a series of coordinated multi-country counter wildlife trafficking operations have also been carried out since the early 2010s, including three iterations of the multilateral Operation Cobra initiatives between 2013– 2015,[11] and the seven Operation Thunder initiatives during 2017–2023.[12] Regional initiatives include the five phases of Operation Mekong Dragon during the period 2019–2023, multilateral Asia regional law enforcement pushes targeting both narcotics and wildlife smuggling.[13] Also, considerable progress has been made with engagement of private sector businesses in efforts to increase barriers to trade-related wildlife crime, including through task forces for the financial and transport sectors.[14]

Challenges in determining the impact of action on wildlife crime

Discerning the impacts of increased attention to and action on wildlife trafficking and associated crime is far from straightforward. If such efforts were successful, illegal trade flows would be expected to decrease, the pressure of illegal harvests would be relieved, and positive wildlife population trends would be realized. However, each of these indicators of success is difficult to discern individually and the chain of cause and effect is complicated. Global analysis of seizure data may provide some insight into the question of whether illegal trade flows have declined if they are triangulated with associated price and market observations. Demonstration of a

reduction in illegal harvests is more challenging because relevant data are not collected for the vast majority of species subject to wildlife trafficking. Similarly, changes in wildlife population levels are not systematically monitored for most affected species. Even where positive trends can be discerned, it is important to pay attention to the risk that traffickers have moved on to deal in other wildlife commodities under less enforcement and market pressure. Indeed, case studies in the current report demonstrate the establishment of linkages between ivory and pangolin illegal trade chains and other examples of traffickers shifting attention between different species and source countries.

Conclusions and policy implications

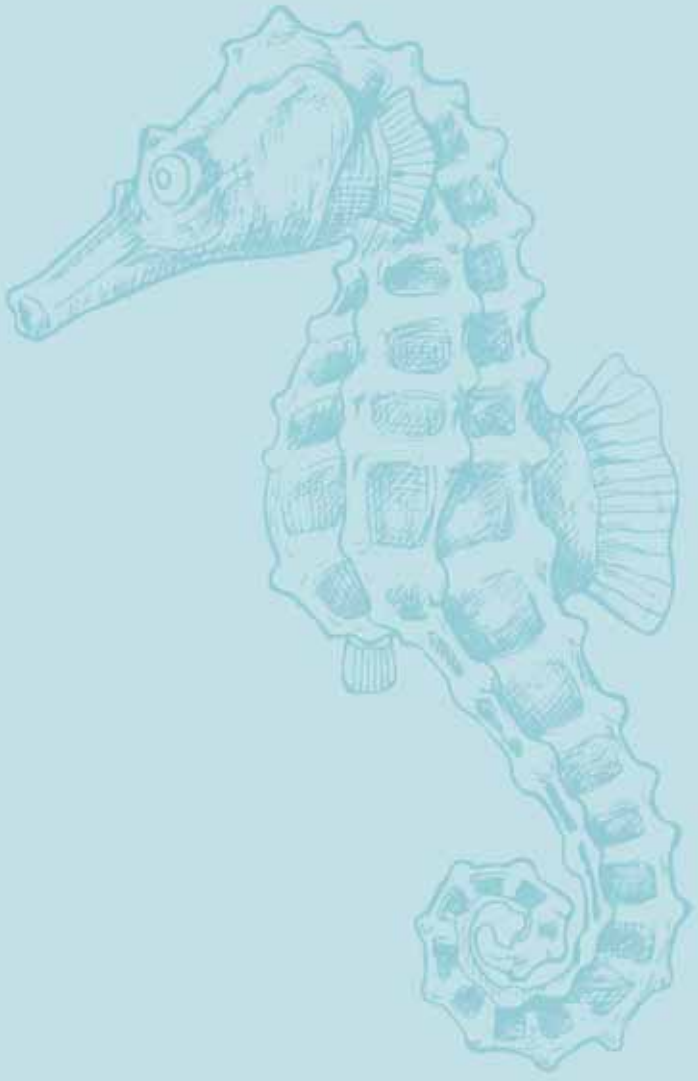
- Despite gaps in knowledge about the full extent of wildlife trafficking and associated crime, there is sufficient evidence to conclude that this remains a significant global problem far from being resolved.

- Continued commitment to pursue incisive and coordinated action on trade-related wildlife crime is essential. Remedial approaches championed in previous editions of the *World Wildlife Crime Report* remain relevant, including calls for increased local community engagement; investigative follow-up to seizure incidents; action to address corruption; prosecutorial support; consumer demand reduction initiatives; inter-agency coordination at the national level; and international cooperation on criminal matters.

- The apparent progress with reductions in poaching and illegal trade in elephant ivory and rhinoceros horn over the past decade suggests that multifaceted interventions through policy engagement, law enforcement and market suppression can reap rewards.

- Important lessons can be derived from these examples about the scale and depth of action required to impact persistent criminal trafficking chains. Major seizures have resulted from multilateral investigations, prosecutions of key traffickers have been pursued and, over time, legal prohibitions have been harmonized across the trade chain from source to end markets. These cases also demonstrate the benefits of investment in tracking impact indicators in order to assess the impact of different interventions.

- The diversity of institutions and intensity of initiatives working to reduce wildlife trafficking have increased substantially over the past decade, but to make the most of this effort there is a need for more structured coordination between government and multilateral agencies, civil society organizations, academics and the private sector.



Wildlife crime harms are diverse and pervasive; their understanding can support better prioritization of action

Findings

Thousands of threatened wildlife species are affected by wildlife trafficking and some of those worst affected receive little public attention

The impact of wildlife trafficking on the conservation status of wildlife species is a critical concern driving policy attention to wildlife crime. A review of evidence about harms caused by wildlife crime in the current report makes it clear that thousands of threatened species are affected by wildlife trafficking, a small minority of which, such as elephants, tigers and rhinoceros, attract the majority of policy attention. In fact, some of the clearest examples of conservation harm caused by wildlife crime receive comparatively little attention, such as the illegal collection of succulent plants and rare orchids, and the trafficking of a wide range of reptiles, fish, birds, and mammals for which illegal trade appears to have played a major role in local or global extinctions.

Beyond the threat to individual species, wildlife trafficking harms ecosystems and their climate -related functions

On environmental harms beyond the immediate conservation threat to target species, population reductions caused by wildlife trafficking can play a role in triggering ecosystem-level impacts by disturbing interdependencies between different species and undermining related functions and processes. This also has considerable potential to undermine the role that natural ecosystems play in long-term climate stability and mitigation of climate change impacts. There is an emerging body of research on potential climate impacts of population reductions of various species affected by wildlife crime. It is also critical to keep in mind that this relationship works in both directions: climate change is likely to exacerbate natural resource conflicts and cause profound social changes that will likely lead to new motivations and opportunities for wildlife crime and new patterns of illegal wildlife trade.

Wildlife crime harms socioeconomic development

Species depletion and ecosystem disruption caused by wildlife crime can undermine the many socioeconomic benefits that people derive from nature. This includes loss of employment and other income from wildlife-based industries and degradation of the material benefits that nature provides to people, such as food, medicines and energy, as well as non-material contributions to identity, culture and learning. Wildlife trafficking can also undermine the role nature plays in life support systems such as agriculture and water supply. Impacts of wildlife crime can extend to reduced security, exposure to violence, undermining community cohesion, and increased vulnerability to abusive employment practices and trafficking in persons. Other potential social and economic impacts include harm to environmental defenders, increased health risks through disease transmission and negative effects on legitimate private sector interests.

Governance is also impacted by wildlife crime

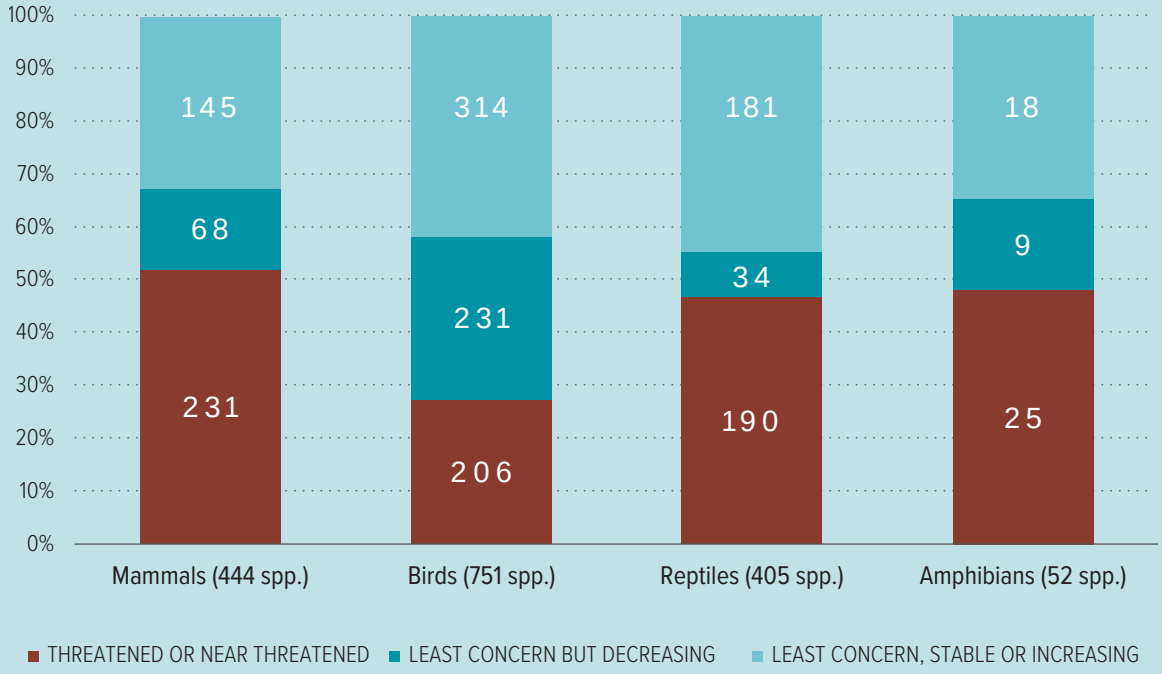
Wildlife trafficking can also have a corrosive influence on governance and the rule of law through corruption, money-laundering and illegal cross-border financial flows. It can also reduce government revenues from legitimate trade, such as licence fees from legal timber harvest and export, and other uses of nature, such as taxation from tourism business. Tackling wildlife trafficking has significant associated government budget costs.

Responses to wildlife crime can themselves be harmful if not well designed

Some harms result from responses to wildlife crime that do not effectively target the core of the problem. For example, criminal justice responses that result in incarceration of lower-level participants in wildlife trafficking can have significant socioeconomic consequences that may not be proportionate to the role such people may have played in comparison to higher-level participants and those operating across

IUCN Red List conservation status of individual mammal, bird, reptile, and amphibian species recorded in seizures 2015–2021

Of the 1,652 mammal, bird, reptile and amphibian species recorded in seizures, 40 per cent have been classified as threatened or Near Threatened species (according to the *IUCN Red List*).



jurisdictions. Although comprehensive data on criminal justice responses are not available, individual studies indicate that low-level offenders tend to be those more likely to be arrested and incarcerated for involvement in wildlife crime. There is a risk that this creates an illusion of progress, with counts of seizures and arrests being poor indicators of the likely impact overall on levels of trafficking activity. Meanwhile, higher-level criminals simply find new people to front their operations.

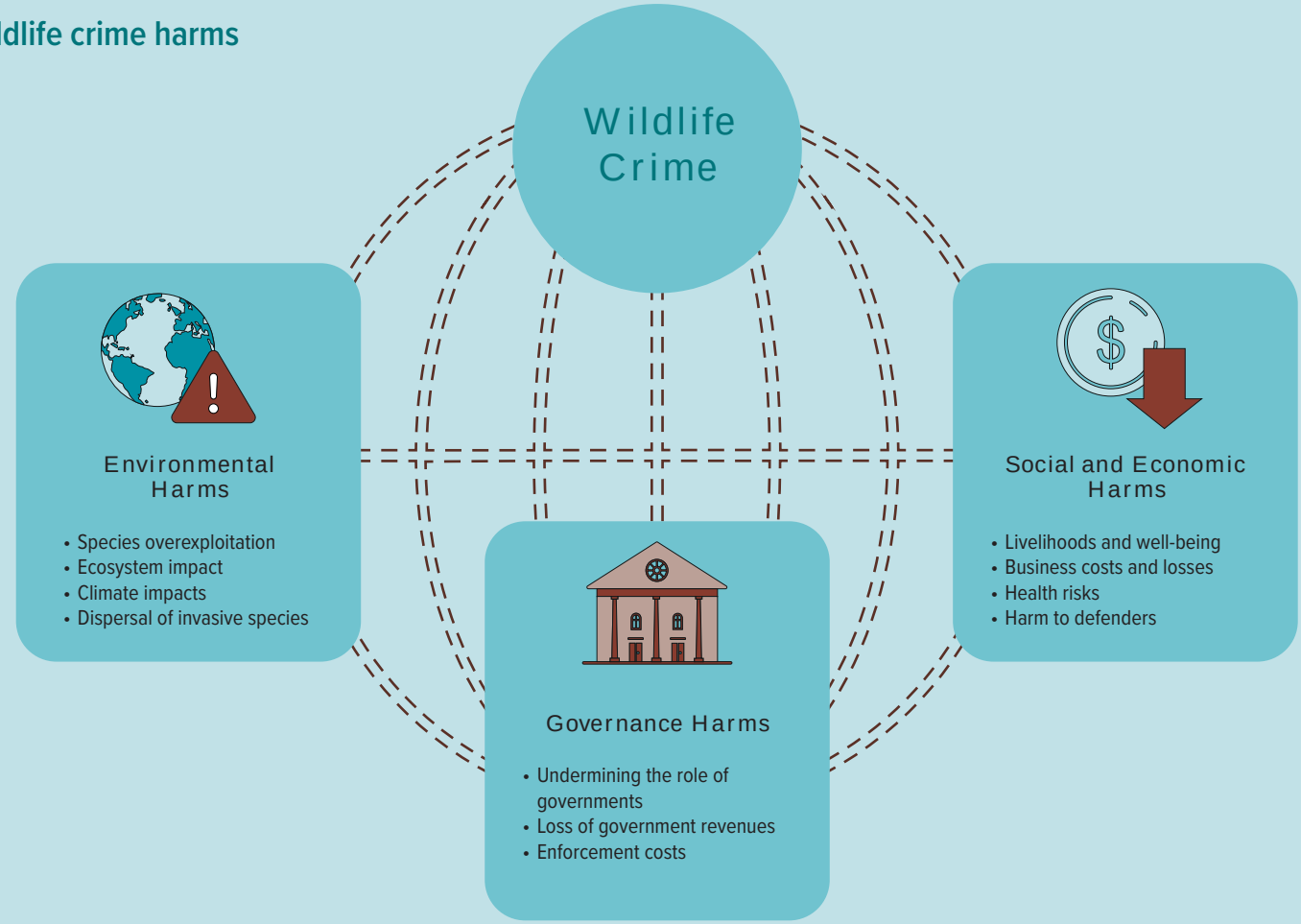
Lack of consensus on the importance of different wildlife crime harms can hamper effective responses

Analysis revealed tensions between different perspectives of the harm resulting from wildlife crime. Some of the most dangerous illegal trade flows from a conservation perspective may involve low volume trafficking of highly threatened species, such as rare succulent plants and orchids for which this activity presents a genuine extinction risk. However, the monetary value and the immediately obvious social and institutional harms associated with such trade are likely small compared with those related to species illegally traded in larger quantities. Conversely, lucrative criminality and multiple harms may result from trafficking of species still perceived as relatively plentiful, albeit subject to regulatory control of harvest and trade, such as those exploited in high-value fisheries and timber trades. Dissonance between these different perspectives on wildlife crime harms can challenge prioritization and pursuit of remedial action.

Conclusions and policy implications

- The case for action on wildlife crime would be strengthened by better articulation and quantification of how associated harms are linked to high-level policy concerns, such as climate, biodiversity, health and sustainable development goals.

Wildlife crime harms



- Greater attention should be paid to improving understanding of the interdependence between environmental, socioeconomic and governance factors in order to strengthen assessment of and responses to the harms of wildlife trafficking. For example, through further research on ecosystem and climate impacts, or on the specific health-related risks of illegal trade.
- Greater efforts are required to unite different perspectives on wildlife crime harms at a policy level.
- At a tactical level, there is a need for more comprehensive accounting for the cascade of interlinked environmental, socioeconomic and governance harms in wildlife crime risk assessment, with prioritization of remedial interventions.
- To enable such accounting, there is a strong need to improve the evidence base and articulation of indicators of risk and severity (such as risk factors for zoonotic disease and a clearer measure of conservation significance of seizures) for all types of harm arising from wildlife trafficking.
- Design of wildlife crime prevention and reduction strategies would benefit from the use of hybrid indicators that combine measures of different harms. Consideration of these may lead to the emergence of new priorities in terms of species, commodity types and geographies.
- The proportionality of criminal justice responses should be carefully considered to ensure that the greatest enforcement effort and most severe sanctions are directed to those playing the most serious and harmful roles in organized wildlife crime.

The forces driving wildlife crime are diverse, complex and evolving

Findings

Different factors drive criminality associated with wildlife trafficking at different stages of the trade chain: illegal sourcing, illegal trade, and demand in end markets. Financial gain from the profits of wildlife trafficking is a primary motivation for most participants in illegal sourcing and trade, but the context by which they become involved defines the scale and critical drive of their involvement.

Organized crime groups continue to profit from large wildlife trafficking operations

Case study research and other sources confirm that organized crime remains a significant factor in many illegal wildlife sourcing and trading chains. At source, professional remotely directed gangs have been active in elephant and tiger poaching, and industrial scale illegal fishing and logging operations are well documented. Sometimes convergence with other criminal businesses enables wildlife trafficking through power relationships with local communities, corrupt relationships, access to illicit firearms and opportunities for money-laundering. Along the trade chain, organized crime is evident in various specialized roles, such as export, import, brokering, storage, keeping and breeding live specimens or handling the interface with processors. There is evidence, for example from the rhinoceros horn trade, that traffickers can play an active role in manipulating demand in end markets to sustain or expand business opportunities.

Some participants in the trafficking chain are opportunists driven by basic needs for income

Organized criminal groups may play central roles in orchestrating the illegal sourcing of some commodities, but those doing the legwork may be opportunists, motivated by basic needs for income with limited understanding of the potential consequences of their actions. They may be particularly vulnerable when regulatory change criminalizes what were previously legal activities and reduces immediate economic opportunities. Furthermore, involvement in poaching of some animal species may result from human–wildlife conflict, such as damage to crops by elephants or predation of livestock by big cats.

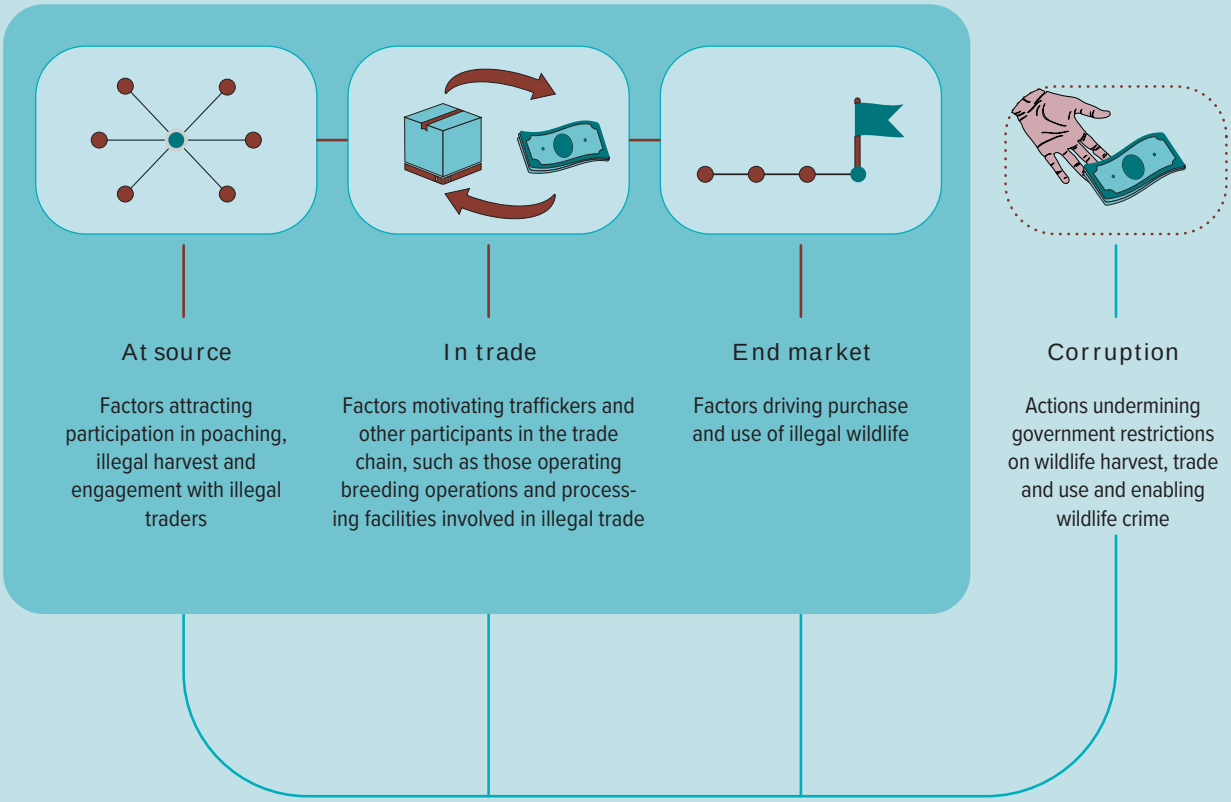
Traffickers exploit inconsistencies and weaknesses in regulation and enforcement

Participants along the illegal wildlife trade chain tend to adapt the methods and routes they employ to shifts in the regulatory and enforcement landscape for different commodities. For some commodities the full trade chain from source to end market operates in contravention of applicable legislation, but for others illegally sourced and traded goods can enter what may appear to be legal trade flows. This can happen when goods are laundered through ostensibly legal stockpiles or breeding operations but may also be because legislation applicable in the end market does not provide jurisdiction over illegal acts outside its territory. For example, timber harvested illegally may be infiltrated into the legal trade chain, then used to manufacture furniture and sold in another country where, even if a crime occurred at the source, there is no legal basis for intervention. However, traffickers exploit not only legislative inconsistencies but also weak law enforcement capacity. Several case studies in the current report show that, even when there is political will, the agencies responsible for implementation and enforcement of wildlife trade regulations may lack the capacity and resources they need to perform effectively.

Wildlife trafficking involves diverse demand clusters with different market drivers; traffickers adapt to and sometimes shape evolving markets to maximise their opportunities for profit

The characteristics of predominant demand clusters for species affected by wildlife trafficking result from different market drivers. For example, products used for food and medicinal uses are typically sought in bulk quantities that meet a particular quality requirement. If the same standard can be maintained, traffickers simply move to alternative species or localities as supplies become scarce to continue to meet the bulk demand. By contrast, for demand sectors in which rarity and exclusivity are key consumer

Drivers of criminality connected with wildlife trafficking



motivations, such as specialist live animal and plant collectors and status-conscious consumers of ivory or big cat skins, scarcity may simply attract more trafficking. In some cases, illegal traders appear to play an active role in shaping end market opportunities, promoting new use types to sustain or grow sales when existing uses lose popularity with consumers or face increased regulatory pressure.

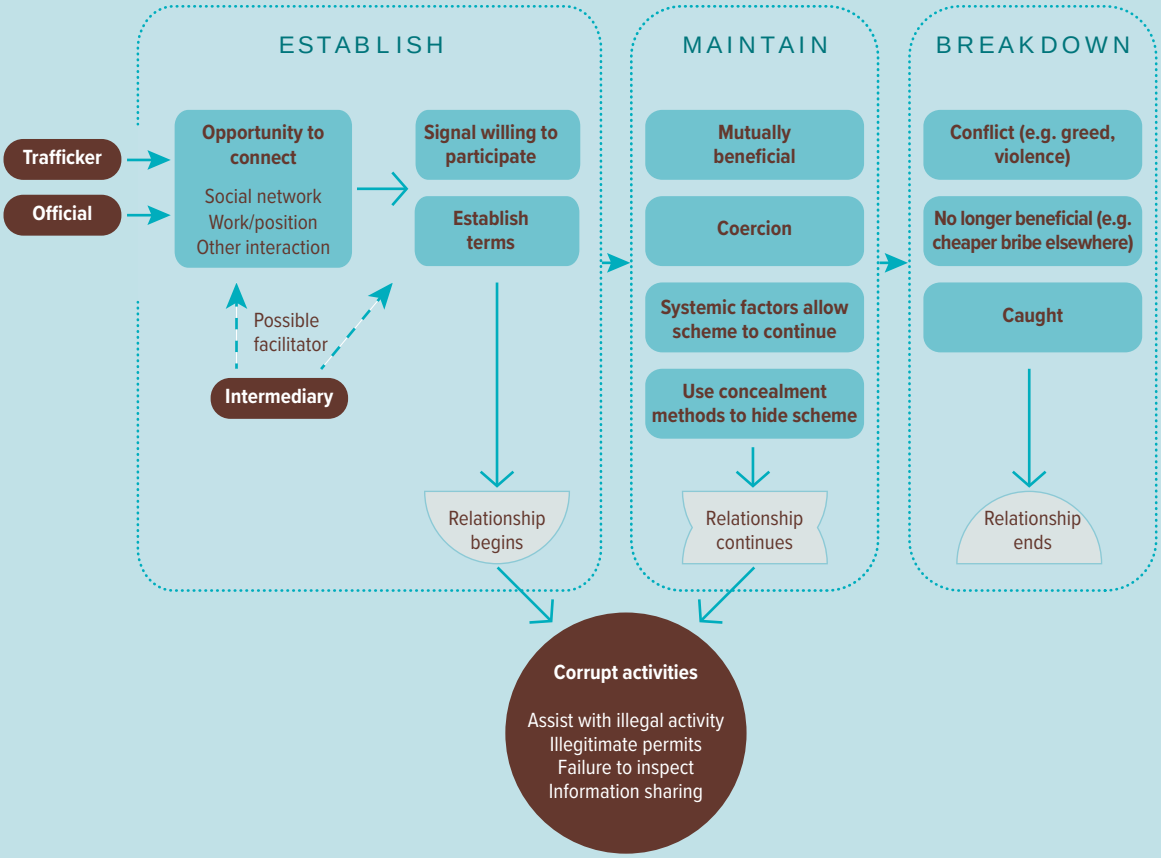
Gender is a factor that shapes roles of people involved in wildlife trafficking

Across the trade chain from source to end market there are important gender-related drivers of involvement in wildlife crime. Research in South America for the current report illustrates how gender norms and roles shape individuals' participation in wildlife-based economies, both legal and illegal. Influencing factors include different experiences of and access to wildlife, expectations within familial structures, and established role differentiation. In locations surveyed, women played prominent roles in primary processing and local sale of wildlife goods typically harvested by men. Involvement in wildlife crime exposed men and women to different risks, including exploitative practices and violence.

Corruption plays a critical role in undermining efforts to disrupt and deter wildlife trafficking

As highlighted in previous editions of the *World Wildlife Crime Report*, corruption plays a critical role in undermining efforts to disrupt and deter wildlife trafficking. This varies from bribery at inspection

Establishment, maintenance, and breakdown of corrupt relationships that facilitate transnational illegal wildlife trade



points along trade routes to ease the passage of illegal goods through to higher-level influence on permit issuance and criminal justice decisions. A review of case evidence for this report indicated that prosecution of those organizing or enabling wildlife trafficking under laws directly addressing corruption is apparently uncommon, despite such legislation often providing strong investigative powers and potentially higher penalties. Consultation with experts in this field showed that the factors shaping establishment and maintenance of corrupt relationships in relation to wildlife crime has much in common with those affecting other legal and illegal economic sectors. However, the evidence base for specific points of vulnerability to corruption in the wildlife trafficking chain and on the effectiveness of risk mitigation responses remains weak.

Conclusions and policy implications

- Actions to address wildlife trafficking would likely be more effective if planned and implemented as integrated components of wider strategies to resolve overexploitation of species and other related harms for distinct wildlife trade sectors, such as the rosewood or live reptile markets. The entry of criminal activity into such markets is a predictable by-product of piecemeal regulatory interventions within sectors with common supply and demand drivers. The risks of crime and possible responses should be factored into regulatory planning.

- If remedial interventions are to be successful, greater attention is needed on the complexity and

diversity of motivations for those involved in wildlife trafficking at different stages of the chain from source to end market. Gender dimensions of wildlife trafficking drivers and responses are also among the factors that require attention.

- Action on illegal sourcing needs to be designed with attention to the fact that profit-related motives may not always predominate, with basic livelihood imperatives and other social and cultural factors that could also be relevant. For example, prevention or mitigation of human–wildlife conflict can play a critical role in reducing poaching motivations for some species for which local communities may feel they are bearing too great a share of conservation costs.

- If regulatory interventions related to wildlife harvest and trade are likely to cause loss of economic opportunities for people with limited livelihood alternatives, compensation, or other pre-emptive actions should be considered to reduce the likelihood that they become involved in wildlife crime.

- Deterring serious criminal engagement requires serious enforcement responses through more incisive investigation of major beneficiaries and targeting enforcement action to undermine the financial motivations for trafficking.

- Interventions aimed to reduce wildlife trafficking need greater coherence and harmonization across the trade chain and between jurisdictions because there are currently too many opportunities for participants to keep adapting their methods and routes to exploit differences between legal regimes, enforcement gaps and new market trends.

- A starting point to reduce opportunities for trafficked wildlife to enter legal trade in other jurisdictions is to require stronger proof of legal sourcing for imports of wildlife goods, as provided for under CITES for listed species and, for example, under European Union law applicable to timber trade. Where legal systems allow, another opportunity to strengthen coherence of legal measures between jurisdictions is the enactment of provisions that designate the contravention of any applicable law concerning the protection or management of wildlife in another country as an offence, such as those applicable under laws in Australia and the United States of America.

- To reduce opportunities for laundering trafficked wildlife goods into legal trade chains further, consideration could be given to widening the range of wildlife trade related activities that are subject to legal control, for example by complementing controls on harvest or cross-border movement of wildlife goods with regulatory oversight of acts such as the offer for sale, purchase or possession.[15]

- There is a need for improved control of breeding operations and stockpile inventories for species subject to wildlife trafficking to reduce opportunities for laundering.

- Although some of the corruption challenges undermining action to address wildlife trafficking are not unique to this sector and require system-wide responses, more attention is warranted for sector- specific vulnerabilities. Of particular importance is the need to build robust corruption risk responses for specialized public sector roles such as harvest, breeding and trade permit issuance, animal health and phytosanitary inspection, and control of specialized retail outlets.

- Strengthening the basic capacity of agencies responsible for wildlife trade regulation and related law enforcement remains a critical priority for both deterrence and suppression of wildlife crime.

Counter wildlife **trafficking interventions lack** guiding evidence

Findings

There are clear advantages to be gained from enhancement of evidence about what measures are effective to address wildlife crime. Such knowledge can be used to prioritize, target, evaluate and refine wildlife crime interventions, employing the wide range of analytical and planning tools already in use in the wider crime prevention community. Such evidence would enable better assessment of the value of capacity and resource allocations and inform decisions about investment of scarce resources.

While evidence on effective interventions is weak, there are some lessons to be learnt

Analysis of available evidence on the effectiveness of different counter wildlife trafficking approaches reveals remarkably few published systematic assessments that draw a clear comparison between the situation before and after remedial interventions are made. Success is typically judged based on outcomes such as seizures, arrests and prosecutions, rather than through assessment of changes in crime levels, illegal trade volumes or relief of associated harms, like recovery of threatened species populations. Even when potentially informative impact data are available, such as on population levels of affected species, the level of resolution and other factors undermine their utility in establishing causal inks to specific wildlife crime interventions.

Despite important evidence gaps, there is a growing body of research on the effectiveness of different wildlife crime responses and useful insights are emerging

Effective patrolling

Evidence-based analysis illustrates that the impact of anti-poaching patrolling in certain locations depends on particular circumstances: the habitat's accessibility; rangers' level of experience and numbers; the time spent patrolling; the longevity of patrols; the type of patrol conducted; the type of target and its mobility; and the bonus/incentives provided to patrollers.

Multi-track interventions

Review of wildlife trafficking case study examples suggests that more successful approaches include sets of mutually supporting interventions such as those that block opportunities, those that increase risks for criminal participants, and those that reduce rewards from crime.

Responses that involve both supply and demand

Multifaceted enforcement and market interventions have contributed to reductions in ivory trafficking and elephant poaching showing that effective responses likely need to involve both supply and demand side interventions.

Lessons can be drawn from evidence-based approaches in other crime sectors

Learning from research into other crime sectors may help with identification of remedial approaches that might have positive impacts in dealing with wildlife trafficking. Examples include geographic and commodity targeting, criminal behaviour forecasting, focused deterrence, and use of restorative justice approaches. Similarly, such research provides useful insights into crime displacement and avoidance of unintended and unhelpful consequences, such as social harms that sustain rather than deter crime motivations. Substantial guidance is already available on how such approaches could be applied more effectively to address wildlife trafficking.

Wildlife crime data resources are inadequate for effective impact assessment

The most significant challenge to accumulation and use of evidence to assess effective responses is the lack of investment in monitoring and evaluation processes, including indicator development, data collection and structured assessment. Within relevant government systems, priority is usually given to direct operational intervention, with limited attention to collection and evaluation of associated crime data.

Evidence reviews indicate that data sources on wildlife crime are currently rather limited in terms of scope and accessibility compared to those available for other crime sectors for which policing results, crime perception and other surveys are available to researchers and the public in many jurisdictions. National datasets on wildlife crime are, in contrast, fragmented, short-term and difficult to access, with a bias towards information on seizures, particularly of illegal shipments of CITES-listed species. Information on enforcement effort, prosecutions, convictions, sentencing, reoffending and differentiation of data by gender or other factors is absent or very difficult to locate.

Conclusions and policy implications

- Improved approaches to assess what measures are effective need to focus on two levels of evidence and evaluation, the direct process-related results of interventions and the consequent impact on crime levels and associated harms. This will require greater cooperation between different communities of research and practice, including those involved in conservation and socioeconomic assessments, law enforcement and market analysis.

- A greater emphasis on collation and analysis of evidence on the results from wildlife trafficking responses is needed to guide decisions by policy makers, regulatory and enforcement agencies and funding agencies in deciding which remedial interventions to fund and implement in different circumstances.

- Action is needed to enhance the quality and coverage of wildlife seizure data, both geographically and in terms of species involved. This requires greater prioritization of seizure data collation and submission by individual government agencies, accompanied by capacity building and other support. Although the highest priority is to improve submissions of CITES Annual Illegal Trade Reports, systematic collation and sharing of seizure data for species not covered by CITES is also important.

- Seizures alone cannot confirm trends and characteristics of wildlife trafficking and other data types are needed, for example on levels of demand, commodity prices, retail availability and turnover, and metrics on criminal justice outcomes. Better knowledge is also needed about changes in different measures of environmental, socioeconomic and governance harm, and clearer differentiation by gender and other relevant factors.

- Collation and analysis of evidence could be enhanced by development and dissemination of data standards for different metrics and efforts to improve data interoperability and sharing.

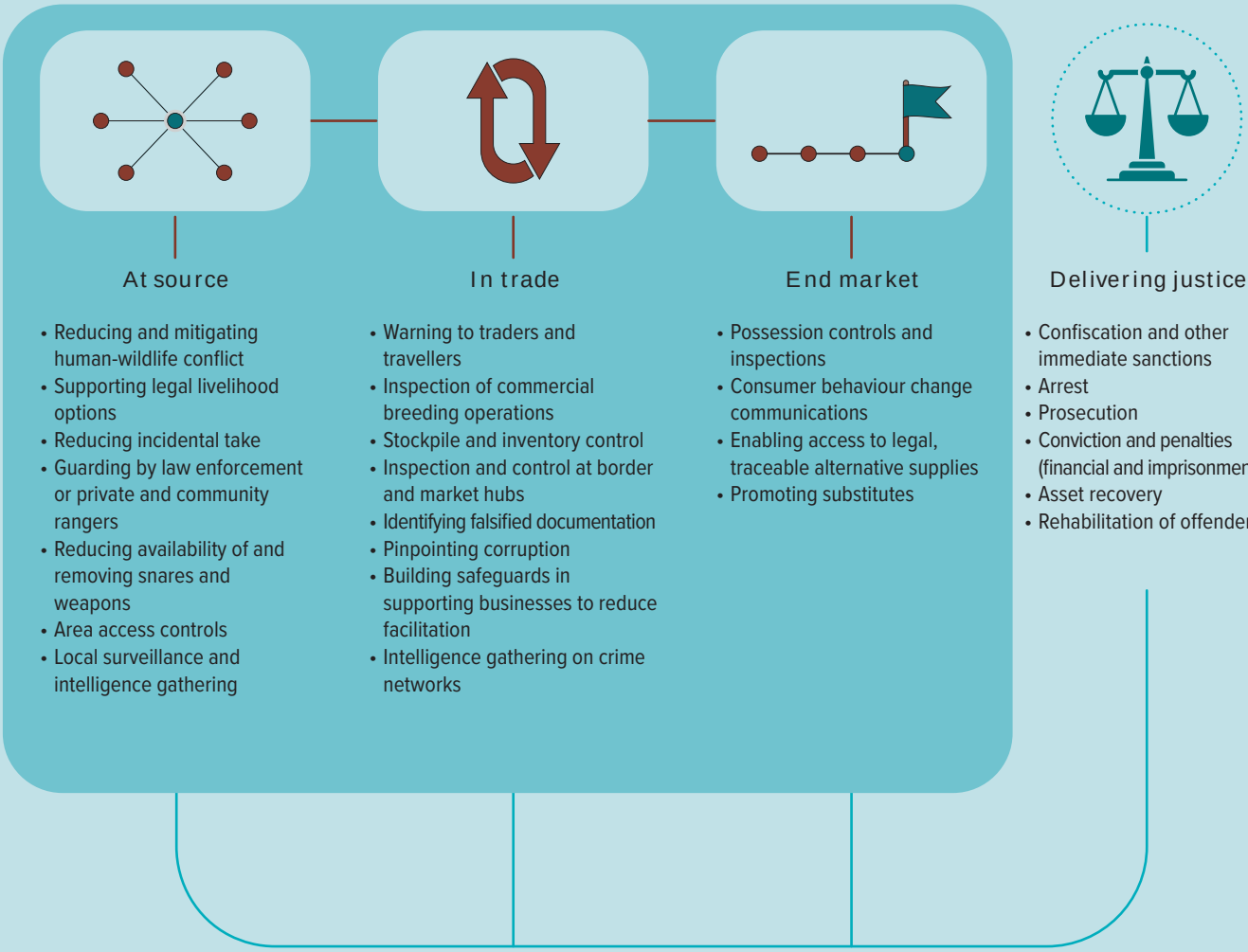
- When relevant, data sources should be disaggregated by gender and other characteristics that might aid understanding of specific motivations for different participants in wildlife crime.

- Funding agencies are in a strong position to provide greater incentives and support for collection, sharing and analysis of evidence about the performance and impact of wildlife crime interventions. This cannot be achieved only through project activity monitoring and evaluation as it also requires investment in dedicated longer-term evidence and data collection and analysis.

- Improved analysis of emerging wildlife trafficking issues and trends will benefit from greater emphasis on triangulation between these different sources of evidence. Communities of practice for sharing both evidence and learning could greatly boost evaluation and refinement of wildlife crime interventions overall.

- Emerging evidence on successful wildlife crime responses and learning from research into what works in dealing with other crime sectors should be put to immediate use to refine responses to wildlife trafficking.

Wildlife crime operational interventions



Shaping the Enabling Environment

- Strengthening treaties and national laws
- Catalysing international and inter-agency cooperation
- Building capacity of implementing institutions and personnel
- Strengthening the wider criminal justice system
- Building general awareness of harms and impacts
- Researching, evaluating and guiding adaptation of wildlife crime responses

Looking ahead

Analysis in the current report demonstrates that wildlife trafficking is a persistent and ongoing global problem. Criminality continues to undermine the impact of laws aimed to reduce harm to nature from excessive trade in wildlife and causes a wide range of associated environmental, socioeconomic and governance harms. However, the current report also provides grounds for optimism. Some persistent wildlife trafficking sectors do appear to have been suppressed in recent years by multifaceted interventions. Although there is no room for complacency, any such progress warrants careful reflection to draw wider lessons about how the challenge of wildlife trafficking might best be met in the future.

New emphasis in this third edition of the *World Wildlife Crime Report* has been placed on assessment of the causes and impacts of wildlife trafficking and associated crime at a global level. Findings reinforce a critical message that the specific factors driving trafficking from source to end markets vary enormously between different illicit wildlife commodity sectors. Solutions therefore need to be tailored appropriately and there is great potential for ongoing wildlife crime research to assist these efforts by gaining insights into criminal structures, financial incentives, evolving demand patterns, and other diagnostic features of sectorial trafficking chains. Similarly, insights in the current report into the nature of and connectivity between different environmental, socioeconomic and governance harms clarify the need for more comprehensive indicators to enable prioritization and evaluation of the success of future actions.

Finally, by probing evidence for what remedial interventions work best to reduce wildlife trafficking and associated criminality, the current report sheds light on major gaps in current knowledge. Looking ahead there is a clear need for comprehensive consideration of data and analytical needs to fill this void. Possibly even more important is the message that the concept of success in tackling wildlife trafficking needs unambiguous definition. Seizures, arrests, successful delivery of behaviour change campaigns and other interventions may all be positive outcomes, but without some insight into whether they are delivering long-term benefits to the wildlife species, people and institutions currently negatively impacted by wildlife crime, they may not be achieving their intended aims.

Endnotes

1 The number of CITES Annual Illegal Trade Reports received per year remained steady through 2016–2020 and was reduced by only about 10 per cent in 2021.

2 CITES Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. CITES Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. CITES Appendix III includes species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

3 Details of Sustainable Development Goal (SDG) indicator 15.7.1 at: https://unstats.un.org/sdgs/metadata/files/Metadata-15-07-01.pdf.

4 Records of legal trade and seizures were each aggregated using a standardized index of relative value. The scope of the indicator is currently restricted to legal trade and seizures of species listed in the CITES Appendices since data for other species are not available at the same level of resolution. See the methodological annex to this report.

5 A European Union enforcement coordination group was established in 1997, the Lusaka Agreement Task Force in 1999 and the ASEAN Wildlife Enforcement Network in 2005. In March 2024 the International Consortium on Combating Wildlife Crime (ICCWC) website listed 14 active wildlife enforcement networks. https://iccwc-wildlifecrime.org/sites/default/files/files/2024-03/WENs%20Focal%20Points%20-%20March%202024_0.pdf.

6 ICCWC Letter of Understanding: https://cites.org/sites/default/files/i/iccwc/mou_0.pdf.

7 The conferences were held in London, United Kingdom of Great Britain and Northern Ireland (2014 and 2018), Kasane, Botswana (2015) and Hanoi, Viet Nam in (2016). Outcomes of the 2018 conference: https://www.gov.uk/government/publications/declaration-london-conference-on-the-illegal-wildlife-trade-2018/london-conference-on-the-illegal-wildlife-trade-october-2018-declaration.

8 United Nations General Assembly resolutions on tackling illicit trafficking in wildlife: 69/314 of 30 July 2015; 70/301 of 9 September 2016; 71/326 of 11 September 2017; 73/343 of 16 September 2019; 75/311 of 26 July 2021; and 77/325 of 25 August 2023.

9 Results from a 2023 UNODC survey of Member State actions on illicit trafficking in wildlife can be found here: https://www.unodc.org/documents/commissions/CCPCJ/CCPCJ_Sessions/CCPCJ_32Reconvened/ECN152023_CRP12_2323139E.pdf.

10 Upcoming UNODC report: The Global Analysis on Crimes that Affect the Environment: Part 1 – The Landscape of Criminalization.

11 See: https://iccwc-wildlifecrime.org/news/successful-operation-highlights-growing-international-cooperation-combat-wildlife-crime.

12 See: https://iccwc-wildlifecrime.org/news/operation-thunder-2023-2114-seizures-endangered-animals-and-timber-major-international-law.

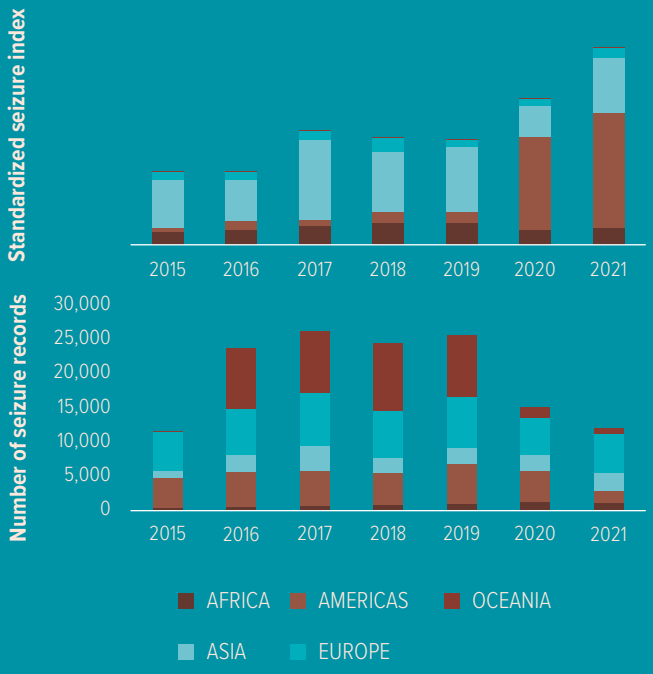
13 See: https://www.unodc.org/unodc/en/environment-climate/webstories/omd-v.html.

14 See United for Wildlife transport and finance sector task forces: https://unitedforwildlife.org/our-taskforces/.

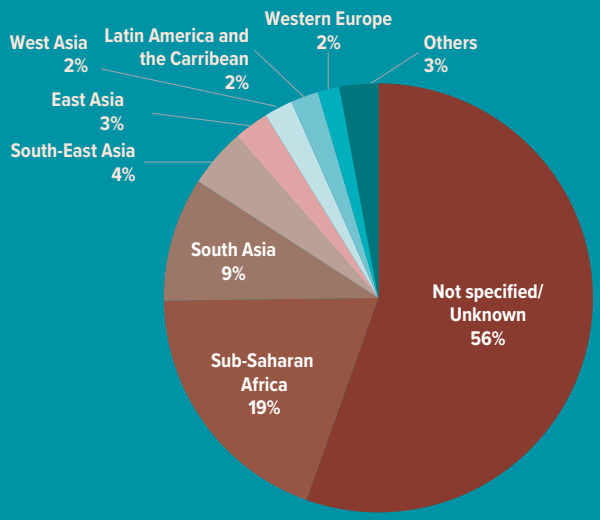
15 UNODC, "Guide on Drafting Legislation to Combat Wildlife Crime" (Vienna, Austria: UNODC, 2018), https://sherloc.unodc.org/cld/uploads/res/guide-on-drafting-legislation-to-combat-wildlife-crime_html/Wildlife_Crime_ebook.pdf.

Regional Insights

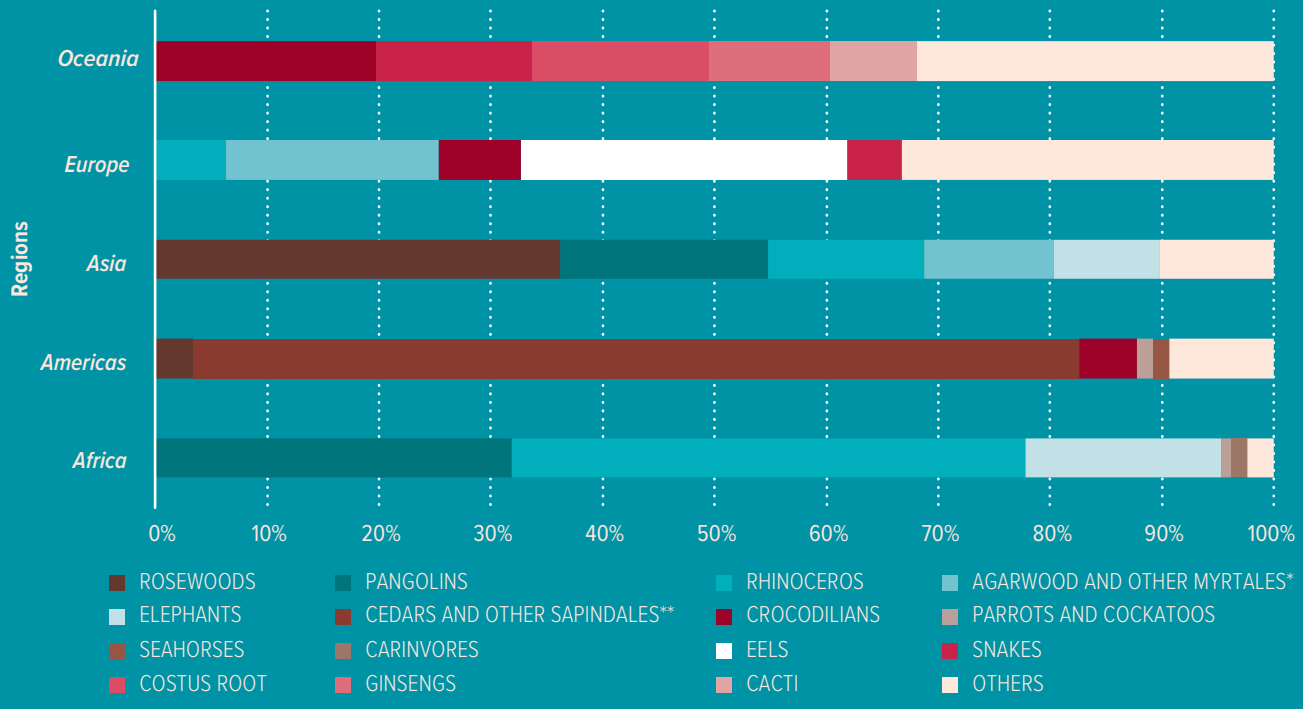
Regions where seizures were made, by standardized seizure index and by number of records 2015–2021



Percentage share of seizure records by subregion of shipping origin aggregated by standardized seizure index 2015–2021

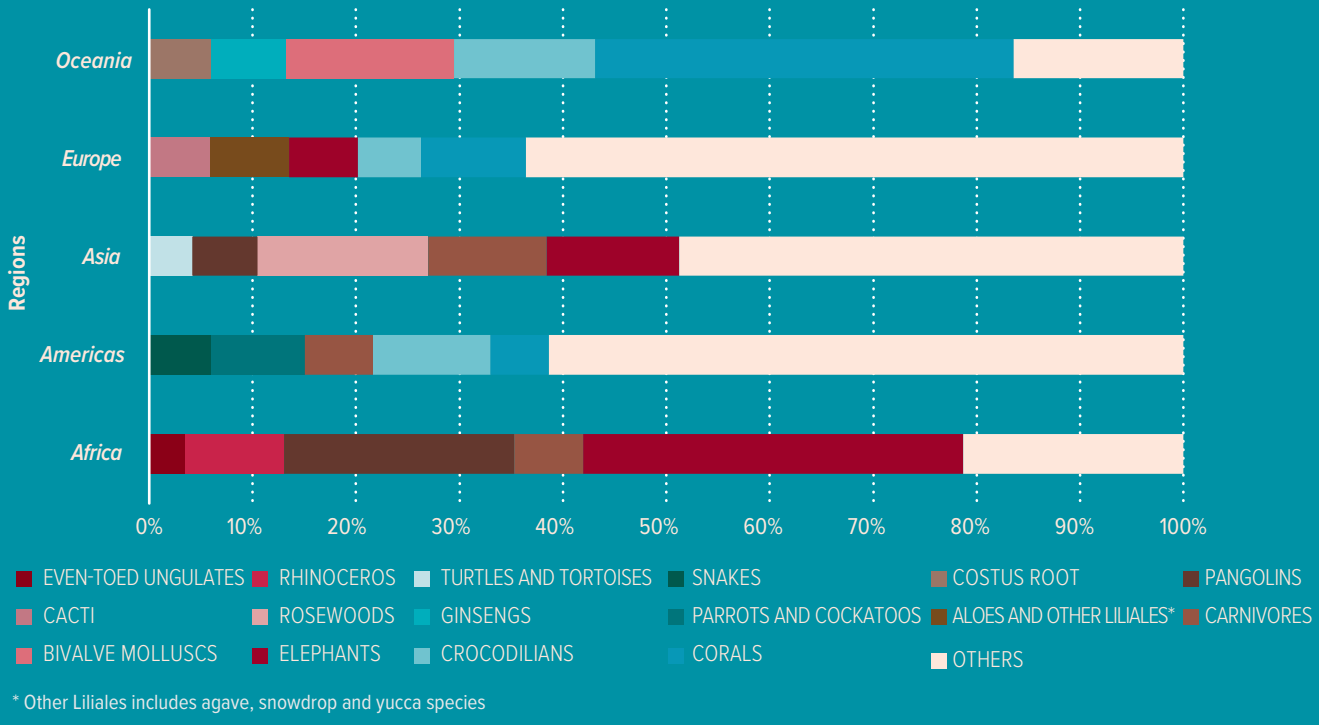


Percentage share of seizures by species group for each region aggregated by standardized seizure index 2015–2021



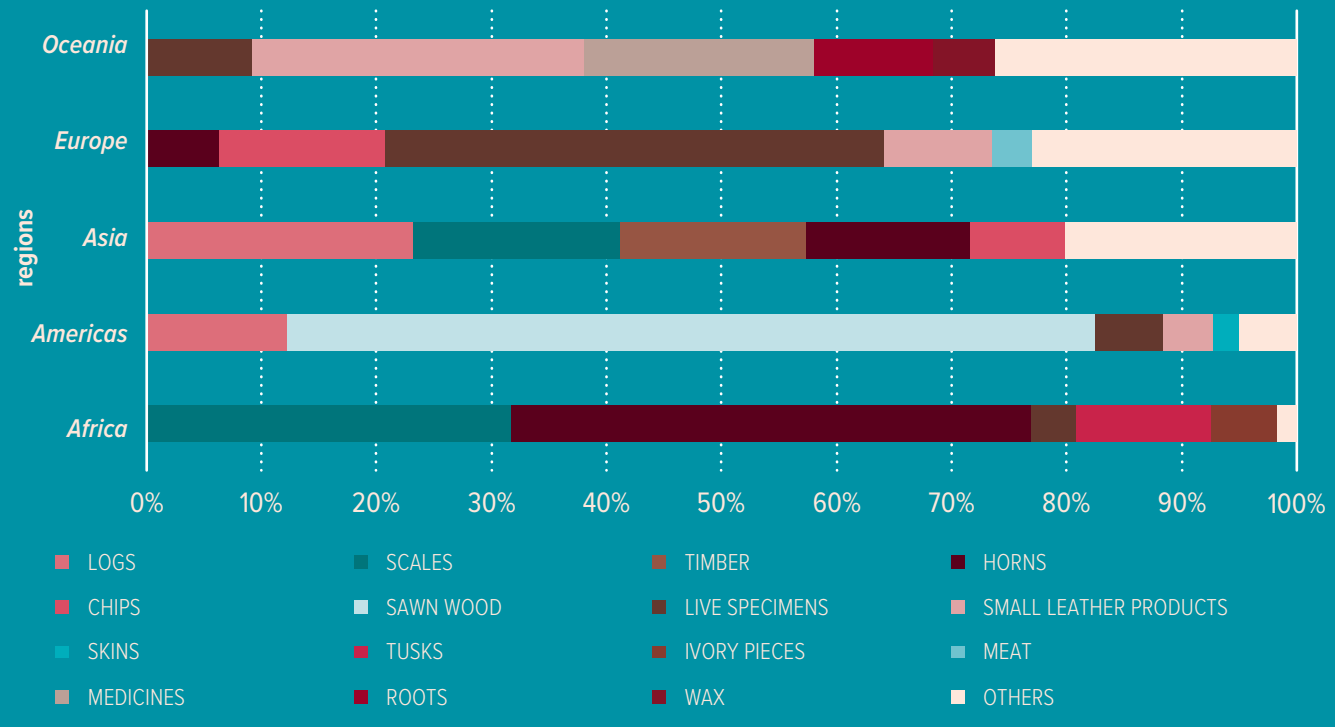
* Other Myrtales species include ramin and eucalyptus
** Other Sapindales includes guaiacum, holy wood and mahogany species

Percentage share of seizure records by species group for each region 2015–2021



* Other Liliales includes agave, snowdrop and yucca species

Percentage share of seizures by commodity type for each region aggregated by standardized seizure index 2015–2021



Chapter 1

Introduction

Introduction

This third edition of the *World Wildlife Crime Report* probes recent trends in the illicit trafficking of protected species of wild fauna and flora and provides a broad assessment of current knowledge about the causes and implications of associated crime at a global level.

As with the first two editions, published in 2016 and 2020 respectively, research carried out for this report included quantitative market assessment and a series of in-depth case studies. The findings inform an overview of recent characteristics and trends in global wildlife crime and provide insights into the dynamics of how it is affecting selected wildlife species. Additional emphasis for this edition is on systematic analysis of wildlife crime harms and impacts, factors driving crime trends, and the evidence for what remedial interventions work best.

The report was prepared in response to the United Nations General Assembly resolution on Tackling Illegal Trafficking in Wildlife adopted in 2021.[1] This resolution requested the United Nations Office on Drugs and Crime (UNODC), in close cooperation and in collaboration with Member States, to continue and strengthen the collection of information on patterns and flows of illicit trafficking in wildlife and to report thereon biennially.

The report has been prepared in coordination with partners of the International Consortium on Combating Wildlife Crime (ICCWC).[2]

Wildlife crime in a changing world

The second edition of the *World Wildlife Crime Report* was published in May 2020, largely based on data available up to the end of 2018. Since that time the global economy and human societies in general have experienced considerable disruption caused by the coronavirus disease (COVID-19) pandemic. This included restrictions on the movement of and interactions between people, while shifts in business and consumption patterns changed global trade patterns.[3] They also transformed the environment of opportunity and threat within which criminal activities are organized and performed.[4] During the pandemic wildlife crime received special attention owing to claims that wild animal trade may have played a role in the emergence of COVID-19. Despite uncertainty about this theory, the concern put a spotlight on wider concerns that wildlife trade and trafficking could contribute to the spread of zoonotic diseases.[5]

These developments were just coming into focus around the time of publication of the 2020 edition of the *World Wildlife Crime Report* when UNODC identified several potential impacts of the pandemic on wildlife crime. These included the possibility that illicit markets would move even deeper underground to avoid scrutiny related to disease risk management. It was also speculated that there may be greater risks of corruption to avoid health-related market restrictions. Additional considerations included the likelihood of sustained shifts in mode and routing of transportation, particularly due to increased use of parcel shipments, and accelerated development of online trading.[6] It was noted at the time that it was far too early to observe clear trends and changes in wildlife trafficking owing to the pandemic and to some extent this may still be the case now.

Since the 2020 edition of the *World Wildlife Crime Report* there have been some significant developments in international policy and actions that have kept wildlife trafficking in the spotlight.

Global legal framework and response

In May 2022, the United Nations Commission on Crime Prevention and Criminal Justice (CCPCJ) adopted a resolution on Strengthening the International Legal Framework for International Cooperation to Prevent and Combat Illicit Trafficking in Wildlife.[7] The CCPCJ invited Member States to provide UNODC with their views on ways to address any perceived gaps in the current international legal framework to prevent and combat illicit trafficking in wildlife, including the possibility of an additional protocol to the United Nations Convention against Transnational Organized Crime (UNTOC). Furthermore, Member States were invited to share their relevant national legislation, experiences, good practices and challenges in terms of preventing and combatting illicit trafficking in wildlife. An initial compilation of Member States' responses was made available for the 32nd Session of the CCPCJ in May 2023,[8] and an updated version was presented at the 33rd session in May 2024. These included reports of a wide variety of actions taken and suggestions for further remedial measures, including views on the merits of an additional protocol to UNTOC addressing wildlife crime. Additionally, UNODC submitted a summary report to CCPCJ analysing the 76 responses provided by the Member States.[9]

International wildlife trade regulation

The nineteenth meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which took place in Panama in November 2022, took stock of progress with multilateral efforts to regulate international wildlife trade to ensure it does not threaten the survival of wild animal and plant species. Subjects under consideration included analysis of compliance problems, the impacts of ongoing illegal trade on selected wildlife species including some addressed by case studies in the current report, and efforts to enforce the provisions of the Convention. Decisions were taken to introduce or amend trade restrictions for a number of species.[10]

Gender mainstreaming

International policy statements related to wildlife crime have adopted greater emphasis on social factors, including attention to gender-related concerns. In 2022, CITES Parties adopted a resolution urging greater efforts to understand how gender issues relate to other factors in legal and illegal international trade in wild species of fauna and flora, with a view to taking these into account when designing responses and interventions.[11] The United Nations General Assembly resolutions on Tackling Illegal Trafficking in Wildlife called upon Member States to ensure the full and effective participation and equal opportunities for leadership of women in the development and implementation of relevant policies and programmes addressing illicit wildlife trafficking.[12]

Nature conservation policy

After a four-year consultation and negotiation process, the Kunming-Montreal Global Biodiversity Framework was adopted in December 2022 during the fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity. The Global Biodiversity Framework, which supports the achievement of the Sustainable Development Goals (SDGs), sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050. This includes a specific ambition set under Global Biodiversity Framework Target 5 to take action to ensure that use, harvesting and trade of wild species is sustainable and safe.[13]

Pursuing the Sustainable Development Goals

In September 2023 the midterm review of the implementation of the SDGs took place at a summit in New York. A UNODC review of crime-related indicators under SDG goal 16, through which countries aspire to establish more peaceful, just and inclusive societies, concluded that progress is worryingly slow and called for recognition that the current pace of change is insufficient to address some of the most significant challenges relating to violence, trafficking, access to justice, and corruption.[14]

Mobilizing global enforcement efforts

Global wildlife crime enforcement efforts continue to be mobilized through Operation Thunder joint initiatives coordinated annually by INTERPOL and the World Customs Organization with the backing of International Consortium on Combating Wildlife Crime (ICCWC) partners. The most recent month-long operation in October 2023 involved police, customs, border control, environment, wildlife and forestry officials in 133 countries, with over 2,000 seizures resulting.[15]

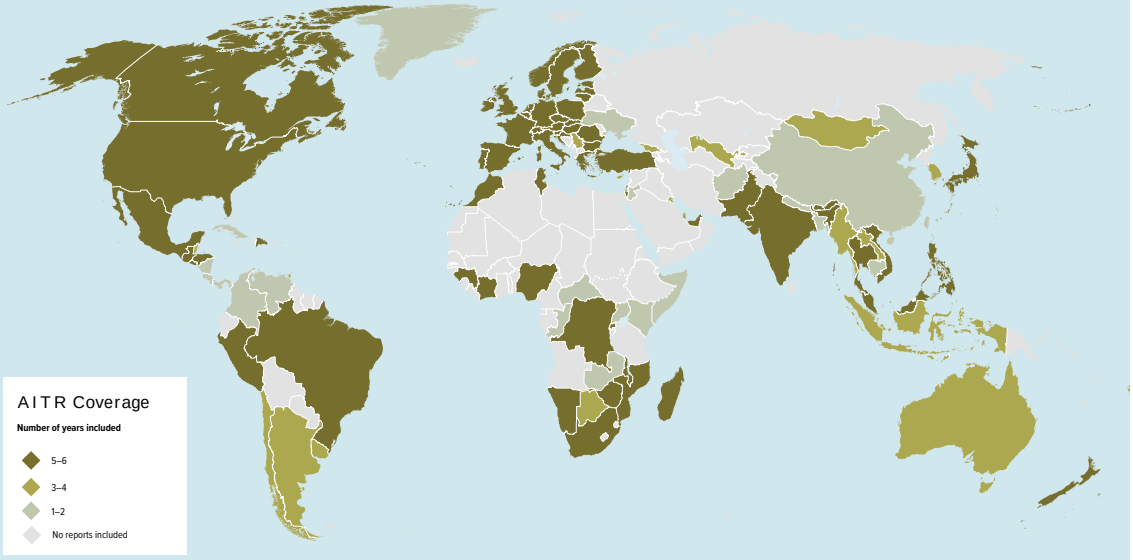
Quantitative market assessment

The quantitative analysis in this third edition of the *World Wildlife Crime Report* draws from two complementary sources of data on wildlife seizures made by government enforcement authorities: the CITES Illegal Trade Database; and the UNODC World Wildlife Seizure Database (World WISE). Hereafter this is referred to as the"WWCR3 analytical dataset".

The CITES Illegal Trade Database

This database incorporates seizure records submitted by designated government focal points to the CITES Secretariat under the terms of a CITES resolution on national reporting.[16] Each CITES Party is required to submit an Annual Illegal Trade Report (AITR) on all seizures for violations involving CITES-listed species irrespective of whether the seizure was made at an international border or at a domestic level, for example during the search of a private or business property or during inspections at domestic markets.[17] The database is managed by UNODC on behalf of the CITES Secretariat. Submission of AITRs is mandatory but not subject to compliance procedures.[18] The first year for which such reports were required was 2016 and the extent of submission up to 2021 is illustrated in Map 1.1.[19]

MAP 1.1 CITES Annual Illegal Trade Reports (AITRs) included in the WWCR3 analytical dataset 2016–2021[19]



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.
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.
Note: A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).
Certain countries and their territories report separately under CITES.

Source: CITES Illegal Trade Database (status as of August 2023)

The UNODC World Wildlife Seizure Database

World WISE was originally developed to inform quantitative market assessment for the first edition of the *World Wildlife Crime Report*, published in 2016 before the introduction of CITES AITRs. Data compilation at that time drew from a wide range of sources including: World Customs Organization seizure records; the former CITES Biennial Reports and other CITES-related sources; and national records such as those from the United States Fish and Wildlife Service (USFWS) Law Enforcement Management Information System (LEMIS), the Europe Trade in Wildlife Information eXchange (EU-TWIX), and the ASEAN Wildlife Enforcement Network (ASEAN-WEN) databases.[20] After 2016, World WISE data collection has focused on collating records from sources that supplement the CITES Illegal Trade Database, including those filling geographic gaps in CITES data submissions.[21] UNODC employs a range of methods to verify such records and avoid duplication that could result from use of data from multiple sources. As with earlier editions, sources and details of data handling procedures are provided in the methodological annex to this report.

At the time of writing, the CITES and UNODC databases included approximately 336,000 records of seizures from 1999–2021 (Figure 1.1). As is usual practice for UNODC research reports, all data were circulated to Member States for verification in September 2023 and reviewed in line with feedback received.

Most of the analysis in this report was based on data from 2015–2021, which includes over 140,000 records of seizures reported to have taken place in 162 countries and territories. Reported seizures for this period in the two databases involved illegal trade in around 4,000 wildlife species, approximately 3,250 of them species listed in the CITES Appendices. Approximately 1,000 additional World WISE records for 2022 were included in the WWCR3 analytical dataset because they help inform preliminary insights

into recent developments for species included in some of the case studies.

Seizure data represent a powerful source of information for analysis of wildlife crime, providing insights into the species and commodities in illegal trade, volumes and routing of trade flows, and indications of other factors that shed light on crime patterns, such as means of transport and concealment. Supplementary data provided with many seizure records also provide insights into seizure locations, the reason for seizure, seizing agency, and applicable legislation.

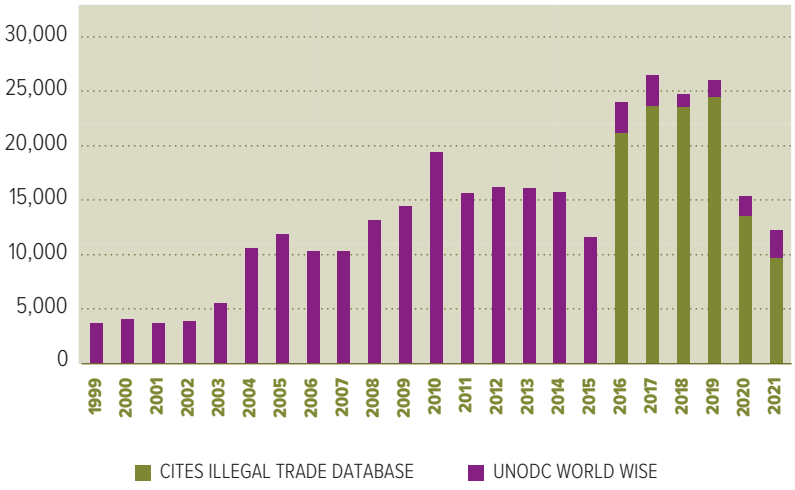
However, in interpreting seizure data it is critical to keep in mind that incidents are as much a representation of the enforcement action taken as they are evidence of the occurrence of illegal trade itself. An absence of seizures of a particular commodity or at a certain location could reflect lack of enforcement, rather than evidence that illegal trade was not taking place. Similarly, the fact that a seizure was made shows first and foremost that an agency in a particular country had the legal authority, capacity and motivation to make an enforcement intervention. The goods involved may have passed through or been destined for other countries and the incident may or may not be indicative of a larger flow of illegal trade.

Analysis of seizure data also needs to be cognisant of reporting biases, both in terms of geographical gaps in data provision and availability, and in terms of the commodities involved. Generally, reporting is weaker for illegal trade involving plant and aquatic species than it is for trade involving terrestrial animals. This may be a consequence of a variety of factors, including the division of responsibility for different commodities between specialized government agencies, varying levels of familiarity with or technical capacity to identify different species, or simply a matter of enforcement prioritization. Other potential biases in terms of geographical representativeness are that enforcement effort may be concentrated at certain locations, particularly at international border crossings and transport hubs.

It is also important to bear in mind that details of individual wildlife seizure records are often incomplete because important information such as accurate species identification, origin of goods, and trade routing is not available to the agency reporting the event.

Some seizures are made at storage locations, breeding facilities or markets, rather than during shipment of goods. In such cases, past and intended trade routing may genuinely be unknown. However, even for the large proportion of seizures made during shipment, routing information is often incomplete. Partial reporting of shipment routing is particularly challenging because it limits insights into illegal wildlife trade flows from points of origin, where animals or plants were taken from nature or bred in captivity, to end market countries (Figure 1.2). Trade flow patterns tend to become clearer as multiple records for a particular commodity are analysed together.

FIG. 1.1 **Number of wildlife seizure records in the CITES and UNODC databases 1999–2021**

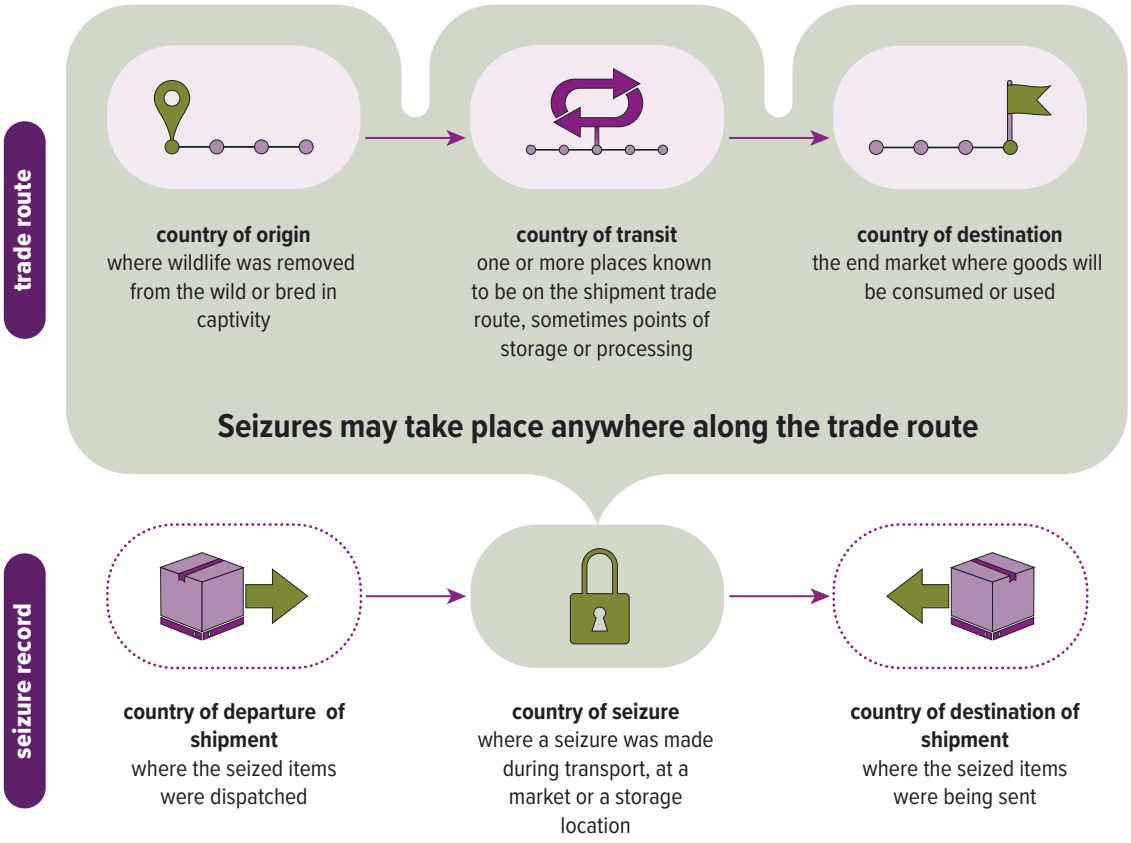


Sources: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

Seizure data interpretation is also complicated because some seizure reports summarize multiple individual incidents under an enforcement operation, while others itemize each incident separately. There are also methodological challenges in converting variously reported seizures to common units of volume, weight or value for analysis.

UNODC strengthens its use of seizure data through triangulation with other indicators, such as evidence of poaching trends for species covered by case studies and insights into market trends from complementary sources.

FIG. 1.2 Shipment routing: a partial view of illegal wildlife trade flows



Sometimes a seizure may include information on the alleged country of departure and/or destination of a shipment, which may provide greater insight into the trade route involved. Triangulation with other records may give some indication whether the country of seizure was the actual origin, a point of transit or an end market.

Source: UNODC

Data-related challenges and analytical approaches by UNODC to interpretation of seizure data are explored in greater depth and explained in the online methodological annex to this report.

Case studies and other research

Like earlier editions of the *World Wildlife Crime Report*, this report draws from additional fieldwork, data gathering and review of the growing academic literature in this field. It also benefits from consultation with a wide range of experts working on related topics, including the members of the Scientific Advisory Committee convened for this report.[22]

Several case studies and other research outputs were produced by UNODC during development of this report. They were selected in consultation with a broad range of experts and were aimed to be diverse in terms of species, commodity and geographical coverage. Some were designed to gain insights from local, on the ground research of specific illegal wildlife trade challenges. Typically, these focused on early upstream parts of the trade chain for which knowledge about crime structures and motivations was lacking. Other research efforts were selected to update analyses of some of the high-profile illegal wildlife trade issues examined in depth in earlier editions of the report to inform overall insights into recent wildlife crime trends. These drew on in-depth seizure analysis, collation of new information such as market price data, and review of newly published analyses developed in response to CITES decisions.

TAB. 1.1 **Research activities carried out during preparation of this edition of the *World Wildlife Crime Report***

Topic	Research content	Case study
Illegal trade in live orchids with emphasis on the European market	Trader and other stakeholder interviews	Yes
Illegal trade in dried seahorses	Global overview and field research in Peru	Yes
Illegal trade in rosewood timber	Global overview and field research in Nigeria	Yes
Wildlife trafficking in Indonesia: participant motivations	Wildlife crime offender interviews in Indonesia	–
Gender dimensions of wildlife crime in South America	Field research in Colombia, Ecuador, and Peru	–
Illegal trade in elephant ivory	Global trade trend review	Yes
Illegal trade in rhinoceros horn	Global trade trend review	Yes
Illegal trade in pangolin scales	Global trade trend review	Yes
Illegal trade in big cat bones	Global trade trend review	–

UNODC also carried out an expert qualitative survey of emerging illegal wildlife trade issues in early 2023 with the intention of identifying important aspects of the issue that might otherwise be missed. Finally, UNODC commissioned a case review and expert interviews on the relationship between wildlife crime and corruption and a research brief on the connections between illegal wildlife trade and climate change. The results of the emerging issues and corruption research have been integrated into relevant chapters of this report.

A subset of the case studies, principally those focused on species-specific analysis, are presented in the section on case studies. These and other studies, including some for which research is ongoing, provided important reference sources for the analytical chapters. The main research activities are summarized in Table 1.1. More information on the methods employed is provided in case study annexes and the methodological annex to this report.

Please note that this selection of case studies and other research themes does not signify in any way that UNODC considers these topics to be more important or of greater concern than other wildlife crime themes.[23]

How this report is organized

The structure of this report diverges from the first two editions, in which the thematic case studies comprised the bulk of the reports. After publication of the second edition, UNODC sought feedback from a variety of report users and relevant experts, including members of the Scientific Advisory Committee established to support report development. Based on these consultations, it was decided to produce both an overview of the characteristics of recent wildlife trafficking and a series of systematic analyses of key questions associated with the development of effective responses to this global challenge.

The report chapters are organized as follows:

- **Summary, conclusions and policy implications**
  Providing an overview of the report findings and implications for public and private sector policymakers and practitioners.

- **Chapter 2: Characterizing wildlife trafficking and associated crime**
  Taking stock of contemporary developments in illegal wildlife trade based on analysis of seizure data, case studies and other research sources.

- **Chapter 3: The impacts and harms of wildlife crime**
  Exploring the different types of harm caused by wildlife crime and the available evidence on the extent of them.

- **Chapter 4: What is driving wildlife crime patterns and trends?**
  Examining evidence of the factors motivating and influencing criminal activity that drives illegal wildlife trade, including the role of corruption.

- **Chapter 5: What works to decrease wildlife crime?**
  Reviewing evidence of the effectiveness of different interventions taken to reduce criminality and illegal trade.

- **Case studies**
  Case study annexes presenting research findings for the topics highlighted in Table 1.1 above.

Endnotes

1 United Nations General Assembly (UNGA), "Res. 75/311, Tackling Illicit Trafficking in Wildlife (UN Doc A/RES/75/311)", 26 July 2021.

2 The International Consortium on Combating Wildlife Crime (ICCWC) is the collaborative effort of five intergovernmental organizations working to bring coordinated support to the national wildlife law enforcement agencies and to the subregional and regional networks that act in defence of natural resources. The partner agencies to ICCWC are the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Secretariat, INTERPOL, the United Nations Office on Drugs and Crime (UNODC), the World Bank and the World Customs Organization (WCO).

3 OECD, "International Trade during the COVID-19 Pandemic: Big Shifts and Uncertainty" (Paris: OECD, 10 March 2022), https://read.oecd-ilibrary.org/view/?ref=1129_1129345-casormobh7&title=International-trade- during-the-COVID-19-pandemic.

4 UNODC, 'The Impact of COVID-19 on Organized Crime' (Vienna: UNODC, July 2020), https://www.unodc.org/documents/data-and-analysis/covid/RB_COVID_organized_crime_july13_web.pdf.

5 Richard Kock and Hernan Caceres-Escobar, *Situation Analysis on the Roles and Risks of Wildlife in the Emergence of Human Infectious Diseases* (IUCN, International Union for Conservation of Nature, 2022), https://doi.org/10.2305/IUCN.CH.2022.01.en.

6 UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

7 CCPCJ resolution 31/1: https://www.unodc.org/documents/commissions/CCPCJ/Crime_Resolutions/2020-2029/2022/Resolution_31_1_CCPCJ.pdf.

8 The initial report of responses to CCPCJ resolution 31/1 is available at: https://www.unodc.org/documents/commissions/CCPCJ/CCPCJ_Sessions/CCPCJ_32Reconvened/ECN152023_CRP12_2323139E.pdf.

9 The updated report is available at: https://www.unodc.org/documents/commissions/CCPCJ/CCPCJ_Sessions/CCPCJ_32Reconvened/ECN152023_ CRP12_2323139E.pdf and the UNODC response will be made available as document E/CN.15/2024/14.

10 The agenda, inputs and summary report of the nineteenth meeting of the Conference of the Parties to CITES are available here: https://cites.org/eng/meetings/cop.

11 CITES Resolution Conf. 19.3. https://cites.org/sites/default/files/documents/COP/19/resolution/E-Res-19-03.pdf.

12 The latest UN General Assembly resolution on Tackling Illicit Trafficking in Wildlife (A/RES/77/325) is available here: https://documents.un.org/doc/undoc/gen/n23/256/80/pdf/n2325680.pdf?token=1rPXTCbakfoMrB19tL&fe=true.

13 For details of the Kunming-Montreal Global Biodiversity Framework see: https://www.cbd.int/gbf/. Target 5 text is as follows: "*Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimizing impacts on non-target species and ecosystems, and reducing the risk of pathogen spillover, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities*".

14 UNODC, 'Global Progress Report on Sustainable Development Goal 16 Indicators: A Wake-up Call for Action on Peace, Justice and Inclusion' (Vienna: UNODC, September 2023), https://www.unodc.org/documents/data-and-analysis/sdgs/SDG16_2023.pdf.

15 See details at https://www.interpol.int/fr/Actualites-et-evenements/Actualites/2023/2-114-seizures-of-endangered-animals-and-timber-in-major-international-law-enforcement-operation.

16 CITES, 'Resolutions Conf. 11.17 (Rev. CoP19)', n.d., https://cites.org/sites/default/files/documents/COP/19/resolution/E-Res-11-17-R19.pdf.

17 CITES Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. CITES Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. CITES Appendix III includes species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

18 Submission of an annual report on legal trade has been an obligation for Parties under Article VIII of CITES since the treaty's inception, while the requirement for submission of annual illegal trade reports was agreed only in 2016.

19 A small number of these reports were not made available to UNODC for analysis on request by the relevant Party. Since closure of the WWCR3 analytical dataset, CITES Annual Illegal Trade Reports for 2022 have been submitted. A regularly updated list of submitted reports is made available on the CITES website here: https://cites.org/eng/resources/reports/Annual_Illegal_trade_report.

20 A full explanation of the World WISE database is included in 'World Wildlife Crime Report 2016' (Vienna: UNODC, 2016). Data sources for the first and second editions are listed in the methodological annexes for each report.

21 The CITES Appendices list species subject to international trade controls under the Convention, currently totalling around 40,900 species –including roughly 6,610 species of animals and 34,310 species of plants (https://cites.org/eng/disc/species.php). Trade in many thousands of additional wildlife species is subject to national regulation.

22 The Scientific Advisory Committee for the report was formed to: advise on the scope of and methodology to be used for the report; help identify sources of evidence that can inform research for the report and advise on access to relevant data sources and experts in the non-governmental organization and academic communities; and contribute to interpretation and analysis of evidence during development and review of the report to help enhance its quality, scientific credibility and impact. Members are listed in the acknowledgements section of the current report.

23 Jacob Phelps, Steven Broad, and Jennifer Mailley, 'Illegal Wildlife Trade and Climate Change: Joining the Dots' (Vienna: UNODC, November 2022), https://www.unodc.org/documents/data-and- analysis/wildlife/llegal_wildlife_trade_and_climate_change_2022.pdf.

Chapter 2

Characterizing wildlife crime

Characterizing wildlife trafficking and associated 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, whether administrative or criminal, are nearly uni-

BOX 2.1 Illegal timber and fisheries trades

Although most of the global trade in timber from natural forests is not regulated under CITES,[a] a wide range of national legislation applies in countries where harvests take place. This includes national laws governing land use rights, harvest limits, transport, taxation and export controls. In some cases, the details and foundations of such rules can be difficult to describe with precision. While these regulations apply at the national level and not internationally, some importing countries have adopted legal measures requiring proof of legal sourcing that depend on clarification of what this entails.[b] Consequently identifying what proportion of the global timber trade is illegal at some point along the trade chain is challenging.

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.[c] 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.[d]

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.[e] 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.[f] Similar to timber trafficking, it can be difficult to work out precisely what constitutes illegal fishing and trade.[g]

Global fisheries statistics differentiate production from aquaculture and wild capture, the latter totalling 90 million tons in 2020 according to FAO data.[h] However, from trade statistics it is not straightforward to make this distinction. To give an impression of scale, according to FAO, global fisheries product trade in 2020 totalled 60 million tons, valued at $150 billion.[h] Again, working out the proportion of trade that contravenes relevant national legislation and/or international agreements is not easy. Typically, studies of this subject adopt broad definitions of illicit trade, encompassing products derived from illegal, unreported and unregulated sources. One study estimated that globally between 8–14 million tons of unreported catches were potentially traded illicitly each year during the early 2010s.[i]

a. Most tree species traded for timber internationally are not subject to CITES trade controls. Global trade volumes can be compared with the following sources: FAO global data https://www.fao.org/forestry/statistics/84922/en/, CITES trade data https://trade.cites.org/.

b. Alison Hoare and Thiago H. Kanashiro Uehara, "Establishing Fair and Sustainable Forest Economies: Lessons Learned from Tackling Illegal Logging" (London, UK: Chatham House, September 2022), https://www.chathamhouse.org/sites/default/files/2022-09/2022-09-28-fair-sustainable-forest-economies-hoare-kanashiro-uehara_0.pdf.

c. https://www.fao.org/forestry/statistics.

d. Gan, Jianbang *et al.*, "Quantifying Illegal Logging and Related Timber Trade," in *Illegal Logging and Related Timber Trade–Dimensions, Drivers, Impacts and Responses. A Global Scientific Rapid Response Assessment Report.* (International Union of Forest Research Organizations (IUFRO), 2016), https://www.research.unipd.it/bitstream/11577/3268146/1/Ch3%20from%20World%20Series%2035%20-%20Full%20Report%20%28low-resolution%29.pdf.

e. 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. https://oceans-and-fisheries.ec.europa.eu/fisheries/rules/illegal-fishing_en.

f. For further information, see "Combatting Crimes in the Fisheries Sector – A Guide to Good Legislative Practices" (Vienna, Austria: UNODC, 2023), https://www.unodc.org/documents/organized-crime/tools_and_publications/Legislative_Guide_Crimes_in_the_Fisheries_Sector.pdf.

g. Julio Jorge Urbina, "Towards an International Legal Definition of the Notion of Fisheries Crime," *Marine Policy 144* (1 October 2022): 105214, https://doi.org/10.1016/j.marpol.2022.105214.

h. FAO, *The State of World Fisheries and Aquaculture* 2022. *Towards Blue Transformation*. (Rome: FAO, 2022), https://doi.org/10.4060/cc0461en.

i. U. R. Sumaila *et al.*, "Illicit Trade in Marine Fish Catch and Its Effects on Ecosystems and People Worldwide," *Science Advances 6*, no. 9 (26 February 2020): eaaz3801, https://doi.org/10.1126/sciadv.aaz3801.

versally accepted since penalizing CITES violations in national law is incumbent on all 184 CITES parties.[3] Also, in terms of significance, CITES-related illegal trade concerns species specifically brought under the treaty's remit because of concern about existing or potential conservation threat. Focus on this component of wildlife crime also reflects that one of the primary sources of available wildlife seizure data, the CITES Annual Illegal Trade Reports, covers only violations of the treaty's trade rules. Since CITES trade measures govern cross-border transactions, most of the reported violations concern international trade, generally excluding illegally sourced wildlife that is consumed domestically, such as meat and medicinal ingredients from wildlife sources.

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,[4] 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.

Participants in 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.[5] 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.[6] 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 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.[7] 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.[8] A recent UNODC organized crime threat assessment for Nigeria found this to be the prevalent scenario.[9] 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 country planned their

BOX 2.2 Prisoners convicted of wildlife crime in Indonesia

As part of the research for the current report, a study was initiated by UNODC to gain additional insights from convicted wildlife crime offenders in Indonesia.[a] In 2022, the male leader of a wildlife trafficking network was interviewed by UNODC in prison in Indonesia where he was serving time for attempting to barter an unknown quantity of Indonesian wildlife for four lion cubs, one leopard and 58 Indian star tortoises.[b] The trade, which was to have taken place in Thailand, was thwarted and the trafficker arrested after the upcoming transaction was detected. The trafficker estimated that he had been involved in between 11–20 illegal wildlife transactions that had involved the bartering of Indonesian wildlife (orangutans, birds of paradise, cockatoos, arowanas, pig-nosed turtles) for big cats. The trafficker said he got involved in wildlife trade through the internet, looking for ways of making money with a small initial investment and without the risks of the illegal drug trade. Following groups on global social media platforms, he learned to connect buyers and sellers. He began with aquarium fish (arowanas) before moving on to big cats. He described working with brokers for both the buyers and sellers (including contacts in Malaysia, India and Pakistan) to set up deals. He used two runners to conduct the physical transactions so that he never touched the wildlife or knew either the initial seller or the final buyer. He made use of airports and seaports where he had connections with informants and corrupt officials. He described his network as his capital.

Other prisoners interviewed in Indonesia at the same time had a background in antiques and collectables, an area where a good network of buyers and sellers was essential in engaging in the illegal trade. Some of the prisoners had made money through their knowledge of antiques markets and their networks for buying and selling these goods. One prisoner reported buying antique (and therefore potentially legal) tiger skin rugs for the purpose of having them made into ceremonial hats that he could resell at a profit, and this practice led him into grey markets.[c] Another prisoner reported buying old tusks as part of his antiques business and was arrested when he bought an ivory item with the intent to resell it immediately to a known buyer for a slight mark up.[d] Still others were involved in legal aspects of wildlife exploitation, such as the collection of swiftlet nests for international trade, and through these channels made contacts with buyers abroad interested in other wildlife products they could source.[e]

a. A report of the results of the UNODC offender interview research in Indonesia will be published later.
b. PEK-004
c. KAL-001
d. IRA-002
e. KAL-002

activities like organized 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.[11] 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 project DISRUPT aimed to reduce illegal firearms trafficking.[16] The operation covered eight countries in Africa and resulted in seizures of illegal firearms along with illegal wildlife goods, drugs, gold, counterfeit medication and cash.[17] Such convergence of criminal interests in different illicit trade sectors is an area of increasing research and concern.[18,19,20]

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.[21] The United Nations Sustainable Development Goal (SDG) 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.[22,23,24]

With the aim of gaining further insights into gender-related aspects of illegal wildlife trade, 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.[25]

BOX 2.3 Gender and crime associated with wildlife trafficking in the Amazon region of South America

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[a]), 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.[b]

- **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.

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.[26] 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.[27] 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).

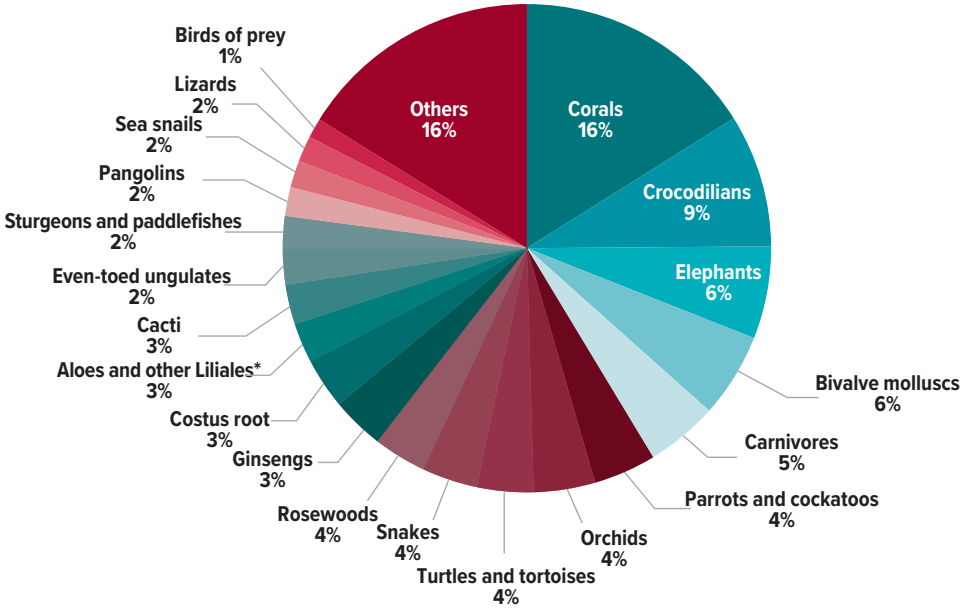
The same seizure data summed using the standardized seizure index shows the dominance of timber (cedar and rosewood) species (Figure 2.2).

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?

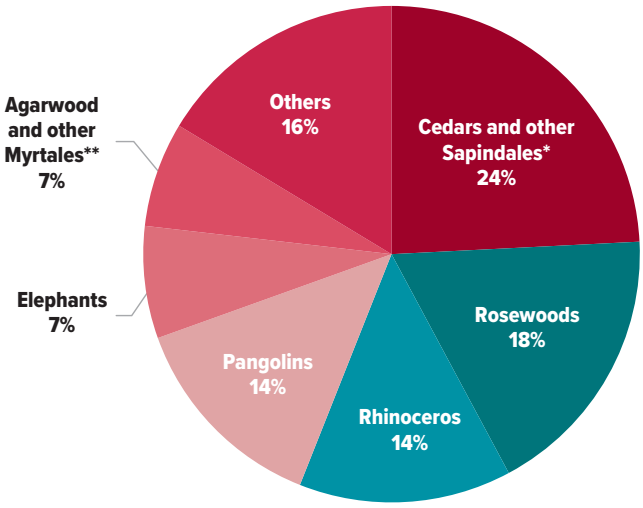
Species groups are traded illegally in a range of forms, which provide insights into the motivations for their trade. These include uses as food, medicine, clothing, fuel, adornment, building material, decoration, entertainment, study and companionship.

FIG. 2.1 Percentage share of seizure records by species group 2015–2021



Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
*Other Liliales includes agave, snowdrop and yucca species

FIG. 2.2 Percentage share by species group aggregated by standardized seizure index 2015–2021

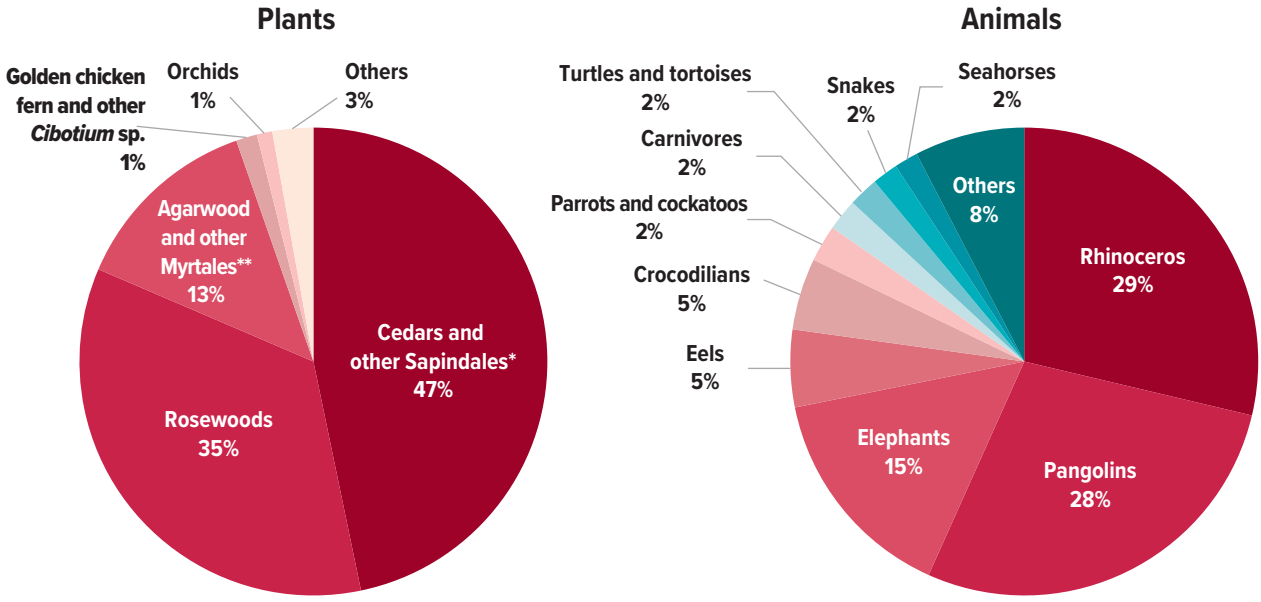


Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
*Other Sapindales includes guaiacum, holy wood and mahogany species
** Other Myrtales species include ramin and eucalyptus species

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 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).

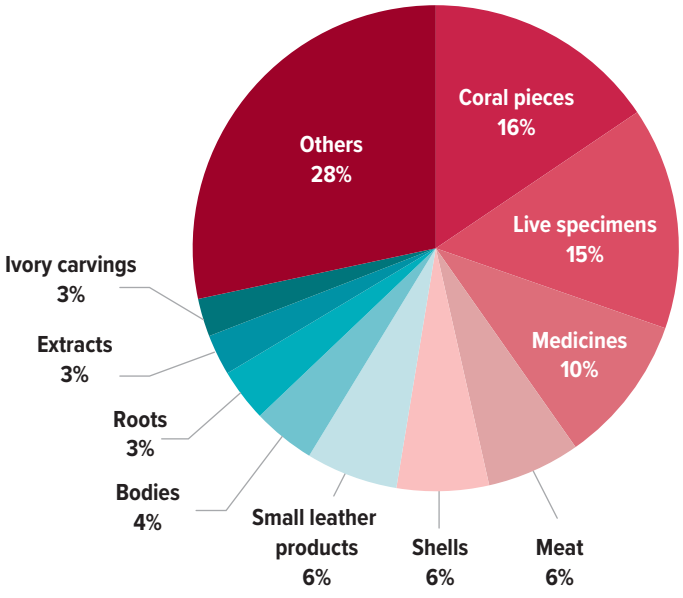
FIG. 2.3 Percentage share by species group (split by plants and animals) aggregated by standardized seizure index 2015–2021



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

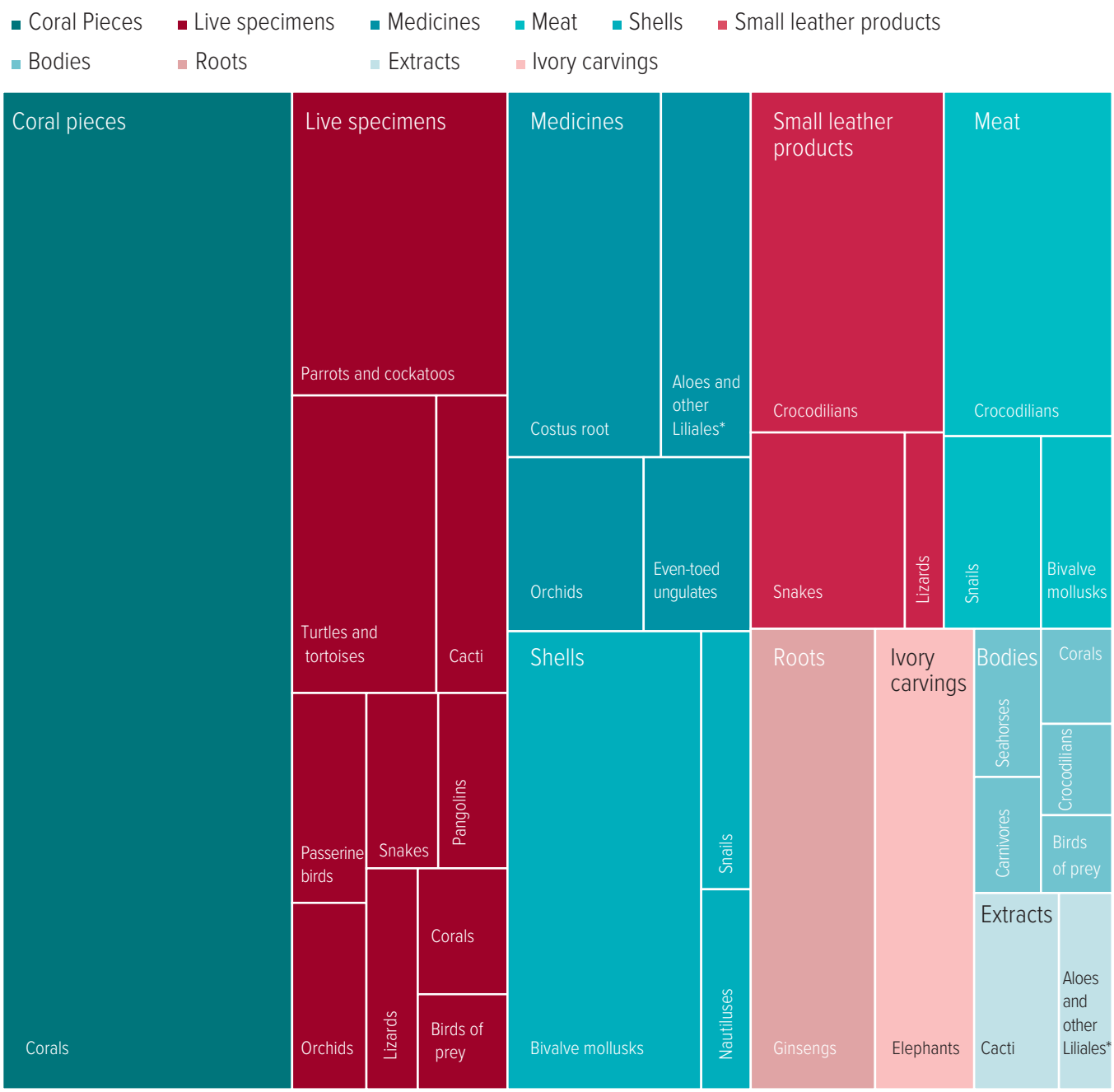
This seizure distribution illustrates the different forms in which the same species groups are illegally traded. For example, pangolins are illegally traded as scales, meat, bodies and also as live specimens; lizards are traded as meat, small leather products and live specimens; and orchids are traded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

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



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

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



Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
* Other Liliales includes agave, snowdrop and yucca species

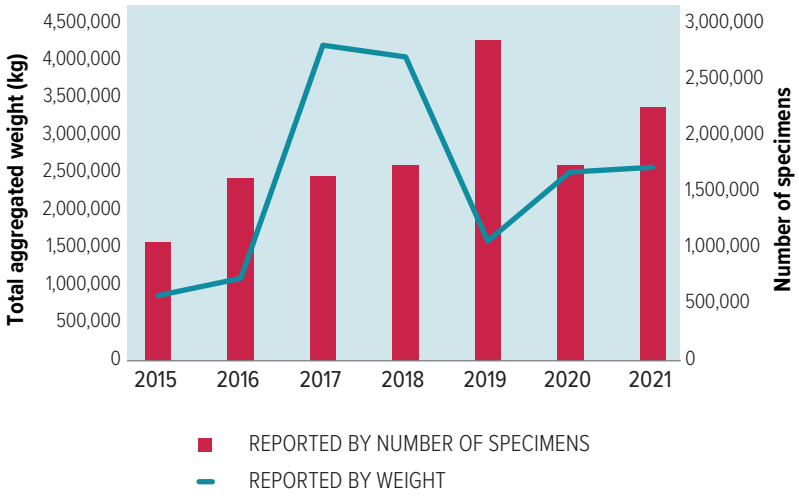
Recent global trends in illegal wildlife trade

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]

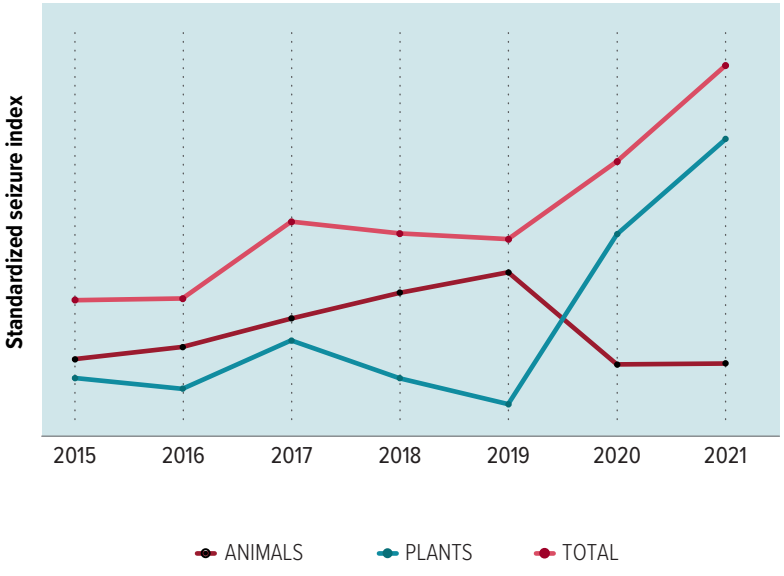
In terms of illegal trade volumes, trends can be examined for seizures reported by numbers of individual specimens and those reported by weight during the period 2015–2021 (Figure 2.6). For those reported by weight there was a significant peak in 2017–2018, a drop in 2019 and smaller increases again 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.

FIG. 2.6 Annual seizures reported by weight and by number of specimens 2015–2021



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 animals and plants 2015–2021

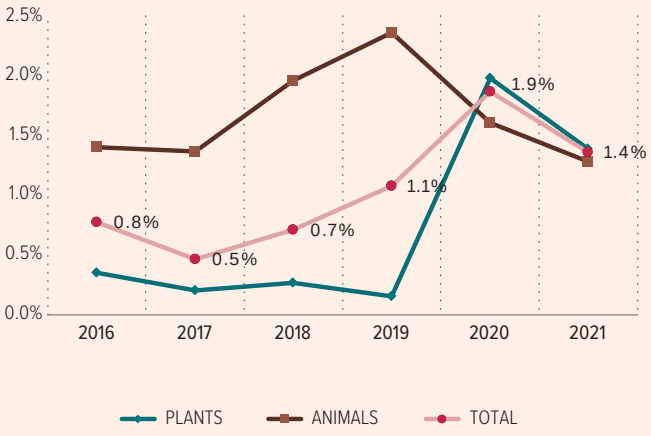


Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

BOX 2.4 Development of the SDG indicator on wildlife trafficking

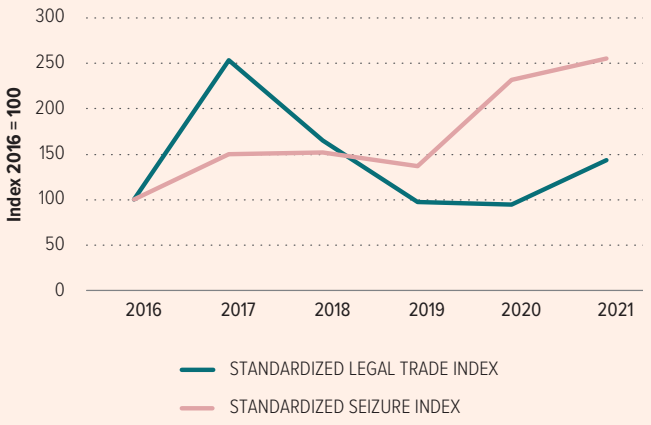
UNODC is populating the indicator on progress to end trafficking of protected species of flora and fauna under the framework of the Sustainable Development Goals (SDGs).[a] SDG indicator 15.7.1 is based on a comparison of CITES legal trade records and seizure records from CITES annual Annual Illegal Trade Reports using the same aggregation method employed for the standardized seizure index as explained in the methodological annex to this report.[b] 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.

FIG. 2.8a Proportion of the estimated value of wildlife trade represented by wildlife seizures, by total, plants, animals 2016–2021



Sources: CITES Trade Database, CITES Illegal Trade Database and World WISE

Fig. 2.8b Trend in the estimated value of wildlife legal trade and seizures 2016–2021



Sources: CITES Trade Database, CITES Illegal Trade Database and World WISE

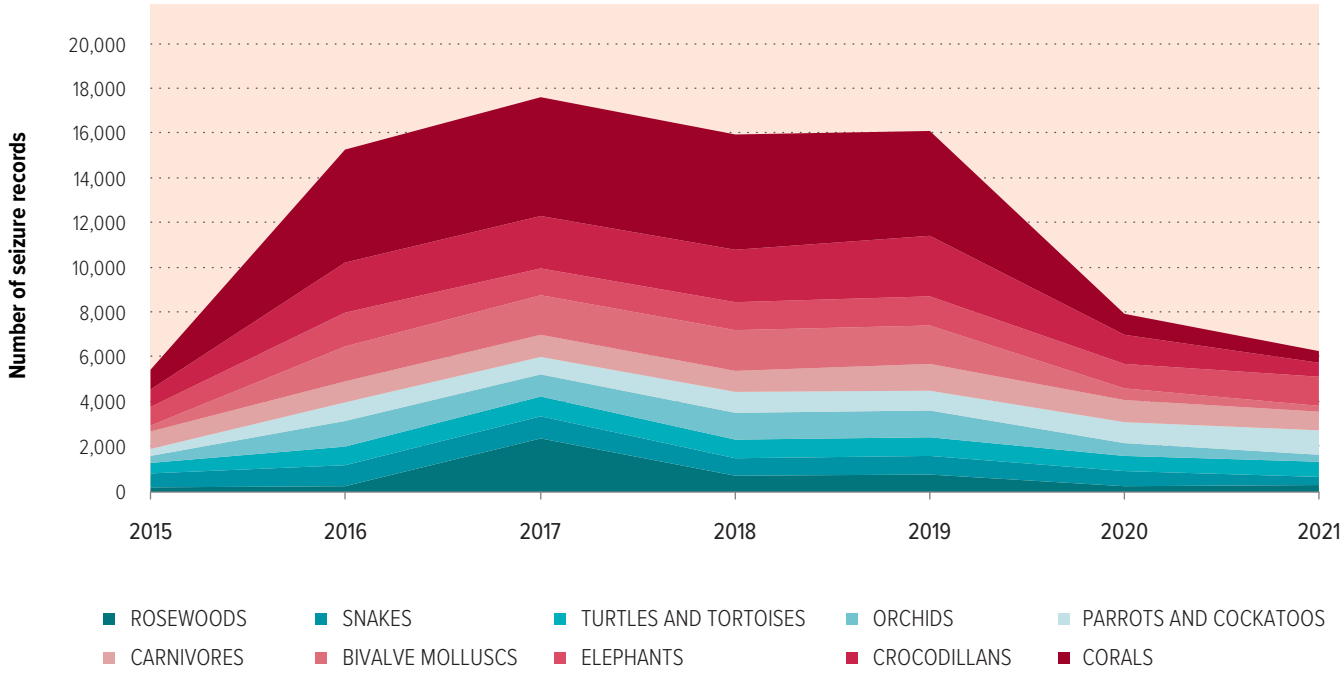
An initial estimate of the indicator suggests that globally the intercepted illegal wildlife trade as a proportion of all wildlife trade (legal and illegal) increased from 2017 onwards, reaching its highest levels during the COVID-19 pandemic in 2020–2021 (Figure 2.8a). Wildlife seizures made up around 1.4–1.9 per cent 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 per cent 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.

a. Details of the indicator and methodology at: https://unstats.un.org/sdgs/metadata/files/Metadata-15-07-01.pdf and in the methodological annex to this report.

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 in CITES changes over time. Therefore, caution should be practiced when interpreting the results.

FIG. 2.9 Top ten species groups per year by number of seizure records 2015–2021



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

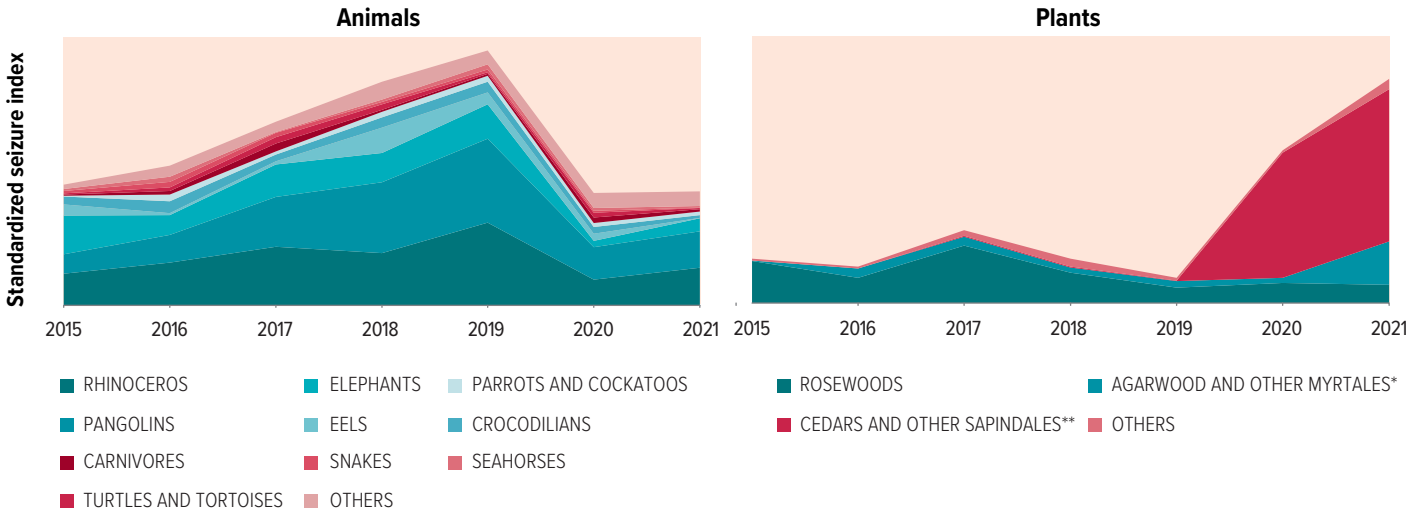
Using the standardized seizure index to aggregate all seizures however reported, there is a generally upward trend during the period 2015–2021 (Figure 2.7). However, when illustrated separately for seizures involving animals and plants there is a significant difference. For seizures of animal species 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,[31] 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 (parrots and cockatoos) 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.[32]

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 predominate across the full period, with the decrease in the index in 2020 and 2021 being fairly consistent across all the illustrated species groups.

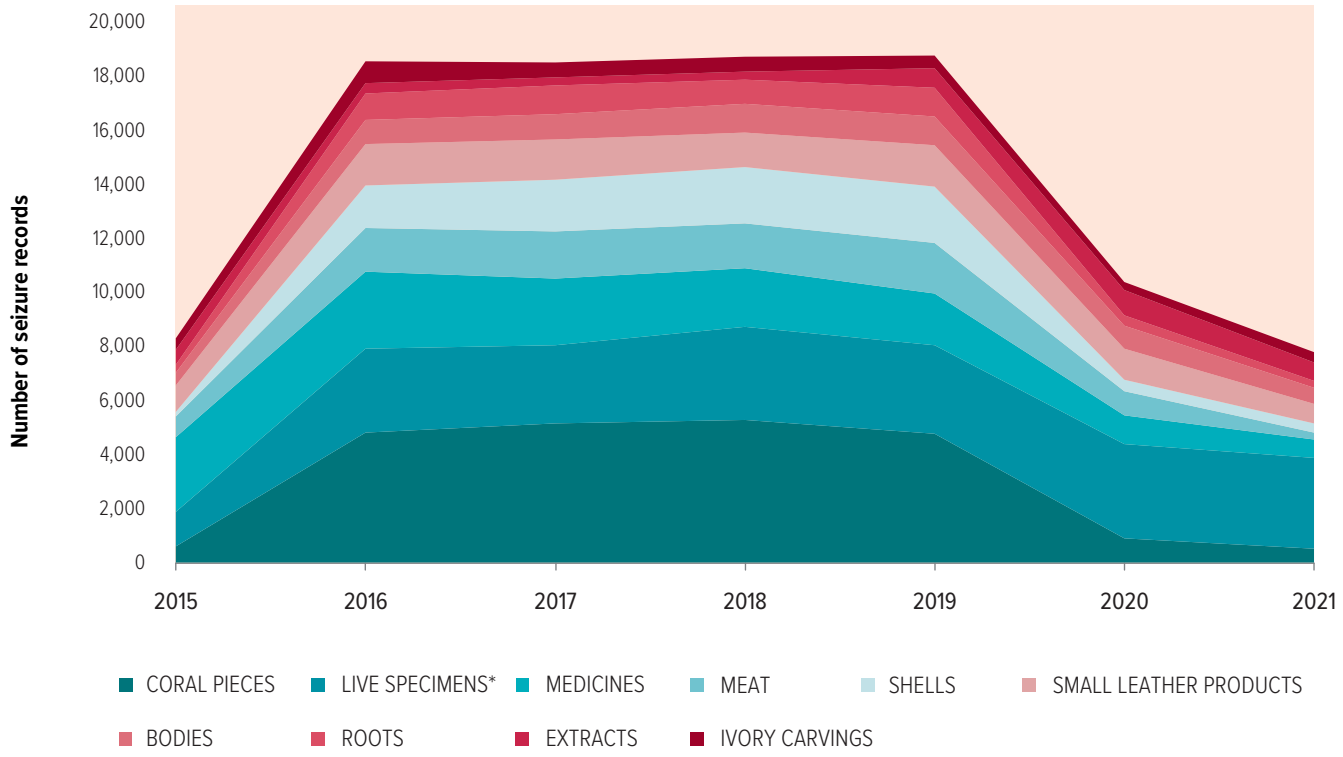
The share of commodity types based on the number of seizure records also changed over 2015–2021. The declining trend in corals from 2020 can be observed again, while the share of seizures of live specimens increased during the same period, which could perhaps reflect increased restrictions on the movement 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 animals and plants 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).

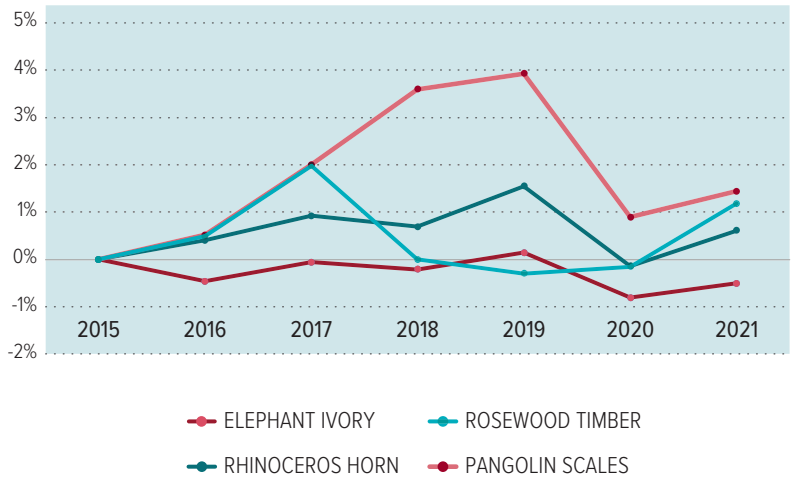
As discussed in the individual case studies, seizure data could infer peaks in illegal trade and/or enforcement action for all these commodities between 2017–2019. For rosewood, seizure records appear to show a dip in illegal trade flows during 2018–2020, while for elephant ivory, rhinoceros horn and 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.

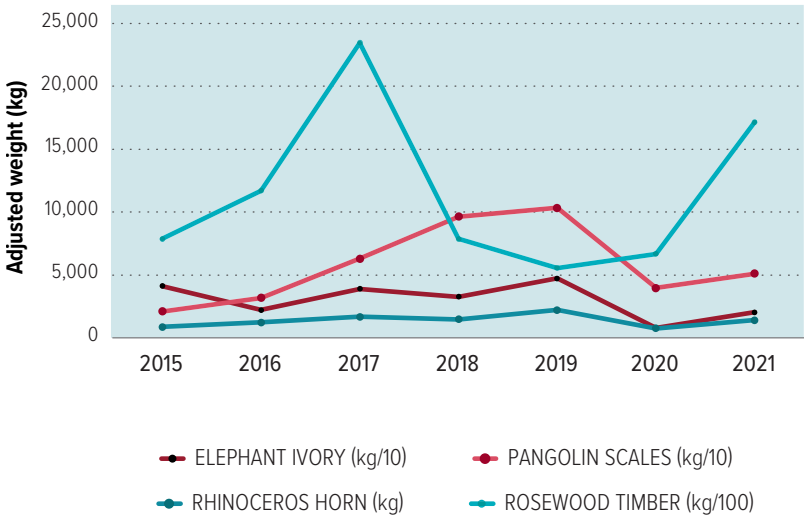
The UNODC research in the Amazon region of South America to explore the roles that women and men play in both facilitating and preventing wildlife trade-related crime also provided some insights

FIG. 2.12 Percentage variance in recorded weight from a 2015 baseline for seizures of four wildlife products 2015–2021



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

FIG. 2.13 Seizure trends by total weight for four wildlife products 2015–2021 (different scales of measurement used to aid comparison)



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

into local circumstances affected by the pandemic.[33] 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."[34]

> "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."[35]

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."[36]

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

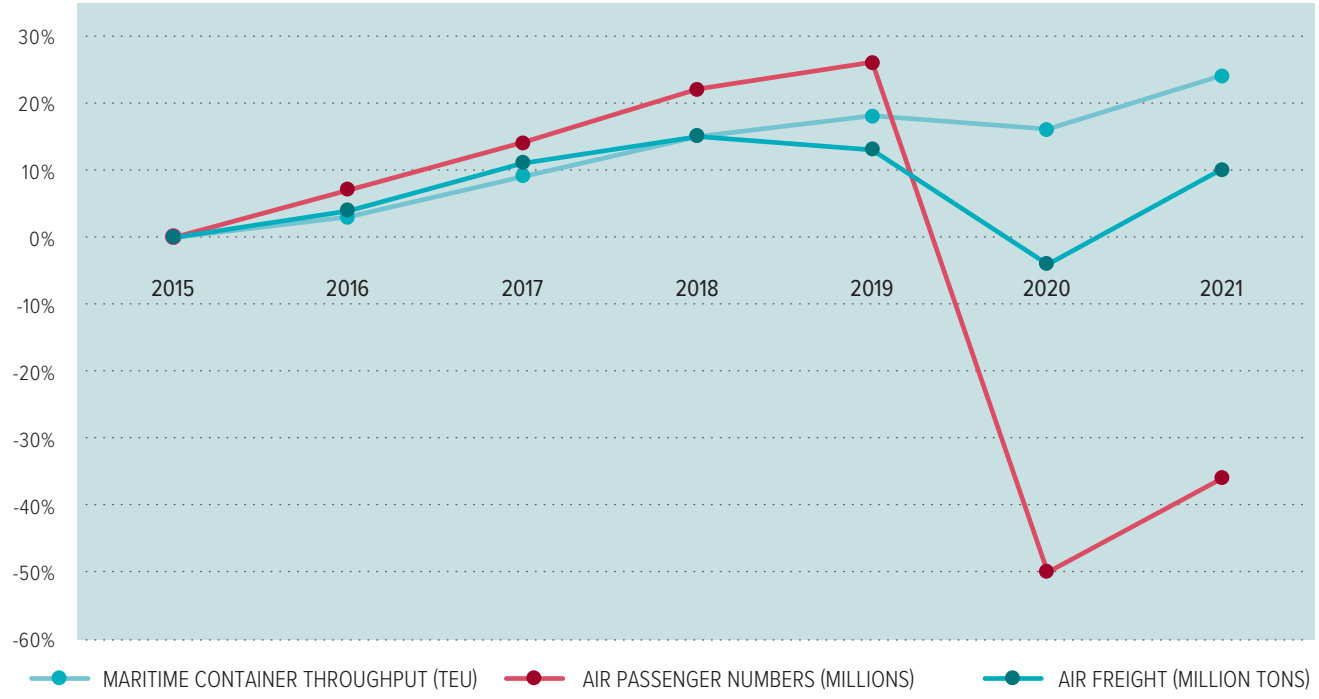
> "You can get wild meat, it's not as much as before and you might not see it, but is always in the market."[37]

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.[38]

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.[39,40]

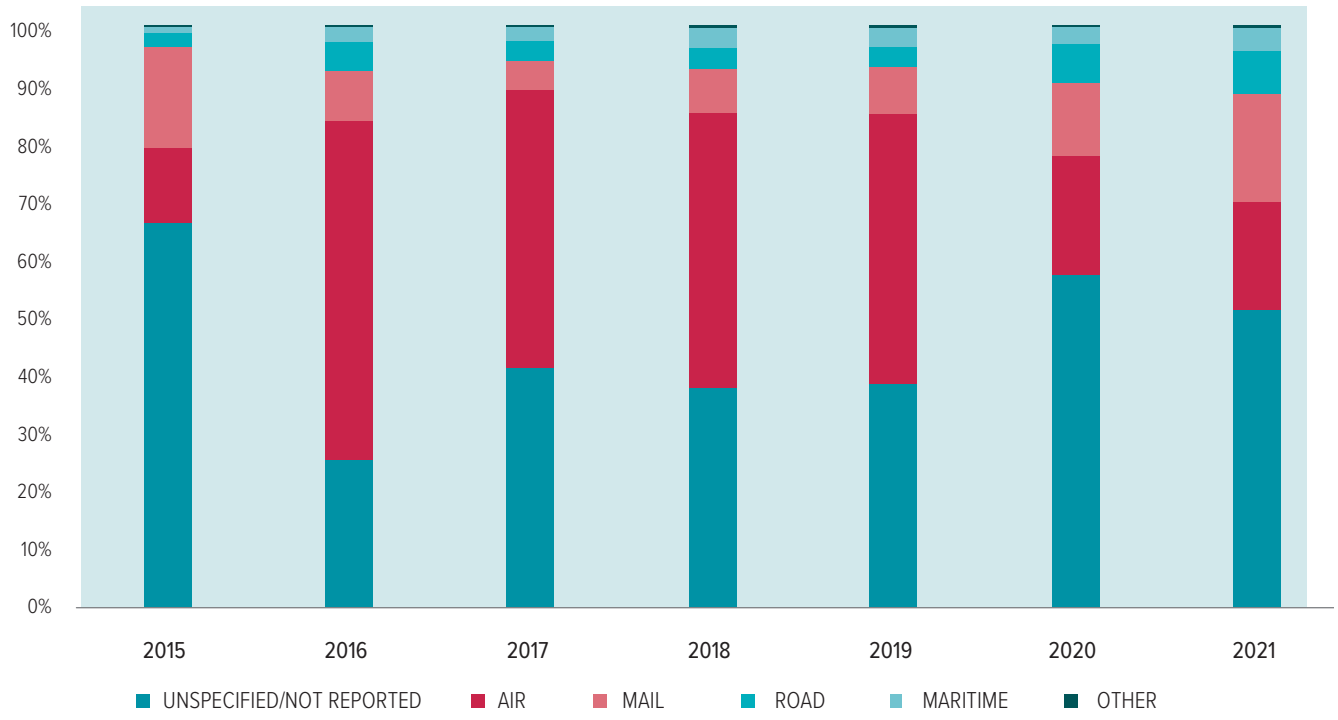
Some reported wildlife seizures take place in markets or storage locations rather than during shipment. Even for those seized on the move, the mode of transport is not always reported so it is difficult to establish robust trends. However, from the limited information available on transport mode in the 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

FIG. 2.14 Percentage variance from a 2015 baseline in air and maritime transport throughput 2015–2021



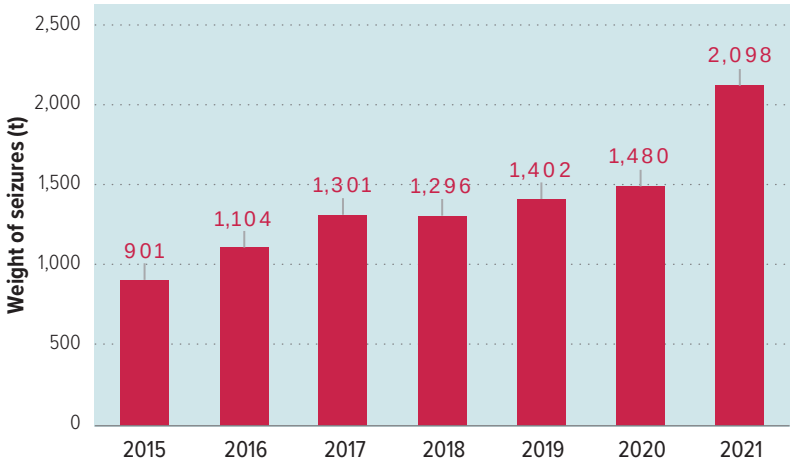
Source: UNCTAD and International Civil Aviation Organization
Note: TEU = Twenty-foot equivalent units

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



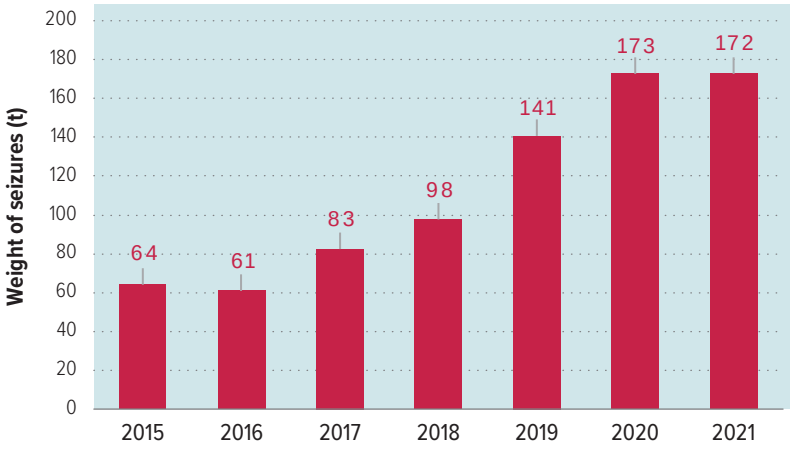
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

FIG. 2.16 Global cocaine seizures (t) 2015–2021



Source: *UNODC World Drug Report 2023*

FIG. 2.17 Methamphetamine seizures in East and South-East Asia (t) 2015–2021



Source:UNODC[46]

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.[41]

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.[42]

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.[43] It is unclear to what extent these contrasting trends during the pandemic period reflect differences between markets or variation in enforcement priorities.

BOX 2.5 Estimating the value of illegal wildlife trade

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 for the monetization of the environmental cost related to wildlife trafficking together with lost governmental revenues from user fees or taxation.[a] These types of estimates help to recognize the harm and impact of wildlife crime on social, economic and environmental development, but provide 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.[b] 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.

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.[b]

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.

a. World Bank, *Illegal Logging, Fishing, and Wildlife Trade* (World Bank, Washington, DC, 2019), https://doi.org/10.1596/32806.
b. UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

BOX 2.6 Estimating illegal trade value for elephant ivory and rhinoceros horn

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).

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.

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.

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 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.

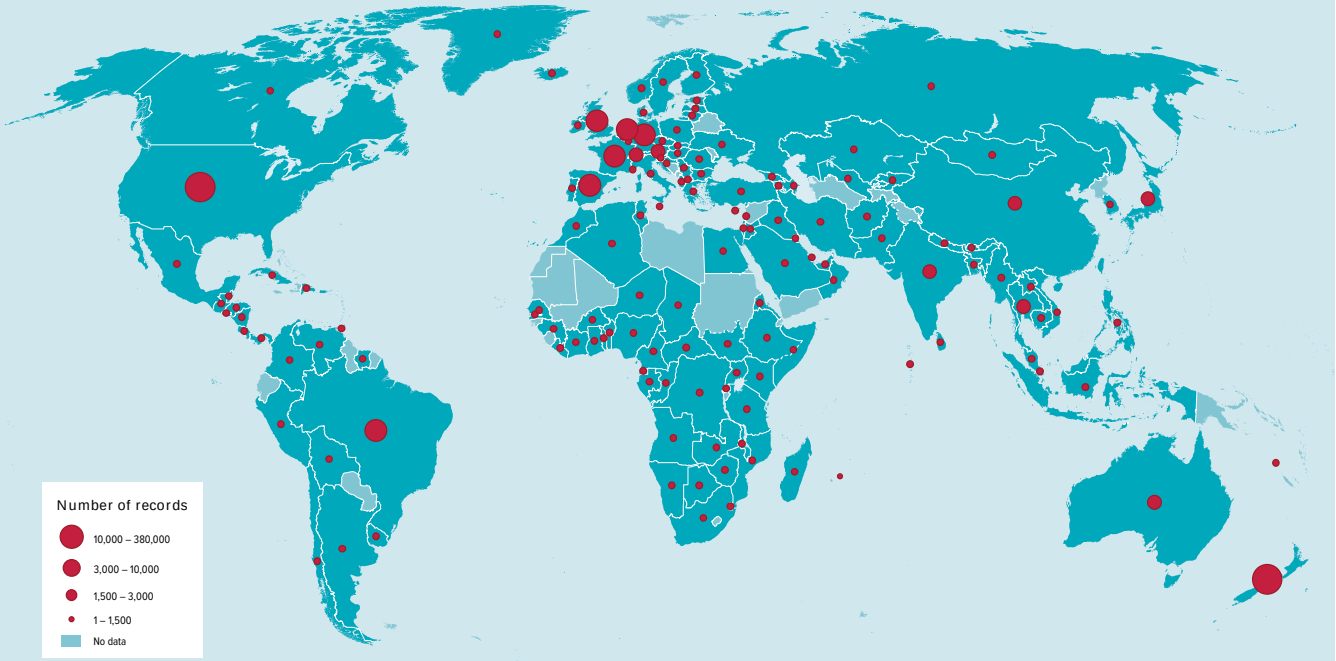
While it may be very difficult to give an accurate estimate of the size of the market overall, estimates of the value of illegal trade flows can be made for some of the best-known markets, such as those for elephant ivory and rhinoceros horn (Box 2.6). This is because knowledge of population losses to 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 over 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, 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.

MAP 2.1 Number of seizure records per country/territory* 2015–2021



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

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. 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).

*Certain countries and their territories report separately under CITES. Dots therefore reflect both categories.

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

FIG. 2.18 Regions where seizures were made aggregated by standardized seizure index and by number of records 2015–2021

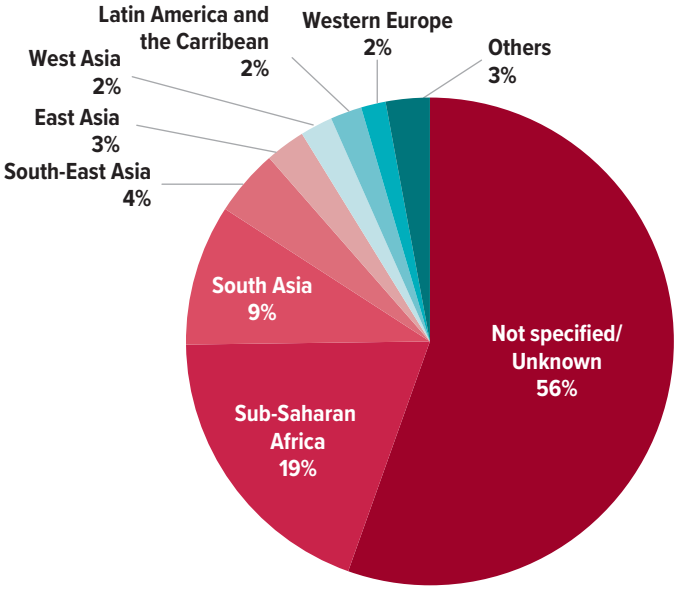
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

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, the Americas, 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 subregions as follows (percentage of global total): South Asia 9 per cent; South-East Asia 4 per cent; East Asia 3 per cent. Of the 19 per cent of seizures reported for Africa, virtually all 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

FIG. 2.19 Percentage share of seizure records by subregion of shipping origin aggregated by standardized seizure index 2015–2021



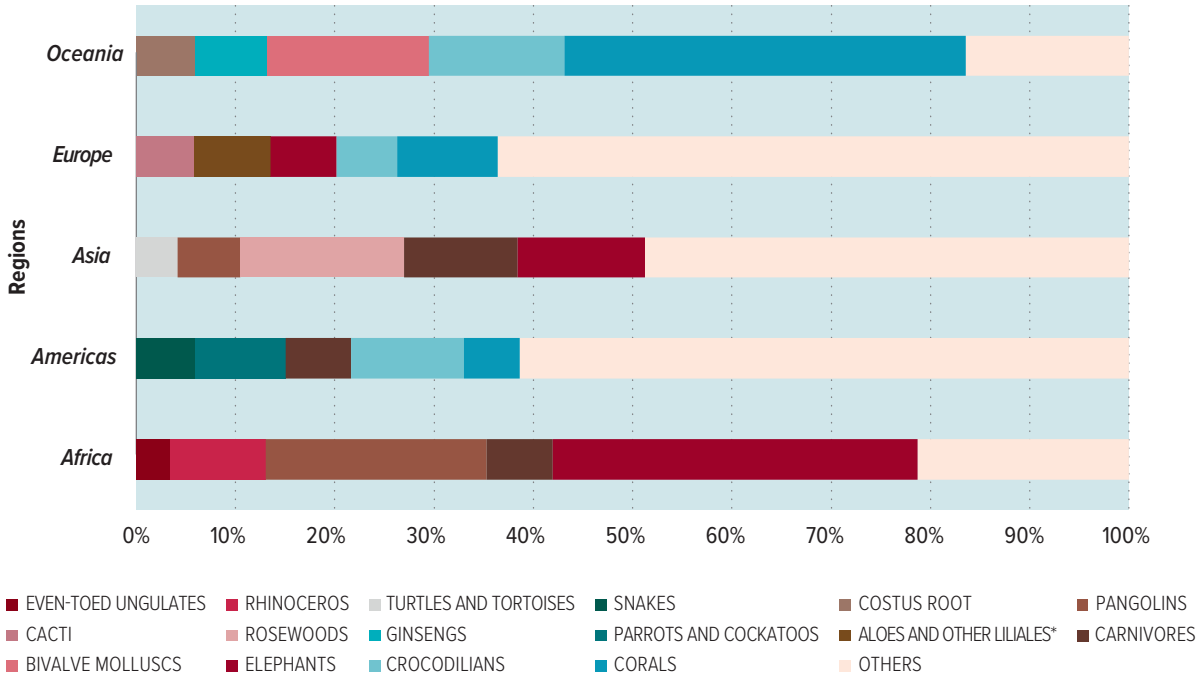
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

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.

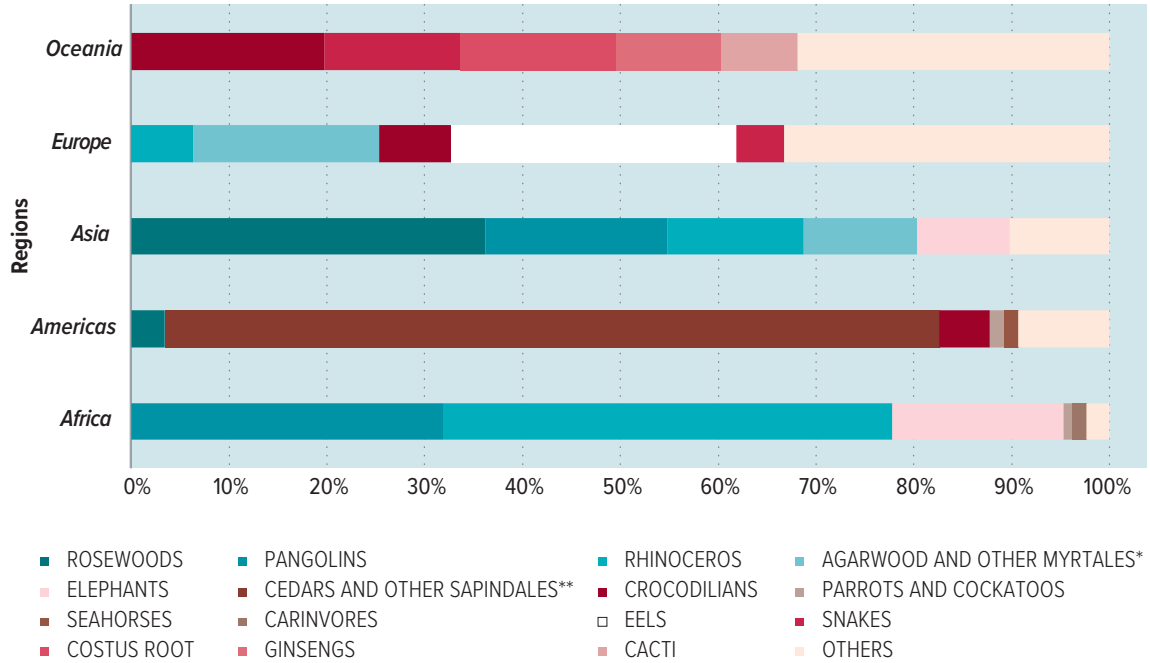
Across the regions significant differences can be observed in the share of wildlife species groups seized between 2015–2021 based on the standardized seizure index analysis. In Asia, a large share of seizures involved timber followed by pangolin items. In Africa, pangolin, rhinoceros and elephant items 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

FIG. 2.20 Percentage share of seizure records by species group for each region 2015–2021



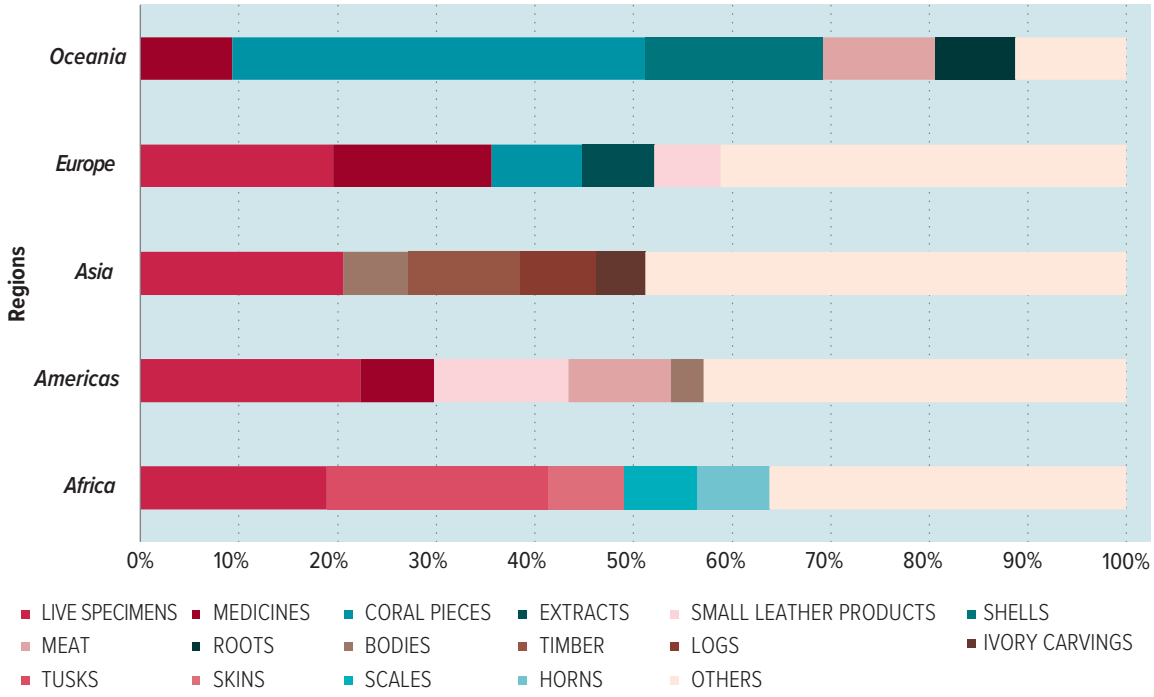
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)
* Other Liliales includes agave, snowdrop and yucca species

FIG. 2.21 Percentage share of seizures by species group for each region aggregated by standardized seizure index 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. 2.22 Percentage share of seizure records by commodity type for each region 2015–2021

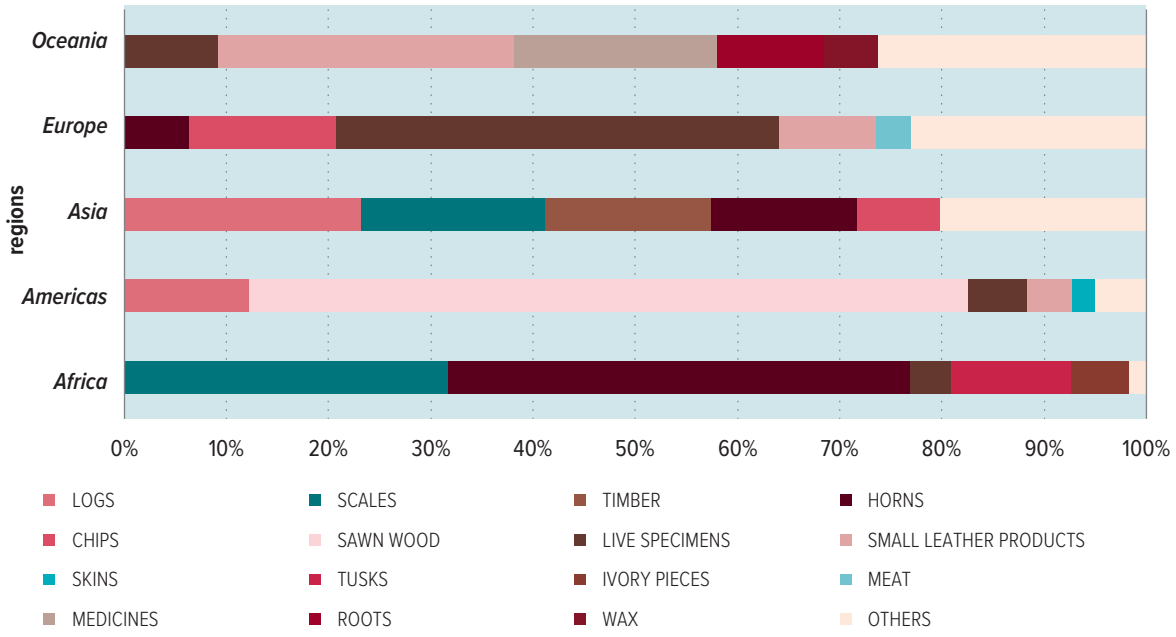


Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

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 2.22), three regions had medicines in their top five: Americas, Europe and Oceania. Aggregated by standardized seizure index (Figure 2.23), 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/.

2 UNODC, "Guide on Drafting Legislation to Combat Wildlife Crime" (Vienna, Austria: UNODC, 2018), https://sherloc.unodc.org/cld/uploads/res/guide-on-drafting-legislation-to-combat-wildlife-crime_html/Wildlife_Crime_ebook.pdf.

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 I 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.

6 James O. Finckenauer, "Problems of Definition: What Is Organized Crime?," *Trends in Organized Crime 8*, no. 3 (March 2005): 63–83, https://doi.org/10.1007/s12117-005-1038-4.

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.

8 UNODC, "Policy Making and the Role of Online Intermediaries in Preventing and Combating Illicit Trafficking," Issue Paper (Vienna, Austria: UNODC, 2021), https://sherloc.unodc.org/cld/uploads/pdf/Online_intermediaries_eBook.pdf.

9 UNODC, "Organized Crime in Nigeria: A Threat Assessment" (Abuja: UNODC, September 2023), https://www.unodc.org/documents/nigeria/NOCTA_Web_Version_25.09.2023.pdf.

10 Ibid.

11 Israel Alvarado Martínez and Aitor Ibáñez Alonso, "Mexican Organized Crime and the Illegal Trade in Totoaba Maw," *Trends in Organized Crime 24*, no. 4 (1 December 2021): 526–46, https://doi.org/10.1007/s12117-021-09436-9.

12 Ibid.

13 Serge J.-P. N. Raemaekers and Peter J. Britz, "Profile of the *Illegal Abalone Fishery* (*Haliotis midae*) in the Eastern Cape Province, South Africa: Organised Pillage and Management Failure," Fisheries Research 97, no. 3 (May 1, 2009): 183–95, https://doi.org/10.1016/j.fishres.2009.02.003.

14 Nicola Okes *et al.*, "Empty Shells: An Assessment of Abalone Poaching and Trade in Southern Africa" (Cambridge, UK: TRAFFIC, September 2018), https://www.traffic.org/site/assets/files/11065/empty_shells.pdf.

15 UNODC, "World Drug Report 2023" (United Nations publication, 2023), https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2023.html.

16 Global Illicit Flows Programme of the European Union, "DISRUPT: Disrupting firearms trafficking flows", Available at: https://illicitflows.eu/projects/disrupt/.

17 INTERPOL, "Arrests, Thousands of Seizures in African Clampdown on Firearms Trafficking," accessed 9 April 2024, https://www.interpol.int/News-and-Events/News/2022/Arrests-thousands-of-seizures-in-African-clampdown-on-firearms-trafficking.

18 Michelle Anagnostou, "Synthesizing Knowledge on Crime Convergence and the Illegal Wildlife Trade," *Environmental Challenges 5* (1 December 2021): 100222, https://doi.org/10.1016/j.envc.2021.100222.

19 William D. Moreto and Daan P. Van Uhm, "Nested Complex Crime: Assessing the Convergence of Wildlife Trafficking, Organized Crime and Loose Criminal Networks," *The British Journal of Criminology 61*, no. 5 (1 September 2021): 1334–53, https://doi.org/10.1093/bjc/azab005.

20 Daan P. van Uhm and Rick C. C. Nijman, "The Convergence of Environmental Crime with Other Serious Crimes: Subtypes within the Environmental Crime Continuum," *European Journal of Criminology 19*, no. 4 (1 July 2022): 542–61, https://journals.sagepub.com/doi/10.1177/1477370820904585.

21 Helen U. Agu and Meredith L. Gore, eds., *Women and Wildlife Trafficking – Participants, Perpetrators and Victims, Routledge Studies in Conservation and the Environment* (Abingdon, UK: Routledge, 2022), https://www.routledge.com/Women-and-Wildlife-Trafficking-Participants-Perpetrators-and-Victims/Agu- Gore/p/book/9780367640286.

22 Helen U. Agu and Meredith L. Gore, "Women in Wildlife Trafficking in Africa: A Synthesis of Literature," *Global Ecology and Conservation 23* (September 2020): e01166, https://doi.org/10.1016/j.gecco.2020.e01166.

23 UNODC research in prep, Shannon Rivera, and Joni Seager, "On Wildlife Crime and Gender in Colombia, Ecuador and Peru" (Vienna, Austria: UNODC, in prep).

24 Joni Seager, "Gender and Illegal Wildlife Trade: Overlooked and Underestimated" (Gland, Switzerland: WWF, 2021), https://cdn.genderandiwt.org/Gender_IWT_WWF_Report_FINAL_with_lang_options_bb2c8d37d8.pdf.

25 See: https://cites.org/eng/Illegal_fishing_of_totoaba_the_associated_illegal_trade_in_totoaba_swim_bladders_and_the_protection_of_the_vaquita_in_the_Gulf_of_California_Mexico.

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.

28 UNODC, "COVID-19 and the Drug Supply Chain: From Production and Trafficking to Use," Research brief (Vienna, Austria: UNODC, 2020), https://www.unodc.org/documents/data-and-analysis/covid/Covid-19-and- drug-supply-chain-Mai2020.pdf.

29 UNODC, "Global Report on Trafficking in Persons 2022" (Vienna, Austria: UNODC, 2022), https://www.unodc.org/documents/data-and-analysis/glotip/2022/GLOTiP_2022_web.pdf.

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 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.

32 TRAFFIC, "An Overview of Seizures of CITES-Listed Wildlife in the European Union" (TRAFFIC, 2020), https://circabc.europa.eu/ui/group/3f466d71-92a7-49eb-9c63-6cb0fadf29dc/library/baf62256-16cf-442a-9bd6-b003dbc693d3/details.

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

38 UNCTAD, "Key Statistics and Trends in International Trade 2022: The Remarkable Trade Rebound of 2021 and 2022" (Geneva, Switzerland: UNCTAD, 2023), https://unctad.org/system/files/official-document/ditctab2023d1_en.pdf.

39 UNCTAD, "Review of Maritime Transport 2023" (Geneva, Switzerland: UNCTAD, 2023), https://unctad.org/system/files/official-document/rmt2023_en.pdf.

40 For air freight costs trend: https://www.statista.com/statistics/1106691/air-freight-rates-globally-coronavirus-impact/.

41 "Connecting Businesses and Consumers During COVID-19: Trade in Parcels" (OECD, 2020), https://read.oecd-ilibrary.org/view/?ref=135_135520-5u04ajecfy&title=Connecting-Businesses-and-Consumers-During-COVID-19-Trade-in-Parcels.

42 https://www.ipsos.com/en/ipsos-global-consumer-confidence-index.

43 UNODC, "Global Report on Trafficking in Persons 2022."

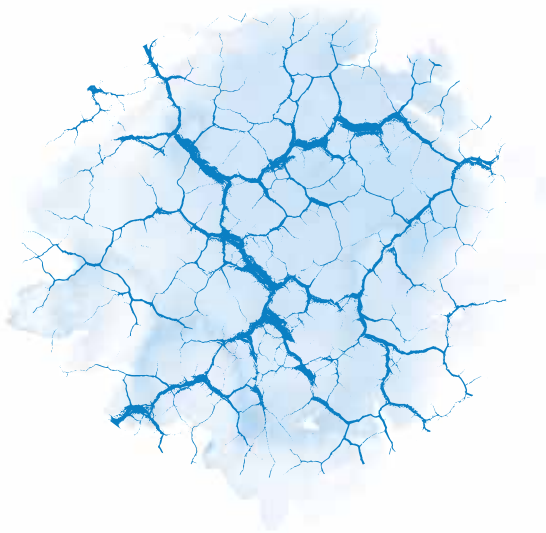
44 Michael 't Sas-Rolfes *et al.*, "Illegal Wildlife Trade: Scale, Processes, and Governance," *Annual Review of Environment and Resources 44,* no. 1 (17 October 2019): 201–28, https://doi.org/10.1146/annurev-environ-101718-033253.

45 CITES Secretariat, "World Wildlife Trade Report 2022" (Geneva, Switzerland: CITES Secretariat, 2022).

46 Extracted from UNODC data portal: https://dataunodc.un.org/dp-drug-seizures.

Chapter 3

Impacts and harms



The impacts and harms of wildlife crime

The preceding chapter of this report provides insights based on seizure data into contemporary patterns and trends in wildlife trafficking and considers evidence of the nature of related criminal activities. This current chapter takes stock of the types of harms that can result from wildlife crime. Such analysis was not a feature of the first two editions of the *World Wildlife Crime Report* but is included here as better understanding of these harms can shape perceptions of wildlife crime's significance and inform both policy responses and prioritization of actions.

Harms resulting from wildlife crime include a range of interlinked negative environmental, social and economic, and governance impacts (Figure 3.1).[1,2,3,4] Concern about these different types of harm is reflected across national and international policies and law, although the full breadth of impacts is rarely addressed.

Assessing the scale of each of these factors is not always straightforward. In some cases, wildlife crime causes harm that is direct and demonstrable, such as environmental defender casualties during conflict with poachers or the relationship between ivory trade, poaching and declining elephant populations. Establishing other causal links between crime and harm often involves considerable complexity, such as estimation of lost government revenue or the impact of illegal wildlife harvests on ecosystem functions and human well-being. There are also potential harms (rather than those already realized) for which evaluation requires a risk-based approach, such as assessment of the threat of zoonotic disease emergence.

Often the level of concern is not simply a function of the level of wildlife crime taking place but is also prompted by where and how it takes place. For example, smuggling of potentially invasive species to an island nation home to vulnerable endemic species is likely a greater concern than the same illegal trade between neighbouring continental countries.[5]

Importantly, harms may also result from responses to wildlife trafficking, including policy interventions, regulatory choices and criminal justice action. Some trade-offs between the positive and negative impacts of regulation are likely inevitable.

FIG. 3.1 Conceptual illustration of wildlife crime harms

Source: UNODC

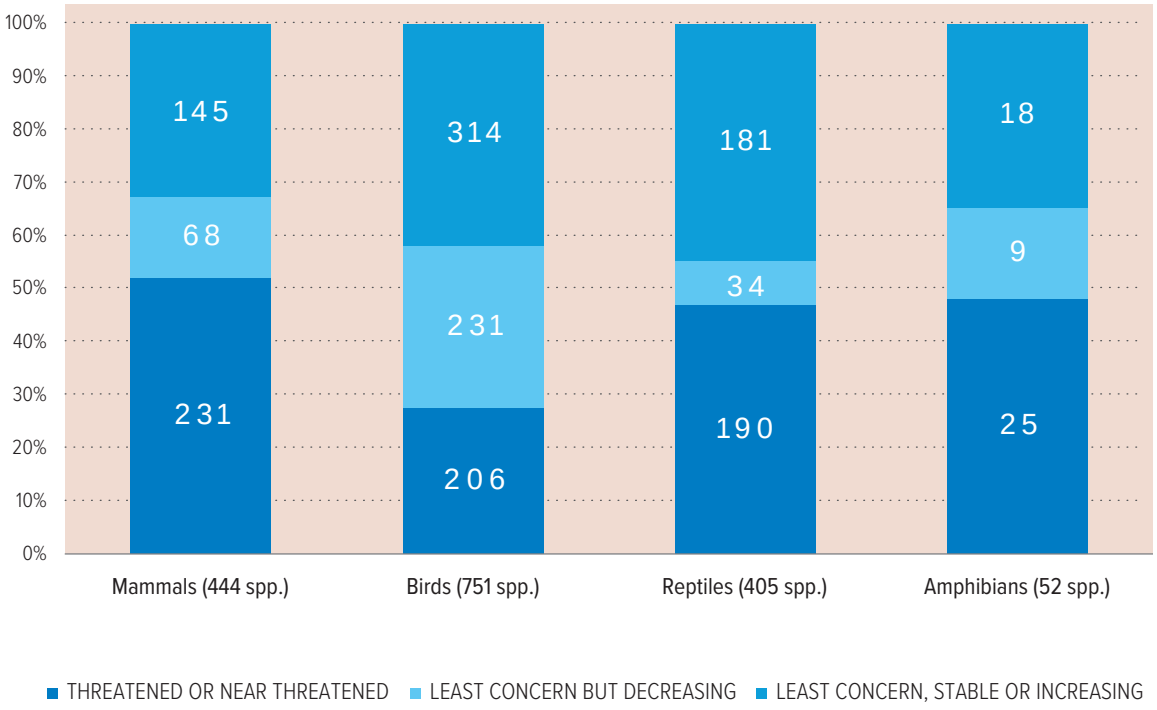
Environmental harms

Species overexploitation

The most prominent environmental harm caused by wildlife crime and related illegal wildlife trade is degradation of the world's biological diversity through overexploitation, resulting in population reduction and extinction threats to wild species. Species diversity is a critical aspect of the functioning ecosystems that support all life on earth. The threat of species overexploitation was identified as the second most significant driver of global biodiversity loss after land-use change by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).[6] Concern about overexploitation motivates much of the national legislation affecting wildlife trade worldwide and it is the rationale for the international trade regulation measures now subscribed to by 184 states that are contracting Parties to CITES.

The threat to species as a result of wildlife crime is typically highlighted using prominent and well-documented examples, such as poaching of elephants, rhinoceros, and tigers to supply illegal markets. Such species attract significant research attention and

FIG. 3.2 ***IUCN Red List*** **conservation status of individual mammal, bird, reptile, and amphibian species recorded in seizures 2015–2021**



Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset), *IUCN Red List* database

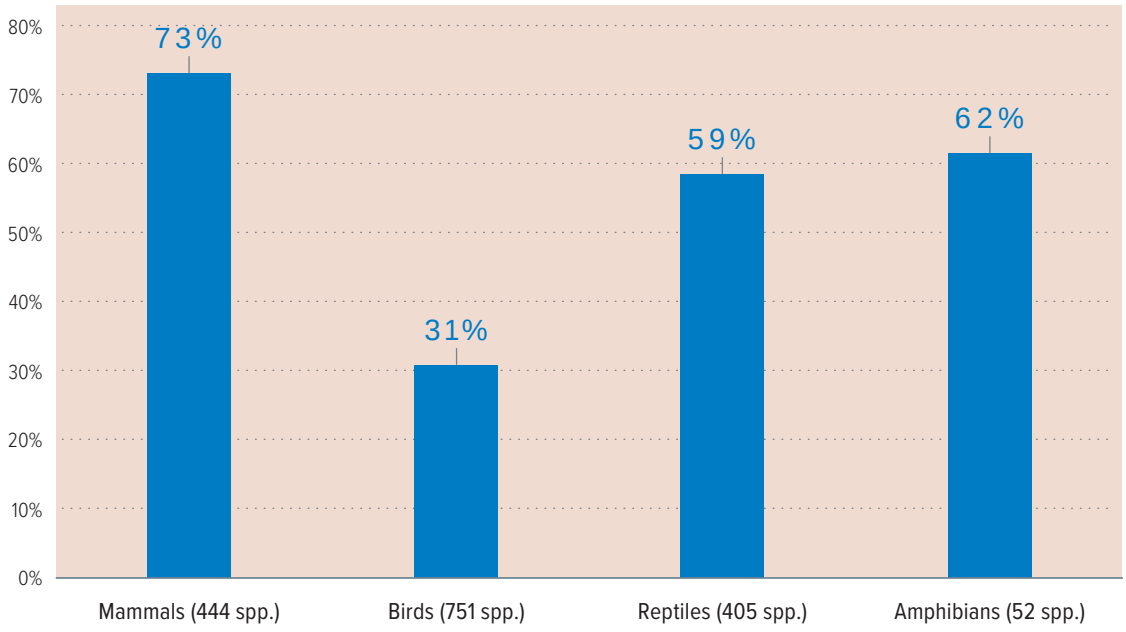
resources. Consequently, there is comparatively extensive information about population numbers, breeding biology, poaching levels, and trade flows. This knowledge provides a solid basis for assessing the impact of illegal trade.[7] However, this is not the case for most species affected by wildlife crime. Some of the clearest examples of conservation harm caused by wildlife crime receive comparatively little attention. For example, illegal collection for trade is believed to have caused the recent extinction of several succulent plant species with extremely limited areas of distribution in South Africa.[8] Illegal trade has also led to severe depletion of rare orchids, including newly described species stripped from their habitat soon after discovery.[9] Other examples include species of reptiles, fish, birds, and mammals for which illegal trade appears to have played a major role in local or global extinctions.[10]

To gain some insight into the relationship between wildlife crime and extinction risk, an analysis was carried out of the assessed conservation status and threats to wildlife species recorded in recent seizure data available to UNODC. For each species recorded as seized during the period 2015–2021 in the WWCR3 analytical dataset, information on its global conservation status and current population trend was extracted from the *IUCN Red List of Threatened Species*, the most comprehensive global information source available on extinction risk to species.[11]

This analysis was carried out for all mammal, bird, reptile, and amphibian species recorded as seized as these are the most comprehensively assessed species groups in the *IUCN Red List* (Figure 3.2). Combined these four species groups represent just over 40 per cent of all recorded seized species in the WWCR3 analytical dataset.

Across the four species groups recorded in seizure data, totalling 1,652 species, 40 per cent have been classified as threatened or Near Threatened species

FIG. 3.3 Percentage of species recorded in seizures identified in the *IUCN Red List* database as subject to ongoing threat from intentional harvest 2015–2021



Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset), *IUCN Red List* database

and a further 20 per cent of those classified as Least Concern have been flagged as experiencing a decreasing global population trend. Only the bird species diverge from this pattern significantly with a smaller proportion of the species recorded in seizures classified as threatened.[12]

Since this assessment does not take account of the volume of illegal trade inferred by seizures nor the actual causes of extinction risk for each species recorded, it should not be interpreted as a direct measure of conservation impact. However, it does demonstrate that wildlife crime involves a very wide range of species of conservation concern.

Using the same datasets, it is possible to probe the question of threat attribution in more depth. The *IUCN Red List* database also includes expert assessment of the significance of different threats that have contributed or still contribute to the conservation status and population trend of a species. Across the four species groups, around 50 per cent of the species recorded in seizures are identified in the *IUCN Red List* database as subject to ongoing threat from intentional harvest (Figure 3.3). For mammals the proportion is higher (73 per cent) and for birds it is lower (31 per cent).

Two difficult challenges frustrate deeper evaluation of the extent to which wildlife crime threatens individual species. First, seizure records alone only provide a partial insight into actual illegal trade levels. Second, conservation impact assessment would require knowledge of precisely where the trade originated, the number of individuals harvested to supply the trade, the age and gender of individuals harvested, when and how they are harvested, and a range of other factors related to population and habitat health. Moreover, the conservation status of a species often varies across its range so that illegal trade may have lower impacts in areas where the species is abundant than it has in areas where it is scarce.

Ecosystem impacts

The conservation harm caused by illegal wildlife trade is not only the overexploitation threat to the survival of a species. The decline in abundance of a species' population also contributes to degradation of the range of functions and processes the impacted species provide in their ecosystems.[13] These harms to ecosystem stability and resilience undermine their various environmental, social, and economic values.[14] Interdependence between different species and overall ecosystem functionality is complicated and recovery from disruption is hard to predict.[15] Wildlife crime affects a wide range of species with different ecological roles, so its ecosystem impact cannot be simply generalized. For example, poaching of big cats or other predators can lead to increased herbivore prey populations, leading to changes in grazing intensity that may alter plant diversity and overall ecosystem function.[16] Conversely, poaching and excessive illegal trade in meat of herbivores that are a food source for big cats, although possibly not a conservation threat to the target species, may have a serious negative impact on predator populations.[17] Other species targeted for illegal trade may play important roles in seed dispersal, as pollinators or in habitat structure. Disruption of ecosystems can reduce availability of the goods and services used by people and negatively impact associated soil and water resources.

Although ecosystem-level conservation is increasingly referenced in natural resource management policy and practice, harm to ecosystems is rarely designated as the primary threat that wildlife trade legislation is enacted to prevent. Nevertheless, there is a requirement to consider the role of species in their ecosystems as a pre-condition for regulated wildlife trade under Article IV of CITES,[18] and a recent Food and Agriculture Organization of the United Nations (FAO) study noted there is a growing body of international, regional and national legislation requiring ecosystem approaches to fisheries and trade in fisheries products.[19]

Climate impacts

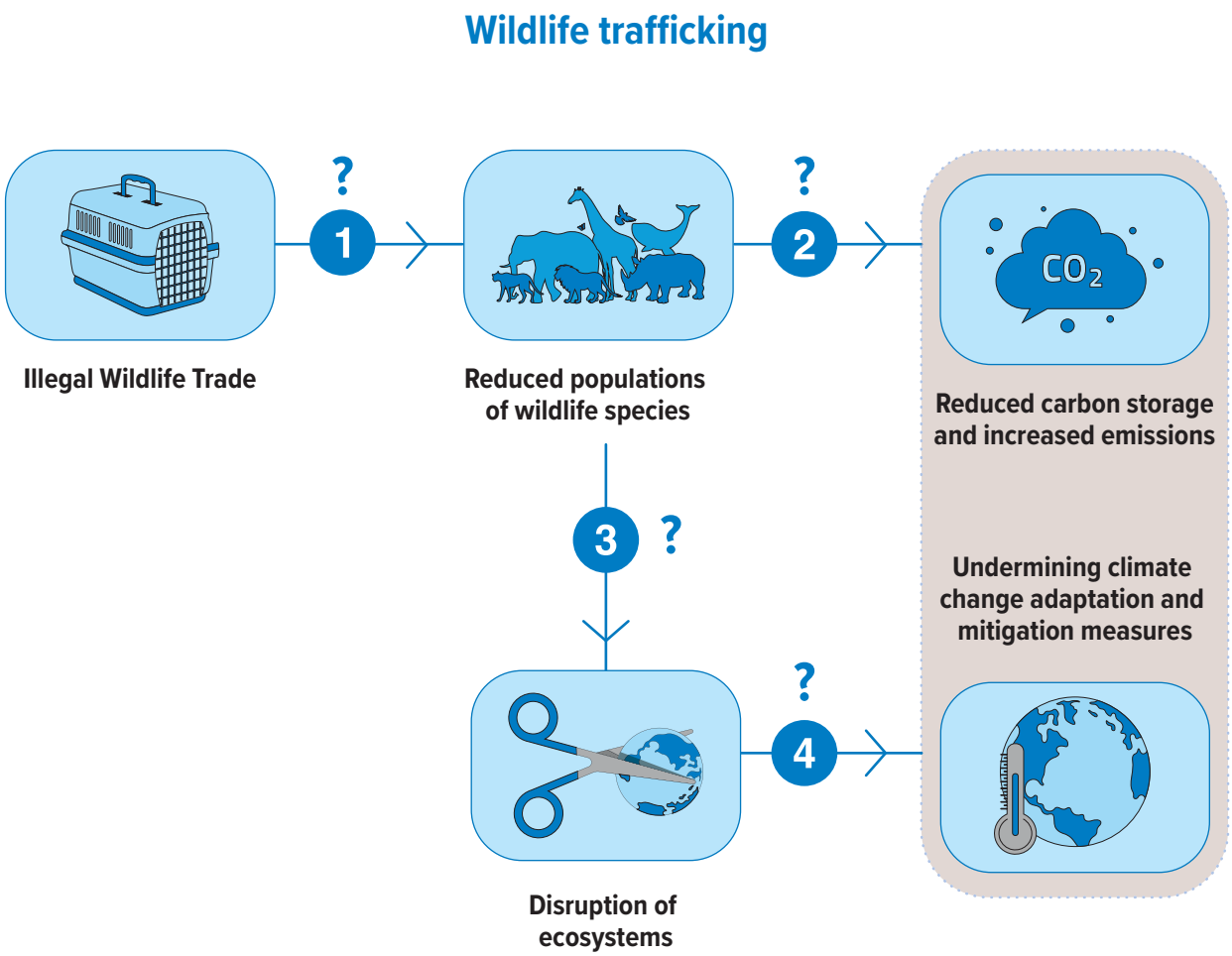
Ecosystem disruption resulting from species overexploitation driven by wildlife crime also has considerable potential to affect carbon storage and emissions and to undermine the critical role that natural ecosystems play in long-term climate stability and mitigation of climate change impacts. In 2022, a UNODC review of available evidence demonstrated that the pathway of cause and effect between illegal wildlife trade, species depletion, disruption of ecosystems, and processes that affect the climate is diverse, complex and not comprehensively documented (Figure 3.4).[20]

A prominent negative impact of wildlife crime on carbon storage and emissions is its role in driving excessive removal of large-bodied species that store significant amounts of carbon, notably trees illegally harvested for timber. The level of impact depends on the characteristics of the tree species affected and the subsequent management of the impacted forest area, although corruption, illegal timber harvests and illegal trade typically undermine sustainable forest stewardship efforts.[21]

There is an emerging body of research on potential climate impacts of population reductions of various species affected by wildlife crime. A recent study on forest-dwelling elephants in Africa examined their impacts as herbivores on forest structure and estimated that their removal through poaching or other threats could result in a 6–9 per cent decrease in the above ground carbon stocks in Central African rainforests.[22] An economic analysis based on these estimates claimed that elephant poaching would result in $2–7 billion of lost carbon services within the next 10–30 years.[23] Similarly a study of white rhinoceros, also threatened by poaching and illegal trade, showed positive impacts on soil carbon levels in grassland habitats in Southern Africa compared to domestic livestock.[24] A simulation study on the impact of poaching of large-bodied frugivores in South-East Asia considered a reduction in seed dispersal led to a reduction in carbon storage in tropical forests.[25] Greater clarity about climate-related impacts of wildlife crime is likely to emerge as further research on this topic is published.

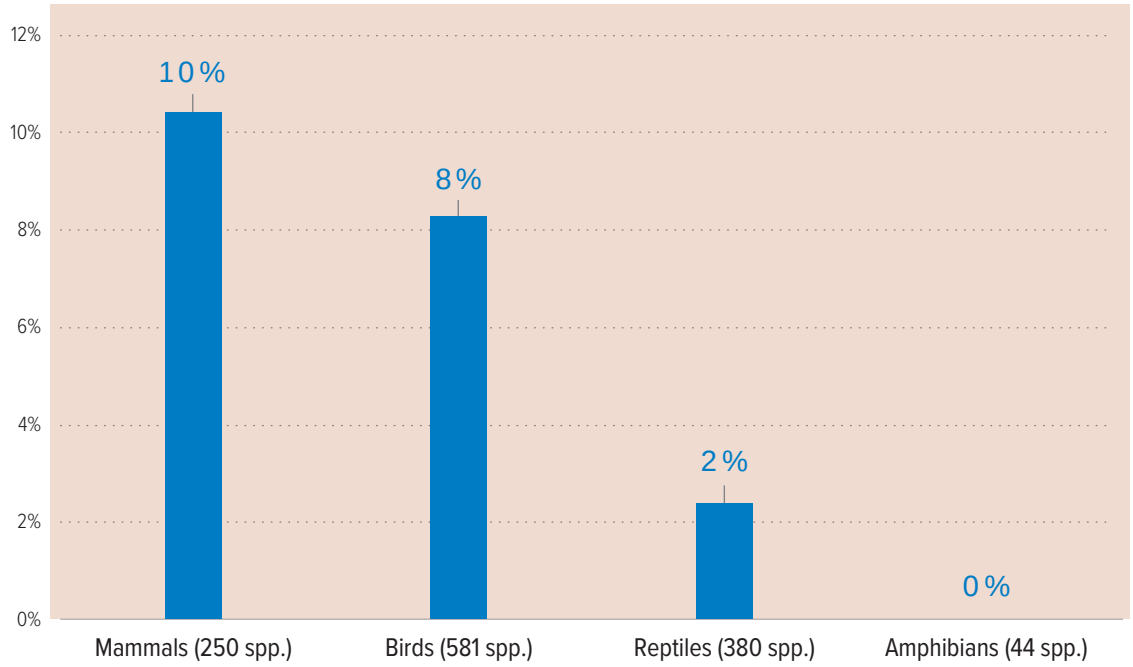
It is critical to keep in mind that this relationship works in both directions: climate change is likely to exacerbate natural resource conflicts as human and wildlife populations adapt to evolving living conditions and people compete for increasingly scarce resources. Furthermore, climate change impacts, such as extreme weather, drought, floods, famine, and migration have been predicted to cause profound social changes that will provide fertile conditions for crime to proliferate.[26] This will likely lead to new motivations and opportunities for wildlife crime and new patterns of illegal wildlife trade.[27]

FIG. 3.4 Assessing impacts of illegal wildlife trade on species, ecosystems and climate



Source: UNODC research brief[28]

FIG. 3.5 Percentage of species listed as invasive in the Global Invasive Species Database for which seizures of live specimens were recorded 2015–2022



Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset), Global Invasive Species Database

Dispersal of invasive species

Another important environmental harm potentially linked to illegal wildlife trade is the damage caused as increasing numbers of wild species are introduced by human activity outside their natural range. Sometimes such introduced species become invasive, causing negative and in some cases irreversible impacts on nature and natural resources upon which people depend. Wildlife trade has been identified as an important introduction pathway for dispersal of invasive alien species.[29] Although not widespread, there are cases in which this concern has been specifically addressed through legislation governing wildlife trade, such as the European Union Invasive Alien Species Regulation, which provides for trade prohibitions for species at risk of becoming invasive, rather than the threat of their overexploitation.[30]

A 2019 study found that the animal pet trade has already led to the establishment of several hundred non-native and invasive animal species globally and was likely to contribute to the establishment of more in the future.[31] Likewise, a study of plant trade claimed that it was acting as an important pathway for introduction of invasive flora in the United States.[32] However, these studies largely focus on legal trade as a pathway for introduction of invasive species. The specific harms from illegal wildlife trade in this regard have not been explored in depth although a study of the risks associated with illegal import of exotic live reptiles into Australia raised concerns about the potential negative impact on native fauna if these animals are released into the wild.[33]

To explore this further, UNODC examined the extent to which known invasive alien wildlife species are recorded in recent seizure data. Seizures of live mammal, bird, reptile, and amphibian specimens recorded in the WWCR3 analytical dataset during the period 2015–2021 were examined to see if they concerned species listed as invasive in the Global Invasive Species Database.[34] Some 83 species (6 per cent) of the 1,255 live species seized across the four species

groups were flagged as invasive in the Database, the majority of them mammal or bird species (Figure 3.5).

While invasive species make up a small minority of all trafficked species, it appears that a significant proportion of invasive species are trafficked. The 83 live seized species represent 27 per cent of the 304 wild species from the four species groups examined that are designated as invasive in the Global Invasive Species Database. However, the significance of these results should be treated with caution as the seized invasive species include many animals, such as brown rat, red fox, wild boar, Canada goose, budgerigar and red-eared terrapin, already widespread outside their natural range. The subset of 48 of these traded and potentially invasive species that are subject to CITES trade controls are without exception also commonly recorded in legal trade. Nevertheless, this analysis does demonstrate that a wide range of known invasive species do appear in illegal trade, undermining monitoring and regulation efforts aimed to assess and address risks from the movement of invasive species.

Social and economic harms

Well-being and livelihoods

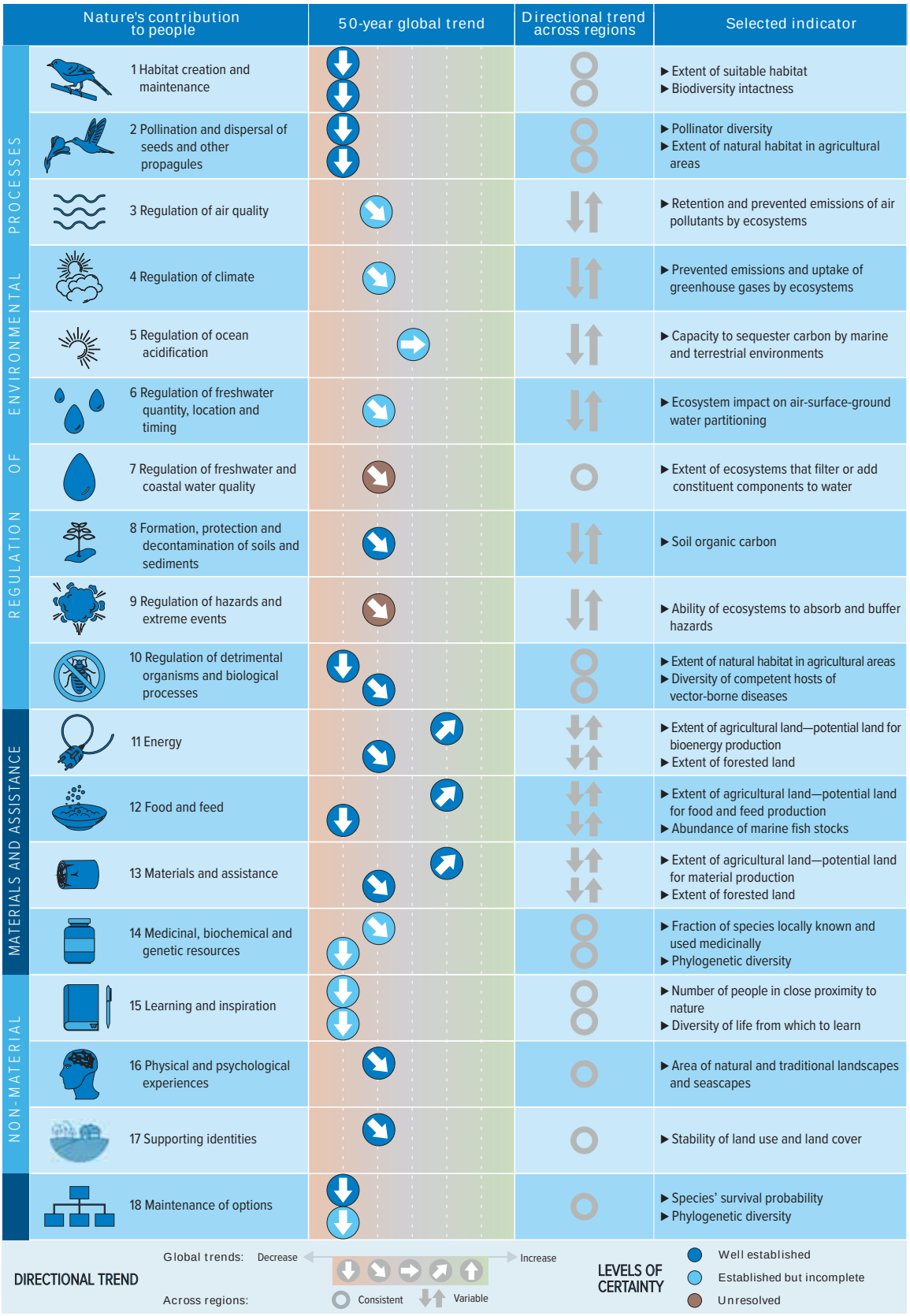
Species depletion and ecosystem disruption caused by wildlife crime can undermine the many benefits that people derive from nature. These include material contributions to livelihoods, such as food, medicines, and energy, as well as non-material contributions to identity, culture and learning, and the role nature plays in the environmental processes upon which life support systems such as agriculture and water supply depend. The IPBES *Global Assessment Report on Biodiversity and Ecosystem Services* stated that, since 1970, 14 of the 18 categories of nature's contributions to good quality of life had declined (Figure 3.6).[35]

Discerning the specific contribution of illegal wildlife trade to overall global declines in benefits to people from nature at a global scale is not straightforward. A World Bank 2019 study estimated long-term global economic losses associated with illegal logging, fishing, and other components of illegal wildlife trade of about $1–2 trillion per year, more than 90 per cent of this figure derived from the estimated value of ecosystem, regulating and cultural services that are not priced by markets.[36] The study stressed limitations and uncertainties with the underlying data, but highlighted the critical message that, however quantified in economic terms, very significant benefits to human well-being and livelihoods may be undermined or lost because of wildlife crime. Loss of such benefits is seldom explicitly considered when legislation is designed, cost-benefit analyses are conducted, or when enforcement priorities, policies and implementation strategies are elaborated.[37,38]

Importantly, although often overlooked, wildlife crime can also cause a range of cascading, non-monetary harms to human well-being associated with the various values that people place on wildlife. These include a range of cultural, religious and spiritual, historical, relational, and scientific values, as well as existence, intrinsic and bequest values for wildlife species that shape many human–nature relationships and are important constituents of human well-being. The IPBES *Global Assessment Report on Biodiversity and Ecosystem Services* specifically highlighted that recognizing these types of diverse values and ontologies in policies is key to delivering greater sustainability but is often dismissed in decision-making and policy systems dominated by economic rationale.[39]

Harms to human well-being caused by wildlife crime extend beyond those related to income and access to resources. Other impacts can include reduced security, exposure to violence, undermining community cohesion, and increased vulnerability to abusive employment practices and human trafficking. Impacts of environmental degradation may be race, class and gender-differentiated; men and women may have different perceptions and experiences of the costs of biodiversity loss. Mounting evidence reveals that gender equality is causally linked with socioenvironmental well-being.[40,41] A UNODC case study on gender dimensions in South America highlighted several vulnerabilities that women may experience in direct relation to wildlife crime. Women frequently take roles with the least power and greatest personal risk under conditions that men in similar positions rarely face. Conversely, men are more often exposed to violence.[42]

FIG. 3.6 Global trends in the capacity of nature to sustain contributions to good quality of life from 1970 to the present



Source: IPBES Global Assessment Report on Biodiversity and Ecosystem Services

Private sector costs and losses

Wildlife crime can have direct negative impact on economies by increasing costs and losses for private sector stakeholders, including businesses and both private and customary land holders. Those affected include operations engaged in legal wildlife trade, along with businesses providing trade facilitation services, such as banking, transport and marketing. The impact of such economic harm also extends to operations dependent on thriving wildlife populations, most obviously tourism operators and others gaining income from facilitation of wildlife viewing experiences.

Wildlife crime-related income losses for operations engaged in legal wildlife trade may result from reduced access to resources, unfair competition, and potentially also from sectorial reputational damage caused by association with illegal activities. Additional costs also may accrue from the need to identify and acquire alternative supply, to invest in legality verification and traceability systems, and from competition in the market with illegal actors.[43,44,45]

Assessing losses from wildlife crime to private sector tourism operations is not straightforward. The relationship between tourism motivations and the status of wildlife populations is complicated, with strong focus typically on a small number of species of interest in any location.[46] Most analyses have a restricted geographical scope although one 2016 study carried out a continental assessment of the economic losses to tourism in Africa from the illegal killing of elephants.[47] Annual losses to both public and private sector interests were estimated to be around $25 million, although it should be acknowledged that this is likely an atypical example owing to the prominence of this species in safari tourism.

Health risks

Disease risks associated with wildlife trade have regularly been flagged in recent decades by specialists in the human and animal health fields. Concerns are related both to direct risks of disease transmission to people from live animals and plants, wildlife meat and other products, and also to the threat to wildlife populations, natural ecosystems, livestock and agricultural food production systems.[48] It had long been predicted that the expanding scope and volume of wildlife commerce as a component of the growing and increasingly interconnected globalized world economy increased the risk of emergence and spread of new dangerous diseases from animals to people.[49] It is therefore not surprising that attention to this issue rose sharply in 2020 when early commentary on the possible origin of the COVID-19 pandemic suggested links to markets where wild animals were believed to have been on sale as pets and for food.[50,51] Although subsequent research on the origin of the disease has not reached a definitive conclusion, a comprehensive evidence review published in late 2022 noted that most papers on this topic point to a zoonotic origin of the coronavirus.[52]

An IUCN situation analysis in 2022 examined evidence of the relationship between wildlife and emerging diseases and human pathogens, their origins, drivers, and risk factors.[53] It concluded that the vast majority of such diseases and infections derive from domesticated animals or as a result of human disruption of natural habitats. For wildlife trade, the study found that evidence of human disease and pathogen emergence from trade in wild-sourced animals was sparse and restricted to a few events, though cautioned that this could simply reflect gaps in knowledge. Other reviews have noted evidence of significant levels of pathogen occurrence of public health concern in live animals and wildlife meat found in illegal trade, so risks of spillover to the human population cannot be discounted.[54,55] The IUCN analysis urged improved surveillance of disease cases linked to wildlife trade and highlighted wildlife breeding operations and larger scale trade flows involving live animals and wildlife meat as priorities for pathogen monitoring. The report stressed that illegal trade posed particular risks, in part because it was likely to bypass health screening and control measures.[56]

Many countries have significant legal provisions aimed to prevent disease and infection from movements of animals, plants and their products. These include risk-based trade restrictions, quarantine, animal health and phytosanitary inspection in trade and in the marketplace. Such regulation is typically designed primarily to address risks from high volume production, trade and consumption from domesticated livestock and crops although their application is usually inclusive of wild animal and plant trade.[57] Some

countries have adopted additional health-focused restrictions on specific types of wildlife trade. A prominent example is the European Union ban on import of live wild birds, first adopted in 2005 and amended in 2013 as a measure aimed to combat avian influenza.[58,59]

Potential and realized health-related harm has clear relevance as a consideration when assessing the significance of wildlife crime. Illegal trade by its very nature may be routed to avoid border inspections, quarantine and other control measures aimed to reduce health-related risks, making it more risky than legal trade. Examination of supplementary data in seizure records in the WWCR3 analytical dataset on the reason for confiscation and the agency making the seizure shows that many wildlife contraband interdictions involve contraventions of veterinary or phytosanitary regulations and enforcement action by animal and plant health inspection agencies. When legal and illegal trade channels intercept: in holding facilities, markets or because of laundering illegally supplied specimens into breeding or farming operations, there are added health-related risks.[60]

There are no simple metrics for assessment of risk or the impacts of such harm. One recent study based on seizure data assessed the presence in illegal trade of live animals of wild species associated with 11 priority diseases—known as the WHO R&D Blueprint priority diseases—that are considered by the World Health Organization (WHO) to pose the greatest public health risk owing to their epidemic potential and the absence of sufficient countermeasures.[61] Species from 31 families of mammals, birds, and reptiles associated with the priority diseases were identified in global seizure data for 2011–2020. Important caveats were noted with respect to potential sampling and reporting biases for both species and pathogens; the fact that zoonotic spillover may not have been confirmed in all species/disease associations included in the dataset; and that the study did not take into account variations in risk caused by differing conditions in rearing, housing, or transporting wildlife products. The study recommended that future exploration of this topic should include other higher risk commodity types (such as meat), trade routes, and estimated volumes of illegal trade, as well as the impact that factors such as concealment methods may have on spillover risk.

Harm to environmental defenders

Various roles embody the function of "environmental defender", including community defenders who do not hold the position as a technical profession. These environmental defenders can play a critical role in wildlife protection, including prevention of wildlife crime, but also can be victims or harassment, violence and in some cases, loss of life.[62,63,64] A direct manifestation of the harms of wildlife crime is injury to and loss of life of people engaged in wildlife protection. The International Ranger Federation's annual roll of honour of wildlife rangers who are reported to have lost their lives in the line of duty recorded a total of 2,351 deaths between 2006–2021, over 80 per cent of them in Africa and Asia.[65] Felonious deaths including homicides made up more than 40 per cent of the total ranger lives lost, with causes for the remainder including vehicle and aircraft accidents, firefighting, drowning, illness and others. Many other fatalities are not recorded and there are no comparable data on non-fatal injuries, which in some cases may lead to permanent disability, nor on other harms, such as intimidation and harassment. Risks were reported to be exacerbated by a range of factors, including remoteness of work locations, conflict-derived firearm availability, inadequate first aid training, and poor living conditions.[66]

Women and men rangers and other environmental defenders have distinct experiences of harm on the job, and for women many of these conditions are doubly challenging as they often additionally face hostility from male colleagues. Similarly, women and men in many defender positions, notably community defenders, face considerable threats that distinctly reflect gender differences.[67,68]

Although less well-documented, threats of physical harm and other forms of coercion are risks at other levels of the criminal justice system, including police, customs officials, prosecutors and the judiciary.[69,70] Such threats are often linked to corruption, as explored in chapter four.

Governance harms

Undermining the rule of law

As a globally significant crime sector, illegal wildlife trade raises concerns about its negative impacts on the robustness of government institutions. As with other forms of criminality, wildlife crime undermines the rule of law and functions of government institutions through corruption, money-laundering, illicit financial movements and cross investment between crime sectors.[71] Although these are generally difficult issues to assess systematically, there is a growing body of work examining their relationship to wildlife crime.

Corruption linked to wildlife crime plays a major role in undermining the impact of legislative measures aimed to address environmental and other harms. It facilitates illegal wildlife trade, weakens natural resource management and criminal justice responses, and in extreme cases can undermine political stability.[72,73] This is explored in more depth in chapter four of this report.

Money-laundering, the processing of proceeds from crime to disguise their illegal origin, is a key element of criminal activity undermining the rule of law. A 2020 report by the Financial Action Task Force drew particular attention to the linkages between money-laundering and illegal wildlife trade.[74] However, it noted that owing to the rarity of financial investigations of this crime sector, both the private and public sector had a less developed knowledge of the trends, methods and techniques used to launder proceeds from illegal wildlife trade than for other major transnational crimes.

Reducing illicit cross-border financial flows was highlighted in the 2030 Agenda for Sustainable Development as a priority to build peaceful societies around the world.[75] A study published in 2020 as part of the second edition of the *World Wildlife Crime Report* reviewed evidence of illicit financial flows across national borders arising from illegal elephant and rhinoceros trade, taking account of both potential income from illegal sales and the costs of doing business, with combined estimates between $34–960 million per year.[76] Even for these species for which data on populations, illegal trade flows and market data are reasonably accessible, there is a wide variance in these estimates depending on underlying assumptions. For most species and commodities in illegal wildlife trade available data are far less complete and such calculations are not possible.

Loss of government revenues

As in other sectors, one potential harm of wildlife crime is the loss of government revenues, particularly those of source countries. Usually payable through legal harvest and trade licence fees and taxation, these can represent significant losses to national economies. However, they can also involve losses such as tourism revenues, which in some contexts are significant to local and national economies and key elements of funding conservation. A 2019 World Bank report estimated that governments lose $7–12 billion per year in potential fiscal revenues from illegal logging, fishing, and other wildlife trade.[77] This was based on estimates of both direct taxation and user fees that might have been paid if the same trade had been carried out legally. It also includes some estimation of lost indirect income from taxation of tourism if visitors are deterred by reductions in wildlife populations or security concerns linked to illegal trade.

Another recent study focused specifically on illicit trade in marine fish catch and estimated global losses to tax revenues of $2–4 billion, affecting maritime African and Asian countries much more than other parts of the world.[78]

Lost revenue estimates rely on assumptions that are difficult to test in practice, and wildlife crimes vary. As illustrated in previous editions of the *World Wildlife Crime Report*, while some exclusively involve illegal transactions along their value chain, other goods may enter the legal market at some stages of the supply chain (for example through falsified documentation or laundering operations), and so some user fees and taxes may be paid even within wildlife trade flows that are illegal at some point along their course.

Financial costs of enforcement

The prevalence and importance of wildlife crimes have necessitated increased public and private investments into conservation, law enforcement and other criminal justice functions globally. Financial costs can be

substantial and tend to be borne largely by government budgets, potentially diverting funds from other uses.

Few estimates of the financial costs of enforcement action to address wildlife crime have been published, but they can be significant especially in the context of developing economies. A national study in Namibia estimated in 2021 that expenditure required to curb illegal wildlife trade in the country was about 250 million Namibian dollars ($17 million) per year.[79] A report on expenditure on protecting rhinoceros species from poaching and illegal trade in the Greater Kruger Region of South Africa estimated that interventions had cost 1.1 billion rand ($61 million) over the period 2017–2021, with the majority spent on security staffing, fencing, air support, detection technology, and access control.[80]

Significant investments from partner governments, foundations and non-governmental organizations (NGOs) have been made to support such government efforts through provision of training, equipment, and technical support. A World Bank review of international funding committed to combat illegal wildlife trade during 2010–2016 estimated annual investment by donor agencies of about $190 million a year globally.[81] Updated figures are planned for publication by the World Bank in 2024.

Harms from wildlife crime responses

Some harms result from responses to wildlife crime, rather than the crime itself. Criminal justice systems are normally designed to inflict higher penalties on those who commit higher levels of crime.[82] However, there has been no comprehensive assessment to date of whether criminal justice system impacts on wildlife crime perpetrators is proportional across different jurisdictions and different population groups. Indeed, there is mounting evidence from studies in different countries that lower-level participants are disproportionately targeted for criminal enforcement in comparison to higher-level participants and those operating across jurisdictions.[83,84]

There is also a growing body of research aimed at understanding—through offender interviews and other methods—the circumstances in which people in the earliest stages of the trade chain become involved in wildlife crime and the socioeconomic consequences of detection. Findings from Nepal and Southern Africa show that many offenders are imprisoned for participation in activities that were not the primary source of their livelihoods. Offenders often claimed to have underestimated the risk of detection and serious sanctions and reported very serious negative impacts on family well-being resulting from their incarceration.[85,86,87]

As part of the research for the current report, a study was initiated by UNODC to gain additional insights from convicted wildlife crime offenders in Indonesia.[88] Preliminary findings mirror those from elsewhere: many of those incarcerated appear to have been low-level participants in poaching and delivery of illegal wildlife goods. The majority claimed it was their first involvement and they had been motivated by the opportunity to gain additional income to their main livelihood. Although most offenders admitted to knowing that they were participating in illegal activity, again the social impacts of incarceration in terms of reputation and employment appeared to have been discounted.[89]

The social impacts of law enforcement may be gender differentiated. Most imprisoned offenders are men and their removal from households can leave female-headed households in economic instability and facing other types of insecurity. Preliminary evidence suggests that women and men are treated differently in wildlife trafficking enforcement—women may be overlooked or not taken seriously as (possible) offenders.[90]

Similarly, other stakeholders can face increased costs in dealing with wildlife crime responses. For example, businesses providing trade facilitation services risk potential legal liability if implicated in facilitating illegal wildlife trade. In the banking sector there is an increasing focus on the imperative to apply money-laundering controls to obstruct financial flows arising from wildlife crime in line with Financial Action Task Force standards and related national compliance measures.[91,92] Although sectoral initiatives to prevent wildlife crime in the transport and online commerce sectors do not articulate loss avoidance as a primary motivation, concern about business risks is at least implicit in the public promotion of their actions.[93]

Accounting for wildlife crime harms

This chapter aimed to take stock of the diverse harms associated with wildlife crime and to examine available evidence on their extent to inform considerations of their significance and the prioritization of responses. It also considers how additional harms can be caused by the responses aimed to reduce wildlife trafficking.

Although instances of illegal wildlife trade may contravene legal measures aimed to reduce different environmental, social and institutional harms, the predominant institutional framing of wildlife crime concern remains the conservation-focused policy and law aimed to prevent the overexploitation and extinction risk to wildlife species. The cascade of harm described in this chapter is rarely represented in legislation, policy or enforcement responses. On the contrary, legal and policy responses are typically associated with administrative and criminal sanctions to stop and punish harm (e.g. fines, imprisonment, removal of permits). Although such responses are important, such mainstream approaches often overlook the importance of providing remedies to harm.[94]

Better accounting for harms will likely challenge many mainstream enforcement priorities and practices. For example, there has been a strong focus on illegal trade flows affecting high-profile species, such as elephants, pangolins and rhinoceros.[95] This emphasis is likely reflected in the frequent occurrence of products from these species in the seizure records summarized in chapter two of this report. However, analysis in the current chapter makes it clear that illegal trade involves a wide range of threatened wildlife species and reveals a greater range of types of harm. Better recognition of and accounting for diverse types of harm could improve recognition of risk and inform priority-setting.

Similarly, enforcement may be guided by perceptions about crime, notably measures of criminality are often associated with their monetary value. This leads to a focus on illegal wildlife trade expected to afford the greatest profits to criminal organizations, those linked to conflict and security concerns, impacts on government revenues, or convergence with other crime types. Although these can be important variables on which to set priorities, they are often difficult to define and measure and there is a tendency to fall back on metrics such as gross valuation of trade flows.

There is tension between these two generalized perspectives on harm from wildlife crime. Some of the most dangerous illegal trade flows from a conservation perspective may involve quite small numbers of individual animals or plants that are highly threatened and for which such illicit commerce has a genuine risk of driving a species towards extinction. However, the monetary value and the obvious social and institutional harms associated with such trade are likely small compared with those related to other trafficked species. If there is a solution to this disconnect between different classes of concern, it is likely to be through greater attention to the interdependence between environmental, social and institutional factors. Accounting for wildlife crime harms requires policy broadening, improved communication and exploration of broader legal tools that can hold offenders responsible for remedying the harms they cause.

Endnotes

1 Annika Mozer and Stefan Prost, 'An Introduction to Illegal Wildlife Trade and Its Effects on Biodiversity and Society', *Forensic Science International: Animals and Environments* 3 (1 December 2023): 100064, https://doi.org/10.1016/j.fsiae.2023.100064.

2 Pedro Cardoso *et al.*, 'Scientists' Warning to Humanity on Illegal or Unsustainable Wildlife Trade', *Biological Conservation* 263 (November 2021): 109341, https://doi.org/10.1016/j.biocon.2021.109341.

3 Tanya Wyatt, *Wildlife Trafficking: A Deconstruction of the Crime, Victims and Offenders*, Critical Criminological Perspectives (Cham: Springer International Publishing, 2022), https://doi.org/10.1007/978-3-030-83753-2.

4 Jacob Phelps *et al.*, 'Environmental Liability Litigation Could Remedy Biodiversity Loss', *Conservation Letters* 14, no. 6 (2021): e12821, https://doi.org/10.1111/conl.12821.

5 Pablo García-Díaz *et al.*, 'The Illegal Wildlife Trade Is a Likely Source of Alien Species', *Conservation Letters* 10, no. 6 (2017): 690–698, https://doi.org/10.1111/conl.12301.

6 IPBES, 'Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services' (Bonn, Germany: IPBES Secretariat, 25 November 2019), https://doi.org/10.5281/zenodo.3553579.

7 A good example being the period CITES analyses of rhinoceros population status, illegal killing and illegal trade, the latest being available here: CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)' (CoP 19, Panama City, 2022), https://cites.org/sites/default/files/documents/E-CoP19-75-R1.pdf.

8 Jacqui James, 'Conophytums on the Cliff Edge', *Samara E-Newsletter.*, no. 1 (September 2021), https://brahmsonline.kew.org/msbp/Samara/ENewsletter.

9 Amy Hinsley *et al.*, 'A Review of the Trade in Orchids and Its Implications for Conservation', *Botanical Journal of the Linnean Society* 186, no. 4 (27 March 2018): 435–455, https://doi.org/10.1093/botlinnean/box083.

10 Amy Hinsley *et al.*, 'Trading Species to Extinction: Evidence of Extinction Linked to the Wildlife Trade', *Cambridge Prisms: Extinction* 1 (January 2023): e10, https://doi.org/10.1017/ext.2023.7.

11 See https://www.iucnredlist.org/ for species data and explanation of status and threat categories.

12 The IUCN Red List Categories indicate the conclusion of evaluation of how close a species is to becoming extinct. Threatened species are those classified as Critically Endangered, Endangered or Vulnerable. Species classified as Near Threatened are judged to be close to qualifying for or are likely to qualify for a threatened category in the near future, Species classified as Least Concern have been evaluated and found not to meet the threatened or Near Threatened criteria although some may have declining populations.

13 Barry W. Brook, Navjot S. Sodhi, and Corey J. A. Bradshaw, 'Synergies among Extinction Drivers under Global Change', *Trends in Ecology & Evolution* 23, no. 8 (1 August 2008): 453–460, https://doi.org/10.1016/j.tree.2008.03.011.

14 World Bank, *Illegal Logging, Fishing, and Wildlife Trade* (World Bank, Washington, DC, 2019), https://doi.org/10.1596/32806.

15 F. S. Chapin *et al.*, 'Consequences of Changing Biodiversity', Nature 405, no. 6783 (11 May 2000): 234–242, https://doi.org/10.1038/35012241.

16 Selwyn Hoeks *et al.*, 'Mechanistic Insights into the Role of Large Carnivores for Ecosystem Structure and Functioning', *Ecography* 43, no. 12 (2020): 1752–1763, https://doi.org/10.1111/ecog.05191.

17 S. Mohsanin *et al.*, 'Assessing the Threat of Human Consumption of Tiger Prey in the Bangladesh Sundarbans', *Animal Conservation* 16, no. 1 (2013): 69–76, https://doi.org/10.1111/j.1469-1795.2012.00571.x.

18 Article IV paragraph 3 of CITES states that "A Scientific Authority in each Party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens. Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species."

19 FAO, 'Legislating for an Ecosystem Approach to Fisheries – Revisited' (Rome, Italy, 2021), https://www.fao.org/3/cb6750en/cb6750en.pdf.

20 Jacob Phelps, Steven Broad, and Jennifer Mailley, 'Illegal Wildlife Trade and Climate Change: Joining the Dots' (Vienna: UNODC, November 2022), https://www.unodc.org/documents/data-and-analysis/wildlife/llegal_wildlife_trade_and_climate_change_2022.pdf.

21 Alison Hoare, 'Tackling Illegal Logging and the Related Trade' (London, UK: Chatham House, July 2015), https://www.chathamhouse.org/sites/default/files/publications/research/20150715IllegalLoggingHoareFinal.pdf.

22 Fabio Berzaghi *et al.*, 'Megaherbivores Modify Forest Structure and Increase Carbon Stocks through Multiple Pathways', *Proceedings of the National Academy of Sciences* 120, no. 5 (31 January 2023): e2201832120, https://doi.org/10.1073/pnas.2201832120.

23 Fabio Berzaghi *et al.*, 'Financing Conservation by Valuing Carbon Services Produced by Wild Animals', Proceedings of the National Academy of Sciences 119, no. 22 (31 May 2022): e2120426119, https://doi.org/10.1073/pnas.2120426119.

24 Olli Hyvarinen *et al.*, 'Grazing in a Megagrazer-Dominated Savanna Does Not Reduce Soil Carbon Stocks, Even at High Intensities', *Oikos* 2023, no. 9 (2023): e09809, https://doi.org/10.1111/oik.09809.

25 Wirong Chanthorn *et al.*, 'Defaunation of Large-Bodied Frugivores Reduces Carbon Storage in a Tropical Forest of Southeast Asia', *Scientific Reports* 9, no. 1 (10 July 2019): 10015, https://doi.org/10.1038/s41598-019-46399-y.

26 Robert Agnew, 'Dire Forecast: A Theoretical Model of the Impact of Climate Change on Crime', *Theoretical Criminology* 16, no. 1 (1 February 2012): 21–42, https://doi.org/10.1177/1362480611416843. Phelps, Broad, and Mailley, 'Illegal Wildlife Trade and Climate Change: Joining the Dots'.

27 Phelps, Broad, and Mailley, 'Illegal Wildlife Trade and Climate Change: Joining the Dots'.

28 Ibid.

29 IPBES, 'IPBES Invasive Alien Species Assessment: Summary for Policymakers' (Bonn, Germany: IPBES Secretariat, 2023), https://doi.org/10.5281/zenodo.7430692.

30 The Invasive Alien Species Regulation (Regulation (EU) 1143/2014) includes a set of measures to be taken across the EU in relation to invasive alien species. Listed species are subject to restrictions on keeping, importing, selling, breeding, growing and releasing into the environment.

31 Julie L. Lockwood *et al.*, 'When Pets Become Pests: The Role of the Exotic Pet Trade in Producing Invasive Vertebrate Animals', *Frontiers in Ecology and the Environment* 17, no. 6 (2019): 323–330, https://doi.org/10.1002/fee.2059.

32 Evelyn M Beaury, Madeline Patrick, and Bethany A Bradley, 'Invaders for Sale: The Ongoing Spread of Invasive Species by the Plant Trade Industry', *Frontiers in Ecology and the Environment* 19, no. 10 (2021): 550–56, https://doi.org/10.1002/fee.2392.

33 García-Díaz *et al.*, 'The Illegal Wildlife Trade Is a Likely Source of Alien Species'.

34 The Global Invasive Species Database is managed by the Invasive Species Specialist Group of the IUCN Species Survival Commission. See: http://www.iucngisd.org/gisd/about.php.

35 IPBES, 'Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services'.

36 World Bank, *Illegal Logging, Fishing, and Wildlife Trade*.

37 IIED and IUCN, 'Local Communities: First Line of Defence (FLoD) against Illegal Wildlife Trade - An Implementation Guide' (Cambridge, UK and Gland, Switzerland, 2021), https://www.iucn.org/sites/default/files/2022-10/09-flod-implementation-guide-enc_0.pdf.

38 Rosie Cooney *et al.*, 'Wildlife, Wild Livelihoods: Involving Communities in Sustainable Wildlife Management and Combatting the Illegal Wildlife Trade' (Nairobi, Kenya: UN Environment, 2018), https://wedocs.unep.org/bitstream/handle/20.500.11822/22864/WLWL_Report_web.pdf.

39 IPBES, 'Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services'.

40 Marlène Elias *et al.*, *Enhancing Synergies between Gender Equality and Biodiversity, Climate, and Land Degradation Neutrality Goals: Lessons from Gender-Responsive Nature-Based Approaches,* 2021, https://hdl.handle.net/10568/114844.

41 Joni Seager, Rob Parry-Jones, and Tamara Léger, 'Gender and Illegal Wildlife Trade: Overlooked and Underestimated', *Oryx* 55, no. 5 (September 2021): 653–654, https://doi.org/10.1017/S0030605321000922.

42 Report in preparation: *Women and Wildlife Crime: Insights from Colombia, Ecuador, and Peru*. UNODC.

43 *World Bank, Illegal Logging, Fishing, and Wildlife Trade*.

44 Inga Carry and Günther Maihold, 'Illegal Logging, Timber Laundering and the Global Illegal Timber Trade' (Geopolitics of the Illicit, Nomos Verlagsgesellschaft mbH & Co. KG, 2022), 275–308.

45 Carl-Christian Schmidt, 'Economic Drivers of Illegal, Unreported and Unregulated (IUU) Fishing', *The International Journal of Marine and Coastal Law* 20, no. 3 (1 January 2005): 479–507, https://doi.org/10.1163/157180805775098630.

46 Richard W. W. Braithwaite and Paul C. Reynolds, 'Wildlife and Tourism', *A Zoological Revolution: Using Native Fauna to Assist in Its Own Survival*, 2002, 108–115.

47 Robin Naidoo *et al.*, 'Estimating Economic Losses to Tourism in Africa from the Illegal Killing of Elephants', *Nature Communications* 7 (1 November 2016): 13379, https://doi.org/10.1038/ncomms13379.

48 William B. Karesh *et al.*, 'Wildlife Trade and Global Disease Emergence', *Emerging Infectious Diseases* 11, no. 7 (July 2005): 1000–1002, https://doi.org/10.3201/eid1107.050194.

49 W. Karesh and Robert Cook, 'The Human-Animal Link, One World - One Health', *Foreign Affairs* 84 (1 July 2005): 38, https://doi.org/10.2307/20034419.

50 Steven Broad, 'Wildlife Trade, COVID-19 and Zoonotic Disease Risks: Shaping the Response' (Cambridge, UK: TRAFFIC, 6 April 2020), https://www.traffic.org/publications/reports/wildlife-trade-covid-19-and-zoonotic-disease-risks-shaping-the-response/.

51 Xiao Xiao *et al.*, 'Animal Sales from Wuhan Wet Markets Immediately Prior to the COVID-19 Pandemic', Scientific Reports 11, no. 1 (7 June 2021): 11898, https://doi.org/10.1038/s41598-021-91470-2.

52 Jose L. Domingo, 'An Updated Review of the Scientific Literature on the Origin of SARS-CoV-2', Environmental Research 215 (1 December 2022): 114131, https://doi.org/10.1016/j.envres.2022.114131.

53 Richard Kock and Hernan Caceres-Escobar, *Situation Analysis on the Roles and Risks of Wildlife in the Emergence of Human Infectious Diseases* (IUCN, International Union for Conservation of Nature, 2022), https://doi.org/10.2305/IUCN.CH.2022.01.en.

54 Marcos A. Bezerra-Santos *et al.*, 'Illegal Wildlife Trade: A Gateway to Zoonotic Infectious Diseases', *Trends in Parasitology* 37, no. 3 (1 March 2021): 181–184, https://doi.org/10.1016/j.pt.2020.12.005.

55, Elizabeth R. Rush, Erin Dale, and A. Alonso Aguirre, 'Illegal Wildlife Trade and Emerging Infectious Diseases: Pervasive Impacts to Species, Ecosystems and Human Health', *Animals : An Open Access Journal from MDPI 11*, no. 6 (18 June 2021): 1821, https://doi.org/10.3390/ani11061821.

56 Kock and Caceres-Escobar, *Situation Analysis on the Roles and Risks of Wildlife in the Emergence of Human Infectious Diseases.*

57 Ibid.

58 '2005/760/EC: Commission Decision of 27 October 2005 Concerning Certain Protection Measures in Relation to Highly Pathogenic Avian Influenza in Certain Third Countries for the Import of Captive Birds (Notified under Document Number C(2005) 4288) (Text with EEA Relevance)', *Official Journal of the European Union* L 285 (27 October 2005): 60–62., originally for one year and extended indefinitely in 2007.

59 Amended 2013: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:047:0001:0017:EN:PDF.

60 Kock and Caceres-Escobar, *Situation Analysis on the Roles and Risks of Wildlife in the Emergence of Human Infectious Diseases.*

61 UNEP-WCMC & JNCC, 'Prevalence of CITES-Listed Taxa Associated with WHO R&D Blueprint Priority Diseases in Legal and Illegal International Wildlife Trade Addendum to: Zoonotic Potential of International Trade in CITES-Listed Species' (Peterborough, UK: JNCC, August 2022), https://data.jncc.gov.uk/data/964ae259-410e-4205-8ec7-e2c54f5c6e3d/jncc-report-678-addendum.pdf.

62 Yiwen Zeng, Fangqi Twang, and L. Roman Carrasco, 'Threats to Land and Environmental Defenders in Nature's Last Strongholds', Ambio 51, no. 1 (1 January 2022): 269–279, https://doi.org/10.1007/s13280-021-01557-3.

63 Julie Viollaz and JB Rizzolo, 'Potential for Informal Guardianship in Community- Based Wildlife Crime Prevention: Insights from Vietnam', *Nature Conservation* 48 (January 2022), https://doi.org/10.3897/natureconservation.48.81635.

64 John M Sellar, 'Human Rights in a Hostile Environment', *Global Initiative against Transnational Organized Crime - Wildlife Watch* (blog), 30 June 2017, https://globalinitiative.net/analysis/human-rights-in-a-hostile-environment/.

65 The International Ranger Federation Ranger Line of Duty Death (RLODD) data cover both state-employed and non-state-employed in-service rangers reported to have died in the line of duty and have been compiled annually since 2006.

66 Galliers Chris *et al.*, 'Conservation Casualties: An Analysis of on-Duty Ranger Fatalities (2006–2021)', Parks 28, no. 1 (May 2022): 39–50, https://doi.org/10.2305/IUCN.CH.2022.PARKS-28-1CG.en.

67 Megan S. Jones and Jennifer Solomon, 'Challenges and Supports for Women Conservation Leaders', *Conservation Science and Practice* 1, no. 6 (2019): e36, https://doi.org/10.1111/csp2.36.

68 Joni Seager, 'Gender and Illegal Wildlife Trade: Overlooked and Underestimated' (Gland, Switzerland: WWF, 2021), https://cdn.genderandiwt.org/Gender_IWT_WWF_Report_FINAL_with_lang_options_bb2c8d37d8.pdf.

69 Daan P. van Uhm and William D. Moreto, 'Corruption within the Illegal Wildlife Trade: A Symbiotic and Antithetical Enterprise', *The British Journal of Criminology*, 13 June 2017, https://doi.org/10.1093/bjc/azx032.

70 Tanya Wyatt and Anh Ngoc Cao, 'Corruption and Wildlife Trafficking', 3 June 2015, https://open.cmi.no/cmi-xmlui/handle/11250/2475047.

71 Michelle Anagnostou and Brent Doberstein, 'Illegal Wildlife Trade and Other Organised Crime: A Scoping Review', *Ambio 51*, no. 7 (July 2022): 1615–1631, https://doi.org/10.1007/s13280-021-01675-y.

72 Wyatt and Cao, 'Corruption and Wildlife Trafficking'.

73 OECD, 'Strengthening Governance and Reducing Corruption Risks to Tackle Illegal Wildlife Trade: Lessons from East and Southern Africa' (Paris, France: OECD, 2018), https://doi.org/10.1787/9789264306509-en.

74 FATF, 'Money Laundering and the Illegal Wildlife Trade' (Paris, France: Financial Action Task Force, 2020), https://www.fatf-gafi.org/publications/methodandtrends/documents/money-laundering-illegal-wildlife-trade.html.

75 Target 16.4, see: https://www.un.org/sustainabledevelopment/development-agenda/.

76 UNODC, World Wildlife Crime Report 2020 (Vienna: United Nations publications, 2020).

77 World Bank, *Illegal Logging, Fishing, and Wildlife Trade*.

78 U. R. Sumaila *et al.*, 'Illicit Trade in Marine Fish Catch and Its Effects on Ecosystems and People Worldwide', *Science Advances* 6, no. 9 (26 February 2020): eaaz3801, https://doi.org/10.1126/sciadv.aaz3801.

79 Tania Briceno and Juliette Perche, 'Namibia Case Study: Cost-Benefit Analysis of Curbing Illegal Wildlife Trade' (USA: USAID, 2021), https://www.conservation-strategy.org/sites/default/files/field-file/08-30-2022%20Namibia%20Case%20Study%20Cost-benefit%20analysis.pdf.

80 Kuiper, Timothy *et al.*, 'Evaluating the Cost and Effectiveness of Rhino Conservation Interventions in the Greater Kruger.' (South Africa: Greater Kruger Environmental Foundation, 2023), https://gkepf.org/wp-content/uploads/2023/08/PROJECT-FIRE-v18-final.pdf.

81 World Bank Group, *Analysis of International Funding to Tackle Illegal Wildlife Trade* (World Bank, Washington, DC, 2016), https://doi.org/10.1596/25340. (currently being updated)

82 Andrew von Hirsch, 'Proportionality in the Philosophy of Punishment', *Crime and Justice* 16 (January 1992): 55–98, https://doi.org/10.1086/449204.

83 Kumar Paudel, Gary R. Potter, and Jacob Phelps, 'Conservation Enforcement: Insights from People Incarcerated for Wildlife Crimes in Nepal', *Conservation Science and Practice* 2, no. 2 (February 2020), https://doi.org/10.1111/csp2.137.

84 Lauren Wilson and Rachel Boratto, 'Conservation, Wildlife Crime, and Tough-on-Crime Policies: Lessons from the Criminological Literature', *Biological Conservation* 251 (1 November 2020): 108810, https://doi.org/10.1016/j.biocon.2020.108810.

85 Paudel, Potter, and Phelps, 'Conservation Enforcement'.

86 Sade Moneron, Adam Armstrong, and David Newton, 'The People Beyond the Poaching: Interviews with Convicted Offenders in South Africa' (Cambridge, UK: TRAFFIC, 2020), https://www.traffic.org/site/assets/files/13126/web-beyond-the-poaching-offender-survey.pdf.

87 Dominique Prinsloo, Sacha Riley-Smith, and David Newton, 'Trading Years for Wildlife: An Investigation into Wildlife Crime from the Perspectives of Offenders in Namibia.' (Cambridge, UK: TRAFFIC, 2021), https://www.traffic.org/site/assets/files/13405/trading-years-for-wildlife-web.pdf.

88 A separate report of findings of this UNODC research will be published at a later date.

89 These points are summarized from 61 interviews carried out by UNODC with incarcerated wildlife crime offenders in Indonesia in 2023.

90 Jessica S. Kahler and Marisa A. Rinkus, 'Women and Wildlife Crime: Hidden Offenders, Protectors and Victims', *Oryx* 55, no. 6 (November 2021): 835–843, https://doi.org/10.1017/S0030605321000193.

91 Cayle Lupton, 'Illegal Wildlife Trade: The Critical Role of the Banking Sector in Combating Money Laundering', *Journal of Money Laundering Control* 26, no. 7 (1 January 2023): 181–196, https://doi.org/10.1108/JMLC-06-2023-0105.

92 FATF, 'Money Laundering and the Illegal Wildlife Trade'.

93 Transport Task Force: https://unitedforwildlife.org/taskforces/transport-taskforce/; Coaltion to End Wildlife Trafficking Online: https://www.endwildlifetraffickingonline.org/.

94 Phelps *et al.*, 'Environmental Liability Litigation Could Remedy Biodiversity Loss'.

95 Michael 't Sas-Rolfes *et al.*, 'Illegal Wildlife Trade: Scale, Processes, and Governance', *Annual Review of Environment and Resources* 44, no. 1 (17 October 2019): 201–28, https://doi.org/10.1146/annurev-environ-101718-033253.

Chapter 4

Drivers

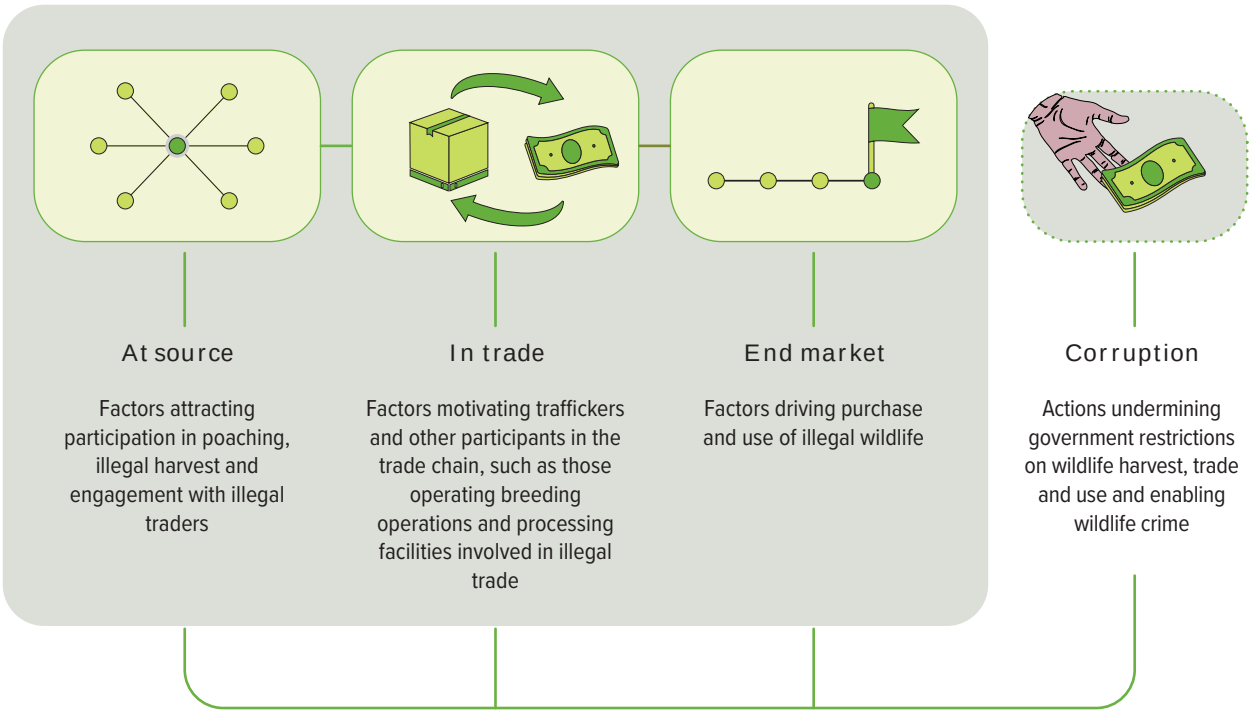
What is driving wildlife crime patterns and trends?

The driving forces behind wildlife crime are a complex interplay of motivations and influences, from economic incentives to socio-cultural dynamics. This chapter attempts to shed light on the diverse drivers shaping the patterns and trends of criminality connected with wildlife trafficking. Better understanding of these factors can inform the design and refinement of remedial interventions.

The approach taken is to consider motivations and influences at three stages of the trade chain: drivers of sourcing, drivers of illegal trading and drivers of demand in end markets. The following three sections of this chapter are structured to take stock of evidence about factors driving participation in crime at each of these stages. A fourth section considers the role of corruption as an enabling factor and a force undermining measures aimed to reduce illegal wildlife trade along the trade chain (Figure 4.1).

Although it is informative to consider the distinct motivations and influences for participants at different stages of the trade chain as well as the system-wide enabling role of corruption, it is important to keep in mind that these elements are interconnected. This has been described as a wildlife crime continuum in which successful crimes by individuals and organizations at different steps along the trade chain provide opportunities for other crimes. Participants each have something to offer and to gain while precise roles and relationships are context and time specific and likely to evolve.[1]

FIG. 4.1 Factors driving and enabling participation in wildlife crime and undermining remedial action



Source: UNODC

Drivers of illegal sourcing

Context

Wildlife trafficking differs from some other forms of transnational organized crime in that the primary harm occurs up front, in the country from which the wildlife is sourced.[2] This is different from the trade in illicit drugs, for example, where the primary concern is the prevention of health-related harms to end users, so stopping it anywhere in the trafficking chain prevents that harm from being realized. In contrast, the principal conservation harm that wildlife trade laws are designed to prevent has already occurred when animals or plants are removed from the wild. Any interdiction that occurs after this action mainly serves as a potential deterrent to future trafficking, the impact of which depends on visibility and hard to predict shifts in market incentives.[3] For this reason, understanding the driving factors behind the decision to source wildlife illegally is vital to its protection.

In the source country, someone needs to harvest or collect the wildlife and pass it on to someone else who has the capacity to sell it within the same country or internationally. There are some markets where the harvester is also the trafficker or the consumer, like the example described in a case study this report, where orchid collectors may organize expeditions to harvest rare or novel orchid species. However, these cases are exceptional and more typically the sourcing of wildlife entering illegal trade is carried out by a distinct group in the trade chain.

Organized commercial illegal sourcing

Clearly there are some people who deliberately and professionally poach or illegally harvest wildlife for profit. Sometimes they are specialized poachers or collectors not from the local area. Evidence of rhinoceros and elephant poaching in Africa reviewed in the case studies for the current and past editions of the *World Wildlife Crime Report* has indicated the involvement of remotely directed and equipped mobile poaching gangs. Similar structures have been documented for poaching of tigers in Indonesia and abalone in South Africa.[4,5]

The industrialization of highly profitable illegal wildlife sourcing is best exemplified in the fisheries and timber trade sectors. In the fisheries trade sector, illegal operators often use flags of convenience and complicated multi-jurisdictional business ownership networks to avoid exposure to law enforcement.[6] Profits from a wide range of fisheries have been demonstrated to attract involvement of organized crime groups.[7] Research based on interviews with officials in Mexico revealed that organized crime groups in the country had infiltrated both legal and illegal fisheries trade chains, with significant control over illegal fishing operations.[8] Similarly, in the timber trade sector profits from illegal logging have attracted significant corporate engagement although it appears that the involvement of small-scale producers was increasing during the 2010s as larger companies experienced increasing regulatory and market pressure.[9]

Additional examples of convergence between wildlife trafficking and other criminal businesses have been noted in chapter 2 of this report. Such connections have been shown to enable wildlife trafficking through power relationships with local communities, corrupt relationships and opportunities for money-laundering. They may also provide access to illicit firearms, ammunition or other tools that aid illegal wildlife sourcing directly, for killing target species, and indirectly, for protection and intimidation of other actors in the trafficking chain.[10]

Supplementary livelihoods and opportunism

Sometimes illegal harvest is predominantly carried out by local people who live alongside wildlife every day, often drawing their livelihood from nature in other ways. Such harvesters may live in communities remote from urban centres, with limited state presence. They may have few opportunities to earn cash income and the emergence of demand for wildlife from their area, manifested by trader offers to purchase, may represent a kind of windfall. The interest of different groups may coincide even at a local level, with specialized poachers and collectors enlisting support and involvement of local community members to aid their activities.

Poverty may be a driving factor in the decision to poach for some, but poachers may not necessarily be acting in desperation. A study of prisoners in Nepal found that those incarcerated for crimes related to wildlife trafficking comprised between 10 per cent and 20 per cent of the overall prison population in the two regions studied.[11] Most of the 384 prisoners in the study who had been convicted for offences related to wildlife trafficking were poor (56 per cent) and from indigenous communities (75 per cent). Of the 116 prisoners individually interviewed, all but one being male, most said that their involvement in wildlife crime was simply an easy way to make extra money. The study concluded that illegal wildlife trade in Nepal was neither a primary livelihood strategy, nor formal organized crime.

Two research studies in Southern Africa involving wildlife crime offender interviews in Namibia and South Africa showed similar findings. The South Africa study involved interviews with 73 offenders incarcerated for offences related to wildlife trafficking, including poaching and illegal trade in abalone, cycads and rhinoceros horn.[12] Most were low level participants in poaching, transport or processing and many were from marginalized communities who were either unemployed or informally employed, with little access to alternative economic opportunity. The Namibia study involved interviews with 45 male offenders incarcerated for offences related to wildlife trafficking. Most of the offenders were low-level poachers or traders within the supply chain with limited knowledge of the market they were supplying. They were either fully or partially employed, mostly in agriculture, but engaged in poaching/trading occasionally and on an opportunistic basis.[13]

Similarly, a survey of convicted wildlife crime offenders in prison in Indonesia conducted by UNODC for this report found that out of the 11 interviewees self-identified as poachers, all male, only one appeared to be regularly occupied with such activity. Rather, most were small-scale farmers with fields abutting wildlife areas, some of whom hunted non-protected wildlife. About half of the poachers interviewed (five out of eleven) claimed not to know what they were doing was illegal. The other half typically came across a chance opportunity to earn some cash for their families and took it knowingly.

Their situation is similar to that of the fishers interviewed in Peru for the illegal seahorse trade case study. Peruvian fishers may find seahorses tangled in their nets as by-catch when targeting other fish species. Usually dead or dying, returning these animals to the sea may seem pointless to the fishers, while retaining them requires very little additional effort. The choice to capitalize on wildlife that is already lost at the time encountered may not be a difficult one for people who make their living from nature. Of course, those who buy the seahorses and sell them to international traffickers have gone beyond simple opportunism. Consolidators active within the Peruvian seahorse trade chain appeared to be among the wealthier community members and/or owners of small businesses who had the means to transport wildlife to urban centres.

People and wildlife in conflict

Opportunistic engagement in illegal wildlife sourcing sometimes occurs in the context of human–wildlife conflict. For example, one prisoner interviewed in Indonesia during the aforementioned UNODC survey reported helping a neighbour poison an elephant that was destroying crops and then taking the ivory in the hopes of making some money on the side.[14] A different offender reported that his community had installed an electric fence to stop elephants from raiding their crops and collected ivory from three of the five elephants that died as a result.[15] Another caught a tiger in a snare intended to prevent wild pigs from eating his rice crop and collected the bones after the tiger had decomposed, finding a buyer for them over a year afterwards.[16] Many claimed it was their first time handling protected species and that they were caught through enforcement sting operations.

Perceptions of legality

Part-time participants in illegal wildlife sourcing are not alone in claiming ignorance of the law. It appeared from interviews carried out for the rosewood case study in this report that the effect of national legislation and regulatory measures was not always clear to participants in the timber industry in Nigeria. Although timber in rough or sawn form has long been on the Nigeria Customs list of banned exports,[17] the CITES Management Authority of Nigeria issued permits for the export of many containers of rosewood in 2017 and 2018.[18] Timber harvesting in Nigeria is largely governed at the state level and there are 36 states and a federal capital territory, each with its own set of forestry laws, most with little enforcement capacity.[19] By the time the timber reaches port it is very difficult to determine whether a particular piece of timber was harvested legally or not.[20] As a result of this complexity in applicable legal provisions participants, even at the supply side of this market, may not always have been aware when they were involved in illegal trade.

From legal to illegal

The rosewood case study in this report illustrates how participants in well-established wildlife trade sectors may fail to adapt to regulatory changes and try to sustain what has become an illegal business. While lamenting the loss of trees, the local traditional leaders interviewed for this report in Taraba State, Nigeria, expounded the benefits that the rosewood trade had brought to their areas. They said it had reduced crime generally within their communities by providing employment to the youth. The trade was "taxed" by many formal and informal authorities, distributing the benefits to hundreds of families. It allowed the growth of infrastructure—including the construction of sawmills and lumber depots, the purchase of specialist vehicles and cranes, and the accumulation of skills. Many of the timber trade workers interviewed spoke of the losses suffered when the rosewood legal exports abruptly ended owing to CITES compliance concerns,[21] but the benefits in one of the country's poorest states had been significant and motivation to sustain involvement in this business, inside or outside the law was considerable.

Tradition

Financial incentives aside, involvement in illegal wildlife sourcing can also be driven by cultural tradition. Research in the periphery of Chinko reserve in the east of the Central African Republic found that some of those involved regarded elephant hunting as part of their cultural identity, a mark of bravery and manhood, a tradition that was passed between the generations. One of the largest threats to local communities was reportedly conflict with a group of men from the Sudan, who annually took a break from their cassava farms to go on an international hunting expedition, sometimes travelling over 1,000 km on horseback to find elephants to shoot. These Sudanese men were said to have hunted with spears until the 1980s and while they had switched to automatic weapons, the motivation apparently remained largely cultural, not profit driven.[22]

Drivers of illegal trading

Context

Both harvesters and consumers may participate in the illegal wildlife trade unwittingly, but with limited exceptions traders illegally buying, transporting, processing and selling wildlife along the trade chain do not. Smuggling wildlife requires knowing participation in the illegal market. Without illegal traders, the sources of supply and demand would never meet. In a sense, it is the illegal traders who individually or in combination help connect the illicit market, drawing revenues from the steps they manage along the trade chain and making the connections from the place of supply to the place of demand and actively working to ensure that associated business remains viable.

The exceptions are people or businesses trading wildlife wholly in ignorance of relevant laws, likely as tourist souvenirs or manufactured goods. Although not the focus of this analysis of drivers of wildlife crime, such participants may be responsible for a significant proportion of wildlife seizure incidents in some countries. For example, a review of seizures made by European Union countries in 2019 showed that over 25 per cent were packaged medicines containing wildlife ingredients or pieces of coral, typically carried in personal baggage.[23] It is not known what proportion of these air passengers were aware that they were breaking the law.

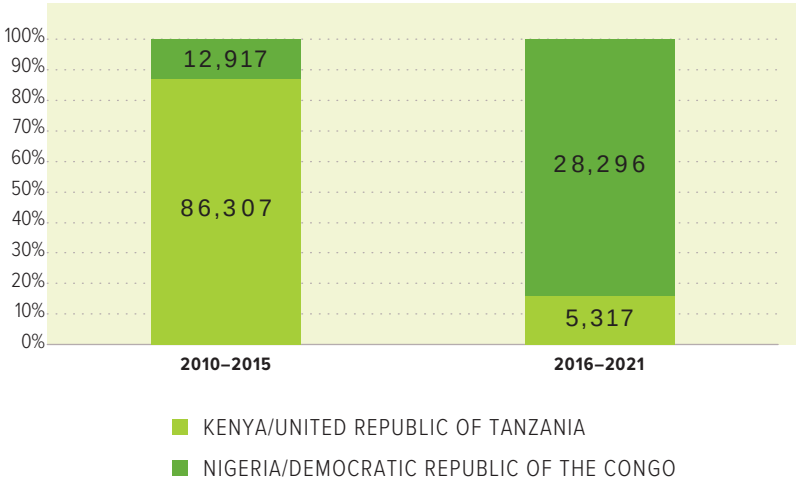
Specialized roles

Illegal trading roles vary in terms of scope of engagement and influence along the trade chain.[24] Some participants may act as local consolidators of illegally harvested wildlife goods before onward sale to urban centres or export markets, perhaps with limited insight into demand-side developments. Others draw profit from handling discrete roles, such as export, import, brokering, storage, keeping and breeding live specimens or handling the interface with processors. Case study examples in this report and previous editions of the *World Wildlife Crime Report* highlight the key role that local consolidators play within source countries, channelling goods into onward trade chains. The same evidence sources show another phenomenon for illegal wildlife trade bridging continents: the involvement in trafficking chains of people from end market countries who arrived in source countries as workers in industries such as forestry, mining and infrastructure development. Later in the trade chain, there may be specialist wholesale and retail dealers with a good understanding of the end market but potentially with limited insight into supply-side factors. For some commodities various roles may be merged, with international traffickers handling multiple steps along the trade chain.

Shaping market opportunities

It would be oversimplistic to characterize all illegal wildlife traders as simply connecting those sourcing wildlife with existing end markets. In addition to managing steps along the trade chain, there is evidence that traffickers can play an active role in manipulating demand in end markets to sustain or expand business opportunities. Some products have been reinvented for different markets repeatedly. For example, rhinoceros horn was highly sought after in the 1980s for two purposes: as traditional medicine in various countries in East Asia and for the handles of traditional daggers in Yemen. Rhinoceros horn as a medicinal ingredient has been banned in China since 1993 and around the same time a proclamation was made forbidding its use in Yemen. Illegal trade flows steeply

FIG. 4.2 **Percentage share and weight (in kg) of ivory tusks seized from Kenya and the United Republic of Tanzania in comparison to those seized from Nigeria and the Democratic Republic of the Congo, 2010–2015 and 2016–2021** [31]



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

fell and it was not until the mid-2000s that rhinoceros horn was again marketed, this time in Viet Nam for a variety of purposes, including cancer treatment and as a remedy for the effects of excessive alcohol consumption.[25] As demand for consumptive use in Viet Nam has apparently fallen in recent years, as evidenced by price decreases, it has again been remarketed in the same country in the form of collectible decorative items, including libation cups, bangles and beads.[26]

The emerging market for jaguar canines and claws may be similar, created by traffickers due to the availability of supply from animals killed for livestock protection, not pre-existing demand. Unlike Asian and African big cats, jaguars have not historically been exploited in the main destination markets in Asia. Although there is some circumstantial evidence of emerging export trade, a CITES review of jaguar trade concluded that most demand for jaguar parts was local within range states, where teeth and claws were being marketed as souvenirs and trinkets.[27] The complexities of trafficking connections between supply and demand for the trade in big cat bones are explored further in Box 4.1.

Tactical adaptation

In addition to pushing their products actively, illegal traders also engage in corruption and undermine the rule of law in countries along the trafficking chain, which appears to be essential to moving products along transport routes and across controlled borders predictably. A review of evidence of financial flows and payment mechanisms from over 40 wildlife crime cases in Africa, Asia and Latin America found bribery of officials to be a common tactic, particularly the procurement of false documents and arrangements to avoid shipment inspection.[28] Opportunities to secure safe passage for illegal goods through corruption can have a significant impact on how smuggling routes are established and how they adapt over time.[29]

Where corruption does not work, illegal traders find other ways around law enforcement. Most trafficked species are available from several countries, so good enforcement in one may compel illegal traders to switch sourcing and operate out of another. Illegal traders also take steps to reduce risk exposure, changing shipment routing to avoid law enforcement scrutiny along direct or exposed trade routes. For example, from about 2018 there was a series of prosecutions of elephant ivory traffickers in East Africa that appears to have influenced illegal traders to switch to exporting ivory from the other side of the continent entirely.[30] Between 2010–2015, the weight of tusks in seizures made in or intercepted from Kenya and the United Republic of Tanzania dwarfed those connected with Nigeria and the Democratic Republic of the Congo. Between 2016–2021, the reverse was true (Figure 4.2).

Both sourcing and routing shifts in response to enforcement action have been observed in elephant ivory trade and rhinoceros horn trade patterns analysed in previous editions of the *World Wildlife Crime Report* and documented in regular CITES reports on these commodity sectors.[32] Together these shifts in sourcing and trafficking routes have been characterized for other illegal commodities as a balloon effect, where an enforcement squeeze in one place leads to a bulge elsewhere, with a resulting spread of related harms.[33]

BOX 4.1 Big cat trafficking for the bone trade

The five big cat species classified as members of the *Panthera* genus (jaguar, leopard, lion, snow leopard and tiger) range variously in Africa, Asia and Latin America and have long been subject to harvest pressure for trade in their parts for local and international markets.[a] The *World Wildlife Crime Report 2020* examined in detail the poaching, trafficking and consumption of tiger bone, mostly destined for medicinal use in Asia. It also touched upon wider concerns about trade impacts on jaguars and lions, including issues related to big cat bone trade and the use of other body parts, such as skins, teeth and claws.[b]

The complexity of supply and demand factors for big cats provides insights into the serious challenges of understanding and addressing drivers of wildlife trafficking. All five species have declining wild populations, all but the jaguar are classified as threatened in the *IUCN Red List of Threatened Species* and all but the lion are listed in CITES Appendix I.[c,d] Trade is a key driver of poaching, but killing of these species is also often driven by human–wildlife conflict motivated by threats to livestock and people. Nevertheless, even in cases where trade was not the prime motivation for killing big cats, carcasses provide a tempting source of potential income if buyers can be found.[e]

Since the early 1990s, there has been a steady increase in interest in development of captive-breeding operations, or farms, oriented in part towards commercial production of both tigers and lions for trade.[e] Investors saw an opportunity because of dwindling supply from wild sources caused by a combination of population declines, hunting bans and increasing restrictions on commercial international trade from wild sources. CITES generally allows commercial international trade in listed species from farming or captive breeding with different regulatory requirements than those applied to trade from the wild, even for species in Appendix I, the strictest level of CITES protection.[f] Furthermore, if breeding operations are in a consumer country, domestic trade is outside the mandate of CITES regulation.

There are CITES-listed species for which legal trade from commercial breeding operations is now the dominant source of supply to international markets. Examples include crocodile and parrot species, many listed in CITES Appendix I, like most big cats.[g] However, CITES parties have consistently agreed a precautionary and restrictive stance on commercial tiger breeding for trade and expressed concern about the risks to wild populations from legalizing end markets.[h] At a national level, policies and legal measures governing development of big cat breeding operations and sales and use of big cat parts vary from country to country.[e]

Several studies have been published in the last few years, particularly under the auspices of CITES, that document the persistence of markets for jaguar parts in South America,[i] for lion parts within Africa,[j] and a diverse range of big cat parts in Asia.[e] These sources show that developments in the market for big cat bones primarily destined for medicinal use in East and South-East Asia are a common concern across all regions. Medicinal demand mainly focuses on the use of tiger bone, but overt or covert substitution of bones from other big cat species is not uncommon, whether simply to bolster supply, to confuse regulators or to diversify the offer to consumers.[e]

From the early 1990s, for over a decade, supply of big cat bone to medicinal trade was increasingly restricted to use of old stocks, sourcing from poaching and, despite some ambiguity about sales restrictions, what is best characterized as leakage from tiger farms in contravention of national law.[e,k,l] However, during the 2010s, South Africa permitted the legal export of lion skeletons to South-East Asia sourced from captive populations established by the sport hunting industry. A published analysis of export records from South Africa and reference to more recent CITES trade records indicate that as many as 7,500 lion skeletons, weighing over 80 tons, were legally exported from South Africa to South-East Asia between 2008–2018. Peak exports in 2014 and 2016 were over 10 tons per year, mostly destined for the Lao People's Democratic Republic and Viet Nam.[m,n] However, South Africa suspended issuance of export permits in 2019 and the Government of South Africa has since indicated its intention to end the captive lion breeding industry,[o] setting up a ministerial task team to develop exit strategies to negotiate the closure of the industry.[p]

Without greater insights into levels of annual consumption of end products, the extent of market control by pivotal traders, or trends in stockpiling of bone from these legal lion bone imports, it is difficult to assess how big cat bone trafficking incentives might be affected. A UNODC review of market data indicates that wholesale prices for unprocessed tiger and lion bone in one end market country were fairly consistent between 2018–2021.[q] Consumer research in end

BOX 4.1 (continued) Big cat trafficking for the bone trade

markets suggests that various forms of medicinal demand are persistent and almost always gender-differentiated.[r,s] Unless this changes, potential trafficking developments to watch for include:

Sustained and diversified sourcing pressure on wild populations: long-term analysis of seizure records shows consistent trafficking of wild-sourced tigers and their parts with skins most prevalent, but also for the bone trade.[k] A CITES overview of big cat trade noted incidents of lion and jaguar poaching that may be destined for the bone market.[e] A study of lion poaching and trade in the United Republic of Tanzania and Mozambique concluded that local use predominated in the United Republic of Tanzania, while in Mozambique poaching was assessed to be high with further evidence of domestic, regional, and international trade of lion parts and derivatives found to be occurring.[t] However, for both these species and leopards, seizure records do not confirm high levels of bone trafficking from wild populations. In light of the recent drop in availability of large quantities of lion bone from captive sources there is a risk that this could change.

Increased leakage of bone stocks held by tiger or lion captive facilities in Asia and Africa: with over 12,000 tigers in captive facilities worldwide and around 8,000 lions in captivity in South Africa alone there is potential accumulation of carcasses and body parts from deceased animals.[u,v] Leakage and intentional trade of such parts from tiger farms already contributes to bone trafficking flows and with the cessation of legal lion bone exports, there is a clear risk of similar problems. Twelve boxes of lion bones were seized in South Africa in 2019 reportedly prior to shipping to Malaysia,[w] and there was a significant seizure in Viet Nam in 2021 of 3.1 tons of lion bone from South Africa shipped along with 138 kg of rhinoceros horn.[x] These examples may indicate that farmed stocks stranded at source are being sought by traffickers. An ongoing CITES review of facilities holding Asian big cats includes attention to security measures for parts from deceased animals.[y] A recent regulatory review raised concern about the absence of a lion bone stockpile register in South Africa at either a provincial or national level.[z]

Shifts in market structure: at present it appears that most processing of big cat bones into medicinal products takes place in end market countries, with high value placed on demonstrating the authenticity of raw materials.[e] However, there are some early indications of a possible trend to processing closer to source into products that may be easier to traffic, particularly paste or glue, made by boiling bones in hot water and eventually used in crude form or as an ingredient in medical preparations. There is evidence of such processing of lion bone in South Africa according to a 2018 national police report,[aa] and jaguar bone in Suriname according to academic research carried out in 2017–2018.[ab] It is currently unclear whether such production is primarily for domestic use by locals or expatriates from Asia, or destined for export, but it does represent a potential trafficking innovation to keep under scrutiny.

a. Other cat species, including the clouded leopard, cheetah and puma are also included within some analyses of big cat trade issues, for example CITES, 'The Legal and Illegal Trade in Big Cats: A Study in Support of Decision 18.246. CITES SC75 Doc. 13 (Rev. 1)' (Geneva, Switzerland: CITES Secretariat, 13 November 2022), https://cites.org/sites/default/files/documents/E-SC75-13-R1.pdf.

b. UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

c. IUCN Red List of Threatened Species: https://www.iucnredlist.org. Jaguar is classified as Near Threatened.

d. African lion populations are listed in CITES Appendix II, with the Indian population listed in Appendix I.

e. CITES, 'The Legal and Illegal Trade in Big Cats: A Study in Support of Decision 18.246. CITES SC75 Doc. 13 (Rev. 1)'.

f. https://cites.org/eng/prog/captive-breeding.

g. CITES Secretariat, 'World Wildlife Trade Report 2022' (Geneva, Switzerland: CITES Secretariat, 2022).

h. CITES Decision 14.69, adopted in 2007, states that "Parties with intensive operations breeding tigers on a commercial scale shall implement measures to restrict the captive population to a level supportive only to conserving wild tigers; tigers should not be bred for trade in their parts and derivatives." Also CITES Resolution Conf. 12.5 (Rev. CoP19), on Conservation of and trade in tigers and other Appendix-I Asian big cat species, recommends that consumer states work with traditional medicine communities and industries to develop and implement strategies for gradually reducing and eventually eliminating the use of Asian big cat parts and derivatives.

i. Melissa Arias, 'The Illegal Trade in Jaguars (*Panthera onca*)' (Geneva, Switzerland: CITES Secretariat, 2021), https://cites.org/sites/default/files/articles/CITES_Study_on_Illegal_Trade_in_Jaguars%20.pdf.

j. CITES, 'Thirtieth Meeting of the Animals Committee; African Lion (*Panthera leo*); The Legal and Illegal Trade in African Lions - A Study in Support of Decision 17.241 e); AC30 Inf. 15', 16 July 2018, https://cites.org/sites/default/files/eng/com/ac/30/Inf/E-AC30-Inf-15x.pdf.

k. Ramacandra Wong and Kanitha Krishnasamy, 'Skin and Bones: Tiger Trafficking Analysis from January 2000–June 2022' (Petaling Jaya, Selangor, Malaysia: TRAFFIC, Southeast Asia Regional Office, November 2022), https://www.traffic.org/publications/reports/skin-and-bones-report-2022/.

l. Wildlife Justice Commission, 'To Skin a Cat: How Organised Crime Capitalises and Exploits Captive Tiger Facilities', November 2022, https://wildlifejustice.org/wp-content/uploads/2022/11/To-Skin-A-Cat-Report-SPREADS-V06.pdf.

m. Vivienne L. Williams *et al.*, 'A Roaring Trade? The Legal Trade in *Panthera leo* Bones from Africa to East-Southeast Asia', ed. Brian Gratwicke, *PLOS ONE* 12, no. 10 (24 October 2017): e0185996, https://doi.org/10.1371/journal.pone.0185996.

n. CITES trade database https://trade.cites.org/.

o. Vivienne L. Williams *et al.*, 'Monitoring Compliance of CITES Lion Bone Exports from South Africa', ed. Kuo-Hsiang Hung, PLOS ONE 16, no. 4 (2 April 2021): e0249306, https://doi.org/10.1371/journal.pone.0249306.

p. 'Advisory Panel to Identify Voluntary Exit Options for Lion Breeders', SANews: South African Government News Agency, 13 December 2022, https://www.sanews.gov.za/south-africa/advisory-panel-identify-voluntary-exit-options-lion-breeders.

q. UNODC reviewed price observation data for unprocessed tiger and lion bone in Viet Nam provided by the Environmental Investigation Agency. There was no major change during 2018–2021, with tiger bone on average offered at a price 15–20 per cent higher than lion bone.

r. Peter Coals *et al.*, 'Preferences for Lion and Tiger Bone Wines amongst the Urban Public in China and Vietnam', *Journal for Nature Conservation* 57 (October 2020): 125874, https://doi.org/10.1016/j.jnc.2020.125874.

s. Elizabeth Oneita Davis *et al.*, 'An Updated Analysis of the Consumption of Tiger Products in Urban Vietnam', *Global Ecology and Conservation* 22 (June 2020): e00960, https://doi.org/10.1016/j.gecco.2020.e00960.

t. Katrina Mole and David Newton, 'African Lion Trade - An Assessment of Trade Mortalities and Anthropogenic Threats Facing Lions in Tanzania and Mozambique' (TRAFFIC, 18 May 2021), .

u. CITES Secretariat, 'Asian Big Cats (Felidae Spp.): Report of the Secretariat. CITES SC70 Doc 51' (Geneva, Switzerland: CITES Secretariat, October 2018), https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-51.pdf.

v. South Africa Department of Environment, Forestry and Fisheries, 'Answer to South African Parliamentary Question: Noting There Are Approximately 7979 Lions in Captivity in 366 Facilities', Conservation Action Trust, 16 August 2019, https://www.conservationaction.co.za/answer-to-south-african-parlimentary-question-noting-there-are-approximately-7979-lions-in-captivity-in-366-facilities/. South African Government Gazette 49322 of 19 September 2023.

w. South African Police Service, 'Media Statement; Directorate for Priority Crime Investigation (HAWKS)', South African Police Service, 3 October 2019, https://www.saps.gov.za/newsroom/msspeechdetail.php?nid=22661.

x. South Africa Department of Forestry, Fisheries and the Environment, 'Rhino Poaching in South Africa in 2021', 8 February 2022, https://www.dffe.gov.za/RhinoPoachinginSouthAfricain2021.

y. CITES Secretariat, 'SC77 Doc. 41.2: Asian Big Cats in Captivity' (Geneva, Switzerland, November 2023), https://cites.org/sites/default/files/documents/E-SC77-41-02_1.pdf.

z. Louise De Waal *et al.*, 'The Unregulated Nature of the Commercial Captive Predator Industry in South Africa: Insights Gained Using the PAIA Process', *Nature Conservation* 50 (5 December 2022): 227–264, https://doi.org/10.3897/natureconservation.50.85108.

aa. South African Police Service, 'Media Statement from Directorate for Priority Crime HAWKS South African Police Service', South African Police Service, 26 November 2018, https://www.saps.gov.za/newsroom/msspeechdetail.php?nid=18255.

ab. A. M. Lemieux and Nicholas Bruschi, 'The Production of Jaguar Paste in Suriname: A Product-Based Crime Script', Crime Science 8, no. 1 (December 2019): 6, https://doi.org/10.1186/s40163-019-0101-4.

An additional tactical adaption that may occur in response to enforcement pressure is to restructure the trade chain, for example by moving processing upstream so that goods traded illegally across international borders are in forms that may be less easy to detect. Police investigations in South Africa in 2017 discovered small home-based workshops in the country for processing rhinoceros horn beads, bracelets and bags of rhinoceros horn powder, apparently to avoid the risks of shipping unprocessed rhinoceros horn to end markets where such processing was usually carried out.[34]

Cutting corners

It is notable that seizure records frequently include illegal transactions that appear from the available information to have been possible to carry out within the law. As noted above, there are doubtless cases where those responsible were ignorant of legal restrictions, but others likely reflect misguided expedience. Contributory factors are not well-researched but might include the desire to skip time-consuming administrative processes or to avoid taxes and licence fees. For example, in research for the illegal orchid trade case study in this report, some of the buyers interviewed said that the costs of taxes, phytosanitary compliance certificates, and CITES documentation could exceed the value of the quantity of plants they wanted to import. They alleged that the orchids were trafficked not because they were from an illegal source, but because the hassle and cost of compliance were deemed too high. There are seizures of species that are cultivated commercially, but which it seems likely were being smuggled simply because this was commercially expedient.

Supporting roles

Involvement of people in the trafficking chain is not restricted to those engaged in buying, transporting and selling wildlife illegally. Other participants may own or be employed in breeding operations: either breeding species in contravention of national law or laundering smuggled wildlife into ostensibly legal supply chains. Additionally, people may own or be employed in processing operations involved in functions such as carving, furniture manufacturing or food processing that use traded wildlife as raw materials, some of which may be illegally sourced.

Like traders, the principal motivation for involvement may be employment and income generation and at this point in the trade chain, their work may be within legal operations. As illustrated by the rosewood case study in the current report, regulatory change can leave large numbers of people with knowledge and skills related to wildlife trade seeking alternative employment, some of whom might be tempted into illegal activity.

BOX 4.2 Gender and drivers of wildlife trafficking: insights from South America

Gender norms and roles shape individuals' participation in wildlife-based economies, both legal and illegal. Men and women have different experiences of and access to wildlife, and notions of masculinity and femininity determine, at least in part, their motivations, willingness, and opportunities for participation in wildlife crime. These gendered realities affect who engages in wildlife crime and their roles within it.

To gain deeper understanding of gender-related dimensions of wildlife trafficking drivers, in 2023 UNODC carried out research in the Amazon regions of Colombia, Ecuador and Peru in South America. Interviews were carried out with wildlife trade participants who made observations at different points along the illegal wildlife trade chain in each country.[a]

Some of the trade chains in the region encompassed familial structures. The research revealed a clear pattern where the involvement of one family member in illicit wildlife trade extends to others in the family. A common pattern was that wives or female partners (or other family members) of male poachers were reported frequently to engage in supplementary roles, helping to process, care for, transport, and/or sell the wildlife. Research has shown that women's engagement in serious organized crime activities is typically initiated or inherited through a relationship with a father or husband involved in these activities.[b] According to one of those interviewed:

"Because women in the Amazon do not marry, they only live with the man, and it is a strong part of the culture that women have to do all the things that men need. Women do these things [participate in wildlife crimes], because they want to stay in a relationship. For the woman, the motive is not always to have more money. For the woman it's, 'I am going to do anything to be with you'. And men realize that; they know that. For men it is out of necessity and survival and also ambition. For example, transporting a jaguar or these protected plants pays you much better than working a month or even a year, both in the public and private sector."[c]

Poaching

According to interviewees, poaching in the region is reportedly almost fully perpetrated by men, reiterating the considerable gender disparity observed in global poaching activities. They claimed that gender roles are often imposed due to exclusionary practices rather than being a matter of choice. Hunting is often regarded as a masculine practice typically passed down from fathers to sons, and many women do not learn the skill. Further, the idea that poaching brings a certain level of physical risk was brought up multiple times. A prevalent speculation, primarily among men, was that women do not hunt due to a fear of the forest. Several women agreed with the assertion; however, others attested that women were not scared of the forest, rather, they were scared of the dangers from people in forested areas. One interviewee said:

"No, women don't go to the forest, but not because they are scared of the animals, it's the men. The forest is dangerous because of people."[d]

Transportation

Women were notably more engaged in the transportation of illegally sourced wildlife. It was reported that women and children are used in transporting illicit wildlife on roads and rivers coming from the Amazon region because they are seen as less conspicuous. According to one interviewee:

"I've seen women and children on the rivers, taking and bringing [illegal wildlife]. They are starting to use children more, I think."[e]

This tactic leverages societal perceptions of gender and age, revealing a calculated driver behind the roles assigned within the illegal wildlife trade. Other regional studies have also shown women having pronounced involvement in transport of illegal wildlife in the Congo and Viet Nam.[f,g]

Processing, preparation, storage

Processing and preparation of wildlife products was seen as a role mainly for women, but this was not consistent across all trade chains. For instance, medicinal products derived from wildlife (e.g. oils, salves, creams) were reported to be processed in the forest by men and brought into the markets already packaged and ready to sell. However, women were identified as being the main processors for wild meat markets and tourist/artisan markets. This could

BOX 4.2 (continued) Gender and drivers of wildlife trafficking: insights from South America

be attributed to various factors such as cultural traditions, skill sets, and economic opportunities that have historically positioned women to excel in these roles more frequently than men. Further, it was found that women assume the primary caretaker roles in the live animal trade, responsible for looking after animals prior to sale or before the animals are moved on to other intermediaries. One of those interviewed said:

"For small mammals, [men] do not often take care of them—the women take care of [the animals]. I've seen more than once, women that have had a baby, a human baby, they also breastfeed the baby monkeys as well as other mammals before they sell them." [h]

Selling

The most dominant finding across all three surveyed areas was that women are the primary market sellers of wildlife products. Similarly, in local markets in Central Africa, women have reportedly been primary actors involved in the sale of wild meat and other wildlife products.[i,j] This reflects a gendered division of labour that is characteristic of small-scale informal enterprises in many places; men's labour is often frontloaded at the beginning of production chains, while women play roles as the vendors or traders.[k,l,m,n]

Consumption

Although drivers of consumption are diverse and intricate, examples of gendered consumerism could be observed in the studied area. For instance, the practice of keeping wildlife as pets is prevalent, with demand coming from both men and women. However, it was widely perceived that women exhibited a greater interest in adopting wildlife as pets for companionship. One interviewee said:

"Women are often the ones most responsible for having [illegal] wildlife in homes … they create more emotional bonds with the animals."[o]

This theme came up in many conversations and interviews, where women overall were said to be more interested in owning or caring for wildlife as pets because their social roles kept them tied to home and wildlife offered them companionship. It is unclear whether women themselves were enthusiastic about acquiring pets.

Lastly, the study revealed a pattern where international tourists sought wildlife souvenirs, driving the demand for illicit wildlife trade. Keepsakes crafted to attract tourists drive a market for products made from parts of the flagship species of the Amazon region (e.g. jaguar, otter, bear). Teeth, bones, feathers and skins are some of the most utilized wildlife specimens in souvenirs. Most of the artisans and sellers of these products are women, often from indigenous communities. The involvement of indigenous women places them at a complex intersection of tradition, survival, and the broader implications with their participation in illicit wildlife trade. The tourism demand has led to exploitative practices and the potential alteration of traditional cultural practices. According to one interviewee:

"There are a lot of indigenous people near here selling artisan [handicrafts] containing illegal wildlife, but this is the thing: that this is not a part of their culture. They are acting that way to attract more tourism. Because the communities further away—the real [indigenous nation omitted for anonymity] communities—they don't do that. It just shows you how impactful tourism dollars are; it changes culture, changes what people would do."[p]

Preliminary insights suggest gender differences in the demand for these products. Women were found to be more likely consumers of wildlife products that are fashioned into jewellery and trinkets (e.g. purses and earrings made from jaguar pelts), a finding supported by studies in other geographies.[g]

a. UNODC field research Colombia, Ecuador and Peru, 2023. in preparation for publication.
b. Jacqueline Hicks, 'The Role of Gender in Serious and Organised/Transnational Crime', *K4D Helpdesk Report 984 Institute of Development Studies*., 30 March 2021, https://doi.org/10.19088/K4D.2021.059.
c. Interview I26
d. Interview S9
e. Interview I32
f. Roger Albert Mbete *et al.*, 'Household Bushmeat Consumption in Brazzaville, the Republic of the Congo', *Tropical Conservation Science* 4, no. 2 (1 June 2011): 187–202, https://doi.org/10.1177/194008291100400207.

g. Pamela McElwee, 'The Gender Dimensions of the Illegal Trade in Wildlife: Local and Global Connections in Vietnam', in *Gender and Sustainability: Lessons from Asia and Latin America* (University of Arizona Press, 2012), 71–93, https://www.researchwithrutgers.com/en/publications/the-gender-dimensions-of-the-illegal-trade-in-wildlife-local-and-.

h. Interview I8

i. Helen U. Agu and Meredith L. Gore, 'Women in Wildlife Trafficking in Africa: A Synthesis of Literature', *Global Ecology and Conservation* 23 (September 2020): e01166, https://doi.org/10.1016/j.gecco.2020.e01166.

j. Mbete *et al.*, 'Household Bushmeat Consumption in Brazzaville, the Republic of the Congo'.

k. Louisa D. Jokia, Elana Swanepoel, and Marius Venter, 'Economic Empowerment of Women in the Informal African Craft Industry: The Case of Tembisa', *Journal of Economic and Financial Sciences* 14, no. 1 (7 January 2021): 10.

l. Sara Recchi, 'Informal Street Vending: A Comparative Literature Review', *International Journal of Sociology and Social Policy* 41, no. 7/8 (1 January 2020): 805–825, https://doi.org/10.1108/IJSSP-07-2020-0285.

m. Kehinde Paul Adeosun, Mary Greene, and Peter Oosterveer, 'Informal Ready-to-Eat Food Vending: A Social Practice Perspective on Urban Food Provisioning in Nigeria', *Food Security* 14, no. 3 (1 June 2022): 763–780, https://doi.org/10.1007/s12571-022-01257-0.

n. Elin Torell *et al.*, 'Analysis of Gender Roles in Philippine Fishing Communities', *Journal of International Development* 33, no. 1 (2021): 233–55, https://doi.org/10.1002/jid.3520.

o. Interview I43

p. Interview I6

Drivers of demand

Context

At the end market there are many distinct wildlife use clusters with specific demand characteristics driving both legal and illegal trade flows. Wildlife is in demand for its use as food, as medicine, in fashion, for ornamental purposes, investment pieces and as pets, for example. Each of these demand clusters has its own trends and dynamics, and some operate in isolation from the others. For example, the factors that affect demand for python skins, such as fashion trends, are distinct from those that affect demand for python meat or demand for live pythons as pets. Preventing the illegal trade in pythons requires an understanding of these different sources of demand and why, in some cases, they favour illegal rather than legal sources of wildlife.

In the first edition of the *World Wildlife Crime Report*, the discussion centred on species in demand in several different types of markets. The table below lays out a modified version of these demand clusters, with adjustments based on more recent trends and market insights (Figure 4.3). The typology of market clusters is not exhaustive, and it would be difficult to come up with a comprehensive set of categories. Furthermore, it is important to recognize that wildlife trafficking flows for some species may supply more than one of these market segments, an example being rhinoceros horn used both as medicine and for carving into decorative items. Some additional demand clusters not included here are unique to a narrow range of species, such as the demand for primates for medical testing.[35]

The table also summarizes information on the nature of the use of the commodities traded in each demand cluster, because this provides some basic insights into forces that shape supply. For example, non-perishable products can be stockpiled, opening these products to speculative procurement binges. In contrast, perishable products such as meat or fish must be consumed within a short period of time after harvesting if kept fresh, and even after smoking or freezing viable storage times are limited. Products that are completely consumed, such as foodstuffs, may have a continuous source of demand, while end markets for non-perishable goods, such as specialized collectable items may involve one-off purchases. Additionally, the table includes a crude expression of the scale of demand for each cluster, distinguishing goods for which demand is for bulk quantities of consistent quality from those for which niche demand seeks novelty and exclusivity.

The dynamics of each of these demand clusters is discussed in turn below. In each case the analysis begins by considering factors that drive and shape demand for the cluster as a whole, whether legally or illegally supplied. Then for each cluster the specific features of demand linked specifically to illegal supply is elaborated. This approach is adopted because in all cases drivers related to illegal trade are grounded in factors shaping demand generally in the demand cluster.

Food

Data from FAO and other sources summarized in the 2022 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) thematic assessment on sustainable use of wild species indicated that at least 10,000 wildlife species are used for food, including those from fisheries, hunting of terrestrial animals and harvest of wild plants and fungi.[36] Although much attention to use of wild foods has focused on tropical and subtropical areas,[37] use of wild animals and plants for food is common globally. For example, estimates of the quantities of wild meat, mushrooms, and berries marketed annually in the European Union reach into the hundreds of millions of kilograms; it was estimated that 65 million European Union citizens were gathering and 100 million consuming wild food in the early 2010s.[38]

Demand factors range from the need for basic nutrition through to the preferential choice for speciality food items, such as sturgeon caviar. Since some species are valued for their associated health benefits, there can be some overlap with factors driving medicinal demand for wildlife. Species in demand are often locally accessible, but there are others for which long-distance supply chains have become established from rural to urban areas within source countries, internationally and between continents. Some wild species in demand are now supplied from captive production or farming.[39] Preference for wild food may be a novel

FIG. 4.3 Demand clusters, nature of commodities and scale of demand for species affected by illegal wildlife trade

	Source of demand	Nature of commodities	Scale of demand	Examples of species in seizures used in this sector
	Food	Perishable and consumed	Mostly sought in bulk demand, some niche markets	Shark fins, pangolins, eels, sturgeons, abalone, orchid tubers
	Medicine	Often dried or processed into less perishable form and then consumed	Mostly sought in bulk	Pangolins, seahorses, big cat bones, costus root
	Mass market pets and ornamental plants	Live animals and plants dependent on care	Generally sought in bulk	African grey parrots, iguanas, cacti and orchids
	Specialist market for live animals and plants	Live animals and plants dependent on care	Rarity is at a premium	Orchids and succulents, reptiles, amphibians
	Exclusive market in goods for adornment, display and demonstration of status	Non-perishable and not consumed. Sometimes processed into manufactured goods	Rarity is often a selling point, but some sought in bulk for manufacture of high-value exclusive goods	Elephant ivory, rhinoceros horns, shahtoosh (wool from Tibetan antelopes), rosewoods

Source: UNODC

lifestyle choice, but often it is retained culturally as people move from rural to urban areas or migrate internationally.[40,41] For people using wild species for basic nutrition a major factor in consumption choice is the availability and comparative price of alternative foods.[42]

Concerns about overexploitation of wildlife species used for food and other risk factors has led to adoption of legal restrictions on hunting, harvest and trade in many countries and some species involved are subject to regulation of international trade under CITES. Populations of some species in demand may also be increasingly confined to protected areas where hunting and collection is not permitted.[43] Both local and international harvest and trade regulations may allow for some conditional sourcing and trade, for example through seasonal restrictions or licensing. However, significant trade flows for some species continue illegally, knowingly or unknowingly in contravention of applicable law in many countries.[44]

Research into specific consumption motivations for illegal wildlife used for food is typically geographically restricted or focused on particular species. As for the legal segment of this cluster, some purchasers seeking basic nutrition likely have limited alternative choices, while other consumers may be motivated by cultural tradition, taste preferences, price or niche interest.[45] Some research has shown peer pressure to influence consumption choices, though generally it is likely to be an individual decision.[46] In end markets, whether local or remote from sourcing areas, the legality of wildlife-derived foods may be difficult for consumers to discern and in some circumstances for speciality foods, demand may even be attracted by the illicit nature of the meal.[47]

Medicines

Wild animal and plant species are widely traded for medicinal and associated health-related uses. The

global trade in wild plants involves as many as 30,000 species, mostly wild-collected and used for modern and traditional medicines, in health supplements, cosmetics and as food ingredients.[48] The diversity of animal species used for modern and traditional medicinal purposes is less comprehensively documented. Although traditional medicinal use of products such as pangolin scales, rhinoceros horn, bear bile or tiger bone gain significant attention in commentary on wildlife trade issues, there are many other species used in this demand cluster. Less well-known examples include horseshoe crabs used for vaccine production,[49] and medicinal leeches used for surgical and therapeutical purposes.[50]

Traditional medicine systems continue to be used by large shares of the population in many parts of the world.[51] A recent WHO overview noted that 170 countries reported traditional medicinal practices to be in current use by their population, including a wide range of medicinal systems, such as herbal medicine, traditional Chinese medicine, indigenous traditional medicine and ayurvedic medicine.[52] One recent meta-study estimated an average traditional medicine use prevalence in 58 per cent of the total population in sub-Saharan Africa, although rates between studies varied substantially.[53] A study in Viet Nam (conducted in two mountainous and remote areas) found a mean frequency of use of traditional medicine to be six times per year, with over 90 per cent of respondents reporting an improvement in health as a result.[54]

Wildlife parts used for medicine may appear in end markets in unprocessed form, particularly as dried ingredients such as seahorses, deer antlers, vulture skulls or ginseng roots. They are sometimes purchased directly by consumers from retail outlets, but also commonly prescribed and dispensed by traditional medicinal practitioners at the point of sale.[55,56] Other medicinal ingredients from wild animals and plants are processed into packaged medicinal products and it can be difficult for users or regulators to ascertain which species are included.

Complementary medicine use, including practices employing wildlife ingredients, is motivated by concern about health and includes treatment of illness, alleviation of symptoms and prevention of disease. A review of evidence on why complementary medicine is chosen indicates a range of motivations, from affordability to desire to avoid the side effects of modern pharmaceuticals.[57] The distinction between medicines chosen individually by end users and those for which prescription decisions are made by medical professionals is important for design of any intervention aimed to influence decision-makers driving demand.[58]

As in the case of wild meat, medicinal uses typically demand large quantities of wildlife ingredients and the sourcing and trade of many of the species is now subject to national regulation and for some, international trade control under CITES. Again, there remain conditional trade options for many wildlife products used in medicine, though some, such as rhinoceros horn and tiger bone, as explained elsewhere in this report, are subject to comprehensive trade prohibitions. Research into consumer motivations to continue use of prohibited wildlife ingredients for medicinal use indicates a diversity of attitudes on the balance between health concerns and associated environmental harms or illegality.[59]

Mass market pets and ornamental plants

Some wild animals and plants are traded in large numbers to be kept and nurtured alive by hobbyists as pets or ornamental plants. The mass market trade in “exotic” pets has a long history, particularly the keeping of wild birds and aquarium fish, and more recently reptiles, amphibians and other species.[60] This growing market has increasingly global reach.[61] Wild-sourced supply is supplemented by commercial captive breeding and hobbyists may themselves become breeders, sometimes using the proceeds of sales to support their own further purchases.[62,63]

The legal international trade in live wild animal pets is large and diverse. The proportion of this business subject to CITES trade controls involved 5 million birds, 41 million reptiles and 0.5 million amphibians during the period 2011–2020.[64] Trade volumes for species not covered by CITES are difficult to estimate as many countries do not keep or publish relevant statistics. Patterns of supply and consumption are complicated and evolving over time in response to regulation and emerging demand trends.[65] Similarly, the trade in ornamental wild plants for private keeping involves a wide range of species, some of which are subject to trade regulation. CITES legal trade data for 2011–2021

included movements of over 180 million snowdrops and almost 5 million cyclamens, all reportedly wild-sourced.[66]

Unlike specialized collection demand described separately below, the pet and mainstream ornamental plant trade is characterized by bulk supply to satisfy demand for animals and plants that are reasonably easy to keep, with aesthetic or interesting features. Consumer research indicates that the exotic pet market demand cluster is not typically motivated by rarity or wild provenance and that captive bred animals and artificially propagated plants may be preferentially sought.[67]

Nevertheless, some of the species in demand for this cluster have become subject to national sourcing and trade restrictions and in some cases to international regulation under CITES. Where illegal trade occurs in connection with these market clusters, it typically involves species that were commonly traded legally before introduction of trade restrictions. High volume demand targeting popular parrot species in the pet trade persists despite national trade bans and CITES interventions. One species involved is the African grey parrot, for decades popular as a pet bird and now listed in CITES Appendix I. Despite the availability of a legal captive-bred supply, illegal trade in this and other parrot species competes to supply some markets through direct smuggling from source countries and falsification of captive breeding claims to launder wild-caught birds.[68]

It is typical in this demand cluster for legal supply to continue from commercial or hobbyist captive breeding of animals or artificial propagation of plants. The motivations for continued illegal sourcing and trade from wild sources are not well-researched but could include imbalance between the continuing demand being in excess of legal supply or that illegal supply has a price advantage.

Despite this demand cluster being typified by large volume trade in popular species, there are niche markets within the pet trade that target threatened and protected species. This is not a new phenomenon: the keeping of exotic animals has a long history among wealthy elites in various parts of the world.[69] However a new dimension, particularly over the past decade, is the emergence of illegal markets for species such as otters, apes, cheetahs and other high value novel pets, inspired through exposure on social media channels, sometimes by high profile celebrities or influencers.[70,71] Although the significance of the scale of demand is difficult to judge, it often focuses on juvenile animals, the acquisition of which may have wider collateral impact on wild populations.[72,73]

Specialist market for live animals and plants

Some pet and ornamental plant owners turned hobbyist breeders may transition to the world of specialist collectors, people who dedicate enormous amounts of time and money to curating collections of objects for their personal enjoyment and for sharing with other admirers. The desire to create these collections is both ancient and commonplace. The collection instinct has even been tied to specific areas of the human brain.[74] In the modern world, there is a community aspect to collecting, with those fascinated by certain objects forming clubs or societies, building expertise, comparing their collections with others, trading objects, and vying for status among their peers. The internet has brought collectors of rare objects closer together, reinforcing their behaviour and providing an international market to those who can source popular collectables.[75]

Specialist collectors of wildlife specimens—such as rare birds, reptiles (Box 4.3), or orchids—are potentially driven by a desire for a complete and balanced collection. Rare specimens are particularly prized.[76] Since the natural world has been incompletely catalogued, the discovery of new species provides perpetual novelty to wildlife collectors. Once acquired, the challenges of keeping lesser-known species and being among the first to breed or propagate a species in captivity are additional motivations. The compulsion to acquire can become so great that the legality of the specimen may become a secondary consideration. Insofar as illegality creates scarcity, it may even add to the attraction.

Demand motivations for specialist collectors of live wildlife specimens are very different from others who keep exotic pets or ornamental plants. Research has shown exotic pet owners prefer species that are captive-bred, common in the wild, and abundant in the market. Collectors, in contrast, prefer almost exactly the opposite, wild species that no one else

has.[77] As described in the orchid case study in this report, some specialist collectors may see themselves as unofficial conservators, rescuing species from the wild before habitat loss leads to their extinction.

Exclusive market in goods for adornment, display and demonstration of status

A wide range of wildlife commodities fall within this demand cluster, including elephant ivory, tiger skins and precious woods. Some are valued in unprocessed form, while the value of others may be enhanced through manufacture into items such as ivory carvings or rosewood furniture.

Although legal trade remains a source of supply for some components of this demand cluster, such as the use of reptile skins for manufacture of fashion goods, for others there is limited or no legal supply. As documented in previous editions of the *World Wildlife Crime Report* some of these goods, such as elephant ivory, have long histories of overexploitation and many are subject to strict trade regulation at national level and under CITES.

Demand for goods in this demand cluster may have some attributes in common with niche components of the food and medicine clusters, such as sturgeon caviar consumption or use of rhinoceros horn as a tonic cure for hangovers. Consumers may be motivated as much by the opportunity to follow cultural traditions or project status and wealth as they are by the intrinsic properties of the goods they desire.[78] For some goods, such as rosewood or reptile skins, manufacturers and retailers may have strong influence on sourcing choices, while for others such decisions lie principally with individual consumers.

When legal supply to markets in this market cluster is restricted or unavailable, there can be strong incentives for illegal trade, with the combination of restricted supply and wealth-driven demand potentially leading to the situation seen with other "luxury" goods where high prices themselves become an added motivation for further purchasing.[79]

At least one researcher has argued that rosewood, used for the manufacture of high status furniture, has become the object of speculation, with buyers accumulating stocks in anticipation of price increases.[80] Previous editions of the *World Wildlife Crime Report* made a similar argument about elephant ivory market incentives in the 2010s. Speculation could also explain rapid rises in detected illegal trade in a wildlife product but no indications of a corresponding increase in end markets sales, as with pangolin scales, although no concrete evidence has been produced so far.

Considering other markets, alternative investments, such as antiques, artworks and rare books, are valued as potential means to hedge against inflation, currency devaluation and other factors when local mainstream investments are deemed unreliable.[81] The attraction of these investments increases when their purchase becomes a status symbol, a marker of cultural sophistication. For example, fine art has become an attractive investment vehicle in a number of developing economies.[82]

Once a wildlife commodity has achieved the qualities of a status symbol, it may be displayed as home decoration or worn as jewellery. This same quality makes them appropriate for gifting, a social obligation that may border on corruption. Such gifting can be difficult to distinguish from bribery in some contexts.[83]

Corruption and wildlife crime

Public and private sector actors as well as individuals may be lured into corrupt behaviour to facilitate wildlife crime as they can obtain high profits at a low risk of being caught. Factors enabling corruption to flourish in the wildlife trade include, among others, the absence of effective sanctions, a lack of transparency in the public administration and other agencies, unclear accountability structures, and a lack of public disclosure of key documents. Criminals thrive on the existence of corruption as it enables them to commit, conceal and avoid conviction for their crimes. Corruption may take various forms and may evolve over time. The United Nations Convention against Corruption (UNCAC), the only global legally binding international instrument against corruption, does not provide a definition of corruption but instead identifies a series of corrupt acts that should be criminalized. Most of the corrupt acts listed in

BOX 4.3 Reptile collectors

There is a large international market for reptiles as pets as well as a community of hobbyists who breed reptiles to supply this market. Researchers have found that 75 per cent of this trade is in species that are not covered by CITES and approximately half of all traded reptiles are captured from the wild.[a] As with orchids, there is a segment of this community that collects rare and protected species and sourcing and trade in many of those not subject to CITES trade regulation are nonetheless subject to national restrictions. These collectors compete to acquire newly described species as well as severely threatened and protected species.[b]

According to a series of 20 interviews with traders and experts conducted for the *World Wildlife Crime Report 2020*,[c] many collectors start out when children after keeping one of the "gateway species" (e.g. bearded dragons, crested geckos, leopard geckos and ball pythons) as pets. Through the internet, they are exposed to owners of rarer species and learn how easy these species are to acquire. Like orchids, many reptile species are amenable to being transported by post, and specialized shipping companies have emerged to facilitate the trade. Soon they too are online showing off their acquisitions to gain status among fellow collectors.

With reptiles, even general demand can pose an extinction risk. This is because, unlike orchids, many reptile species are relatively difficult to breed in captivity, sustaining the demand for wild-caught specimens.[d] As national or international trade restrictions are introduced to address overcollection for this trade, persistent market demand drives illegal trade and also creates demand for similar species not yet subject to regulation, which in turn may be negatively affected.

According to the interviewees, social media communications were driving demand and one good photo of a novel species can prompt exponential sharing and market interest. Global social media platforms and specialized trading forums are key to the market. Where direct sales are not allowed, prices are often listed in the comments. Those hesitant to do business online can buy protected species under the counter at reptile shows.

New collectors may initially buy their reptiles through one of the many brokers online, but they soon learn that through the internet they can commission collectors to find any desired specimen, irrespective of legality. Customs clearance specialists are hired in the source countries to ensure the order arrives. Hobbyists often import surplus animals and use the proceeds from onward sales to fund their own purchases. In a similar manner to user-dealers with illicit drugs, hobbyist breeders are a key source of supply in both the licit and illicit side of the reptile market.

Like collector demand for ornamental orchids explored in the case study in this report, published research on the exotic pet trade indicates that novelty and scarcity are among the key factors that attract specialist demand and higher values. Species that are only found in a limited geographic range, particularly island endemic species, are inherently scarce and so in demand from traders. Additionally, endemism allows for collectors to know exactly where to find a species. As trade diminishes supplies, the prices increase.[e] Such patterns have been observed for several species groups in demand for the pet trade, including chameleons, iguanas and freshwater turtles.[e] It may also incentivize greater effort to establish captive-bred supply, but this can take some time to be established at significant levels.[f]

a. Benjamin M. Marshall, Colin Strine, and Alice C. Hughes, 'Thousands of Reptile Species Threatened by Under-Regulated Global Trade', *Nature Communications* 11, no. 1 (29 September 2020): 4738, https://doi.org/10.1038/s41467-020-18523-4.

b. Mark Auliya *et al.*, 'Trade in Live Reptiles, Its Impact on Wild Populations, and the Role of the European Market', *Biological Conservation* 204 (December 2016): 103–19, https://doi.org/10.1016/j.biocon.2016.05.017.

c. A series of formal and informal interviews were conducted across 12 countries between 2017 and 2019. For details see UNODC, 'Methodological Annex to the 2nd Edition of the World Wildlife Crime Report: Trafficking in Protected Species' (UNODC, 2020), https://www.unodc.org/documents/data-and-analysis/wildlife/2020/WWCR2_Methods_Annext.pdf.

d. Sandra Altherr and Katharina Lameter, 'The Rush for the Rare: Reptiles and Amphibians in the European Pet Trade', *Animals* 10, no. 11 (10 November 2020): 2085, https://doi.org/10.3390/ani10112085.

e. Marshall, Strine, and Hughes, 'Thousands of Reptile Species Threatened by Under-Regulated Global Trade'.

f. Janine E. Robinson *et al.*, 'Dynamics of the Global Trade in Live Reptiles: Shifting Trends in Production and Consequences for Sustainability', *Biological Conservation* 184 (1 April 2015): 42–50, https://doi.org/10.1016/j.biocon.2014.12.019.

BOX 4.4 Expert insights into corruption and wildlife crime

Between November 2022 and April 2023, UNODC undertook interviews with selected experts involved in law enforcement, criminal justice or related research or capacity building in government and non-governmental organizations. Among 17 respondents interviewed, only six were able to speak about specific examples of which they had first-hand knowledge. The survey was organized to establish a baseline understanding of the nature of corrupt relationships that facilitate the illegal import/export of wildlife through points of entry and to identify research gaps, opportunities, and directions for future work.

The types of corruption incidents (e.g. through bribery, trading in influence, abuse of functions) that were discussed by respondents when describing specific cases involved the following:

- Bribed to turn a blind eye and not inspect shipments at checkpoints.
- Provided access to information (e.g. patrol schedules for coastguard).
- Paid bribe to avoid arrest following detection by authorities.
- Abused functions by providing falsified documents (e.g. CITES permits).
- Abused functions by reselling confiscated wildlife.
- Bribed a public official to provide direct assistance physically to move the product through checkpoints.

Government officials involved in the schemes ranged from entry-level to senior management and higher-level government officials were suspected to be involved in some instances. Functions included: coastguards, customs, police and environmental agencies. In some cases, a government official was directly involved or leading the transnational shipment of wildlife. In terms of rewards, the government officials in all the described incidents received monetary gains for their participation in corrupt activities.

Establishment of corrupt relationships:

- Through collaboration with family or friends.
- An employment position had provided the opportunity to meet and connect with people involved in trade and access resources to facilitate illegal trade.
- Social networks had exposed officials to potential corruption by traffickers.
- Some corruption was reactive, a response to being detected.
- How the terms of the relationship were established was largely unknown.

Maintenance of corrupt relationships:

- Relationships generally continue because they are mutually beneficial.
- Some get locked into relationships through coercion (e.g. threats of violence).
- Some relationships can last for long periods of time (years).
- Some participants hide schemes through concealment methods, but some do not hide them because there is nothing to stop them continuing (systemic issues).

Breakdown of relationships:

- A conflict between the parties had emerged, perhaps related to a loss of trust although details were not clear.
- Some relationships were no longer beneficial although this raises questions about how suitable alternatives are found or if services are no longer needed (e.g. no one checks at the border regardless of whether bribes were on offer).
- There was little knowledge of what happens to corrupt relationships when they are detected—whether this causes the corruption to stop or be displaced to other people.

the Convention are employed by public officials who facilitate wildlife crime perpetrators who may offer bribes to officials for information on the movement of wildlife or patrols, to obtain licences or permits, to allow illegal specimens to pass through controls and borders, or to ensure that illegal shipments are not inspected or seized, as well as money-laundering to conceal the proceeds of crime.[84,85] Corruption is an enabling element of wildlife crime at all stages of the trade chain. In source countries, first line wildlife defenders are an obvious target for traffickers as they are often poorly paid for what can be dangerous work. One study found that in just one section in the south of Kruger National Park in South Africa, 14 of its 20 rangers have been linked to poaching networks, many recruited with a combination of promises and threats.[86] In some cases, the rangers may become poachers or traffickers themselves. A ranger in Zimbabwe was recently arrested alongside a police officer and a retired police officer in a sting in which they offered to sell almost 30 kg of ivory to undercover officers.[87] When active rangers cannot be corrupted, former ones may be the next option as they have first-hand knowledge of the enforcement mechanisms that must be circumvented. Operation Blood Orange in South Africa implicated two former park rangers who, "Provided tactical information to rhino poaching syndicates in exchange for substantial sums of money."[88] An overview of how corruption impacts wildlife ranger work highlighted weak governance systems as a critical vulnerability.[89]

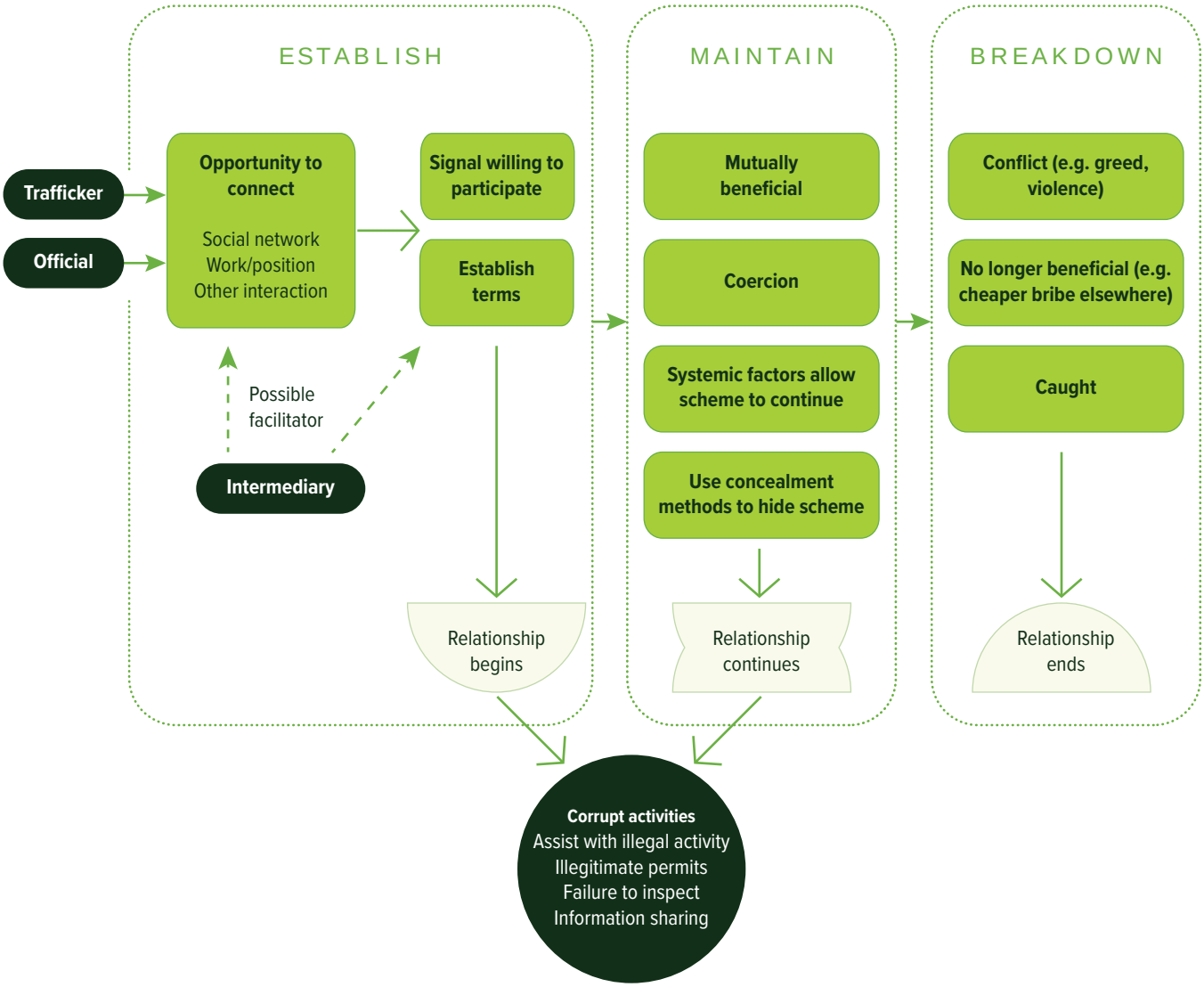
In some countries the revenues related to wildlife trafficking are apparently attractive enough to extend corruption to senior levels of government. For example, in 2023 the Government of the United States barred entry by three senior government officials responsible for wildlife trade regulation in the Democratic Republic of the Congo, for allegedly, "Trafficking chimpanzees, gorillas, okapi, and other protected wildlife ... using falsified permits, in return for bribes."[90] This is not the first time this particular management authority has been implicated: a 2018 international investigation into an attempt to export African manatees resulted in the arrest of a staff member from the CITES Management Authority in the Democratic Republic of the Congo.[91] Reviews of evidence on corruption links to wildlife trafficking have highlighted arrests and conviction of senior government officials in a range of countries in Africa, Asia and Latin America.[92,93,94]

Another point of vulnerability is government stockpiles. In 2018, a customs official in Viet Nam was reportedly sentenced to 16 years in prison for stealing ivory and rhinoceros horn from government stockpiles.[95] A similar case emerged in 2023 in Malaysia involving pangolin scales.[96] A series of ivory seizures have been connected through inventory markings and isotope analysis to Burundi stockpiles,[97] and a similar situation pertains to the rosewood stockpiles of Madagascar.[98] Other forms of corrupt acts could well be applicable to these cases, such as diversion of property, embezzlement, trading in influence and abuse of functions, all of which are listed in UNCAC.

The role of corruption as a facilitator of wildlife crime is receiving increased attention and research effort in recent years. This issue was specifically flagged as a growing concern and focus for action in a 2016 CITES resolution,[99] and the urgent necessity to address environmental crime and corruption was the subject of a 2019 resolution of the UNCAC Conference of the States Parties.[100] A range of analyses have been published on the role of corruption in enabling illegal wildlife trade flows generally or with respect to specific commodities, including rhinoceros horn and sturgeon caviar.[101,102,103] Available evidence also reveals that women and men experience, participate in, profit from and lose from corruption differently.[104]

To gain some deeper understanding of the underlying mechanisms of corruption linked to wildlife crime, UNODC organized a review of case examples for which corrupt acts were directly addressed by prosecution rather than referred to indirectly in cases typically tried under wildlife legislation. However, limited source data was found to be available. Such information could be of high value for the identification of possible points of intervention and to gain an understanding of why prosecution under laws directly addressing corruption is apparently uncommon, despite potentially higher penalties. To try and address this evidence gap, a consultation was carried out by UNODC in 2022–2023 to seek insights from experts with case-level experience about how corrupt relationships that facilitate the illegal wildlife trade are established, structured and maintained (Box 4.4). These findings are summarized in Figure 4.4.

FIG. 4.4 Establishment, maintenance, and breakdown of corrupt relationships that facilitate illegal transnational wildlife trade



Source: UNODC

Insights from the expert interviews and case studies for the current report illustrate that wildlife crime-related corruption has much in common with corruption affecting other legal and illegal economic sectors. Participants bribed to facilitate illegal wildlife trade at transport checkpoints and borders provide the same services in relation to other forms of contraband, while the road checkpoint corruption described in the rosewood case study in this report is clearly a liability for passage of legal goods too. For wildlife crime, specific vulnerabilities are likely for specialized public sector roles such as harvest and trade permit issuance, animal health and phytosanitary inspection, and control of specialized retail outlets. However, the evidence base for specific points of vulnerability and on the effectiveness of risk mitigation responses for such roles remains weak.

Endnotes

1 A. M. Lemieux, R. S. A. Pickles, and D. Weekers, 'Problem Analysis for Wildlife Protection in 55 Steps' (Arizona USA: Center for Problem Oriented Policing, Arizona State University, 2022), https://popcenter.asu.edu/sites/default/files/problem_analysis_in_55_steps_lemieux_pickles_weekers_2022-single_page.pdf.

2 Other harms do of course occur along the trade chain after sourcing, as elaborated in chapter 2 of this report, including negative environmental, social, economic and governance impacts of wildlife trafficking and associated crime.

3 Such interdictions may of course have other benefits in reducing harms along the trade chain, including prevention of the use of proceeds from crime.

4 Iding A. Haidir *et al.*, 'Examining the Shifting Patterns of Poaching from a Long-Term Law Enforcement Intervention in Sumatra', *Biological Conservation*, 2016, http://dx.doi.org/10.1016/j.biocon.2016.10.029.

5 Serge J.-P. N. Raemaekers and Peter J. Britz, 'Profile of the Illegal Abalone Fishery (Haliotis Midae) in the Eastern Cape Province, South Africa: Organised Pillage and Management Failure', *Fisheries Research* 97, no. 3 (1 May 2009): 183–195, https://doi.org/10.1016/j.fishres.2009.02.003.

6 Tony Long *et al.*, 'Approaches to Combatting Illegal, Unreported and Unregulated Fishing', *Nature Food* 1, no.7 (July 2020): 389–391, https://doi.org/10.1038/s43016-020-0121-y.

7 Andrea A. Stefanus and John A. E. Vervaele, 'Fishy Business: Regulatory and Enforcement Challenges of Transnational Organised IUU Fishing Crimes', *Trends in Organized Crime* 24, no. 4 (1 December 2021): 581–604, https://doi.org/10.1007/s12117-021-09425-y.

8 Vanda Felbab-Brown, 'China-Linked Wildlife Poaching and Trafficking in Mexico' (Washington DC, USA: Brookings, March 2022), https://www.brookings.edu/wp-content/uploads/2022/03/FP_20220328_wildlife_trafficking_felbab_brown.pdf.

9 Alison Hoare, 'Tackling Illegal Logging and the Related Trade' (London, UK: Chatham House, July 2015), https://www.chathamhouse.org/sites/default/files/publications/research/20150715IllegalLoggingHoareFinal.pdf.

10 UNODC, 'Digest of Firearms Trafficking and Related Crimes Cases 2023: A Review of Cases and Related Good Practices Emerging From National Jurisprudence' (Vienna, Austria: UNODC, 2023), https://www.unodc.org/documents/firearms-protocol/Publications/Digest_of_Firearms_Trafficking_Cases.pdf.

11 Kumar Paudel, Gary R. Potter, and Jacob Phelps, 'Conservation Enforcement: Insights from People Incarcerated for Wildlife Crimes in Nepal', *Conservation Science and Practice* 2, no. 2 (2020): e137, https://doi.org/10.1111/csp2.137.

12 Sade Moneron, Ben Brock, and David Newton, 'Insights from the Incarcerated: An Assessment of the Illicit Supply Chain in Wildlife in South Africa - Wildlife Trade Report from TRAFFIC' (Cambridge, UK: TRAFFIC, November 2020), https://www.traffic.org/publications/reports/insights-from-the-incarcerated/.

13 Dominique Prinsloo, Sacha Riley-Smith, and David Newton, 'Trading Years for Wildlife: An Investigation into Wildlife Crime from the Perspectives of Offenders in Namibia.' (Cambridge, UK: TRAFFIC, 2021), https://www.traffic.org/site/assets/files/13405/trading-years-for-wildlife-web.pdf.

14 IRA-005

15 CAL-002

16 BLP-001

17 Nigeria Customs Service Export Prohibition List (presumably related to the Export (Prohibition Act 1989)) see: https://customs.gov.ng/?page_id=3079.

18 CITES, 'Application of CITES Article XIII in Nigeria SC70 Doc 27.3.5' (CITES Secretariat, October 2018), https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-27-03-05.pdf.

19 See the rosewood chapter in UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

20 UNODC, 'Organized Crime in Nigeria: A Threat Assessment' (Abuja: UNODC, September 2023), https://www.unodc.org/documents/nigeria/NOCTA_Web_Version_25.09.2023.pdf.

21 The rosewood case study provides further explanation of the reasons why legal exports of rosewood form Nigeria stopped and related CITES mechanisms.

22 Ted Leggett, ed., *Wildlife Crime*, Forum on Crime and Society Special Issue, volume 9, numbers 1 and 2 (2018) (Vienna: United Nations, 2019).

23 TRAFFIC, 'An Overview of Seizures of CITES-Listed Wildlife in the European Union January 2019–December 2019', Analysis compiled for the Euopean Commission (Cambridge, UK: TRAFFIC, March 2021), https://circabc.europa.eu/ui/#.

24 Michael 't Sas-Rolfes *et al.*, 'Illegal Wildlife Trade: Scale, Processes, and Governance', Annual Review of Environment and Resources 44, no. 1 (17 October 2019): 201–228, https://doi.org/10.1146/annurev-environ-101718-033253.

25 Tom Milliken, 'Illegal Trade in Ivory and Rhino Horn: An Assessment Report to Improve Law Enforcement Under the Wildlife TRAPS Project.' (Cambridge, UK: TRAFFIC and USAID, 2014), https://www.traffic.org/site/assets/files/2544/w-traps-elephant-rhino-report.pdf.

26 Wildlife Justice Commission, 'Rhino Horn Trafficking as a Form of Transnational Organised Crime 2012–2021' (Brussels, 2022), https://wildlifejustice.org/publications/rhino-horn-trafficking-as-a-form-of-transnational-organised-crime-2012-2021-2022-global-threat-assessment/.

27 Melissa Arias, 'The Illegal Trade in Jaguars (*Panthera onca*)' (Geneva, Switzerland: CITES Secretariat, 2021), https://cites.org/sites/default/files/articles/CITES_Study_on_Illegal_Trade_in_Jaguars%20.pdf.

28 TRAFFIC, 'An Initial Analysis of the Financial Flows and Payment Mechanisms Behind Wildlife and Forest Crime' (Cambridge, UK: TRAFFIC, 2020), https://www.traffic.org/publications/reports/case-digest-an-initial-analysis-of-the-financial-flows-and-payment-mechanisms-behind-wildlife-and-forest-crime/.

29 Gautam Basu, 'The Role of Transnational Smuggling Operations in Illicit Supply Chains', *Journal of Transportation Security* 6, no. 4 (1 December 2013): 315–328, https://doi.org/10.1007/s12198-013-0118-y.

30 See case study on ivory below.

31 Sum of seizures made in each country and seizures made elsewhere for which these countries were named as country of shipment.

32 Latest CITES reviews of elephant ivory and rhinoceros horn trade: CITES, 'CITES CoP19 Doc. 66.6' (Panama City, 2022), https://cites.org/sites/default/files/documents/COP/19/agenda/E-CoP19-66-06.pdf; CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)' (CoP 19, Panama City, 2022), https://cites.org/sites/default/files/documents/E-CoP19-75-R1.pdf.

33 James Windle and Graham Farrell, 'Popping the Balloon Effect: Assessing Drug Law Enforcement in Terms of Displacement, Diffusion, and the Containment Hypothesis', *Substance Use & Misuse* 47, no. 8–9 (10 June 2012): 868–876, https://doi.org/10.3109/10826084.2012.663274.

34 Sade Moneron, Nicola Okes, and Julian Rademeyer, 'Pendants, Powder and Pathways: Smuggling Routes and Techniques in the Illicit Trade in African Rhino Horn' (Cambridge, UK: TRAFFIC, September 2017), https://www.traffic.org/site/assets/files/1313/pendants-powder-pathways.pdf.

35 https://www.justice.gov/usao-sdfl/pr/cambodian-officials-and-six-co-conspirators-indicted-taking-part-primate-smuggling-0.

36 IPBES, 'Thematic Assessment of the Sustainable Use of Wild Species of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' (IPBES Secretariat, 2022), https://doi.org/10.5281/zenodo.6448567.

37 R. Nasi *et al.*, 'Wild Meat', Report (The CGIAR Research Program on Forests, Trees and Agroforestry (FTA), 18 November 2021), https://www.foreststreesagroforestry.org/.

38 C. J. E. Schulp, W. Thuiller, and P. H. Verburg, 'Wild Food in Europe: A Synthesis of Knowledge and Data of Terrestrial Wild Food as an Ecosystem Service', *Ecological Economics* 105 (September 2014): 292–305, https://doi.org/10.1016/j.ecolecon.2014.06.018.

39 Nasi *et al.*, 'Wild Meat'.

40 IPBES, 'Thematic Assessment of the Sustainable Use of Wild Species of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services'.

41 S. Gombeer, C. Nebesse, and P. Musaba, "Exploring the Bushmeat Market in Brussels, Belgium: A Clandestine Luxury Business," *Biodiversity and Conservation* 30 (2021): 55–66, https://doi.org/10.1007/s10531-020-02074-7.

42 Daniel J. Ingram *et al.*, 'Wild Meat Is Still on the Menu: Progress in Wild Meat Research, Policy, and Practice from 2002 to 2020', *Annual Review of Environment and Resources* 46, no. 1 (2021): 221–254, https://doi.org/10.1146/annurev-environ-041020-063132.

43 Ibid.

44 Ibid.

45 Ibid.

46 Alegría Olmedo *et al.*, 'Who Eats Wild Meat? Profiling Consumers in Ho Chi Minh City, Vietnam', *People and Nature* 3, no. 3 (2021): 700–710, https://doi.org/10.1002/pan3.10208.

47 Rebecca Catherine Drury, 'Identifying and Understanding Consumers of Wild Animal Products in Hanoi, Vietnam: Implications for Conservation Management' (UCL (University College London), 2009), https://discovery.ucl.ac.uk/id/eprint/16275.

48 Martin Jenkins, Anastasiya Timoshyna, and Marcus Cornthwaite, *Wild at Home: Exploring the Global Harvest, Trade and Use of Wild Plant Ingredients* (Cambridge, UK: TRAFFIC, 2018), https://www.traffic.org/site/assets/files/7339/wild-at-home.pdf.

49 Jordan Krisfalusi-Gannon *et al.*, 'The Role of Horseshoe Crabs in the Biomedical Industry and Recent Trends Impacting Species Sustainbility', *Frontiers in Marine Science* 5 (5 June 2018), https://doi.org/10.3389/fmars.2018.00185.

50 Sarah Lemke and Andreas Vilcinskas, 'European Medicinal Leeches—New Roles in Modern Medicine', *Biomedicines* 8, no. 5 (May 2020): 99, https://doi.org/10.3390/biomedicines8050099.

51 The World Health Organization (WHO) defines "traditional medicine" as "the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness." https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1.

52 WHO, 'WHO Global Report on Traditional and Complementary Medicine 2019' (World Health Organization, 2019), https://www.who.int/publications-detail-redirect/978924151536.

53 Peter Bai James *et al.*, 'Traditional, Complementary and Alternative Medicine Use in Sub-Saharan Africa: A Systematic Review', *BMJ Global Health* 3, no. 5 (October 2018): e000895, https://doi.org/10.1136/bmjgh-2018-000895.

54 Bach Xuan Tran *et al.*, 'Preference and Willingness to Pay for Traditional Medicine Services in Rural Ethnic Minority Community in Vietnam', *BMC Complementary and Alternative Medicine* 16, no. 1 (December 2015): 48, https://doi.org/10.1186/s12906-016-1010-7.

55 Rômulo Romeu Nóbrega Alves *et al.*, 'Medicine from the Wild: An Overview of the Use and Trade of Animal Products in Traditional Medicines', in *Animals in Traditional Folk Medicine: Implications for Conservation*, ed. Rômulo Romeu Nóbrega Alves and Ierecê Lucena Rosa (Berlin, Heidelberg: Springer, 2013), 25–42, https://doi.org/10.1007/978-3-642-29026-8_3.

56 James *et al.*, 'Traditional, Complementary and Alternative Medicine Use in Sub-Saharan Africa'.

57 Mayuree Tangkiatkumjai, Helen Boardman, and Dawn-Marie Walker, 'Potential Factors That Influence Usage of Complementary and Alternative Medicine Worldwide: A Systematic Review', *BMC Complementary Medicine and Therapies* 20, no. 1 (23 November 2020): 363, https://doi.org/10.1186/s12906-020-03157-2.

58 Laura Thomas-Walters *et al.*, 'Motivations for the Use and Consumption of Wildlife Products', *Conservation Biology* 35, no. 2 (2021): 483–491, https://doi.org/10.1111/cobi.13578.

59 USAID, 'What Drives Demand for Wildlife: A Situation Analysis of Consumer Demand for Wildlife Parts and Products in China, Thailand and Vietnam, Based on a Literature Review' (Washington DC, USA: USAID, 2017), https://www.usaidrdw.org/resources/reports/inbox/what-drives-demand-for-wildlife.

60 Mark A. Mitchell, 'Chapter 1 - History of Exotic Pets', in *Manual of Exotic Pet Practice*, ed. Mark A. Mitchell and Thomas N. Tully (Saint Louis: W.B. Saunders, 2009), 1–3, https://doi.org/10.1016/B978-141600119-5.50004-4.

61 Julie L. Lockwood *et al.*, 'When Pets Become Pests: The Role of the Exotic Pet Trade in Producing Invasive Vertebrate Animals', *Frontiers in Ecology and the Environment* 17, no. 6 (2019): 323–330, https://doi.org/10.1002/fee.2059.

62 Joseph A. Cacioppo *et al.*, 'A Survey of Husbandry and Breeding Techniques in the Ball Python (*Python regius*) Pet Trade', *Journal of Herpetological Medicine and Surgery* 31, no. 1 (1 May 2021): 25–35, https://doi.org/10.5818/JHMS-05-2020.

63 Jennifer M. Robinson, 'The Dynamics of Avicultural Markets', *Environmental Conservation* 28, no. 1 (March 2001): 76–85, https://doi.org/10.1017/S0376892901000078.

64 CITES Secretariat, 'World Wildlife Trade Report 2022' (Geneva, Switzerland: CITES Secretariat, 2022).

65 James S. Sinclair *et al.*, 'The International Vertebrate Pet Trade Network and Insights from US Imports of Exotic Pets', *BioScience* 71, no. 9 (1 September 2021): 977–990, https://doi.org/10.1093/biosci/biab056.

66 CITES Secretariat, 'World Wildlife Trade Report 2022'.

67 Anna Hausmann *et al.*, 'Assessing Preferences and Motivations for Owning Exotic Pets: Care Matters', *Biological Conservation* 281 (May 2023): 110007, https://doi.org/10.1016/j.biocon.2023.110007.

68 David Tsz Chung Chan *et al.*, 'Global Trade in Parrots – Influential Factors of Trade and Implications for Conservation', *Global Ecology and Conservation* 30 (1 October 2021): e01784, https://doi.org/10.1016/j.gecco.2021.e01784.

69 Mitchell, 'Chapter 1 - History of Exotic Pets'.

70 Leonarda B. Spee *et al.*, 'Endangered Exotic Pets on Social Media in the Middle East: Presence and Impact', *Animals 9*, no. 8 (August 2019): 480, https://doi.org/10.3390/ani9080480.

71 Penthai Siriwat and Vincent Nijman, 'Illegal Pet Trade on Social Media as an Emerging Impediment to the Conservation of Asian Otters Species', *Journal of Asia-Pacific Biodiversity* 11, no. 4 (1 December 2018): 469–475, https://doi.org/10.1016/j.japb.2018.09.004.

72 Cheetah trade: CITES, 'The Legal and Illegal Trade in Big Cats: A Study in Support of Decision 18.246. CITES SC75 Doc. 13 (Rev. 1)' (Geneva, Switzerland: CITES Secretariat, 13 November 2022), https://cites.org/sites/default/files/documents/E-SC75-13-R1.pdf.

73 GRASP and IUCN, 'Great Apes Status Report: CITES SC70 Doc 52' (Geneva, Switzerland: CITES, August 2018), https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-52.pdf.

74 S. W. Anderson, 'A Neural Basis for Collecting Behaviour in Humans', *Brain* 128, no. 1 (17 November 2004): 201–212, https://doi.org/10.1093/brain/awh329.

75 Susan Koppelman and Alison Franks, eds., Collecting and the Internet: *Essays on the Pursuit of Old Passions through New Technologies* (Jefferson, N.C: McFarland & Co, 2008).

76 Anna Hausmann, Gonzalo Cortes-Capano, and Enrico Di Minin, 'Exploring the Effects of Market Scarcity on Consumers' Demand for Rarity in the Wildlife Trade', *Global Ecology and Conservation* 48 (1 November 2023): e02744, https://doi.org/10.1016/j.gecco.2023.e02744.

77 Hausmann *et al.*, 'Assessing Preferences and Motivations for Owning Exotic Pets'.

78 Hoai Nam Dang Vu and Martin Reinhardt Nielsen, 'Understanding Determinants of the Intention to Buy Rhino Horn in Vietnam through the Theory of Planned Behaviour and the Theory of Interpersonal Behaviour', *Ecological Economics* 195 (May 2022): 107361, https://doi.org/10.1016/j.ecolecon.2022.107361.

79 Julie M. Ayling, 'A Regulatory Approach to Demand Reduction in the Illegal Wildlife Market', SSRN Scholarly Paper (Rochester, NY, 2015), https://doi.org/10.2139/ssrn.2634303.

80 Annah Lake Zhu, 'China's Rosewood Boom: A Cultural Fix to Capital Overaccumulation', *Annals of the American Association of Geographers* 110, no. 1 (2 January 2020): 277–96, https://doi.org/10.1080/24694452.2019.1613955.

81 Brendan Brown, 'Collectables', in *A Theory of Hedge Investment*, ed. Brendan Brown (London: Palgrave Macmillan UK, 1982), 185–191, https://doi.org/10.1007/978-1-349-06103-7_10.

82 Roman Kraeussl and Robin Logher, 'Emerging Art Markets', *Emerging Markets Review* 11, no. 4 (December 2010): 301–318, https://doi.org/10.1016/j.ememar.2010.07.002.

83 Adam Graycar and David Jancsics, 'Gift Giving and Corruption', *International Journal of Public Administration* 40, no. 12 (15 October 2017): 1013–1023, https://doi.org/10.1080/01900692.2016.1177833.

84 UNODC, 'Preventing and Combating Corruption as It Relates to Crimes That Have an Impact on the Environment: An Overview.' (Vienna, Austria: UNODC, 2021), https://www.unodc.org/documents/treaties/UNCAC/COSP/session9/CAC-COSP-2021-CRP.8_E.pdf.

85 UNODC, 'Scaling Back Corruption: A Guide on Addressing Corruption for Wildlife Management Authorities' (Vienna, Austria: UNODC, 2020), https://www.unodc.org/documents/Wildlife/19-08373_Scaling_Back_Corruption_ebook.pdf.

86 Julian Rademayer, 'Landscape of Fear Crime, Corruption and Murder in Greater Kruger', ENACT Research Paper, January 2023, https://enactafrica.org/research/research-papers/landscape-of-fear-crime-corruption-and-murder-in-greater-kruger.

87 Lyndie Whiz, 'Zimbabwe: Game Ranger, Police Officer Arrested over Possession of 28.35kg of Ivory', *The Journal of African Elephants*, 7 April 2022, https://www.africanelephantjournal.com/zimbabwe-game-ranger-police-officer-arrested-over-possession-of-28-35kg-of-ivory/.

88 https://www.saps.gov.za/newsroom/msspeechdetail.php?nid=43672.

89 Mike Belecky, William Moreto, and Rob Parry-Jones, 'Corrupting Conservation: Assessing How Corruption Impacts Ranger Work | Publications | WWF' (Targeting Natural Resource Corruption, April 2021), https://www.worldwildlife.org/publications/corrupting-conservation-assessing-how-corruption-impacts-ranger-work.

90 https://www.state.gov/designation-of-democratic-republic-of-the-congo-drc-public-officials-for-significant-corruption/.

91 https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-30-001.pdf.

92 OECD, 'Strengthening Governance and Reducing Corruption Risks to Tackle Illegal Wildlife Trade: Lessons from East and Southern Africa' (Paris, France: OECD, 2018), https://doi.org/10.1787/9789264306509-en.

93 Wildlife Justice Commission, 'Dirty Money: The Role of Corruption in Enabling Wildlife Crime' (The Hague, Netherlands: Wildlife Justice Commission, July 2023), https://wildlifejustice.org/wp-content/uploads/2023/07/corruption-report-2023-SPREADS-V12.pdf.

94 Jorum Duri, 'Corruption and Environmental Crime in Latin America' (U4 Anti-Corruption Resource Centre,2020), https://www.u4.no/publications/corruption-and-environmental-crime-in-latin-america.

95 https://www.traffic.org/news/former-hanoi-customs-officer-gets-16-years/.

96 https://www.sprm.gov.my/index.php?id=21&page_id=105&contentid=2969.

97 Thure E. Cerling *et al.*, '14-Carbon Demonstrates That Some Illegal Ivory Is Being Taken from Government Stockpiles', *Proceedings of the National Academy of Sciences* 119, no. 44 (November 2022): e2211550119, https://doi.org/10.1073/pnas.2211550119.

98 See, for example, CITES Notification to Parties 2022/005: https://cites.org/sites/default/files/notifications/E-Notif-2022-005.pdf.

99 CITES Resolution Conf. 17.6 (Rev. CoP19) on prohibiting, preventing, detecting and countering corruption, which facilitates activities conducted in violation of the Convention: https://cites.org/sites/default/files/documents/COP/19/resolution/E-Res-17-06-R19.pdf.

100 UNCAC CoSP Resolution 8/12 on Preventing and combating corruption as it relates to crimes that have an impact on the environment, https://www.unodc.org/unodc/en/corruption/COSP/session8-resolutions.html.

101 Wildlife Justice Commission, 'Dirty Money: The Role of Corruption in Enabling Wildlife Crime'.

102 Louisa Musing *et al.*, 'Corruption and Wildlife Crime: A Focus on Caviar Trade' (Cambridge, UK: TRAFFIC, WWF, U4 ACRC, Utrecht University, and Northumbria University, 2019), https://www.traffic.org/site/assets/files/11818/corruption-and-caviar-final.pdf.

103 See: UNAID-funded Targeting Natural Resource Corruption (TNRC) programme resources: https://www.worldwildlife.org/pages/tnrc-targeting-natural-resource-corruption.

104 Rachel Kramer, Elizabeth Hart, and Nathalie Simoneau, 'Reducing Corruption's Impact on Natural Resources: How Does a Gender Lens Help?' (Washington DC, USA: Targeting Natural Resource Corruption, 2020), https://biodiversitylinks.org/projects/current-global-projects/tnrc/resources/reducing-corruption2019s-impact-on-natural-resources-how-does-a-gender-lens-help.pdf/view.

Chapter 5

What works?

What works to decrease wildlife crime?

Policy makers, regulatory and enforcement agencies, and funding institutions have good reason to seek insights into which interventions are effective in decreasing wildlife crime and in what contexts success has been achieved. Such knowledge can inform decisions about which interventions to fund or implement and which policies to pursue.[1]

A critical question to consider in assessing the impact of interventions aimed to decrease wildlife crime is what constitutes success? In basic terms, levels of criminal activity are expected to decline and flows of illegal trade to decrease, leading to a reduction in the severity of the various types of harm discussed in chapter 3 of this report. As harms reduce, positive benefits may result, such as recovery of wildlife populations or restoration of lost livelihoods.

It is not easy to measure the impact of crime reduction interventions although for some, immediate results may be obvious, such as increased arrests or seizures arising from an increase in patrolling or inspections. Others, such as the outcome of interventions aimed to deter or disrupt trafficking or reduce opportunities for crime, are more difficult to assess. In such cases a successful outcome is that a potential criminal act does not take place.

Furthermore, it is also difficult to discern which results arise from a specific intervention and which relate to other causes of change in the levels of crime and related harms that might have occurred regardless. There is also the question of how to assess and view displacement of crime. One intervention may have a positive impact in one location or on one commodity but may or may not push the crime to other locations or other commodities.

BOX 5.1 Funding wildlife crime interventions

Globally, most interventions to reduce wildlife crime are likely managed and resourced from within individual government budgets. This includes financing ranger, police, customs, and criminal justice functions. There is limited available data to quantify such investments, in part because they are typically embedded within budget allocations, such as an annual allocation for policing or customs controls. It is also important to recognize that there is likely considerable variability at a national level in terms of the adequacy of these allocations.

Funding to address wildlife crime is also provided by multilateral, national and private donor institutions. While it is not possible to assess how the level of such international donor funding compares to the financial resources spent by national governments to tackle illegal wildlife trade, useful information is available on where and how it is allocated. A World Bank survey of multilateral and bilateral donor agencies, foundations, United Nations programmes and international non-governmental organizations found that over $1.3 billion had been committed between January 2010 and June 2016 to combat illegal wildlife trade in Africa and Asia, approximately $190 million per year.[a] Donor funding was allocated to projects in 60 different countries and to various regional/multi-country and global projects. In total, 63 per cent of the funds were committed to Africa ($833 million), 29 per cent to Asia ($381 million), 6 per cent to global programmes and initiatives ($81 million), and 2 per cent to projects covering both Africa and Asia ($35 million). The top five recipient countries accounting for $328 million were: United Republic of Tanzania (8 per cent), Democratic Republic of the Congo (5 per cent), Mozambique (5 per cent), Gabon (3 per cent), and Bangladesh (3 per cent).

The purpose of funding allocations was broken down into various categories (Table 5.1).[a]

This significant volume of funding begs the question as to whether the interventions funded by these donors were effective. Notably only 6 per cent of the funding was allocated to research and assessment. This limited investment may in part explain why the evidence base for the efficacy of interventions to counter wildlife crime is so limited.

Table 5.1 Funding allocations to address different aspects of wildlife crime

Type of action	% of funding
Supporting protected area management to help prevent poaching	46%
Law enforcement that included intelligence-led operations and transnational coordination	19%
Sustainable use and alternative livelihoods	15%
Policy and legislation	8%
Communication and awareness raising	6%
Research and assessment	6%

Source: World Bank

a. World Bank Group, *Analysis of International Funding to Tackle Illegal Wildlife Trade* (World Bank, Washington, DC, 2016), https://doi.org/10.1596/25340.

The evidence-base for the identification of what works and what does not work to prevent wildlife crime is in the early stages of development. Existing prevention efforts draw primarily on the knowledge and expertise of individual practitioners, qualitative learning, and inference from logic models. Formal evaluations of wildlife crime prevention are rare, particularly those with strong evaluation designs.[2]

Intervention planning for some other crime sectors benefits from more sophisticated evaluations of interventions and a strong body of professional experience and research provides helpful insights into what works for crime prevention. Some of the insights from other sectors can help widen the scope of approaches used in responding to wildlife crimes.

This chapter begins by classifying different types of interventions to counter wildlife crime. It then probes evidence about which of these interventions work best to reduce wildlife trafficking levels and related harms, based on available literature and some illustrative examples. The chapter then takes stock of what can be learned from the evidence of what works to address other crime types and refers to some existing sources of guidance on how such approaches might be applied in the wildlife crime sector. Finally, there is a discussion of future needs for building and using evidence to evaluate outcomes and impacts of crime prevention interventions properly.

A taxonomy of interventions to counter wildlife crime

Several types of intervention are currently employed to reduce wildlife crime and illegal wildlife trade. The approach in the following analysis is focused primarily on wildlife crime interventions intended to engage directly with the people involved or potentially involved in the criminal supply chain. They are separated into three generalized trade stages, at source, in trade and at consumption. Criminal justice interventions, treated as a fourth distinct category, are applied at all of these trade stages (Figure 5.1).

These wildlife crime interventions are distinguished from other types of action that are aimed to shape or shift the enabling environment in which wildlife crime takes place. As illustrative examples, a change in trade rules through legislation or a new mechanism for inter-agency cooperation may be critically important in shaping the environment for reducing illegal wildlife trade. However, such initiatives will only have impact when implemented through direct wildlife crime interventions, whether that be simply through deterrence triggered by publicity about the new initiative or through active enforcement action.

What evidence is there about which interventions to counter wildlife crime work best?

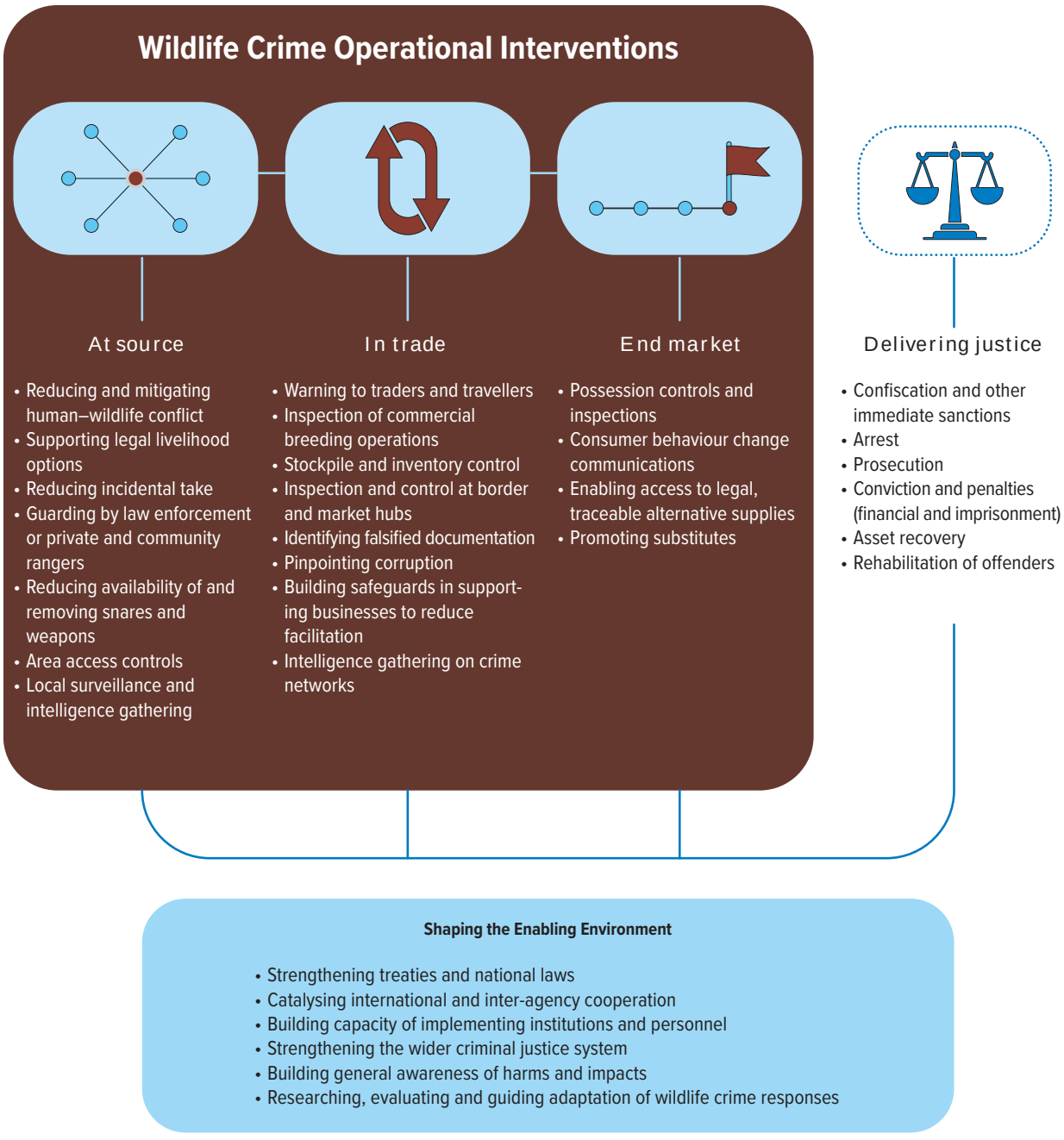
There are remarkably few published systematic assessments of the effectiveness of wildlife crime interventions. When such assessments are carried out, their value as a basis for evaluation depends largely on whether they can draw a clear comparison between the situation before and after remedial interventions were made.

One group of researchers used a systematic mapping approach to collate the existing body of literature addressing the effectiveness of interventions to counter wildlife crime, including those that directly protect wildlife from illegal harvest, detect and sanction rulebreakers, and interdict and control illegal wildlife commodities.[3] The "effectiveness" of interventions was viewed in terms of whether they could be linked to biological or threat reduction outcomes.[4] The focus was plant and animal species targeted by the international grant programmes and law enforcement activities of the United States Fish and Wildlife Service (USFWS), specifically those directly threatened by exploitation and native to Africa, Asia and Latin America.[5]

Preliminary results of this research have been provided to UNODC for the current report in advance of publication as follows:

- 530 studies from 477 articles met the inclusion criteria and were subsequently included in the systematic map (Figure 5.2).
- The most common species groups for which relevant studies were identified were African and Asian elephants (16 per cent of studies), followed by felids (14 per cent), and turtles and tortoises (11 per cent).

FIG. 5.1 A taxonomy of interventions aimed to counter wildlife crime and actions aimed to shape the enabling environment



Source: UNODC

- Approximately 90 per cent of the evidence base included an evaluation of interventions to counter wildlife crime employing only post-intervention data and lacked any before/baseline intervention data or spatial comparator.

- Only 11 per cent of the evidence base used direct biological measures (e.g. increased wildlife population numbers) to evaluate intervention effectiveness; instead, most often, threat reduction (e.g. fewer poaching incidents) or intermediate outcomes (e.g. increase in offender arrests) were used as indicators of a potential or perceived change in population/species outcomes.

- Many knowledge gaps still exist in examining interventions to address wildlife crime for (1) Latin America, (2) all relevant plants (e.g. rosewoods, mahoganies, cycads, succulents, aloes), (3) reptiles and birds, especially related to actions aiming to prevent the loss of target wildlife species from their habitat by illegal harvesters (i.e. wildlife population-centric actions), and (4) non-patrol-based interventions to counter wildlife crime.

- Among the different intervention types and impacts covered by the systematic mapping, "the effectiveness of patrol regimes on population abundance" was identified as a candidate for further synthesis, based on the presence of sufficient pre- and post-intervention evidence.

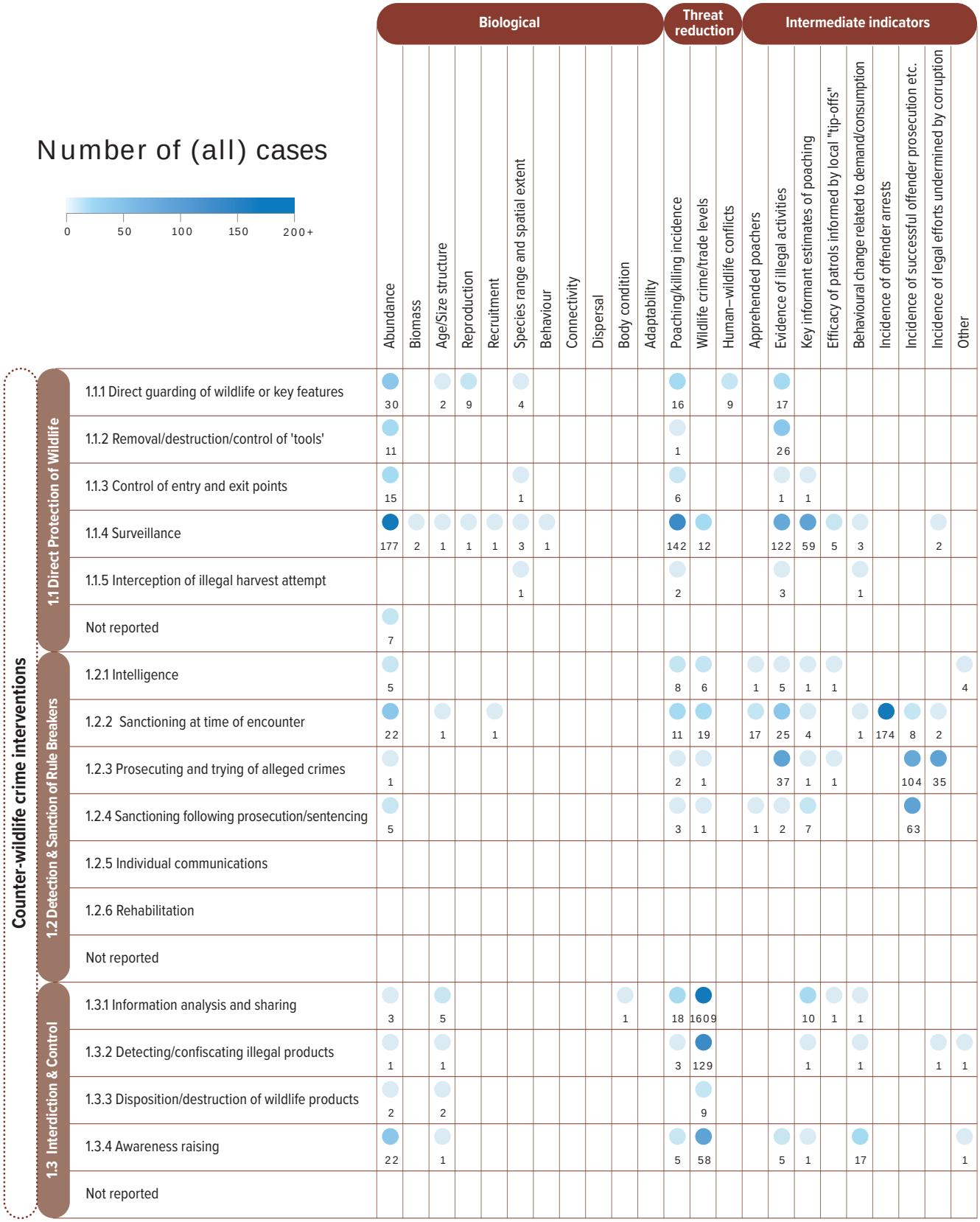
- Initial findings of this further analysis indicate that overall, for areas implementing a patrol regime (alongside other interventions) there was an increase, on average, in wildlife abundance of African, Asian, and Latin American wildlife directly threatened by exploitation compared to a time period(s) or location(s) where no patrols (or some baseline level of patrols) were conducted. However, causality is difficult to confirm.

- Detailed results of the study can be found in the published paper and a deeper analysis of variability within the patrolling subset will be published in due course.

An earlier systematic review focused specifically on interventions to prevent crime involving terrestrial species.[6] This review was based on a full text assessment of over a hundred published articles on wildlife crime prevention and sought quantitative evidence of effectiveness in delivering positive outcomes in reducing crime and poaching impacts on species populations. The study discovered that only five of these studies met the inclusion criteria for further analysis. Some were excluded because they did not focus on direct crime prevention interventions, others because they lacked outcome evidence. The five retained studies took place in four different countries, two in Asia and two in Africa (two different studies in one African country). Studies focused on the impact of anti-poaching patrols indicated that they were effective to a larger or lesser extent in decreasing the prevalence of poaching. Factors highlighted as influencing the efficacy of anti-poaching patrols were: the habitat's accessibility; rangers' level of experience and numbers; the time spent patrolling; the longevity of patrols; the type of patrol conducted; the type of target and its mobility; and the bonus/incentives provided to patrollers. The studies also shed light on various supporting conditions for patrol efficiency that those designing anti-poaching patrols might consider. However, the results are from a low number of studies focused on rhinoceros, elephants, and tigers.[7]

A recent review of 115 case studies of community-based interventions to counter illegal wildlife trade featured on the People Not Poaching platform aimed to understand their effectiveness and how this was measured.[8,9] It noted that not all studies provided sufficient evidence to understand how they had determined their intervention was effective at reducing poaching. When they did do so, frequently used indicators were process rather than outcome based, like the number of poaching incidents detected or the number of seizures made, or even the number of individuals involved in education or awareness raising activities. This made it difficult to discern if a reduction in poaching had occurred. This study also noted that behavioural change on the part of poachers was primarily measured by observation rather than quantitatively. In conclusion, it was suggested that future evaluations of community-based approaches to wildlife crime prevention should use stronger social science methods to assess behavioural change in addition to using direct measures of intervention success such as ecological indicators (population numbers, changes in reproductive rates).

FIG. 5.2 Heatmap of wildlife crime studies by intervention and measured outcome type



Source: Rytwinski *et al.*, 2024[10]

At the other end of the trade chain, a recent meta-analysis of communication campaigns and other initiatives potentially impacting illegal wildlife consumption in selected countries in Asia assessed evidence of reductions in indicators of consumer demand. Post-campaign evaluation through market surveys indicated an average 50 per cent drop from 2018–2020 in consumers' intent to buy wildlife products and a 30 per cent decrease in perceived social acceptability of buying and using wildlife products. Research also showed significant reductions in demand related indicators, including attitudes/beliefs driving consumption, social acceptability, and intention to purchase.[11] However, these findings are not definitive in terms of reducing actual demand. Demonstrating links between attitudinal changes and reductions in actual purchasing behaviour is difficult and requires triangulation with other measures of market trends.[12]

Overall, the challenge of finding evidence of what works remains. Many evaluations are designed only to measure process outputs rather than outcomes and many are carried out within short-term projects before it is realistic for impact to be noticed. Even the more ambitiously structured evaluations can fail to discern clear patterns. Indeed, it is technically very challenging to evaluate quantitatively how interventions, often with multiple elements, impact complex social-ecological systems. Moreover, the scope of interventions that are evaluated is geographically and thematically biased. For example, a review of the Conservation Evidence platform database for primates showed that: 1) fewer than 1 per cent of studies evaluated conservation effectiveness, and 2) those studies that included an evaluation were biased geographically on certain types of interventions and on specific taxa of primates.[13,14] Evaluations undertaken by institutions typically focus on understanding the impact of their priority interventions. A 2015 USAID review of the metrics used to assess illegal wildlife trade interventions focused mainly on two strategic approaches:[15] building capacity for effective enforcement and prosecution; and improving monitoring and response to the status and trends of wildlife and wildlife crime together. These two strategic, but non-operational intervention types, accounted for 70 per cent of the metrics reported on.

Learning from success

Despite the paucity of impact-level evidence, it is nevertheless informative to consider cases in which success at an outcome level has been demonstrated. Actions taken to address wildlife crime and indicators used to measure outcomes are summarized in Box 5.2 for four examples of successful wildlife crime interventions compiled for a 2020 guide on problem-oriented wildlife protection.[16] These successes in reducing wildlife crime indicate that, despite the size and scope of the global illicit wildlife trade, there are grounds for cautious optimism. The case studies summarize the preventive responses and the indicators for interventions with manta rays, Amur falcons, leopards, and illegal fishing. They are described here using the problem-solving cycle for crime reduction known as SARA (Scanning, Analysis, Response, and Assessment).[17]

Common characteristics of the successful case studies include the diverse information gathered, the focus on a specific rather than generalized problem, and the locally appropriate responses introduced. A set of responses, rather than a single response, was common, and crime prevention research suggests that a set of measures is more effective because they reinforce each other to positive effect.[18] The interventions in the case studies worked via numerous mechanisms. Some initiatives blocked crime opportunities, including promoting the accountability of fishing vessel movements, and removing nets used for falcon trapping. Such measures reduce access to targets, facilitate compliance with the law, and make it much harder for offenders to act. Other responses reduced the reward to poachers, including the distribution of subsidized leopard skins to reduce the market for illegal products and the promotion of tourism that encouraged local conservation with a set of guidance rules, increased formal surveillance, and alerted the conscience of local poachers. Where traditional law enforcement techniques, such as patrols and arrests, were used, it was complementary to other responses.

It can be argued that the decline of the ivory market described in the case study in this report is also an

BOX 5.2 Some examples of wildlife crime interventions with evidence of successful outcomes

Example 1: Foiling falcon trapping in India

The Amur falcon is the longest-distance migrant raptor in the world and passes through Nagaland, India, where it is nationally protected, as part of its 22,000 km annual migration from North-East Asia to Southern Africa. Through *scanning* of the case, it was clear that the problem was large-scale trapping of migrating Amur falcons at Doyang Reservoir in Nagaland for cheap meat. *Analysis* showed falcons were killed during a 10-day period when congregating for migration. Around 70 hunter groups in three villages used fishing nets to catch the birds. Research indicated that trapping did not have a cultural motivation and that trapper behaviour might be strongly influenced by village council and male local religious leaders. In *Response*, the Nagaland Fisheries Department seized nets and posted reservoir guards, local leaders discouraged falcon consumption, hunters were supported to transition into tourist guides and falcon protection teams, eco-clubs were established, and falcon protection encouraged. *Assessment* found that falcon trapping declined from at least 120,000 birds in 2012 to zero in 2013 with minimal evidence of illegal harvest during subsequent surveys through to 2019.[a,b,c]

Example 2: Interrupting illegal fishing in Australia

Scanning of the problem identified illegal commercial fishing in unapproved areas or at unapproved times. *Analysis* showed that fishers bypassed regulations by failing to install a vessel monitoring system (VMS) on board and/or have it always operating. In *Response*, a team was formed that cross-checked logbooks against VMS data within three days of landing, along with a zero-tolerance policy whereby patrols forced vessels without VMS to return to port. *Assessment* found VMS compliance rates increased from 87.5 to 97.9 per cent during the study period in the mid-2010s.[d]

Example 3: Protecting manta rays in Indonesia

Scanning of evidence determined that the problem was illegal hunting of manta rays in Eastern Indonesia, where these species have been protected since 2014. Hunting was motivated by demand for manta ray gills in traditional medicine markets elsewhere in Asia. *Analysis* determined that one village was the location of the illegal hunting and market, with a group of repeat offenders who targeted concentrations of manta rays at certain times. The *Response* was patrols focused on the problem times and locations. High-level traders were prosecuted, supported by training of the judiciary. Livelihood interventions were focused on hunters, processors, and the community. *Assessment* found manta ray hunting in the intervention area declined 85 per cent in 2017 compared to the 2013 baseline.[e]

Example 4: Lessening leopard poaching in South Africa

Scanning of the situation identified the problem as illegal, unlicensed leopard hunting for fur capes used in local traditional religious ceremonies. *Analysis* estimated thousands of leopard skins in use locally by one religious community within South Africa. Capes were costly and lasted seven years, but some community members used artificial capes. There was low awareness of leopards' threatened status. The *Response* was the manufacture and distribution from 2013 onwards of durable synthetic leopard skins, initially free before transition to a sustainable business model, combined with education to reduce the desirability of wild leopard skins. *Assessment* showed the proportion of real leopard skins in use by the community likely dropped to 50 per cent by 2018.[f]

a. Sahana Ghosh, 'A Naga Village's Journey from Hunting Ground to Safe Haven for the Amur Falcon', Mongabay-India, 4 May 2018, https://india.mongabay.com/2018/05/a-naga-villages-journey-from-hunting-ground-to-safe-haven-for-the-amur-falcon/.

b. *The Pangti Story*, Documentary, 2016, https://www.youtube.com/watch?v=kJrPg2rWav0.

c. Anwaruddin Choudhury, Anil Kumar Goswami, and Debendra Luitel, 'Three Years Monitoring of the Amur Falcon *Falco amurensis* at a Roosting Site in Assam in North-East India', *The Rhino Foundation*, 2020, Newsletter and journal of the Rhino Foundation for Nature in North East India.

d. Mark C. G. Gibson, 'Problem-Oriented Policing for Natural Resource Conservation', in *Conservation Criminology* (John Wiley & Sons, Ltd, 2017), 115–31, https://doi.org/10.1002/9781119376866.ch7.

e. Hollie Booth *et al.*, 'An Integrated Approach to Tackling Wildlife Crime: Impact and Lessons Learned from the World's Largest Targeted Manta Ray Fishery', *Conservation Science and Practice 3*, no. 2 (February 2021), https://doi.org/10.1111/csp2.314.

f. Vincent N. Naude *et al.*, 'Longitudinal Assessment of Illegal Leopard Skin Use in Ceremonial Regalia and Acceptance of Faux Alternatives among Followers of the Shembe Church, South Africa', *Conservation Science and Practice 2*, no. 11 (2020): e289, https://doi.org/10.1111/csp2.289.

illustration of how multifaceted interventions can bring success. These interventions include both demand and supply reduction strategies: introduction of stricter domestic market restrictions in China, Thailand and other countries in the late 2010s represented a major shift in the enabling environment.[19] Operational interventions included market inspection and enforcement of new domestic trade restrictions, large-scale communication to both retailers and potential customers about risks of non-compliance, and an increase in international collaboration to identify and close important smuggling routes and networks.[20,21] In combination, these measures appear likely to have contributed significantly to declining illegal ivory trade flows inferred by the triangulation of different indicators: poaching levels, seizures and market prices.

What can be learned from the evidence of what works to address other crime types?

There are gaps in the evidence of what works to reduce wildlife trafficking across all intervention types, from livelihood-related actions at source through to demand reduction in end markets. Based on the review in the previous section of this chapter, the shortage of evidence appears to be particularly acute for interventions aimed to disrupt criminal activity through law enforcement and other criminal justice actions. It therefore makes sense to take stock of the knowledge accumulated by criminologists and enforcement strategists who have evaluated interventions aimed to address other crime sectors. Some crime types that, for decades, appeared likely to continue to increase have been contained, and others significantly reduced. Car crime, burglary, and violence that once characterized high-income countries, have generally been declining for decades. This reflects the blocking of crime opportunities, particularly through security improvements to vehicles, households, businesses, and in many sectors of public and private life.[22]

The following examples by no means represent a comprehensive review of research on action against other crime types, rather they illustrate the types of lessons that might be taken into account in shaping effective interventions to counter wildlife crime.

Targeting enforcement effort

Crime requires the convergence in time and space of a likely offender who is disposed to committing crime, a suitable target that is attractive to an offender, and the absence of a capable guardian to prevent the crime.[23] These circumstances only come together at certain points and in certain places in a predictable pattern. However, some basic patterns hold true across crime types, providing insights about the circumstances when risk and the need for prevention are greatest. Examples include the concentration of crime in geographic hotspots,[24] along certain routes,[25] and on specific types of products.[26] Identifying these patterns in crime can help target resources more effectively.

For wildlife crime, application might include focusing patrols on known access routes into national parks and enforcement at critical transport hubs. Caution is needed to avoid confirmation bias, so collation of comprehensive data for analysis of patterns and trends is of great importance. Gaining deeper understanding of participant motivations can also help with the forecasting of places and species likely to be targeted in future by wildlife trafficking.

Understanding and predicting criminal behaviour

Crime scientists have also shown that criminal behaviour can be predicted and manipulated. Offenders often make rational choices, but that rationality is bounded by their understanding of their environment, which is never perfect. They act in a certain way because of their own disposition and because of the cues and reinforcements that their environment provides. A car thief, for example, will choose to target a car that is easy to resell in a parking lot with fewer lights and no visible cameras at a time when they know few people will be parking or retrieving their cars. There is a logic why offenders choose to commit a crime and when and how they do so. Generally, offenders decide to commit a crime by weighing up its risks and benefits at a particular time and place, but they tend to focus on immediate, not long-term, risks and benefits.[27] Understanding how these choices are made is key to designing effective crime prevention interventions.

For wildlife trafficking, as for other crime sectors, there is great potential to learn more about behavioural motivations from qualitative research, such as offender interviews, and to employ such insights to design and target interventions better.

Designing for deterrence

Understanding offenders' decision making is also critical to using deterrence appropriately. The assumption is that punishments like prison will deter specific offenders because the experience of punishment will dissuade them from future crime.[28] Meanwhile, others around the offender who see or hear of the punishment will be discouraged from criminal behaviour.[29] However, the reality of deterrence is far more complicated. The general tenet of classical theories of deterrence is that punishment must be certain, severe, and swift to deter.[30] However, deterrence hinges on the public perception of this and people are poor at accurately predicting arrest certainty or sanction severity.[31] Overall reviews of deterrence conclude that perceptions of the severity of punishment show weak to no impact on crime levels, but the perception of certainty of punishment does.[32] This is because people are remarkably good at assuming "getting caught could never happen to me, it only happens to the unlucky ones.[33]" To design effective interventions, it is important to understand how first-time and repeat offenders perceive risk in their environment when making decisions. The goal is to increase the perception of risk through specific cues that counter crime interventions can place in the environment to deter offenders. An effective approach based on this insight, labelled "focused deterrence", targets high-volume offenders with a combination of increasing perceptions of punishment certainty, while at the same time offering support through provision of social services.[34]

Numerous examples in this report indicate that more strategic approaches to deterrence could enhance wildlife crime reduction interventions. Research in source countries indicates that participants in crime may underestimate risks. Perhaps of even greater concern, higher-level traffickers may perceive impunity and may count on the inefficiency of the criminal justice system. Some high-profile cases that dig deeper into criminal networks, like those related to ivory trafficking in recent years, could have a significant impact on perceptions of risk. For legislative design, there is guidance available on penalty and sentencing approaches to dissuade wildlife crime.[35]

Restorative justice

An alternative approach that shows promise for crime prevention, specifically recidivism (re-offending), is restorative justice. Restorative justice is an approach that focuses on the rehabilitation of offenders by encouraging them to "accept responsibility for the harm caused by their actions to make themselves accountable to those they have harmed," promoting reconciliation with the victim and the community at large who take part in resolving the situation.[36] It has shown evidence of some effectiveness in decreasing repeat offending when carried out within a range of specified parameters. Careful attention is needed to manage any offender-victim meetings and the type of reparation requested. One study focused on recidivism behaviour for various groups of offenders in Australia. Offending by violent youths who participated in a restorative justice conference fell by 49 per cent, while offending for those assigned to traditional court processes only fell by 11 per cent. Offenders and victims reported the conferences to be procedurally fairer than court.[37]

As documented in Chapter 3 of the current report, wildlife trafficking is not a victimless crime as people affected, including environmental defenders, can suffer loss of livelihoods, persecution, injury and loss of life as a result of wildlife offences. Examples in the current report indicate that innovation in criminal justice responses to wildlife crime is particularly worthy of consideration in deterring low-level participants in source countries. Illegal harvesting and trade in many wildlife goods often depends on occasional and sometimes opportunist participants in the wildlife trafficking chain. A pilot application under way in South Africa aims to trial restorative justice within communities where wildlife crime has impacted impacted people and their natural heritage.[38]

Liability for remedying harm

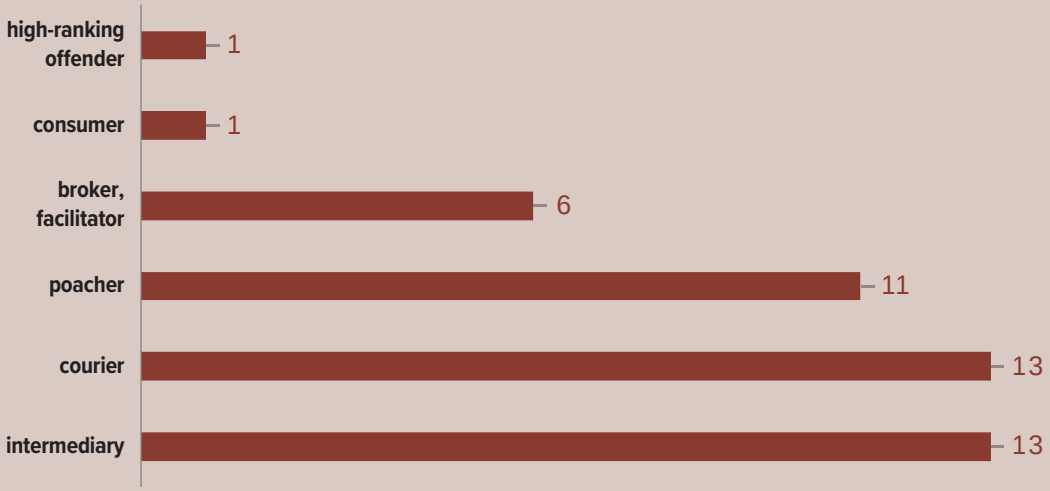
Complementary to criminal justice interventions, many countries also have existing legal provisions (within administrative, criminal and civil law) that can hold

BOX 5.3 Insights from wildlife crime offender interviews in Indonesia

In recent years, Indonesia has made great strides in improving its enforcement of wildlife crime laws, leading to numerous prosecutions and prison sentences for wildlife crime offenders.[a] UNODC collaborated with the Indonesian prison service to interview offenders as part of a broader initiative for criminal justice reform to reduce prison overcrowding. The interviews focused on understanding how offenders got into wildlife poaching and trafficking, their modus operandi, and what would deter them from future criminal acts.

Two thirds of those interviewed claimed that the action leading to their arrest was their first involvement in illegal wildlife trade and only two were convicted reoffenders. The majority explained that they had been motivated by opportunity for supplementary income rather than livelihood necessity and that they had been aware that the activity they were involved in was illegal. In terms of deterrence, it is noteworthy that 21 of the offenders interviewed indicated that they did not worry about the effects of conviction on their social standing.

FIG. 5.3 Wildlife crime offenders in prison in Indonesia and their roles in the trafficking chain



Source: UNODC

What is clear from an initial sample of 45 interviews is that while Indonesia has ramped up enforcement successfully, those incarcerated may not be the most prolific or high-ranking offenders (Figure 5.3).

a. Dwi N. Adhiasto *et al.*, 'A Criminal Justice Response to Address the Illegal Trade of Wildlife in Indonesia', *Conservation Letters 16*, no. 2 (2023): e12937, https://doi.org/10.1111/conl.12937.

offenders legally responsible for remedying the harm caused, including for the harm caused through wildlife crimes documented in chapter 3.[39] Liability cases seeking remedies for harm have demonstrated success in changing the behaviours of environmental offenders in other contexts, notably pollution,[40] and public health,[41,42] where the increased costs and public visibility of court cases and providing remedies have had deterrent effects.

A growing number of cases around the world have operationalized these types of liability provisions for illegal wildlife trade cases in recent years, including against pangolin traders in Cameroon, illegal zoo owners in Indonesia, illegal fishers in France,[43] and illegal recreational hunters in Thailand.[44] Several additional cases are currently under way in five other countries.[45]

Understanding crime displacement

Crime displacement has been characterized as the relocation of crime from one place, time, target, offence, or tactic to another as a result of some crime prevention initiative.[46] A systematic review of over a hundred situational crime prevention evaluations where spatial displacement was measured found that it only occurred in around a quarter.[47] When spatial displacement did occur, on average, its impact tended to be less than the gains achieved by the intervention. Furthermore, in another quarter of the examples reviewed there was evidence of what criminologists refer to as a "diffusion of benefits." This occurs when reductions of crime (or other improvements) are achieved in areas that are close to crime-prevention interventions, even though those areas were not actually targeted by the intervention itself.[48] Further research on this topic concluded that it is more helpful to think about crime deflection, rather than displacement, with possible malign and benign outcomes that can be predicted in the design of prevention interventions.[49] The scarcity of displacement is likely because it requires extra time, effort and risk, reduces rewards, and increases uncertainty on the part of offenders. Some offenders are unable, and others unwilling, to shift their activities.[50] Insights into likely displacement effects can therefore be used strategically to deflect offenders to less harmful crime forms, and to delay crime, sometimes indefinitely.

Displacement of wildlife crime geographically and in terms of target species and smuggling methods was raised as a concern in the *World Wildlife Crime Report 2020*.[51] These are certainly important trends to track, but learning from other crime types makes it clear that displacement is not necessarily a sign of failed intervention and that there is a lot to gain from detailed analysis of displacement outcomes. Wildlife populations have defined areas of distribution and availability, and some types of harvest opportunity may be seasonal. As is clear from the analysis of trafficking drivers in chapter 4, different wildlife market sectors have specific preferences. Shifting wildlife sourcing to a new location likely attracts increased costs leading to reduced criminal profits. Shifting to a new species may be a compromise in terms of market value. Evidence on displacement has strong potential to inform design of strategies to address different wildlife trafficking sectors.

Avoiding unintended consequences

Increasing the number of enforcers is not necessarily proven to reduce crime. Overall, there is some evidence of higher police numbers decreasing crime in the short-term but only if large-scale increases in police numbers are seen—marginal changes in policing numbers most likely do not greatly alter crime levels.[52] Increased enforcement can also have the negative consequence of inciting backlash from communities if the legitimacy of the increased enforcement and force used is not established.[53] A review of learning from "tough-on-crime" sentencing policies concluded that such approaches may prove ineffective at reducing crime rates and recidivism, and that they can be harmful to individuals, communities, and state economies.[54] There is also evidence that law enforcement resulting in large numbers of arrests of low-level offenders may not necessarily have the hoped for impact of crime reduction and can incur high, unintended economic and social costs.[55]

These are particularly important lessons for wildlife crime given evidence that low-level offenders are incarcerated for offences in this sector, as discussed in chapter 3. Recent research carried out by UNODC probed this issue through interviews of offenders convicted of wildlife crimes in Indonesia (Box 5.3).

Sources of guidance

Several guides that outline step-by-step processes and factors to consider when designing interventions to counter wildlife crime are found on a website hosted by Arizona State University dedicated to the problem-solving approach to "wilderness problems" (which includes illegal wildlife trade and broader wildlife crimes). Content is peer-reviewed to the extent that the website is led by an editorial board of crime reduction specialists from both urban and wildlife crime backgrounds.[56] Guidance is rooted in the evidence-based practice of problem-solving. Content includes: an overview guide on how to conduct problem-oriented wildlife protection;[57] a problem analysis manual;[58] guides for specific types of wildlife crime problems including wildlife poaching on US Federal Lands;[59] illegal commercial fishing;[60] methods

for understanding the crime problem in detail, such as crime scripting;[61,62] and a guide on the use of situational crime prevention methods in response to illegal wildlife trade.[63]

Crime script analysis is another tool increasingly used to help design illegal wildlife trade interventions. It employs a step-by-step review of how a specific crime is committed, identifying the complete sequence of choices and actions prior to, during, and after the crime and the links between them.[64] Any specific crime, in terms of type and location, can be represented in a crime script as following a decision sequence with several broad stages from preparation through commission and aftermath. From a crime script, it is possible to determine which actors to target with interventions and where and when those interventions might be best implemented. Over a hundred published crime script studies include a range of wildlife crime examples, including some involving organized and financial crime.[65] Further specific wildlife crime examples and guidance on use of crime scripts to address illegal wildlife trade are included in some of the aforementioned guidance sources.[66,67]

The second edition of the International Consortium on Combating Wildlife Crime (ICCWC) Wildlife and Forest Crime Analytic Toolkit provides national and local government officials with guidance in five key areas: legal frameworks; law enforcement; criminal procedures and the court; international cooperation; and drivers and prevention.[68] It allows government officials to assess national and local structures and procedures in comparison to international best practice and provides practical guidance for design and implementation of different interventions. Guidance is also available on design and implementation of interventions to address drivers of wildlife trafficking at source and in end markets. For example, the People Not Poaching online platform fosters learning and experience-sharing on supporting and engaging communities in initiatives to reduce poaching and illegal trade.[69] On the demand side, a social and behavioural change community of practice operates an online platform to share knowledge on application of behavioural science approaches to reduce demand for illegally traded wildlife products.[70]

Towards better insights into what works to address wildlife crime

There are clear advantages to be gained from enhancement of evidence about what works to address wildlife crime. Such knowledge can be used to prioritize, target, evaluate and refine wildlife crime interventions, employing the wide range of analytical and planning tools already in use in the wider crime prevention community. The evidence can be used to inform policy and other reforms to the enabling environment within which wildlife crime takes place. Every intervention then becomes an opportunity to understand "what works" and improve.

Among current obstacles to accumulation and use of such evidence, the most significant challenge is a lack of investment in monitoring and evaluation processes, including indicator development, data collection and structured assessment. Within relevant government systems, priority is usually given to direct operational intervention, with limited attention to collection and evaluation of associated crime data. Success is typically judged based on outcomes such as contraband seizures, and arrests and prosecutions, rather than through assessment of changes in crime levels, illegal trade volumes or reduction in associated harms like the recovery of threatened species populations.[71]

Project-level interventions do usually require more rigorous monitoring and evaluation elements. However, they typically rely on limited baseline reference points and post-intervention data gathering. Even in cases where data are available, weaknesses in associated decision-making processes may lead to ineffective use of evidence, faulty decisions, wasting of resources, and the erosion of public and political support.[72] This challenge is compounded by the fact that project funding cycles are typically too short to incorporate evidence-driven adaptive management cycles or rigorous assessment of harm reduction. Furthermore, monitoring and evaluation costs are often capped at relatively low levels in budgets.

BOX 5.4 Experimental learning

A study in Kui Buri National Park, Thailand, covering the period 2008–2011 provides a good example of quasi-experimental methods being used where data are triangulated. Some 116 outreach events were held with the aim of decreasing local poaching. The interventions aimed to: build trust and raise awareness; offer opportunities for action; promote benefits and confidence that positive results were achievable; generate social pressure against poaching. Wildlife abundance was assessed for four species at three sites using both observational studies and camera trapping. Poaching pressure was recorded as the encounter rate of poaching signs per kilometre patrolled. The deterrent effect of the outreach was assessed by triangulating measures of patrol effort (mean number of days per month) and poaching for the months before and after outreach, along with an attitudinal survey of people in the area to learn about poaching involvement, motivations and perceptions of changing intensity. Two thirds (67 per cent) of respondents believed that community outreach had caused a decline in poaching.[a]

While neither the simple before and after comparison of poaching levels, in the absence of a control site, nor the perceptions survey is perfect, they both point to similar results (a decrease in poaching, not due to an actual patrol increase). The limitations of such a design are that the results cannot be reliably assumed to be replicable in other contexts and ideally a control area is needed, but the study does provide an example of promising evidence being generated from a relatively simple design because it is strengthened by some element of triangulation and examination of evidence for the assumed mechanisms being activated.[b]

a. Robert Steinmetz *et al.*, 'Can Community Outreach Alleviate Poaching Pressure and Recover Wildlife in South-East Asian Protected Areas?', *Journal of Applied Ecology 51*, no. 6 (2014): 1469–1478.

b. Dorothea Delpech, Herve Borrion, and Shane Johnson, 'Systematic Review of Situational Prevention Methods for Crime against Species', *Crime Science 10*, no. 1 (6 January 2021): 1, https://doi.org/10.1186/s40163-020-00138-1.

Improved approaches to assessment of what works need to focus on two levels of evidence and evaluation, the direct process-related results of interventions made, and the consequent impact on crime levels and associated harms. Experience from other crime research indicates that spending adequate funds for strong evaluations in a few sites is far more cost-effective than spending little amounts of money for weak evaluations in thousands of sites,[73] although caution is necessary in generalizing results on a wider scale.

Tools for tracking process-related results include the ICCWC Wildlife and Forest Crime Indicator Framework, which is structured under eight enforcement outcome measures and 50 individual indicators. It can be used to guide development of baseline measures, monitoring of progress, and evaluation of effectiveness over time.[74] Similarly useful at this level are the ICCWC Guidelines for Wildlife Enforcement Networks, which include a comprehensive evaluation matrix.[75]

At an impact assessment level, many wildlife crime studies report something about observed changes without establishing that the intervention caused that change.[76] An example would be the observation that the number of arrests in a protected area increased and the number of wildlife carcasses detected decreased in a six-month period. While it is possible that the two are related, the causal link has not been established. Establishing that causal link would be best done through experimental or quasi-experimental evaluation designs that ask what would happen if there had been no intervention?[77] Often, these designs require a control group or location where the intervention is not implemented to use for comparison with where it was. This could create ethical problems if a choice is made purposely not to help a location or group, although in reality, with limited resources for intervention, a non-intervention comparator will likely be available. However, if such experimental approaches are not feasible, the best solution may be to collect baseline data before an intervention and compare this to the same indicators post intervention. Nevertheless, a mix of indicators is needed to establish impact through triangulation (Box 5.4).

Evidence reviews indicate that data sources on wildlife crime are currently rather limited in terms of scope and accessibility compared to those available for other crime sectors for which policing results and crime

perception and other surveys are available to researchers and the public in many jurisdictions. This is partly attributed to what has been termed the "silent victim syndrome", whereby wildlife troubled by crime cannot "call the police" as other victims might do.[78] As a result, evidence of wildlife crime is usually a product of enforcement effort. National datasets on wildlife crime are typically fragmented, short-term and difficult to access, with a bias towards information on seizures, particularly of CITES-listed species.[79,80]

Like arrest and conviction statistics that are sometimes available for wildlife crime offences and used as indicators of success, seizure data are a mixed indicator in that they illustrate the level of enforcement effort made as much as they indicate the extent of crime and illegal trade. They may also reflect embedded biases of enforcement efforts, including racialized and gendered presumptions. Furthermore, as noted earlier in this chapter, research from other crime fields indicates that seizure and arrest do not necessarily deter further criminal behaviour. Complementary measures of market data, such as price changes, retail availability and turnover, and changes in harm, such as poaching levels and wildlife population impacts, are necessary to extend the utility of such data.[81] Triangulation with less direct measures can help to check logically whether mechanisms have been activated, and whether those mechanisms are therefore likely to be achieving some impact.[82]

The absence of accessible baseline data on a range of metrics along the illegal wildlife trade chain is a persistent concern.[83,84] It is generally not practical for the costs of pre-intervention monitoring and data compilation to be absorbed into budgets for discrete enforcement actions and support projects. A community of practice approach for collation and sharing of data for key variables, such as wildlife population trends, market indicators and criminal justice results could greatly boost evaluation of wildlife crime interventions overall.

Another topic worthy of greater investment in evidence gathering and analysis is the performance of law enforcement, prosecution and sentencing processes related to wildlife crime within criminal justice systems. Factors of interest include the impact of corruption, identification of process obstacles and gaps, and ultimately the evidence for impact on criminal behaviour.[85]

Overall, there is a clear case that priority-setting and tactics would benefit from stronger evidence. Climate science provides an informative example of how progress in the accumulation, collaborative analysis and policy use of evidence for problem-solving can be achieved.[86] For wildlife crime this will require investment in data gathering and analysis and stronger cooperation between relevant agencies, including multilateral, government, civil society and academic institutions. It will also require prioritization by funding agencies.

Putting current learning into action

Despite evidence gaps, wildlife crime reduction policies are being implemented by regulatory and enforcement agencies and funding institutions are making decisions about investments in related interventions. Since multi-faceted approaches appear to be effective in reducing other types of crime, these efforts are unlikely to be in vain. Furthermore, this chapter demonstrates that there is a growing body of research on the effectiveness of different wildlife crime responses and that useful insights are emerging. The lessons from such work should be put to use.

For example, evidence-based analysis illustrates how different factors influence the impact of anti-poaching patrolling in certain locations and how multifaceted enforcement and market interventions are contributing to reductions in ivory trafficking and elephant poaching. Such findings can already be used to help inform intervention design in other places and for other trafficked commodities. There is also a wide range of useful knowledge to draw from insights already developed for other crime sectors. For example, displacement of wildlife crime between places and species may not simply be a sign of failure, systematic situational analysis can guide effective intervention design and effective deterrence requires action beyond seizures and arrests. Again, such learning can be applied now. A call for better evidence is not a case for inaction due to uncertainty.

Endnotes

1 Ray Pawson and Nicholas Tilley, Realistic Evaluation (London, UK: Sage Publications Ltd, 1997), https://uk.sagepub.com/en-gb/eur/realistic-evaluation/book205276#preview.

2 Dorothea Delpech, Herve Borrion, and Shane Johnson, 'Systematic Review of Situational Prevention Methods for Crime against Species', Crime Science 10, no. 1 (6 January 2021): 1, https://doi.org/10.1186/s40163-020-00138-1.

3 A systematic mapping study is a process of identifying, categorizing, and analysing existing literature relevant to a particular research topic to gain insights to existing evidence and guide future research.

4 Staff from the United States Fish and Wildlife Service (USFWS) and the Canadian Centre for Evidence-Based Conservation collaborated with a diverse team of expert advisors to screen and analyse published evidence.

5 Trina Rytwinski *et al.*, 'What Is the Evidence That Counter-Wildlife Crime Interventions Are Effective for Conserving African, Asian, and Latin American Wildlife Directly Threatened by Exploitation? A Systematic Map', *Ecological Solutions and Evidence,* 2024, https://doi.org/10.1002/2688-8319.12323.

6 Delpech, Borrion, and Johnson, 'Systematic Review of Situational Prevention Methods for Crime against Species'.

7 Ibid.

8 This online platform fosters learning and experience-sharing on supporting and engaging communities in initiatives to reduce poaching and illegal wildlife trade (IWT). It is a joint project between the International Union for Conservation of Nature (IUCN) Commission on Environmental, Economic and Social Policy (CEESP) and the Species Survival Commission (SSC) Sustainable Use and Livelihoods Specialist Group (SULi), the International Institute for Environment and Development (IIED) and TRAFFIC. https://www.peoplenotpoaching.org/.

9 Olivia Wilson-Holt and Dilys Roe, 'Community-Based Approaches to Tackling Illegal Wildlife Trade—What Works and How Is It Measured?', *Frontiers in Conservation Science 2* (28 October 2021): 765725, https://doi.org/10.3389/fcosc.2021.765725.

10 Trina Rytwinski et al., 'What Is the Evidence That Counter-Wildlife Crime Interventions Are Effective for Conserving African, Asian, and Latin American Wildlife Directly Threatened by Exploitation? A Systematic Map', Ecological Solutions and Evidence, 2024, https://doi.org/10.1002/2688-8319.12323.

11 USAID, 'A Meta-Analysis of USAID Wildlife Asia Social and Behavior Change Communication (SBCC) Campaigns' (Washington DC, USA: USAID, September 2022), https://pdf.usaid.gov/pdf_docs/PA00ZMT5.pdf.

12 Gayle Burgess and Steven Broad, 'Evolving Evaluation: Exploring New Measures to Assess the Impact of End-Market Interventions to Address Harmful Wildlife Trade', *TRAFFIC Bulletin 32,* no. 2 (November 2020), https://www.traffic.org/site/assets/files/13362/evolving-evaluation.pdf.

13 Conservation Evidence: www.conservationevidence.com.

14 Jessica Junker *et al.*, 'A Severe Lack of Evidence Limits Effective Conservation of the World's Primates', *BioScience 70*, no. 9 (18 September 2020): 794–803, https://doi.org/10.1093/biosci/biaa082.

15 USAID, 'Measuring Impact: Survey of Indicators for Combating Wildlife Trafficking' (Washington DC, USA: USAID, 2015), https://pdf.usaid.gov/pdf_docs/PA00KJRB.pdf.

16 A. M. Lemieux and R. S. A. Pickles, 'Problem-Oriented Wildlife Protection' (Center for Problem-Oriented Policing, Netherlands Institute for the Study of Crime and Law Enforcement, Panthera, 2020), https://popcenter.asu.edu/sites/default/files/problem-oriented_wildlife_protection_lemieux_pickles_2020.pdf.

17 John Eck and William Spelman, 'Problem-Oriented Policing in Newport News' (Police Executive Research Forum, 1987), https://www.ncjrs.gov/App/Publications/abstract.aspx?ID=111964.

18 See, for example, Andromachi Tseloni *et al.*, 'The Effectiveness of Burglary Security Devices', Security Journal 30, no. 2 (1 May 2017): 646–664, https://doi.org/10.1057/sj.2014.30; Graham Farrell, Andromachi Tseloni, and Nick Tilley, 'The Effectiveness of Vehicle Security Devices and Their Role in the Crime Drop', *Criminology & Criminal Justice 11*, no. 1 (February 2011): 21–35, https://doi.org/10.1177/1748895810392190.

19 UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

20 Yingwei Chen, Yifu Wang, and Hannah S. Mumby, 'Five Years of the Ivory Ban in China: Developments, Limitations, and Potential for Improvement', *Biological Conservation 284* (1 August 2023): 110177, https://doi.org/10.1016/j.biocon.2023.110177.

21 CITES, 'CITES CoP19 Doc. 66.6' (Panama City, 2022), https://cites.org/sites/default/files/documents/COP/19/agenda/E-CoP19-66-06.pdf.

22 Andromachi Tseloni *et al.*, 'Exploring the International Decline in Crime Rates', *European Journal of Criminology 7* (1 September 2010): 375–394, https://doi.org/10.1177/1477370810367014.

23 Lawrence E. Cohen and Marcus Felson, 'Social Change and Crime Rate Trends: A Routine Activity Approach', *American Sociological Review 44*, no. 4 (1979): 588–608, https://doi.org/10.2307/2094589.

24 David Weisburd, 'The Law of Crime Concentration and the Criminology of Place*', *Criminology 53*, no. 2 (2015): 133–157, https://doi.org/10.1111/1745-9125.12070.

25 L. Tompson, H. Partridge, and N. Shepherd, 'Hot Routes: Developing a New Technique for the Spatial Analysis of Crime', *Crime Mapping: A Journal of Research and Practice 1*, no. 1 (2009): 77–96.

26 R. Clarke, 'Hot Products: Understanding , Anticipating and Reducing Demand for Stolen Goods', 1999, https://www.semanticscholar.org/paper/Hot-Products-%3A-understanding-%2C-anticipating-and-for- Clarke/213ab8b0f0c6133170e718a403d5497dfb15f139.

27 Derek B. Cornish and Ronald V. Clarke, 'The Rational Choice Perspective', in *Environmental Criminology and Crime Analysis*, 2nd ed. (Routledge, 2016).

28 Johannes Andenaes, 'Does Punishment Deter Crime', *Criminal Law Quarterly 11*, no. 1 (November 1968): 76–93.

29 Daniel Nagin, 'General Deterrence: A Review of the Empirical Evidence', in *Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates* (Washington D.C.: The National Academies Press, 1978).

30 Deryck Beyleveld, 'Identifying, Explaining and Predicting Deterrence', *Brit. J. Criminology 19* (1979): 205.

31 Gary Kleck *et al.*, 'The Missing Link in General Deterrence Research', *Criminology 43*, no. 3 (August 2005): 623–660, https://doi.org/10.1111/j.0011-1348.2005.00019.x.

32 Robert Apel, 'Sanctions, Perceptions, and Crime: Implications for Criminal Deterrence', *Journal of Quantitative Criminology 29*, no. 1 (1 March 2013): 67–101, https://doi.org/10.1007/s10940-012-9170-1.

33 Julie Viollaz and Meredith L. Gore, 'Piloting Community-Based Conservation Crime Prevention in the Annamite Mountains Findings Report Drafted for Global Wildlife Conservation, Fauna and Flora International, World Wildlife Fund and Vinh University', 2019, https://doi.org/10.13140/RG.2.2.30548.45449.

34 Michael S. Scott, *Focused Deterrence of High-Risk Individuals* (Center for Problem-Oriented Policing, 2017), https://popcenter.asu.edu/sites/default/files/spi_focused_deterrence_pop_guide_final.pdf.

35 UNODC, 'Guide on Drafting Legislation to Combat Wildlife Crime' (Vienna, Austria: UNODC, 2018), https://sherloc.unodc.org/cld/uploads/res/guide-on-drafting-legislation-to-combat-wildlife-crime_html/Wildlife_Crime_ebook.pdf.

36 UNODC, *Handbook on Restorative Justice Programmes Second Edition*, Criminal Justice Handbook Series (Vienna: United Nations, 2020).

37 Lawrence Sherman, Heather Strang, and Daniel J. Woods, 'Recidivism Patterns in the Canberra Reintegrative Shaming Experiments (RISE)' (Canberra, Australia: Centre for Restorative Justice, Australian National University., November 2000), https://webarchive.nla.gov.au/awa/20171112233316/http://www.aic.gov.au/criminal_justice_system/rjustice /rise/recidivism.html.

38 Annette Hübschle, Ashleigh Dore, and Harriet Davies-Mostert, 'Focus on victims and the community: applying restorative justice principles to wildlife crime offences in South Africa', *The International Journal of Restorative Justice 4*, no. 1 (2021): 141–150, https://doi.org/10.5553/TIJRJ.000068.

39 Jacob Phelps *et al.*, 'Environmental Liability Litigation Could Remedy Biodiversity Loss', *Conservation Letters 14*, no. 6 (2021): e12821, https://doi.org/10.1111/conl.12821.

40 Fabio Bothner, Annette Elisabeth Töller, and Paul Philipp Schnase, 'Do Lawsuits by ENGOs Improve Environmental Quality? Results from the Field of Air Pollution Policy in Germany', *Sustainability 14*, no. 11 (27 May 2022): 6592, https://doi.org/10.3390/su14116592.

41 M. Palin and M. Young, 'The Impact of Smoking Litigation on Australian Workplaces', *Tobacco Control 3, no. 1* (March 1994).

42 Rebecca L. Haffajee, 'The Public Health Value of Opioid Litigation', *Journal of Law, Medicine & Ethics 48*, no. 2 (July 2020): 279–292.

43 Angelique Chrisafis, 'Pirates of the Med: The Mafia-Style Poachers Threatening Endangered Fish', *The Guardian,* 13 October 2018, sec. World news, https://www.theguardian.com/world/2018/oct/13/pirates-of- mediterranean-divers-plunder-endangered-fish-marseille-calanques-national-park.

44 Piyarat Chongcharoen and King-Oua Laohong, 'Supreme Court Sentences Premchai to 3 Years 2 Months in Prison', Bangkok Post, 8 December 2021, https://www.bangkokpost.com/thailand/general/2228555/supreme- court-sentences-premchai-to-3-years-2-months-in-prison.

45 'Global Team Launches Groundbreaking Project to Secure Justice for Nature', Conservation-Litigation.org, 28 September 2023, https://www.conservation-litigation.org/news/rydal.

46 Rob T. Guerette, 'Analyzing Crime Displacement and Diffusion', Problem-Oriented Guides for Police Problem-Solving Tools Series Guide No. 10 (Arizona USA: Center for Problem Oriented Policing, Arizona State University, 2009), https://portal.cops.usdoj.gov/resourcecenter/content.ashx/cops-p167-pub.pdf.

47 Rob T. Guerette and Kate J. Bowers, 'Assessing the Extent of Crime Displacement and Diffusion of Benefits: A Review of Situational Crime Prevention Evaluations*', *Criminology 47*, no. 4 (2009): 1331–1368, https://doi.org/10.1111/j.1745-9125.2009.00177.x.

48 Ibid.

49 Robert Barr and Ken Pease, 'Crime Placement, Displacement, and Deflection', *Crime and Justice 12* (1990): 277–318.

50 Shane D. Johnson, Rob T. Guerette, and Kate Bowers, 'Crime Displacement: What We Know, What We Don't Know, and What It Means for Crime Reduction', *Journal of Experimental Criminology 10*, no. 4 (December 2014): 549–571, https://doi.org/10.1007/s11292-014-9209-4.

51 UNODC, *World Wildlife Crime Report 2020*.

52 Ben Bradford, 'Police Numbers and Crime Rates - a Rapid Evidence Review', His Majesty's Inspectorate of Constabulary and Fire & Rescue Services, 2011, https://hmicfrs.justiceinspectorates.gov.uk/publications/police-numbers-crime-rates-rapid/.

53 Meares Tracey, 'Don't Jump the Shark: Understanding Deterrence and Legitimacy in the Architecture of Law Enforcement - NIJ Research for the Real World Seminar | Office of Justice Programs' (National Institute of Justice, USA, November 2020), https://www.ojp.gov/ncjrs/virtual-library/abstracts/dont-jump-shark-understanding-deterrence-and-legitimacy.

54 Lauren Wilson and Rachel Boratto, 'Conservation, Wildlife Crime, and Tough-on-Crime Policies: Lessons from the Criminological Literature', *Biological Conservation 251* (1 November 2020): 108810, https://doi.org/10.1016/j.biocon.2020.108810.

55 Megan Comfort, '"A Twenty-Hour-a-Day Job": The Impact of Frequent Low-Level Criminal Justice Involvement on Family Life', *The ANNALS of the American Academy of Political and Social Science 665*, no. 1 (1 May 2016): 63–79, https://doi.org/10.1177/0002716215625038.

56 See https://popcenter.asu.edu/content/wilderness-problems.

57 Lemieux and Pickles, 'Problem-Oriented Wildlife Protection'.

58 A. M. Lemieux, R. S. A. Pickles, and D. Weekers, 'Problem Analysis for Wildlife Protection in 55 Steps' (Arizona USA: Center for Problem Oriented Policing, Arizona State University, 2022), https://popcenter.asu.edu/sites/default/files/problem_analysis_in_55_steps_lemieux_pickles_weekers_2022-single_page.pdf.

59 M. D. Spencer, 'The Problem of Wildlife Poaching on U.S. Federal Lands. A Problem Solving Guide':, Wilderness Problems, Guide No. 1. (Arizona, USA: Center for Problem-Oriented Policing, Arizona State University, 2020), https://popcenter.asu.edu/sites/default/files/wildlife_pop_guide_mds_final_v2_aml.pdf.

60 G. A. Petrossian and N. Marteache, 'Illegal Commercial Fishing Within the Exclusive Economic Zones of Coastal Countries.', Wildnerness Problem Specific Guide No 3 (Arizona USA: Center for Problem-Oriented Policing, Arizona State University, 2022), https://popcenter.asu.edu/sites/default/files/iuu_fishing_problem_guide_no._3_petrossian_marteache_2022. pdf.

61 A. M. Lemieux, 'The Poaching Diaries (Vol 1): Crime Scripting for Wildnerness Problems.' (Arizona, USA: Center for Problem Oriented Policing, Arizon State University, 2020), https://popcenter.asu.edu/sites/default/files/the_poaching_diaries_vol._1_crime_scripting_for_wilderness_problems_lemieux_2020.pdf.

62 Julie Viollaz *et al.*, 'Using Crime Script Analysis to Understand Wildlife Poaching in Vietnam', Ambio 50, no. 7 (1 July 2021): 1378–1393, https://doi.org/10.1007/s13280-020-01498-3.

63 Fauna and Flora, 'Using Situational Crime Prevention Ro Address Illegal Wildlife Trade: A Toolkit V2' (Cambridge, UK: Fauna and Flora, 2023), https://www.fauna-flora.org/publications/using-situational-crime-prevention-to-address-illegal-wildlife-trade-a-toolkit/.

64 Cornish, D.B. 1994. The procedural analysis of offending and its relevance for situational prevention. In Crime prevention studies, vol. 3, ed. R.V. Clarke, 151–196. Monsey, NY: Criminal Justice Press.

65 Hashem Dehghanniri and Hervé Borrion, 'Crime Scripting: A Systematic Review', *European Journal of Criminology 18*, no. 4 (1 July 2021): 504–525, https://doi.org/10.1177/1477370819850943.

66 Lemieux, A. M., 'The Poaching Diaries (Vol 1): Crime Scripting for Wildnerness Problems.'

67 Fauna and Flora, 'Using Situational Crime Prevention Ro Address Illegal Wildlife Trade: A Toolkit V2'.

68 ICCWC, 'Wildlife and Forest Crime Analytic Toolkit (2nd Edition)' (International Consortium on Combatting Wildlife Crime, 2022), https://iccwc-wildlifecrime.org/tools-and-services.

69 People Not Poaching - the Communities and IWT Learning Platform is a joint project between the IUCN CEESP/SSC Sustainable Use and Livelihoods Specialist Group (SULi), The International Institute for Environment and Development (IIED) and TRAFFIC. See: https://www.peoplenotpoaching.org/.

70 Information about the community of conservation practitioners, non-governmental organizations, government agencies, academics, researchers, social marketers and advertisers working on demand reduction approaches to address wildlife trafficking can be found at: https://www.changewildlifeconsumers.org/.

71 Trina Rytwinski *et al.*, 'What Is the Evidence That Counter-Wildlife Crime Interventions Are Effective for Conserving African, Asian and Latin American Wildlife Directly Threatened by Exploitation? A Systematic Map Protocol', *Ecological Solutions and Evidence 2*, no. 4 (2021): e12104, https://doi.org/10.1002/2688-8319.12104.

72 William J. Sutherland, ed., *Transforming Conservation: A Practical Guide to Evidence and Decision Making*, 1st ed. (Cambridge, UK: Open Book Publishers, 2022), https://doi.org/10.11647/OBP.0321.

73 Shermleman et al (1998). Preventing Crime: What Works, What Doesn't, What's Promising? National Institute of Justice: Research in Brief.

74 ICCWC, 'Wildlife and Forest Crime Indicator Framework (2nd Edition)' (International Consortium on Combating Wildlife Crime, 2022), https://iccwc-wildlifecrime.org/tools-and-services.

75 ICCWC, 'ICCWC Guidelines for Wildlife Enforcement Networks (WENS): A Self-Assessment Tool for Regional Use' (Geneva, Switzerland: CITES Secretariat, May 2020), https://iccwc-wildlifecrime.org/sites/default/files/files/2022-10/ICCWC%20WEN%20Guidelines_FINAL_ENG.pdf.

76 Nancy Ockendon *et al.*, 'How Conservation Practice Can Generate Evidence', in *Transforming Conservation*, ed. William J. Sutherland, 1st ed. (Cambridge, UK: Open Book Publishers, 2022), 305–330, https://doi.org/10.11647/OBP.0321.10.

77 Paul J. Ferraro and Subhrendu K. Pattanayak, 'Money for Nothing? A Call for Empirical Evaluation of Biodiversity Conservation Investments', *PLOS Biology 4*, no. 4 (11 April 2006): e105, https://doi.org/10.1371/journal.pbio.0040105.

78 Lemieux, Pickles, and Weekers, 'Problem Analysis for Wildlife Protection in 55 Steps'.

79 Justin Kurland *et al.*, 'Wildlife Crime: A Conceptual Integration, Literature Review, and Methodological Critique', *Crime Science 6*, no. 1 (28 April 2017): 4, https://doi.org/10.1186/s40163-017-0066-0.

80 Alison Hutchinson, Maria Camino-Troya, and Tanya Wyatt, 'Global Scoping of Wildlife Crime Offences, Penalties, and Statistics', *Global Journal of Animal Law 11*, no. 1 (2023), https://ojs.abo.fi/ojs/index.php/gjal/article/view/1810.

81 Burgess and Broad, 'Evolving Evaluation'.

82 Pawson and Tilley, Realistic Evaluation.

83 USAID, 'Measuring Impact: Survey of Indicators for Combating Wildlife Trafficking'.

84 Kurland *et al.*, 'Wildlife Crime'.

85 ICCWC, 'Wildlife and Forest Crime Analytic Toolkit (2nd Edition)'.

86 Edward A. Morgan and Gabriela Marques Di Giulio, 'Science and Evidence-Based Climate Change Policy: Collaborative Approaches to Improve the Science–Policy Interface', in *Communicating Climate Change Information for Decision-Making*, ed. Silvia Serrao-Neumann, Anne Coudrain, and Liese Coulter (Cham: Springer International Publishing, 2018), 13–28, https://doi.org/10.1007/978-3-319-74669-2_2.

Case studies

Case study 1

Orchids

Live orchids

with emphasis on the European market

Previous editions of the *World Wildlife Crime Report* have not included detailed analyses of illegal trade in ornamental plants despite many species being threatened by overexploitation and subject to national and CITES trade regulation. Case study research on illegal orchid trade for the present report was carried out to shed light on distinct types of organized criminal activity in this sector and to address concerns about "plant blindness" in discourse about wildlife crime.[1]

Orchids are particularly suited to becoming collectables. There are over 29,000 recognized species found across the globe,[2] with around 500 new species described annually in recent years.[3] Their variety is seemingly infinite as natural stocks can be cross-bred with over 125,000 named hybrids already catalogued.[4] Some wild species are endemic to a very small geographic area while the conservation status of most species is poorly documented.[5]

The legal ornamental orchid trade in live plants and cut flowers is dominated by mass-produced hybrids of a small number of genera such as *Phalaenopsis, Vanda* and *Dendrobium*. However, despite the widespread availability of artificially propagated orchids, thousands of wild orchids are still collected for trade, often driven by specialist international hobbyists looking for new species.[6] The desire to be the first to possess a rare and beautiful wild orchid can push prices into the thousands of dollars for a single specimen. Dedicated collectors may even travel to remote areas for the sole purpose of prospecting for yet undiscovered species.[7]

Analysts have compared the illicit collection of wild orchids to the illicit collection of antiquities and found many similarities.[8] Some perpetrators argue that by collecting these types of commodities they are preserving them, rescuing them from possible destruction. The analysts argue that this is more than just the neutralization or rationalization of a criminal act. Some orchid collectors appear to be motivated by a genuine desire to protect the objects of their fascination, particularly given that habitat loss and degradation is a leading cause of species extinction and a single orchid can yield hundreds of thousands of seeds of which only a tiny fraction survives in the wild.[9]

In addition to individual collectors, commercial propagators may seek out new wild species for the purpose of creating hybrids. Just as some in the exotic pet trade will draw in wild breeding stock to increase genetic diversity, commercial orchid producers can use novel species to enhance the value of their own proprietary varieties.[10] There is also a localized risk of overharvesting wild orchids as a food source,[11] the most prominent examples being the use of orchid tubers to make a beverage/ice cream called *salep* in the eastern Mediterranean,[12] and a meat-like dish called *chikanda* in Southern-Central Africa.[13]

While the primary concern about trade impacts on wild orchid populations may relate to collectors of rare and novel species, CITES trade regulation measures apply to all orchid species. Although CITES usually targets trade restrictions at the individual species level, sometimes multiple related species share a common threat. In these cases an entire genus may be listed, such as the listing of the *Dalbergia* genus of rosewood species. These higher-taxon listings do not require evidence that every single species in the genus is threatened by trade, and therefore they often include species that are not traded at all. These higher taxa protections are, at least in part, a concession to practicality, a recognition that it may be difficult for enforcement authorities to differentiate between threatened and unthreatened species in complex taxa such as the orchids. Orchids provide the single largest example of such mass listing because the entire Orchidaceae family has been listed in Appendix II of CITES since 1975.[14] The large number of orchid species means they comprise some 70 per cent of the almost 41,000 CITES-listed species. Two popular slipper orchid genera—*Paphiopedilum* and *Phragmipedium*—and seven individual orchid species have subsequently been moved to Appendix I because of their special vulnerability to wild harvesting.[15,16]

In addition to their popularity with collectors, orchids are also widely traded internationally as ornamental plants.[17] Most of this trade derives from commercial producers of artificially propagated hybrids not wild harvesting of pure species, but owing to their family listing the majority of these exports require CITES paperwork.[18] Mistakes are made, and many orchids seized are not threatened species rather hothouse-grown commercial shipments without the correct documentation.[19] Additionally, orchid extracts are used in a range of traditional medicines, cosmetics and other products, often as a minor component, but all of which may require CITES permits.[20,21] Owing to the need for consistent quality supply in bulk, it is highly unlikely that these commercial applications draw on wild-harvested threatened species of orchids. Thus, when these products are seized, they are not necessarily indicative of a criminal threat to protected species. Nevertheless, despite such cases clouding the seizure record, trafficking of rare orchid species does take place. When a new species is discovered, it may be quickly decimated in its habitat.

The following case study looks at the process by which rare and new orchid species are brought from the forest to collectors. Research for the case study took place between November 2022 and January 2023 and included of a series of interviews with 17 key experts with insights into the illegal trade of ornamental orchids with a focus on European markets (for full methods see the methodological annex to this report).[22] The interview findings were triangulated and combined with information from published literature as well as analysis of trade and seizure data from the WWCR3 analytical dataset.

Sourcing

Harvesters are primarily local men who have good knowledge of the habitat, often due to experience hunting animals or collecting other forest products.[23,24] Harvesters may be professional collectors who harvest orchids and other plants as their main income source, or people with other sources of income who harvest orchids opportunistically whenever they see them.[25]

One expert reported that even those involved in enforcement in protected areas, such as rangers, were said to collect plants for money.[26] Despite financial motivations, harvesters are likely to be paid very little for the plants they collect.[27] A South America-based expert reported that in Brazil collectors who harvested orchids in the genus *Cattleya* in bulk for intermediaries earn as little as the equivalent of $0.30 per plant. The expert also said that the original harvesters of *Phragmipedium kovachii*, which later sold for $10,000 per plant, sold the plants for the equivalent of $3.60 each (see Box CS1.1).[28]

Finding and harvesting some wild orchid species can be hazardous. Many orchid species are "epiphytic", which means they grow on the surface of trees, gaining elevation and deriving moisture and nutrients from the air, rain, or debris.[29] Harvesters must either climb or fell the host tree to access the orchid. One interview subject had witnessed orchid harvesters in Brazil "climbing trees without equipment…or cutting trees such as *Cedro rosa [Cedrela fissilis],* often 200- or 300-years old trees, to collect *Laelia purpurata.*"[30] In South-East Asia, an interview subject reported that orchids in the genus *Paphiopedilum* are harvested from cliffs using ropes and bamboo ladders, while *epiphytes* growing on branches across rivers were collected using "a boat and a hooked pole."[31] In addition to local gatherers, international collectors stage their own collecting trips, organized by local nurseries.[32]

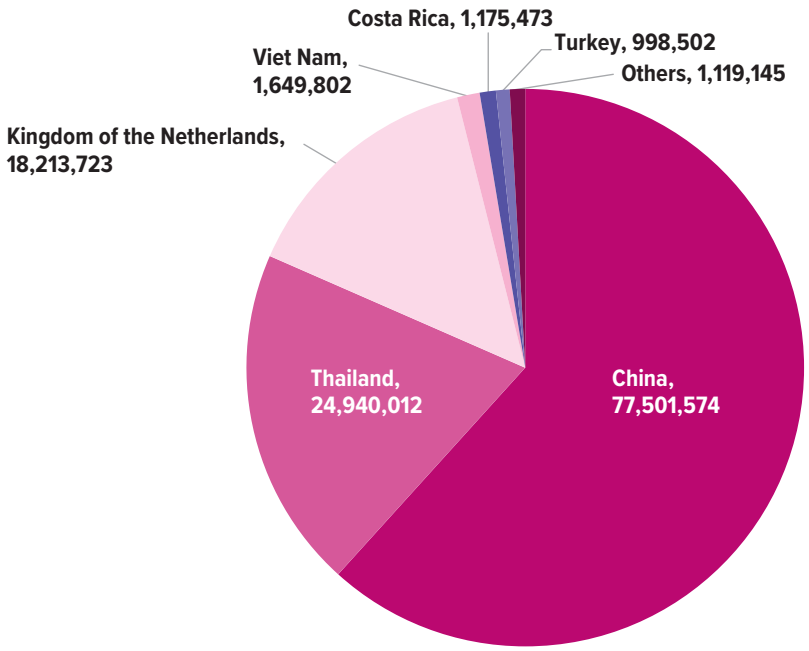
Harvested orchids may be sold locally on markets or street stalls or online to domestic or international consumers and nurseries directly.[33] As with other wildlife products, scouts may visit villages located in orchid habitats to inform villagers of the plants they wish to purchase.[34] These scouts may give a description or show a photograph or a live plant of the orchids they are interested in.[35] These intermediaries will either buy plants in bulk or pay only for valuable plants using cash or payment apps. As one informant reported: "People will bring bunches and mountains of plants and [the intermediary] will say 'no, I don't want these, I will not pay for this…I'll pay for this.'"[36] This can result in considerable "by-catch"; as one respondent reported: "I saw barrel-sized bins of discarded orchids."[37]

BOX CS1.1 The discovery of *Phragmipedium kovachii* in Peru

In May 2002, according to a journalist's published account of the case, an orchid grower based in the United States was on an orchid collecting trip to northern Peru and saw a highly unusual orchid in the *Phragmipedium* genus with a large pink flower for sale at a roadside stall. The seller had harvested the plant from the wild near his land and was selling three plants for the equivalent of $3.60 each. The species had been offered for sale as an undescribed species two weeks previously by a Peruvian nursery at a show in Florida for $10,000 per plant.[a] After illegal import to the United States, the grower took the orchid to Selby Botanical Garden, where it was quickly described as a new species, *P. kovachii*. The Government of Peru complained that the species had been described from illegal material and the grower was charged with smuggling, receiving a $1,000 fine and two years of probation, while the botanical garden and one of its staff members were also fined.[b,c] Large-scale harvesting for trade stripped most known plants from the wild immediately after the species was discovered.[d] However, an academic expert interviewed for this case study reported that the Government of Peru later gave licences to local nurseries to collect five wild plants as motherstock for artificial propagation, making the case an interesting example of a country trying to address smuggling and promote access and benefit sharing, even after its genetic resources had been taken.[e]

a. Craig Pittman, *The Scent of Scandal: Greed, Betrayal, and the World's Most Beautiful Orchid,* The Florida History and Culture Series (Gainesville: University Press of Florida, 2012).
b. Phillip Cribb, '511. *Phragmipedium kovachii*', *Curtis's Botanical Magazine 22*, no. 1 (2005): 8–11, https://doi.org/10.1111/j.1355-4905.2005.00454.x.
c. US Department of Justice, 'Virginia Orchid Dealer Pleads Guilty to Violating the Endangered Species Act', June 2004, https://www.justice.gov/archive/opa/pr/2004/June/04_enrd_397.htm.
d. Cribb, '511. *Phragmipedium kovachii*'.
e. AC1

FIG. CS1.1 Total number of live orchids legally exported in 2021 by country of export (exporter reported data)



Source: CITES Trade Database[38]

Buyers of illegally sourced orchids transport the plants to commercial nurseries and breeders, which may be entirely clandestine operations or may be apparently legitimate businesses that launder illegally harvested orchids through their operations.[39] Plants destined for international markets where customs checks may occur may be kept in nursery conditions for some time to ensure that the damaged leaves and roots that enforcement officers are trained to check for are no longer present.[40] As one trader interviewed said: "So they get wild plants. They establish them for six months or one year in Thailand or in Taiwan [Province of China], and then they export all around the world as a hybrid or even as a real species."[41]

Once seeds have been produced, the wild plants may then be discarded. According to the calculations of one trader interviewed: "[Of] 600 wild-collected *Paphiopedilum anitum,* 100 will bloom [and] 40 will be strong enough to make seeds. And the 600 plants go to the dustbin, because they can sell the flask for 150 to 250 dollars [$150–200]."[42] A "flask" is a sterile sealed container in which a fertilized seed has been embedded in a medium containing agar and a nutrient source. Trade in this form is excepted from international licensing requirements under the terms of the CITES listing so no CITES permits are needed.

Since a large proportion of international orchid shipments require CITES permits, it is possible to track the legal orchid trade through the CITES Trade Database. Between 2012 and 2021, CITES data indicate that 6,796 unique orchid species in 481 genera were legally commercially traded as live specimens.[43] Looking at the same official data in more detail for 2021, the top commercial exporters were in Asia (Figure CS1.1), although countries in Latin America and Europe were also prominent in the trade. About 76 per cent of these live plant exports were *Phalaenopsis* hybrids ("moth orchids") or *Dendrobium* hybrids, both genera native to East Asia and the Pacific. The largest enumerated species exported was *Cymbidium sinense,* the so-called "New Year's orchid", native to China and northern Viet Nam. In 2021, this legal trade was reported as being from artificial propagation rather than wild harvest.

While the bulk of the legal trade is concentrated in a few genera, the hobbyist orchid market is characterized by the demand for rarity and diversity with thousands of species traded annually.[44] Field observers in street markets in Asia and Latin America found hundreds of species commonly available in domestic trade.[45,46,47] The demand for novel species seems to be insatiable with prices shooting into the thousands of dollars per specimen when a new species is discovered only to fall just as rapidly as commercial propagation becomes widespread.[48] One respondent ifnterviewed said that high levels of wild collection are seen "two to three years after the species is published and [they] will decline rapidly after that."[49]

While orchids are found on every inhabited continent, they are not evenly distributed. Asia and South America each have over 12,000 species, compared to more than 4,000 in North America, about 2,000 in Africa and much lower counts in the rest of the world.[50] According to experts interviewed during research for this report, key source countries for wild live orchids are those with remaining populations of highly in-demand species, such as orchids in the *Paphiopedilum* genus, including Indonesia, Malaysia, Thailand, the Philippines and Viet Nam.[51] New orchids are also sourced from areas in the Americas with high species diversity, including Ecuador, Colombia, Costa Rica and Brazil.[52] African sources are not as popular, with the possible exception of Madagascar.[53]

Illegal trading

According to experts interviewed during research for this report, most orchids illegally entering Europe come by post.[54] This includes hybrids and other orchids that could, in theory, receive CITES paperwork, but multiple experts reported that they are imported illegally to avoid the costs and trouble of applying for trade permits or certificates. They are also smuggled in personal baggage by air or land,[55] including, according to one interviewee, by airline staff.[56] In addition to smuggling, plants that do not meet the CITES definition of artificially propagated are reported to be shipped through legal routes, with paperwork for a different species or hybrid.[57]

Plants may be sent to consolidators (often nurseries or vendors) in consumer countries, who collect orders from different consumers or vendors to reduce shipping costs.[58] This also occurs in the legal trade and it is possible that consolidators arranging the import of plants believe they are from legitimate businesses and are not intentionally buying plants illegally. As either active partners or passive facilitators of illegal trade, nurseries can provide an identifiable and potentially deterrable part of some trafficking chains.

Some plants are sold in person to consumers who travel to visit an international nursery,[59] although these buying trips were reported by interviewees as less common following the rise of internet sales.[60]

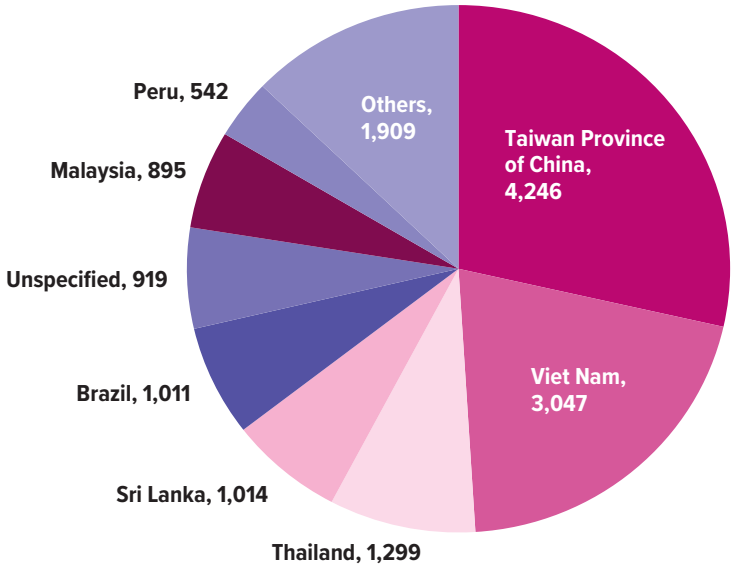
BOX CS1.2 Overharvesting of a newly described species driven by social media posts

Paphiopedilum canhii was first discovered in 2009 by Hmong people in Viet Nam who brought plants from remote areas to sell at urban markets where they were acquired by a local grower who realized they were a new species. When the species was described in 2010, orchid growers in Viet Nam posted pictures of the flowers on social media. This attracted international dealers, who flocked to Viet Nam to buy wild plants for nurseries and breeders all over the world, with the largest shipments reportedly destined for Europe and Taiwan Province of China. Exports without permits were in contravention of CITES as all species of this genus, even if newly discovered, are listed in CITES Appendix I. With prices of $100 per plant being offered, local people reportedly "put aside their daily duties and, instead, went to the forest; on some days, more than 20 plant hunters collected plants." Prices rapidly fell to $50 per kg and then to $10 per kg, and many harvested plants were discarded once demand from dealers stopped at the end of 2010.[a] According to its evaluation in the IUCN Red List of Threatened Species, an estimated 10,000–15,000 plants were collected in the six months following the species' description and it is now classified as Critically Endangered with 10 mature individuals thought to remain.[b]

a. Leonid V Averyanov *et al.*, 'Field Survey of *Paphiopedilum canhii*: From Discovery to Extinction', *Slipper Orchids Fall* (2014).

b. J. Phelps, L. R. Carrasco, and E. L. Webb, "A Framework for Assessing Supply-Side Wildlife Conservation," *Conservation Biology 28*, no. 1 (2014): 244–57.

FIG. CS1.2 Number of live orchids seized in Europe by country or territory of departure of shipment 2015–2021



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

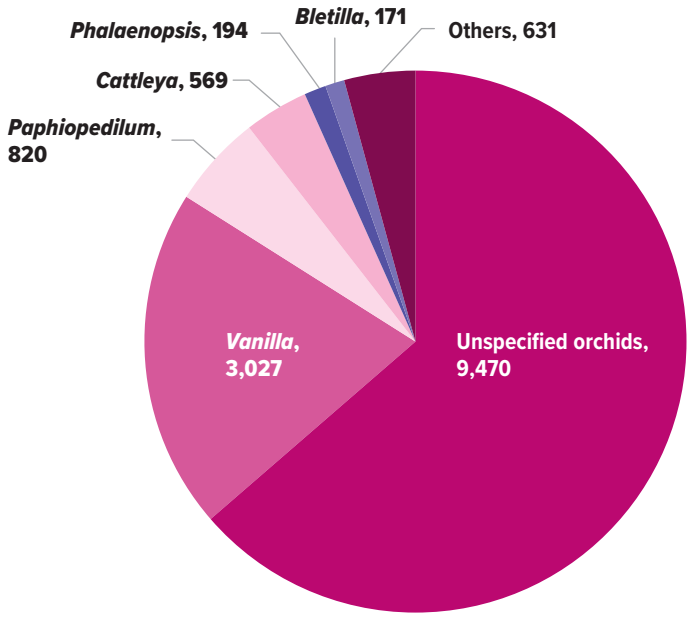
Numerous academic and non-governmental organization studies have documented the legal and illegal trade on multiple international and national online platforms.[61,62,63,64]

The internet was reported to be an important platform for illegal orchid sales in both domestic and international markets, including Europe.[65] According to one academic interviewed: "I think online trade is now more important for trading orchids, certainly in the EU [European Union], compared to face-to-face sales."[66] A case example in Box CS1.2 illustrates how social media communications can help drive collection pressure.

While artificially propagated plants are widely sold online, a 2016 study of orchid groups on one large social media website estimated that 22–46 per cent of orchids for sale were likely to be wild-harvested based on the text descriptions, comments from potential buyers, or photographs used in the advertisement.[67] Interviewees reported that the main platforms being used to sell wild or illegal orchids were Facebook[68] and eBay.[69] Sales were also reported from international platforms such as Etsy[70] and Instagram,[71] and domestic trade on national platforms such as Shoppi in Indonesia[72] and Mercadolivre in Brazil.[73]

Some orchid sellers based outside the European Union, including in Asian countries, were reported to be using social media profiles that appear to be European Union-based to make consumers there believe that that they did not need CITES paperwork.[74] According to two interviewed experts, while many platforms are reported not to take action to stop wild orchid sales, a recent ban on sales of CITES-listed plants on Etsy[75] is reported to have led to a decline in wild orchid trade there.[76] One trader said that when Facebook groups were closed, new groups were formed "in 10 minutes", or the users would shift to direct messaging.[77] Online advertisements for wild orchids on social media

FIG. CS1.3 Number of live orchids seized in Europe by genus, 2015–2021



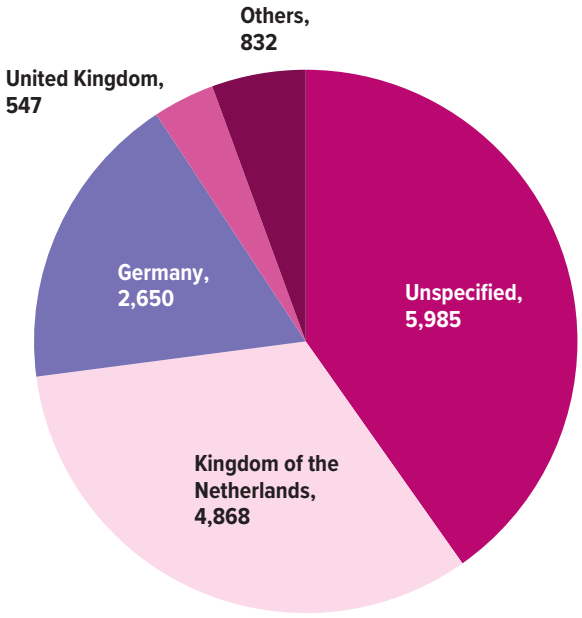
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

platforms will often include an instruction to connect via WhatsApp to arrange a purchase.[78]

According to available seizure data in the WWCR3 analytical dataset, the most prominent points of departure for live orchid shipments seized in Europe during 2015–2021 were, in descending number of specimens seized: Taiwan Province of China, Viet Nam, Thailand, Sri Lanka and Brazil (Figure CS1.2). Some 91 per cent of these shipments were seized by the Kingdom of the Netherlands, Germany and the United Kingdom of Great Britain and Northern Ireland. Expert perception is that Europe is no longer a major destination for illicit bulk shipments of wild orchids, with trade in smaller quantities of plants in the postal system more likely.[79] One trader stated that this was not always the case: "Twenty years ago, orchid smuggling was a large problem to Europe and to [the United States of] America, there were big batches and a lot of customers, all hidden." The trader suggested this was as a result of artificial propagation, declining numbers of wealthy European consumers, and strong enforcement in many European countries.[80]

Most of the orchids seized were of unknown species. The most common named species seized was *Vanilla planifolia*, one of the most cultivated orchids in the world and unlikely to be wild sourced. This was followed by *Paphiopedilum* species, a CITES Appendix I listed genus widely trafficked from the wild (Figure CS1.3). A trade source interviewed for this report claimed that prices of wild *Paphiopedilum* plants vary from $2 for a species that is widely artificially propagated to around $2,000 for a plant of a threatened, recently discovered species. Up to $5,000 can be offered for a rare colour form of an existing species, such as an "alba" form where the flower is white. In addition, flasks of seedlings of *Paphiopedilum anitum* from wild motherstock were reported by one trader to sell for $150–200.[81]

FIG. CS1.4 Number of live orchids seized in Europe by country of shipping destination, 2015–2021



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

Destination markets

Previous studies suggest that orchid consumers fall into two key groups: hobbyist consumers, who dedicate time and resources to growing orchids and seek out specific plants, and casual consumers, who may buy orchids occasionally but do not have specialist knowledge or interests.[82] Casual consumers are unlikely to seek out wild orchids but may buy them from street markets if they are readily available, cheaper or more attractive.[83] This is also likely to happen online, where consumers with little knowledge of orchids who do not fit the definition of a hobbyist may find a plant for sale and buy it, without knowing that it is not legal.[84,85] In some cases, wild plants sold online may be cheaper than artificially propagated plants, increasing the chance that unwitting consumers who find them may buy them instead of legal alternatives.[86,87]

Hobbyists seeking out specific orchids may also buy wild plants unwittingly or intentionally.[88] Intentional purchase may include hobbyists who travel internationally to orchid habitats to collect or buy specific wild plants personally,[89] including by joining guided tours organized by traders or local hobbyist groups.[90]

In South-East Asia, a trade source interviewed for this report said that "speculators" use social media groups to buy and sell large quantities of wild *Paphiopedilum* orchids in bulk, with the sole aim of selling them on quickly for a higher price to other dealers.[91] According to one interviewed expert, scientists can be employed by, or work closely with, nurseries or breeders to describe new species from wild plants in the nursery, increasing their value in trade.[92] One interviewee stated

that they were unsure if corruption was involved, but knew of "judges, lawyers, many influential people… involving the highest level" who were smuggling newly described orchid species from Brazil to Europe.[93]

According to seizure records in the WWCR3 analytical dataset, most of the live orchids seized in Europe for which a country of shipping destination was specified were destined for the Kingdom of the Netherlands, Germany and the United Kingdom during 2015–2021. The Kingdom of the Netherlands has a large flower export trade and is the largest legal exporter of orchids from Europe according to the CITES Trade Database.[94] The Kingdom of the Netherlands and Germany are also two of the largest legal importers, according to CITES trade data.

Implications

Plants present special challenges to wildlife crime enforcement. Particularly when processed, they can be difficult for inspectors to identify while the sheer variety of orchids makes it almost impossible to distinguish between hybrids and newly discovered species.[95] When a container of tusks is found it is clear a crime has been committed, but the prevention of orchid trafficking cannot rely on physical inspections alone. To stop the decimation of wild orchid species, proactive investigation and monitoring are essential.

The research conducted for this report did not reveal the involvement of structured organized crime groups, but rather a complex network of dealers and collectors. Some may even regard themselves as conserving unique species in the face of habitat loss. Profits made by individual collectors are likely reinvested in their hobby, but the evidence from interviews indicates there are also some intermediary businesses, particularly nurseries, profiting from laundering of illegally collected wild plants into trade. At the same time, the world of collectors is competitive and the orchid business can be lucrative, so it is difficult to disentangle the motivations of those involved. This scattered group is actually small and connected, which plays to the advantage of those monitoring illegal activity in this area. The social media used by both collectors and their suppliers in the field can be a rich source of information on species in need of protection.

Preventing poaching is more complicated, given that those collecting orchids from the wild are large in number and disconnected. It is clear that collectors can identify the next hotspot to be explored, and so officials can likewise be predictive and targeted in their enforcement efforts. Key to these efforts is building good relations with nurseries and traders in the source countries, as their vigilance to illegal activity could stop overcollection early, while it is still possible.

Endnotes

1 Jared D. Margulies *et al.*, 'Illegal Wildlife Trade and the Persistence of "Plant Blindness"', *Plants, People, Planet 1*, no. 3 (July 2019): 173–82, https://doi.org/10.1002/ppp3.10053.

2 R Govaerts, 'World Checklist of Ochidaceae' (Facilitated by the Royal Botanic Gardens, 2017), http://apps.kew.org/wcsp/.

3 Mark W. Chase *et al.*, 'An Updated Classification of Orchidaceae', *Botanical Journal of the Linnean Society 177*, no. 2 (1 February 2015): 151–74, https://doi.org/10.1111/boj.12234.

4 M. Jangyukala, 'Review on Advances in Production of Hybrid Orchids', *Research & Reviews: Journal of Crop Science and Technology 10*, no. 3 (24 November 2021): 15–20, https://doi.org/10.37591/rrjocst.v10i3.3221.

5 Michael F. Fay, 'Orchid Conservation: How Can We Meet the Challenges in the Twenty-First Century?', *Botanical Studies 59*, no. 1 (5 June 2018): 16, https://doi.org/10.1186/s40529-018-0232-z.

6 Amy Hinsley *et al.*, 'A Review of the Trade in Orchids and Its Implications for Conservation', *Botanical Journal of the Linnean Society 186*, no. 4 (27 March 2018): 435–55, https://doi.org/10.1093/botlinnean/box083.

7 AC2, BO3, BO4, CTS1.

8 Simon Mackenzie and Donna Yates, 'Collectors on Illicit Collecting: Higher Loyalties and Other Techniques of Neutralization in the Unlawful Collecting of Rare and Precious Orchids and Antiquities', *Theoretical Criminology,* n.d.

9 Tim Wing Yam and Joseph Arditti, 'History of Orchid Propagation: A Mirror of the History of Biotechnology', *Plant Biotechnology Reports 3*, no. 1 (February 2009): 1–56, https://doi.org/10.1007/s11816-008-0066-3.

10 Hinsley *et al.*, 'A Review of the Trade in Orchids and Its Implications for Conservation'.

11 https://cites.org/sites/default/files/documents/E-CoP19-Inf-09.pdf.

12 Anna Kreziou, Hugo de Boer, and Barbara Gravendeel, 'Harvesting of Salep Orchids in North-Western Greece Continues to Threaten Natural Populations', *Oryx 50*, no. 3 (July 2016): 393–96, https://doi.org/10.1017/S0030605315000265.

13 Sarina Veldman *et al.*, 'Trade in Zambian Edible Orchids—DNA Barcoding Reveals the Use of Unexpected Orchid Taxa for Chikanda', *Genes 9*, no. 12 (30 November 2018): 595, https://doi.org/10.3390/genes9120595.

14 Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

15 The six species are *Aerangis ellisii, Dendrobium cruentum, Laelia jongheana*, *L. lobata, Peristeria elata* and *Renanthera imschootiana*. For details, see 'Species+', accessed 19 October 2023, https://www.speciesplus.net/.

16 Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

17 Hinsley *et al.*, 'A Review of the Trade in Orchids and Its Implications for Conservation'.

18 Annotations to orchid listings in the CITES Appendices provide some limited exceptions. Under annotation P3 artificially propagated hybrids of *Cymbidium, Dendrobium, Phalaenopsis* and *Vanda* are not subject to the provisions of the Convention if certain conditions are met. Under annotation P4 for Appendix I orchid species, seedling or tissue cultures obtained in vitro and transported in sterile containers are not subject to the provisions of the Convention if the specimens meet the definition of 'artificially propagated'. Also, for Appendix II listed orchid species, some parts and derivatives are not covered by the CITES listing, including seeds and cut flowers. https://cites.org/eng/app/appendices.php.

19 CITES Secretariat, 'World Wildlife Trade Report 2022' (Geneva, Switzerland: CITES Secretariat, 2022).

20 Hinsley *et al.*, 'A Review of the Trade in Orchids and Its Implications for Conservation'.

21 CITES CoP19 #4 provides an annotation exempting "finished products derived from artificial propagation, packaged and ready for retail trade of cosmetics containing parts and derivatives of *Bletilla striata*, *Cycnoches cooperi, Gastrodia elata, Phalaenopsis amabilis* or *Phalaenopsis lobbii.*"

22 The 17 experts consulted included academic researchers and field botanists based in Europe, Latin America and South-East Asia, scientists working in European CITES scientific authorities for plants, a specialist orchid hobbyist, commercial orchid traders based in Europe, and a senior customs officer in a European country.

23 AC3, BO1, BO2, BO3, BO4, CTS4.

24 AC2, AC3, BO4, CTS3.

25 AC2, BO1, BO2, BO4, CTS4.

26 HOB1.

27 BO4, TR2, HOB1.

28 BO4.

29 Shibao Zhang *et al.*, 'Physiological Diversity of Orchids', *Plant Diversity*, Celebrating 80 years of KIB, 40, no. 4 (1 August 2018): 196–208, https://doi.org/10.1016/j.pld.2018.06.003.

30 BO4.

31 BO2.

32 AC2.

33 AC2, BO1, BO2 CTS4.

34 BO1, BO2, CTS4.

35 AC2, CTS4.

36 AC2.

37 CTS4.

38 Taiwan Province of China is not a Party to CITES so it does not appear in the exporter-reported data, but it is the largest source in the importer-reported data between 2015 and 2022.

39 AC2, BO1, BO3,TR2.

40 BO2, TR2, CTS1, CTS3, EN1.

41 TR2.

42 TR2.

43 CITES database search was carried out in January 2023 at https://trade.cites.org/.

44 Amy Hinsley, Diogo Verissimo, and David L. Roberts, 'Heterogeneity in Consumer Preferences for Orchids in International Trade and the Potential for the Use of Market Research Methods to Study Demand for Wildlife', *Biological Conservation 190* (October 2015): 80–86, https://doi.org/10.1016/j.biocon.2015.05.010.

45 Thailand: 347 species based on: J. Phelps and Edward L. Webb, '"Invisible" Wildlife Trades: Southeast Asia's Undocumented Illegal Trade in Wild Ornamental Plants', *Biological Conservation 186* (June 2015): 296–305, https://doi.org/10.1016/j.biocon.2015.03.030.

46 Southern China: 440 species base on: Stephan W. Gale *et al.*, 'Quantifying the Trade in Wild-Collected Ornamental Orchids in South China: Diversity, Volume and Value Gradients Underscore the Primacy of Supply', *Biological Conservation 238* (October 2019): 108204, https://doi.org/10.1016/j.biocon.2019.108204.

47 Mexico: 333 species based on: Tamara Ticktin *et al.*, 'Synthesis of Wild Orchid Trade and Demography Provides New Insight on Conservation Strategies', *Conservation Letters 13*, no. 2 (March 2020), https://doi.org/10.1111/conl.12697.

48 BO2.

49 BO2.

50 The Huntington Botanical Gardens, 'Orchids: Around the World in Six Continents', ArcGIS StoryMaps, 25 July 2023, https://storymaps.arcgis.com/stories/d6a0766fef2b47b199ef82ae7b778a86.

51 AC1, BO1, BO2, TR2, CTS4.

52 BO3, BO4.

53 CTS2, CTS3.

54 AC1, AC3, TR1, CTS1, EN1.

55 BO2, BO4, TR1, TR2, HOB1.

56 CTS4.

57 AC2, BO1, BO4, TR2.

58 AC1, AC3.

59 AC2, BO3, CTS1, CTS4.

60 BO2.

61 Leigh-Anne Bullough *et al.*, 'Orchid Obscurity: Understanding Domestic Trade in Wild-Harvested Orchids in Viet Nam', *Frontiers in Ecology and Evolution 9* (2021), https://www.frontiersin.org/articles/10.3389/fevo.2021.631795.

62 A. Hinsley, 'The Role of Online Platforms in the Illegal Orchid Trade from Southeast Asia' (Geneva, Switzerland: The Global Initiative Against Transnational Organized Crime, 2018).

63 Anita Lavorgna and Maurizio Sajeva, 'Studying Illegal Online Trades in Plants: Market Characteristics, Organisational and Behavioural Aspects, and Policing Challenges', *European Journal on Criminal Policy and Research 27*, no. 4 (December 2021): 451–470, https://doi.org/10.1007/s10610-020-09447-2.

64 Jing Huang *et al.*, 'Trade of Native Orchids on Chinese Online Platforms', *Biodiversity Science 30*, no. 4 (20 April 2022): 21,233, https://doi.org/10.17520/biods.2021233.

65 AC1, AC4, BO1, BO2, BO3, BO4, TR1, TR2, CTS1, CTS3, CTS4, HOB1, EN1.

66 AC1.

67 Amy Hinsley *et al.*, 'Estimating the extent and structure of trade in horticultural orchids via social media', *Conservation Biology 30*, no. 5 (2016): 1,038–47, https://doi.org/10.1111/cobi.12721.

68 AC1, AC4, BO1, BO2, BO3, BO4, TR1, TR2, CTS1, CTS3, CTS4.

69 AC1, TR1, BO3, HOB1.

70 AC1, AC3, BO3, TR1.

71 AC1, BO2, BO3.

72 AC1, BO2.

73 BO4.

74 TR1, BO3.

75 'Plants, Herbs, Seeds and Soil - Our House Rules', Etsy.com, n.d., https://www.etsy.com/uk/legal/policy/plants-herbs-seeds-and-soil/2426859079 51#endangered.

76 AC1, BO3.

77 TR2.

78 Hinsley *et al.*, 'Estimating the extent and structure of trade in horticultural orchids via social media'; Hinsley, 'The Role of Online Platforms in the Illegal Orchid Trade from Southeast Asia'.

79 AC1, BO3, EN1.

80 TR2.

81 TR2.

82 Hinsley, Verissimo, and Roberts, 'Heterogeneity in Consumer Preferences for Orchids in International Trade and the Potential for the Use of Market Research Methods to Study Demand for Wildlife'.

83 J. Phelps, L. R. Carrasco, and E. L. Webb, 'A Framework for Assessing Supply-Side Wildlife Conservation', *Conservation Biology 28*, no. 1 (2014): 244–57.

84 AC3, CTS1, EN1.

85 Hinsley, 'The Role of Online Platforms in the Illegal Orchid Trade from Southeast Asia'.

86 Ibid.

87 HOB1

88 AC1, AC2, AC3, BO2, BO3, BO4, CTS1, CTS3, TR1, TR2, HOB1, EN1.

89 CTS1.

90 AC2, BO4.

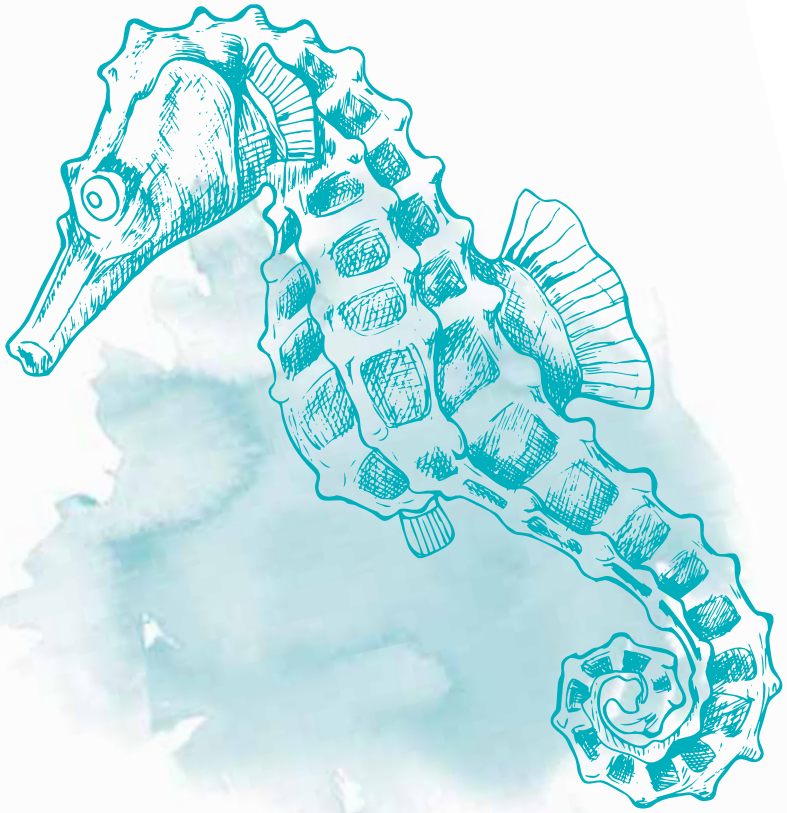
91 TR2.

92 AC2.

93 BO4.

94 'EU Exported €100.6 Million Worth of Bulbs of Orchids and Tulips', Eurostat News, 3 April 2023, https://ec.europa.eu/eurostat/web/products-eurostat-news/w/edn-20230406-1.

95 Hinsley *et al.*, 'A Review of the Trade in Orchids and Its Implications for Conservation'.



Dried seahorses

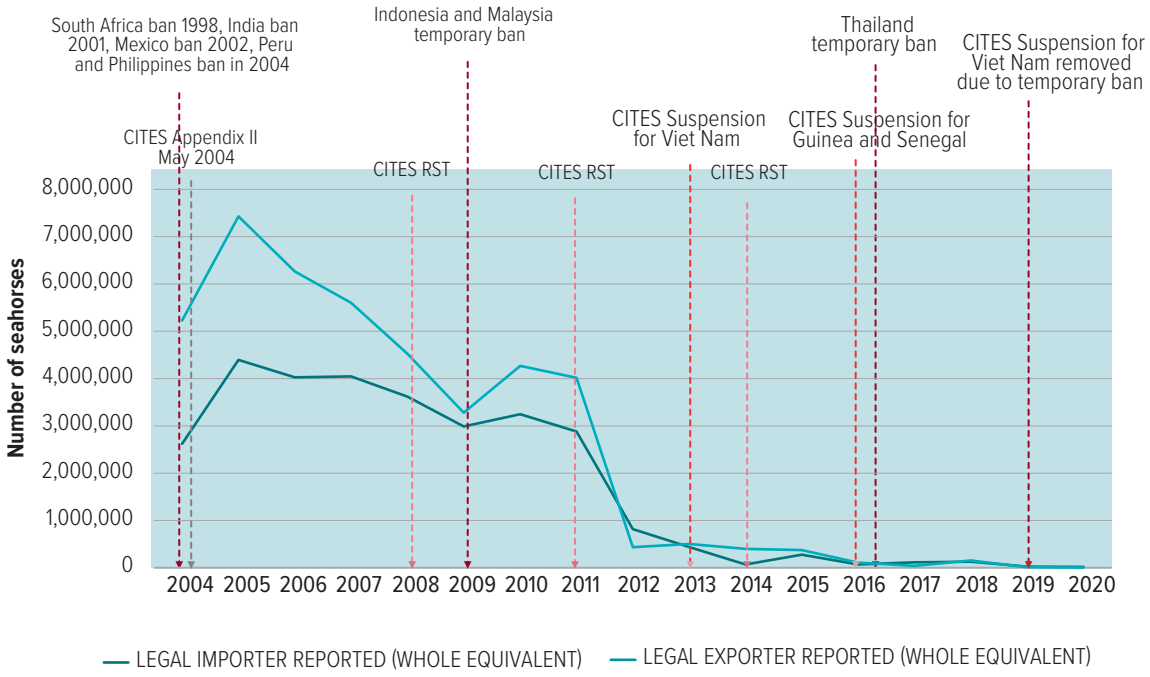
Previous editions of the *World Wildlife Crime Report* have examined illegal trade in several aquatic species, including eels, sea cucumbers, sturgeons and marine turtles, showing how criminal actions undermine regulatory measures.[1,2] For the current report, a new case study on illegal seahorse trade similarly examines the dynamics of trafficking from source to market.

Poaching often takes place in areas where the cost of harvesting wildlife is low. People who farm, hunt and forage in rural areas may encounter protected wildlife species while going about their daily lives. If gathering this wildlife presents some prospects for gain, poaching may become a rational choice. The poaching of seahorses is essentially opportunistic, but it may feed into international organized trafficking when enforcement is weak.

Opportunistic poaching exists in the marine context in the form of illegal by-catch, a term used in fisheries to describe species that are inadvertently caught when other species are being targeted.[3,4] While some of this wildlife can be returned to the sea alive, much of it will die due to injury and stress from capture. For fishers not licensed or not interested in making use of the additional species, this by-catch is simply waste and discarded.[5]

In 2019, the FAO estimated that marine fisheries discards amounted to 9.1 million tons annually, equivalent to over 10 per cent of annual catches. Some 4.2 million tons of these discards came from bottom trawling, a fishing technique known to increase the rate of by-catch significantly.[6]

FIG. CS2.1 Number of whole seahorses legally traded internationally 2004–2020



Source: CITES Trade Database

Notes: Analysis was based on bodies, fingerlings, live and skeleton data of *Hippocampus* spp. for commercial trade purposes and unknown purposes. Where data were reported by weight, they were converted to whole body equivalents (see methodology annex for details). CITES RST is the Review of Significant Trade.

Marine species caught as by-catch can include those with trade value and longstanding wildlife markets can be fed primarily from by-catch. A 2017 review of global seahorse fisheries found that "[t]he regulated international trade in seahorses ... is largely sourced from by-catch."[7] Very few seahorses caught in bottom trawlers will survive their injuries, find a suitable habitat and mate successfully.[8]

Seahorses are traded for several purposes, including live for the aquarium trade. However, a recent review concluded that most live trade comes from cultured specimens, a separate market with little impact on wild seahorses.[9] It is also a minor component of the international seahorse trade: 98 per cent of the total trade involves dried seahorses.[10,11] Dried seahorses are sold as curios and decoratively, but the largest market appears to be for their use in medicine.[12] Prior to CITES placing the entire genus *Hippocampus* in Appendix II in 2004,[13] an estimated 54 tons, or 19 million dried seahorses, were traded internationally each year.[14]

Seahorses are found off the coasts of every inhabited continent and trade has historically been dominated by a limited number of countries.[15] Since all species of seahorses are listed in CITES Appendix II, international trade is allowed if compliant with the Convention's regulatory requirements. However, many of the key suppliers have banned exports following the CITES listing owing to implementation challenges, particularly with making the scientific non-detriment findings required before issuance of export permits.[16,17]

In 2005, the peak year of CITES regulated trade, over 90 per cent of the wild-sourced seahorse commercial supply came from Thailand, which exported almost 20 tons of some 22 tons traded that year.[18] Thailand voluntarily banned trade in 2016 after years of sharply declining exports.[19] Several other leading supplier countries including India (2001),[20] the Philippines (2004)[21] and Peru (2004)[22] banned exports before or at the time of the CITES listing. Other former suppliers have either subsequently instituted export bans or have been subject to CITES recommendations to

FIG. CS2.2 Weight of dried seahorses seized globally 2015–2021

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

suspend seahorse trade (Figure CS2.1).[23] As a result, there has been very little legal trade in seahorses since 2012 and there was virtually none by 2020.[24]

Based on exporter reported data, CITES permits were only issued for just over 300 kg, or about 120,000, wild-caught seahorses in 2020.[25,26]

The impact this decline in legal supply has had on consumption is unclear. It is theoretically possible that the international market demand for seahorses declined from an estimated 19 million animals annually before 2004 to some 120,000 animals in 2020. However, past studies to assess national dried seahorse markets following the CITES listing did not reflect this rapid decline.[27] This begs the question as to what level of demand persists and whether it is being met by illegal trade.

Since there is very limited legal international trade in seahorses, most of the evidence over the past decade comes from seizures.[28] These data, which are reliant on enforcement effort and levels of reporting, provide only partial insight into illegal trade levels. From 2015–2021, around 10.4 tons of dried seahorses were recorded in seizures in the WWCR3 analytical dataset, equivalent to an average of approximately 1.5 tons or 550,000 individuals per year (Figure CS2.2).[29]

Review of individual seizure records in the WWCR3 analytical dataset indicated that one country, Peru, played a prominent role in seahorse shipments. Together, the seven largest seizures linked to Peru during 2015–2021 amounted to over 5.4 tons of dried seahorses (Box CS2.1).

In 2022, UNODC conducted 22 interviews with fishers representing three small-scale fishery types in two locations in northern Peru, as well as with five local buyers of seahorses. Academics and authorities from Peru were also consulted.[30] These interviews showed that, while they are mainly unintentionally captured in nets intended for other species, seahorses are being systematically channeled into the illegal export market.

BOX CS2.1 Major dried seahorse seizures with links to Peru

In December 2015, according to the Government of Peru, 570 kg of dried seahorses in 58 black sacks were seized from a container owned by a dried fish company in Paita, on the coast of Peru.[a]

In March 2016, according to the Government of Peru, 400 kg of dried seahorses were seized from a bus in Ica, southern Peru.[b]

In May 2016, according to the Government of Peru, some 648 kg of dried seahorses were found hidden in the hold of a Chinese vessel.[c]

On 10 March 2017, according to a media source quoting customs officials in Viet Nam, an estimated 900 kg of dried seahorses were seized by customs officers in Viet Nam in a container shipped from Peru. The seahorses were smuggled in bags under a shipment of donkey hides.[d,e] However, the species involved in this seizure were identified as *H. algiricus* (endemic to West Africa), suggesting the shipment may only have transited through Peru.[e]

In April 2019, according to a report by a Peruvian non-governmental organization and a Government of Peru social media post, 631 kg of dried seahorses destined for China were found hidden under bales of cattle skins during a routine customs inspection of a warehouse in Callao.[f]

In April and May 2019, according to a China Customs news release, in three connected seizures, Qingdao Customs in China seized 1,280 kg of dried seahorses from a gang importing them from Peru concealed under a shipment of horse hides.[g]

In September 2019, according to the Government of Peru, 55 cardboard boxes of dried seahorses weighing 1,043 kg were seized from a registered artisanal fishing vessel from Peru about 300 km from the coast.[h]

a. Ministerio de la Producción de Perú, Resolución Directoral No. 533-2018-PRODUCE/DS-PA, 7 February 2018.
b. Ministerio de la Producción de Perú, Resolución Directoral No. 2719-2017-PRODUCE/DS-PA, 21 July 2017.
c. Ministerio de la Producción de Perú, Resolución Consejo de Apelación de Sanciones, No. 065-2021-PRODUCE/CONAS-CP, 24 May 2021
d. Giang Chinh, 'Vietnam Seizes Nearly 300,000 Dead Seahorses Smuggled from Peru', *VnExpress International*, 10 March 2017, https://e.vnexpress.net/news/news/vietnam-seizes-nearly-300-000-dead-seahorses-smuggled-from-peru-3553714.html.
e. CITES, 'Species Specific Matters: Seahorses (*Hippocampus* spp.). Report of the Secretariat. Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions. SC74 Doc. 70.1 Annex 2' (CITES, March 2022).
f. SPDA Actualidad Ambiental, 'Iban a China | Más de 600 kilos de caballitos de mar fueron incautados en el Callao', 22 April 2019, https://www.actualidadambiental.pe/iban-a-china-mas-de-600-kilos-de-caballitos-de-mar-fueron-incautados-en-el-callao/; See also *Fiscalía Especializada En Materia Ambiental Del Callao Incautó 631 Kilos de 'Caballito de Mar'*, 2019, https://www.youtube.com/watch?v=AInFXefNj-Y.
g. General Administration of Customs of the People's Republic of China. (2019). Qingdao uncovered the country's largest dried seahorse smuggling case (translated). http://www.customs.gov.cn/customs/xwfb34/mtjj35/2508740/index.html.
h. Ministerio de la Producción de Perú, Resolución Directoral No. 03466-2021-PRODUCE/DS-PA, 16 December 2021

In a manner akin to pangolins in Africa,[31] seahorses in Peru are essentially "crowd sourced". The interviewees explained that exporters, often Asian expatriates based in urban areas, make their interest in buying seahorses known. Local buyers, usually shop owners, act as points of consolidation. Fishers sell their seahorse by-catch to these consolidators. While each fisher contributes a relatively small number of seahorses, the cumulative impact can be significant.[32]

While not intentionally poached, technically speaking, these seahorses enter illegal trade as soon as they are landed. Capture and trade in seahorses have been illegal in Peru since 2004.[33] In addition, the fishing technique that appears to be the main way seahorses are caught—bottom trawling—is itself illegal in Peru within five nautical miles of the coast.[34] The poaching may be unintentional, but it feeds directly into organized illegal trade.

Sourcing

Peru is one of the leading fishing nations in the world. In 2020, it ranked third globally in terms of marine catch, behind only China and Indonesia, responsible for more than 7% of the fish taken from the ocean that year.[35] It is best known for its industrial anchoveta fishery, the single largest fishery in the world. Much of the anchoveta catch goes into the production of fish meal, used especially for animal feed and aquaculture, as well as fish oil.[36]

While the industrial anchoveta fishery is dominant in terms of sheer tonnage, most of the marine landings in Peru for direct human consumption are caught by the local small-scale fleet.[37] This includes exports, such as squid and mahi mahi,[38] but also jack mackerel, an input essential for food security in the country and a source of sustenance for artisanal fishers.[39] The importance of this sector was highlighted during the COVID-19 pandemic lockdown in March 2020; the country was reliant on artisanal fishing for food security because the industrial fleet was docked.[40]

There were an estimated 88,000 artisanal fishers in Peru in 2021,[41] which represents over 80 per cent of those employed in the fishing industry.[42] It has been estimated that for every person involved in the primary fishing industry at sea, two are employed in the secondary industry on land.[43] This sector has experienced explosive and unsustainable growth in recent years, partly due to national policies designed to support artisanal fishing. In 1992, a new General Fisheries Law came into effect that, among other things, removed the regulation limiting the expansion of the fishing fleet.[44] The result has been a rapid expansion in the number of vessels in the water, reducing fishing efficiency and undermining the well-being of the fishers.[45]

For this study, fishers were interviewed in two locations in the extreme north-west of the country, an area known from past research for its role in the seahorse trade.[46,47] Seahorse traders were interviewed in Sechura and Talara, a town situated between Mancora and Sechura.

The artisanal and small-scale fleet employs a wide range of techniques for fishing. According to one study, fishers using the least selective fishing gear, particularly bottom trawlers, and those engaged in illegal fishing had the most stable incomes over the past decade in Peru. In 2018, trawlers were estimated to earn over six times the national annual minimum wage, while gillnetters and handliners made less than half of it.[48] In 2015, 31 per cent of surveyed small-scale fishers reported annual incomes below the equivalent of $1,500, while 39 per cent reported annual incomes between the equivalent of $1,500 and $3,000.[49]

For this case study, longline, gillnet and trawl fishers were interviewed. Almost three-quarters of all fisher respondents and all of the trawl fisher respondents indicated that they incidentally catch seahorses while fishing.[50] Nearly all said they would retain any seahorses caught, although one fisher said he would return them if alive.[51] They referred to the seahorse catch as a kind of bonus for those who chose to collect and sell them, not part of the formal catch of the vessel that was always divided between the owner of the ship and the crew.

Most gillnet fishers reported by-catch of only one or two seahorses per month, but trawl fishers reported catching 5–20 seahorses per trip, with up to 20 trips per month. This suggests that trawl vessels are catching upwards of 100 seahorses per month apiece. There are an estimated 20 trawlers in Secura Bay and 30 in the port of Mancora, with additional vessels also found in Talara and Parachique.[52] This suggests an annual offtake of many tens of thousands of seahorses from the trawlers alone, in addition to the thousands of fishers employing other techniques with lower seahorse capture rates.

Retained seahorses could be sold fresh[53] or dried,[54] and some reported selling them in both forms.[55] Those who sold them fresh were largely trawl fishers, and this is likely due to the increased frequency that trawlers caught seahorses. Seahorses were typically dried on the roofs of the fishers' houses. Drying reduced the weight of the seahorses by about two-thirds.[56]

The fishers said that they could receive 1–5 Peruvian nuevo soles ($0.25–1.25) per individual fresh or dried seahorse, with some variation by location, size and season.[57] This suggests an additional income per trawler of the equivalents of at least $1.25 per trip or $25 per month per vessel.

Most (57 per cent) of fishers interviewed said they did not know that national law prohibited the capture and trade of seahorses in Peru,[58] and of those that did know, only one felt that the prohibition had reduced trade.[59] Several of those who admitted trading seahorses explained that since they caught them anyway, they might as well make use of them.[60] Seventy-three per cent of fisher respondents indicated that it was highly unlikely they would be caught or penalized for participating in illicit trade of seahorses.[61] Those operating bottom trawlers within five nautical miles of the coast were already very openly breaking the law. Some analysts argue that the lack of enforcement of this prohibition is due to a national decentralization effort initiated in the early 2000s. Power was devolved to regional governments, but not all of these had the capacity to assume responsibility for fisheries management.[62]

Although there was little disincentive to gathering seahorses, most of the fishers,[63] and all but one of the traders interviewed,[64] felt the trade had diminished in recent years. One said this decline began around 2018.[65] It was attributed to both dwindling seahorse numbers and reduced demand.

The first buyers or local consolidators were often local shopkeepers,[66] like the first buyers in the pangolin trade.[67] According to all those interviewed, these local buyers were exclusively Peruvian. Buying at the rate of 1–2 Peruvian nuevo soles per animal cited above, they sold for 250–300 Peruvian nuevo soles per kg (about $70–$80). If sold to a tertiary buyer, one dealer interviewed indicated the rate could increase to 1,100 Peruvian nuevo soles per kg (about $300).[68]

These buyers dealt in a range of dried sea products, not exclusively in seahorses, often species caught as by-catch including shark fins,[69] guitarfish,[70] and eel swim bladders.[71] Eel swim bladders were said to be particularly valuable (800 Peruvian nuevo soles, or about $200, apiece).[72] One fisher interviewed said that both seahorses and shark fins could also be imported from Ecuador through the terrestrial border in Aguas Verdes (Tumbes) to be sold in Peru.[73]

The local buyers interviewed were not exporters. There is a small local market for seahorses, mainly comprised of Asian expatriates,[74] including employees of a national petroleum corporation,[75] but the primary market is for export. Three of the dealers interviewed said they sold to persons of Asian descent who came from Lima.[76] The local buyers could call the exporters when they had sufficient quantity to sell or the exporters could place orders for a specific amount by a certain date.[77] Some exporters would tour the fishing areas to buy from the local consolidators.[78]

Illegal trading

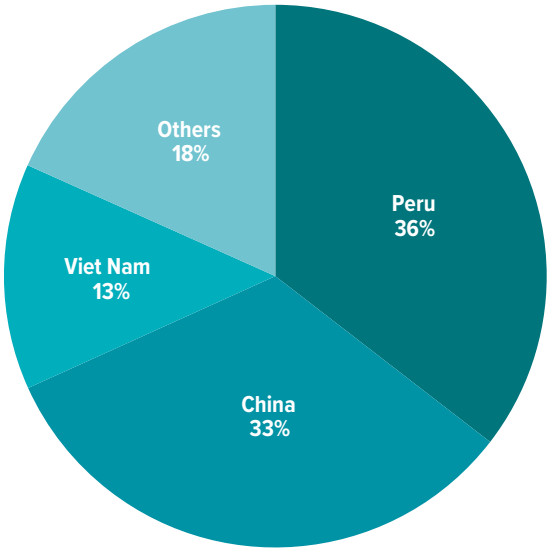
As species listed in Appendix II of CITES, seahorses remain legal to trade internationally where sourcing is certified legal and sustainable. While the CITES data suggest that few legal exports are being permitted, other official international trade data indicate that some trade continues.[79] A survey of traders carried out in Hong Kong, China in 2016 and 2017 found that 95 per cent of imports (by volume) had been imported into Hong Kong, China from countries for which CITES recommendations to suspend trade were in force.[80]

Another study, carried out in India between 2015 and 2017, suggested that seahorse extraction was continuing despite the country's ban and CITES regulations.[81,82] Interviews with traders suggested that many tons of seahorses were exported from India each year between 2015–2017.[83,84,85] More recently, an in-depth 2023 study of seahorse trade developments for six net exporters (Indonesia, India, Malaysia, the Philippines, Thailand and Viet Nam), asserted that in all cases exports had continued, despite the fact that trade had been banned or suspended.[86]

Analysis of the seizures during the period 2015–2021 suggests Peru, China and, more recently, Viet Nam seize the largest volumes of seahorses (Figure CS2.3). Of those seizures where a source of shipment was specified, Peru is the leading shipment source (Figure CS2.4). Only 9 per cent of the seizures specified a destination.

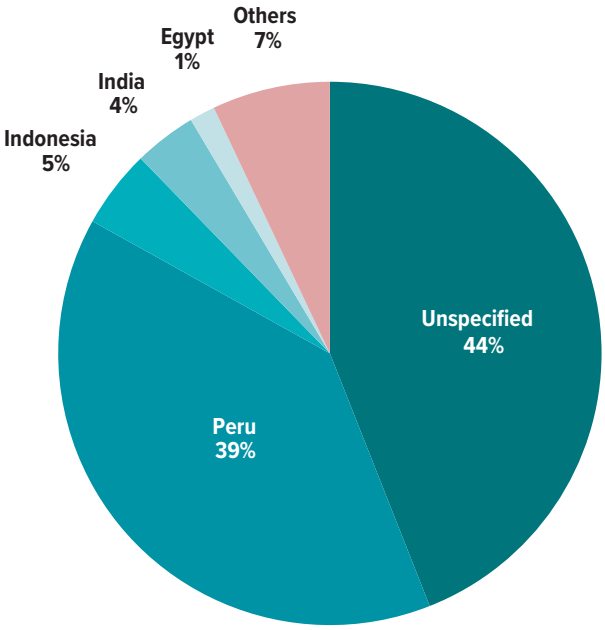
All the fishers interviewed said that foreign vessels rarely visited their local ports. Based on seizures and interviews, the ports of Paita (in the north, close to the capture areas)[87] and Callao (Lima)[88,89] appear to be the primary points of export. One buyer mentioned that offshore transfer of seahorses does take place,[90] although most of the fishers interviewed denied this.

FIG. CS2.3 Share of dried seahorses by weight seized by country 2015–2021



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

FIG. CS2.4 Share of dried seahorses seized by weight by reported country of source of shipment 2015–2021



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

BOX CS2.2 Recent seahorse seizures in Viet Nam

In December 2021, Viet Nam reportedly seized 500 kg of dried seahorses hidden in a shipment of sheep skins.[a]

In May 2022, Ho Chi Minh City Customs in Viet Nam reportedly seized 573 kg of dried seahorses along with other undeclared products (tiger bones, a leopard skull, and 86 kg of Javan pangolin scales) in a shipment declared as imported snails.[b,c]

In March 2022, Hai Phong Customs and Viet Nam Customs anti-smuggling and investigation department reportedly inspected a shipment of frozen fish from Indonesia where they found 350 kg of dried seahorses hidden at the bottom of the container.[d,e,f]

a. Customs News, 'Discover Nearly 500kg of Dried Seahorses Importing without Declaration', Customs News - Hải quan Online, 23 December 2018, https://english.haiquanonline.com.vn/discover-nearly-500kg-of-dried-seahorses-importing-without-declaration-9351.html.
b. Le Thu, 'HCMC Customs: Nearly 600 kg of dried seahorse found in shell containers', Ho Chi Minh City Customs, 25 May 2022, https://haiquanonline.com.vn/hai-quan-tphcm-phat-hien-gan-600-kg-ca-ngua-kho-trong-container-vo-oc-162998.html.
c. Le Thu, 'The bones hidden in the shipment of shells were tiger bones, leopards', Hải quan Online, 29 July 2022, https://haiquanonline.com.vn/xuong-giau-trong-lo-hang-vo-oc-la-xuong-ho-bao-165314.html.
d. Ho Chi Minh City Customs Department, 'Customs Forces: Seized 350 kg of seahorses disguised in frozen fish containers', accessed 17 October 2023, https://tphcm.customs.gov.vn/index.jsp?pageId=3244&aid=167046&cid=5278.
e. Vietnam Financial Times Online, 'Customs Forces: Seized 350 kg of seahorses disguised in frozen fish containers', Thời báo Tài chính Việt Nam, accessed 17 October 2023, https://thoibaotaichinhvietnam.vn/bat-giu-350-kg-ca-ngua-nguy-trang-trong-container-ca-dong-lanh-103146.html.
f. Thai Binh and Ngoc Loan, '350kg of Smuggled Seahorses Seized at Hai Phong Port', Customs News - Hải quan Online, accessed 17 October 2023, https://english.haiquanonline.com.vn/350kg-of-smuggled-seahorses-seized-at-hai-phong-port-22096.html.

Skins from sheep,[91] donkeys,[92] horses,[93] and cows [94] have been used to conceal loads, highlighting the trade in a wide variety of animal skins in Peru.

In 2021, Peru was the world's leading exporter of animal meal and pellets, as well as fish oil made largely from anchoveta.[95] China, with its massive aquaculture industry, was the world's largest importer of these products.[96] This large bilateral trade in processed marine products may be one reason most of the largest detected illegal shipments proceeded directly between the two countries. However, a series of large seizures recently reported by media sources suggest Viet Nam could be emerging as a destination or transit area (Box CS2.2).

Evidence from seized seahorse shipments indicates that the routing can be convoluted with multiple transit points, sometimes on different continents, perhaps reflecting the nature of the commodity (dried, durable and relatively light) as well as the evasion methods adopted by traffickers.[97] While the seizure record indicates Peru as a key source of international supply today, past species identification studies conducted at traditional medicine markets have not found the giant Pacific seahorse (*Hippocampus ingens*), the only seahorse species found in Peruvian waters,[98,99] to be particularly prominent.[100] Updating this analysis would be essential to determine if the seizure record accurately reflects current trafficking trends.

Seizures made in China have found the involvement of complex organizations involved in smuggling seahorses into the country. For example, in 2020, a joint operation of customs and other enforcement agencies operating in seven locations in China resulted in the arrest of 26 suspects. The investigation determined that four gangs had purchased large quantities of wild animal products (including 716 kg of dried seahorses) and used ocean freight liner crew members, barge crew members and passengers to transport the goods. These products were then mailed to the shipper or the consignee designated by the shipper through domestic express delivery.[101,102,103]

Consumption

The primary use of dried seahorses in destination markets is medicinal. In many countries the domestic sale and use of legally imported supplies is not restricted and both unprocessed seahorses and manufactured medicines containing seahorses are available on the retail market.[104] With legal trade sources increasingly limited, a critical challenge is to discern whether ongoing sales in destination markets are from legal stocks or illegal imports.[105] Updated research on consumer market trends is clearly warranted.

Implications for policy

To limit the damage caused by wildlife trafficking, interventions are necessary that prevent poaching at origin. By-catch is particularly problematic in this regard. With species that are primarily harvested accidentally, like seahorses in Peru, preventing collection may be impossible, but it can be greatly reduced. While bottom trawling may be the most lucrative form of fishing in Peru, it is also illegal within five nautical miles of the coast, where the small-scale vessels appear to operate.[106] Until it is stopped, seahorses and other collateral species will continue to be unnecessarily adversely affected. This principle is true not just for Peru but for small-scale trawl fisheries around the world.[107]

The seahorse market is also difficult to counter because it is legal in much of the value chain. As a CITES Appendix II-listed species, seahorses remain legal to trade internationally where sourcing is legal and sustainable, but there have been very few permits for this trade issued in recent years. Despite this, there is apparently a large open market for seahorses in the primary destination countries. If these domestic markets are being supplied mostly by domestically harvested seahorses, the illegal international trade could be minor. However, if the species available in the consumer markets are of foreign origin, then the question of the legality of their entry into the country becomes relevant. For this reason, one of the best ways of monitoring the illegal trade is by continually assessing the geographic origin of seahorses in markets.

Endnotes

1 UNODC, *World Wildlife Crime Report 2016* (Vienna: United Nations publications, 2016).

2 UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

3 FAO defines "incidental catch" as the "Retained catch of non-targeted species." It defines "discarded catch" as "That portion of the catch returned to the sea as a result of economic, legal, or personal considerations." It defines "by-catch" as "Discarded catch plus incidental catch."

4 FAO, 'A Global Assessment of Fisheries Bycatch and Discards', accessed 16 October 2023, https://www.fao.org/3/T4890E/T4890E02.htm.

5 M. A. Pérez Roda (ed.), E. Gilman, T. Huntington, S. J. Kennelly, P. Suuronen, M. Chaloupka, and P. Medley, 'A Third Assessment of Global Marine Fisheries Discards', FAO Fisheries and Aquaculture Technical Paper (Rome, 2019), https://www.fao.org/3/cb1136en/cb1136en.pdf.

6 FAO, *The State of World Fisheries and Aquaculture 2020* (Rome: FAO, 2020), https://doi.org/10.4060/ca9229en.

7 Julia M. Lawson, Sarah J. Foster, and Amanda C. J. Vincent, 'Low Bycatch Rates Add Up to Big Numbers for a Genus of Small Fishes', *Fisheries 42*, no. 1 (2 January 2017): 19–33, https://doi.org/10.1080/03632415.2017.1259944.

8 S. J. Foster and A. C. J. Vincent, 'Making Non-Detriment Findings for Seahorses – a Framework, Version 4.' (Project Seahorse, The Institute for the Oceans and Fisheries (formerly the Fisheries Centre), The University of British Columbia, 2016), https://projectseahorse.org/wp-content/uploads/2021/10/NDFframeworkV42016March22.pdf.

9 S. J. Foster *et al.*, 'CITES Makes a Measurable Difference to the Trade in Live Marine Fishes: The Pioneering Case of Seahorses', *Biological Conservation 272* (August 2022): 109653, https://doi.org/10.1016/j.biocon.2022.109653.

10 CITES, 'Species Specific Matters: Seahorses (*Hippocampus* spp.). Report of the Secretariat. Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions. SC74 Doc. 70.1 Annex 2' (CITES, March 2022).

11 Sarah Foster, Stefan Wiswedel, and Amanda Vincent, 'Opportunities and Challenges for Analysis of Wildlife Trade Using CITES Data – Seahorses as a Case Study: Analysis of Wildlife Trade Using CITES Data, *Aquatic Conservation: Marine and Freshwater Ecosystems 26*, no. 1 (February 2016): 154–72, https://doi.org/10.1002/aqc.2493.

12 A. C. J. Vincent, S. J. Foster, and H. J. Koldewey, 'Conservation and Management of Seahorses and Other Syngnathidae', *Journal of Fish Biology 78,* no. 6 (June 2011): 1,681–1,724, https://doi.org/10.1111/j.1095-8649.2011.03003.x.

13 Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

14 Vincent, Foster, and Koldewey, 'Conservation and Management of Seahorses and Other Syngnathidae'.

15 Foster, Wiswedel, and Vincent, 'Opportunities and Challenges for Analysis of Wildlife Trade Using CITES Data – Seahorses as a Case Study'.

16 CITES, 'Species Specific Matters: Seahorses (*Hippocampus* spp.). Next Steps toward Successful Implementation of Appendix-II Listing of Seahorses. CoP19 Doc. 69.2' (CITES, November 2022).

17 S. J. Foster and A. C. J. Vincent, 'Holding Governments Accountable for Their Commitments: CITES Review of Significant Trade for a Very High-Volume Taxon', *Global Ecology and Conservation 27* (June 2021): e01572, https://doi.org/10.1016/j.gecco.2021.e01572.

18 Based on data from CITES, 'CITES Trade Database', n.d., https://trade.cites.org/.

19 Foster and Vincent, 'Holding Governments Accountable for Their Commitments'.

20 Sarah J. Foster *et al.*, 'Global Seahorse Trade Defies Export Bans under CITES Action and National Legislation', *Marine Policy 103* (1 May 2019): 33–41, https://doi.org/10.1016/j.marpol.2019.01.014.

21 Ibid.

22 Confirmed by Government of Peru response to CITES Secretariat in CITES AC31 Doc 26 Annex 1. https://cites.org/sites/default/files/eng/com/ac/31/Docs/E-AC31-26-A-R1.pdf.

23 Recommendations to CITES Parties by the CITES Standing Committee to suspend trade in particular species are typically made under the terms of Resolution Conf. 12.8 (Rev. CoP18) on Review of Significant Trade in specimens of Appendix II species, which was designed to identify Appendix II listed species that may be subject to unsustainable levels of international trade, and identify problems and solutions concerning effective implementation of the Convention.

24 CITES, 'CITES Trade Database'.

25 Ibid.

26 Conversion rate is 2.69 g per seahorse based on Melissa Evanson *et al.*, 'Tracking the International Trade of Seahorses (*Hippocampus* Species)', n.d.

27 Ting-Chun Kuo and Amanda Vincent, 'Assessing the Changes in International Trade of Marine Fishes under CITES Regulations – A Case Study of Seahorses', Marine Policy 88 (February 2018): 48–57, https://doi.org/10.1016/j.marpol.2017.10.031.

28 IUCN, 'Tracking Seahorse (*Hippocampus* spp.) Illegal Wildlife Trade through Seizures Reported Online' (Panama City, 2022), https://cites.org/sites/default/files/documents/E-CoP19-Inf-96.pdf.

29 Again the conversion from weight to number of dried seahorses uses the average 2.69 g per animal based on Evanson *et al.*, 'Tracking the International Trade of Seahorses (*Hippocampus* Species)'.

30 These included representatives of the Superintendencia Nacional de Aduanas y de Administración Tributaria (SUNAT), the Peru government import-export agency including monitoring of illegal trade; the Peru-based NGO Sociedad Peruana de Derecho Ambiental (SPDA), which specializes in legal issues related to environmental protection; one northern Peru based biologist for Instituto del Mar del Peru (IMARPE) and representatives of the Dirección de Conservacion Sostenible de Ecosistemas y Especies, Ministerio del Ambiente (MINAM). Peru's Ministry of Environment – the CITES focal point. For full details, see the online methodological annex.

31 UNODC, *World Wildlife Crime Report 2020.*

32 Lawson, Foster, and Vincent, 'Low Bycatch Rates Add Up to Big Numbers for a Genus of Small Fishes'.

33 Resolucion Ministerial Nr. 306-2004-PRODUCE, 2004.

34 Decreto Supremo N.° 012-2001-PE, Article 63.
https://cdn.www.gob.pe/uploads/document/file/418473/Decreto_Supremo_N%C2%BA_012-2001-PE.pdf.

35 FAO, *The State of World Fisheries and Aquaculture 2022*. Towards Blue Transformation. (Rome: FAO, 2022), https://doi.org/10.4060/cc0461en.

36 Ibid.

37 Santiago De la Puente *et al.*, 'Growing Into Poverty: Reconstructing Peruvian Small-Scale Fishing Effort Between 1950 and 2018', *Frontiers in Marine Science 7* (18 August 2020): 681, https://doi.org/10.3389/fmars.2020.00681.

38 FAO, *The State of World Fisheries and Aquaculture 2022*. Towards Blue Transformation.

39 South Pacific Regional Fisheries Management Organization, 'SPRFMO COMM11-Report' (Wellington, New Zealand, 2023), https://www.sprfmo.int/assets/Meetings/01-COMM/11th-Commission-2022-COMM11/COMM11-Report/SPRFMO-COMM11-Report-2023-with-annexes.pdf.

40 Eloy Aroni, 'Peruvian Fisheries Experience Massive Decline in Activity from COVID-19', *Global Fishing Watch*, 12 June 2020, https://globalfishingwatch.org/news-views/peruvian-fisheries-covid-19/.

41 Plataforma digital única del Estado Peruano, 'Produce: En el Perú hay más de 88 000 pescadores artesanales', 23 July 2022, https://www.gob.pe/institucion/produce/noticias/634552-produce-en-el-peru-hay-mas-de-88-000-pescadores-artesanales.

42 Nicolas Pécastaing and Juan Salavarriga, 'The Potential Impact of Fishing in Peruvian Marine Protected Areas (MPAs) on Artisanal Fishery Poverty during El Niño Events', Ecological Economics 202 (December 2022): 107598, https://doi.org/10.1016/j.ecolecon.2022.107598.

43 Villy Christensen *et al.*, 'Valuing Seafood: The Peruvian Fisheries Sector', *Marine Policy 44* (February 2014): 302–11, https://doi.org/10.1016/j.marpol.2013.09.022.

44 FAO, 'Decreto Ley No 25977 - Ley General de Pesca', accessed 17 October 2023, https://www.fao.org/faolex/results/details/es/c/LEX-FAOC001377/.

45 De la Puente *et al.*, 'Growing Into Poverty'.

46 Julia K. Baum and Amanda C. J. Vincent, 'Magnitude and Inferred Impacts of the Seahorse Trade in Latin America', *Environmental Conservation 32*, no. 4 (December 2005): 305–19, https://doi.org/10.1017/S0376892905002481. https://doi.org/10.1017/S0376892905002481.

47 Joanna Alfaro-Shigueto, Eliana Alfaro-Cordova, and Jeffrey C. Mangel, 'Review of Threats to the Pacific Seahorse *Hippocampus ingens* (Girard 1858) in Peru', *Journal of Fish Biology 100*, no. 6 (June 2022): 1327–34, https://doi.org/10.1111/jfb.15058.

48 De la Puente *et al.*, 'Growing Into Poverty'.

49 Castillo Mendoza, Gladis *et al.*, 'Tercera Encuesta Estructural de La Pesquería Artesanal En El Litoral Peruano. Resultados Generales' (Lima, Peru: Instituto del Mar del Perú, 2018), https://repositorio.imarpe.gob.pe/handle/20.500.12958/3300.

50 F2, F3, F4, F5, F6, F12, F13-22.

51 F4.

52 In 2018, a national survey of artisanal fishing estimated that there were 4,700 net vessels, 2,200 purse-seine vessels and 1,200 compressor diver vessels. Castillo Mendoza, Gladis *et al.*, 'Tercera Encuesta Estructural de La Pesquería Artesanal En El Litoral Peruano. Resultados Generales'.

53 F2-7, F18.

54 F11, F12, F15-17, F19, F21, F22.

55 F8, F10, F13, F14, F20.

56 C1.

57 F4, F5, F6, F8, F9, F10, F11, F13, F18, C1, C3, C4.

58 F3-F10, F13, F15, F18-20.

59 F12.

60 F16, F17, F21, F22.

61 F8-10, F13, F14 F16, F18-22.

62 De la Puente *et al.*, 'Growing Into Poverty'.

63 F1, F5, F6, F12-19, F22.

64 C1, C2, C4, C5.

65 C4.

66 For example, C1, C2, and C5 all owned local shops.

67 UNODC, *World Wildlife Crime Report 2020*.

68 C2.

69 C1, C2.

70 C5.

71 C1, C3, F5, F9.

72 F8.

73 F8.

74 C1.

75 C2.

76 C1, C2, C4.

77 C1.

78 C5.

79 Foster *et al.*, 'Global Seahorse Trade Defies Export Bans under CITES Action and National Legislation'.

80 Ibid.

81 T. Vaidyanathan and A. C. J. Vincent, 'State of Seahorse Fisheries in India, Nearly Two Decades after They Were Banned', *Biodiversity and Conservation 30*, no. 7 (June 2021): 2223–53, https://doi.org/10.1007/s10531-021-02188-6.

82 Tanvi Vaidyanathan *et al.*, 'Catch and Trade Bans for Seahorses Can Be Negated by Non-selective Fisheries', *Aquatic Conservation: Marine and Freshwater Ecosystems 31*, no. 1 (January 2021): 43–59, https://doi.org/10.1002/aqc.3419.

83 Ibid.

84 Sarah J. Foster, ed., 'Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions', Fisheries Centre Research Reports, 31, no. 3 (2023), https://doi.org/10.14288/1.0435869.

85 CITES, 'Species Specific Matters: Seahorses (*Hippocampus* spp.). Report of the Secretariat. Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions. SC74 Doc. 70.1 Annex 2'.

86 Sarah J. Foster, 'Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions'. https://doi.org/10.14288/1.0435869.

87 O1, C2, Ministerio de la Producción de Perú, Resolución Directoral No. 533-2018-PRODUCE/DS-PA, 7 February 2018.

88 Alfaro-Shigueto, Alfaro-Cordova, and Mangel, 'Review of Threats to the Pacific Seahorse *Hippocampus ingens*'.

89 *Fiscalía Especializada En Materia Ambiental Del Callao Incautó 631 Kilos de 'Caballito de Mar'*, 2019, https://www.youtube.com/watch?v=AInFXefNj-Y.

90 C1.

91 Customs News, 'Discover Nearly 500kg of Dried Seahorses Importing without Declaration', Customs News - Hai quan Online, 23 December 2018, https://english.haiquanonline.com.vn/discover-nearly-500kg-of-dried-seahorses-importing-without-declaration-9351.html.

92 Giang Chinh, 'Vietnam Seizes Nearly 300,000 Dead Seahorses Smuggled from Peru', *VnExpress International*, 10 March 2017, https://e.vnexpress.net/news/news/vietnam-seizes-nearly-300-000-dead-seahorses-smuggled-from-peru-3553714.html.

93 UNODC World WISE.

94 SPDA Actualidad Ambiental, 'Iban a China | Más de 600 kilos de caballitos de mar fueron incautados en el Callao'; see also *Fiscalía Especializada En Materia Ambiental Del Callao Incautó 631 Kilos de "Caballito de Mar."* https://www.actualidadambiental.pe/iban-a-china-mas-de-600-kilos-de-caballitos-de-mar-fueron-incautados-en-el-callao/.

95 OEC - The Observatory of Economic Complexity, 'Peru (PER) Exports, Imports, and Trade Partners', accessed 17 October 2023, https://oec.world/en/profile/country/per/.

96 Ibid.

97 Foster, 'Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions', 2023.

98 Saarman et al assert that *Hippocampus ingens* is "the only seahorse found in the eastern Pacific."

99 Norah P. Saarman, Kristina D. Louie, and Healy Hamilton, 'Genetic Differentiation across Eastern Pacific Oceanographic Barriers in the Threatened Seahorse *Hippocampus ingens*', *Conservation Genetics 11*, no. 5 (October 2010): 1989–2000, https://doi.org/10.1007/s10592-010-0092-x.

100 Feixia Hou *et al.*, 'Identification of Marine Traditional Chinese Medicine Dried Seahorses in the Traditional Chinese Medicine Market Using DNA Barcoding', *Mitochondrial DNA Part A 29*, no. 1 (2 January 2018): 107–12, https://doi.org/10.1080/24701394.2016.1248430.

101 General Administration of Customs of the People's Republic of China. (2020). The customs of many places jointly cracked the case of smuggling 449.5 kilograms of seahorses by the "water passenger" gang (translated). http://www.customs.gov.cn/customs/xwfb34/mtjj35/2936712/index.html.

102 Gongbei Customs District P.R. China. (2020). Gongbei Customs: The war zone cracked down on the smuggling of 449.5 kilograms of seahorse by the "Shuike" gang (translated). http://www.customs.gov.cn/gongbei_customs/374293/374294/2934671/index.html.

103 Xiamen Customs District P.R. China. (2020). During the epidemic prevention and control period, Xiamen Customs cracked down on the smuggling of wildlife products (translated). http://www.customs.gov.cn/xiamen_customs/491073/491074/2938611/index.html.

104 Foster, 'Implementation of CITES Appendix II Listing for Seahorses in the Context of Export Bans and Suspensions', 2023.

105 Foster *et al.*, 'Global Seahorse Trade Defies Export Bans under CITES Action and National Legislation'.

106 M. A. James *et al.*, 'To Ignore or Mitigate – Economic Implications of an Illegal Artisanal Trawl Fishery in Northern Peru', *Marine Policy 158* (December 2023): 105865, https://doi.org/10.1016/j.marpol.2023.105865.

107 A. C. J. Vincent *et al.*, 'Implementing CITES Appendix II Listings for Marine Fishes: A Novel Framework and a Constructive Analysis.', *Fisheries Centre Research Report,* 2022, https://projectseahorse.org/resource/framework-implementing-cites-for-marine-fishes/.

Rosewood

Analysis of the trafficking of "rosewood"[1] hardwood timber was a focus for both previous editions of the *World Wildlife Crime Report*. Reports of large-scale seizures of rosewood timber shipments indicated that illegal operators were circumventing national and international regulatory controls aimed to ensure the sustainability of harvest and trade in these high value tropical tree species. In addition to probing the context and possible motivations for rosewood trafficking specifically, the aim of previous UNODC analyses of this commodity was to gain insights into how wildlife crime operates within larger industrialized sectors of wildlife trade. The current case study extends this enquiry by examining how trafficking has adapted to circumvent increased international regulation of rosewood trade, with particular attention to factors influencing participation in associated crime at the sourcing end of the trade chain.

Although a highly valued commodity globally, recent trade in rosewood has been largely driven by demand for use in traditional furniture and arts and craft industries in East Asia, where it fulfils the technical requirements of certain traditional furniture manufacturing or carving styles.[2,3] Species valued for this use include those listed in the National Hongmu Standard of China, but also other trees producing timber with similar characteristics.[4] Originally supplied by Asian tree species, the rosewood trade has a history of shifting to new sources as populations of the species originally targeted by industry buyers have been depleted and logging regulations have been adopted and enforced.[5] As a result, the rosewood trade now encompasses at least 50 species of the Fabaceae family from Asia, Africa and Latin America that share similar characteristics.[6]

TAB. CS3.1 History of CITES regulation of tree species traded under the name "rosewood"

TAXA	ORIGIN	LISTING IN THE CITES APPENDICES	CURRENT ANNOTATION
Aniba rosaeodora	South America	Appendix II: 23/06/2010	#12
Dalbergia nigra	Brazil	Appendix I: 11/06/1992	-
Other *Dalbergia* species (except for the species listed in Appendix I)*	Central and South America, Africa, Madagascar and South Asia	Appendix II: 12/06/2013	#15
Guibourtia demeusei	Central Africa	Appendix II: 02/01/2017	#15
Guibourtia pellegriniana	West and Central Africa	Appendix II: 02/01/2017	#15
Guibourtia tessmannii	Central America	Appendix II: 02/01/2017	#15
Paubrasilia echinate	Brazil	Appendix II: 13/09/2007	#10
Platymiscium parviflorum	Central America	Appendix I: 01/07/1975 Appendix II: 18/01/1990	#4
Pterocarpus erinaceus	West and Central Africa	Appendix III: 09/05/2016 Appendix II: 02/01/2017	#17
Pterocarpus santalinus	India	Appendix II: 16/02/1995	#7
Pterocarpus tinctorius	Africa	Appendix II: 26/11/2019	#17
Other *Pterocarpus* species (only the African populations; no other population is included in the Appendices)*	Africa	Appendix II: 23/02/2023	#17
Senna meridionalis	Madagascar	Appendix II: 12/06/2013	-

* these genera include many species, only some of which are considered to be rosewoods
# annotation symbols designate parts and derivatives subject to CITES trade control[7]
Source: CITES Appendices and Species+ website[8]

International trade controls have also been introduced through the listing in the CITES Appendices some of the species traded as rosewood (Table CS3.1).[9]

Case studies in the *World Wildlife Crime Report 2020* examined the complicated situation arising during rapid growth of rosewood supply from Madagascar to Asian markets from around the year 2000 and then from West and Central Africa after 2010.[10] Concerns about unsustainable levels of logging and export in some countries triggered the adoption of national trade restrictions. Meanwhile, as detailed above, several rosewood-producing species were added to CITES Appendix II, a measure aimed to help ensure that timber entering international trade was legally and sustainably sourced and did not threaten the conservation status of the species involved.[11]

Large volumes of timber from rosewood species were reported to have been licensed for export from West

Africa during the 2010s.[12] However, evidence emerged that some of this was being sourced illegally, including timber of *Pterocarpus erinaceus*, the most prominent rosewood species exported from the region at that time, even after introduction of CITES Appendix II trade controls for this species in 2017.[13] Furthermore, regular seizures of illegal shipments of timber from this and other rosewood species within source countries and along the trade chain to end markets demonstrated that traffickers were seeking and finding opportunities to circumnavigate local and international trade restrictions. Analysis in the *World Wildlife Crime Report 2020* pointed to a range of trafficking problems, including illegal rosewood movements between countries to infiltrate legal trade flows, corruption and use of false documentation, misdeclaration of timber to take advantage of difficulties with timber identification, and smuggling through concealment in container shipping.[14]

Sourcing

International trade data compiled for the *World Wildlife Crime Report 2020* showed that Nigeria was the most prominent exporter of rosewood timber to Asia during the period 2015–2018.[15] Following the listing of one of the main rosewood species exported from that country, *Pterocarpus erinaceus* (known in Nigeria as "*kosso*") in CITES Appendix II in 2017, formal concerns were raised about the legality of acquisition of exported timber and the scientific basis for non-detriment findings, which should help establish sustainable levels of trade.[16] Lack of resolution of these concerns led to a CITES recommendation to suspend legal trade in this species from Nigeria in 2018.[17] Threat assessments carried out by UNODC at that time and subsequently noted significant vulnerabilities. There was a risk that traffickers in the country, previously involved in laundering through legal exports timber they had sourced illegally in Nigeria or other countries, might try to continue exports through smuggled shipments. There was also a risk of leakage into illegal trade from timber stocks held by traders but now ineligible for legal export.[18,19]

To assess the situation in greater depth, UNODC carried out fieldwork in Nigeria in 2022, particularly in Taraba state, which is known for its forestry industry. A total of 35 individual semi-structured interviews and six focus groups were conducted with various actors in the timber supply chain in May and June 2022.[20] While the findings of these interviews cannot necessarily be generalized internationally, they provide useful insights into the ways rosewood trafficking has developed in West Africa. Some of the respondents had experience with aspects of the rosewood trade in other parts of Nigeria and even in other West African countries. In addition, most of the respondents had moved on to use of other valuable species after the trade in rosewood logs had declined.

While organized crime threat assessment research suggested a good deal of local involvement in promoting and managing rosewood trade in Nigeria, including that of high-ranking politicians, traders from Asia were playing an active role in the country in organizing trade, both legal and illegal.[21] Field research conducted in connection with this and previous UNODC reports has shown these traders to be a heterogenous group. Interviewed Nigerian nationals who had worked with them describe them as mostly quite young, in their late twenties and early thirties, and desperate to succeed.[22] Many of them were poor people who borrowed heavily to try their luck in the "frontier" of Africa and felt unable to return to their home country empty handed.[23] In some parts of the region they had engaged in the manual labour of logging themselves, while others had the resources to finance or equip sawmills of varying sophistication.[24] During the rosewood boom, better resourced groups appeared primarily as buyers and traders from the larger urban areas, including some that appeared to be representatives of Asia-based timber firms, ranging from family-owned concerns to larger corporations.[25] All these levels of participation occurred in parallel, so it is inappropriate to generalize about their role in the market.

The rosewood trade brought benefits to the countries of supply. When exported legally, it brought foreign exchange and tax revenues to national governments.[26] The trade also brought resources to local authorities, including the traditional authorities who act as stewards over community owned forests in some countries.[27] It brought jobs to local young people, who were employed in logging and transporting timber.[28] However, in nearly every country of the region, unsustainable extraction eventually prompted the imposition of regulations or laws designed to slow or prevent the export of rosewood.[29]

At least initially in some countries, foreign traders were not doing anything illegal. They were simply taking advantage of the lack of controls on logging in many countries of the region, some of which had never been major timber source countries before. Even when illegally harvested, the timber became legal to trade for most countries once it had left the national borders. Until *Pterocarpus erinaceus* was listed in the CITES Appendices, many states had no legal basis for helping to enforce the source countries' timber laws by stopping imports.

Once local controls were put in place, the traders had several options. Many elected simply to move to a new country where controls were not present, like the traders from Benin discussed below. In other instances, traders remained in place as local loggers petitioned for moratoria on export controls.[30] Others continued to export illegally, either moving the timber to countries with less regulation for export or colluding with local officials to export despite the laws and regulations.[31]

According to interviews conducted in Nigeria for this report, the rosewood trade came to Nigeria after Asian traders relocated there from Benin. According to one respondent, even in those days, many of the logs exported from Benin came from Nigeria.[32] One informant said that the traders began to relocate around 2014 as the wood became scarcer in Benin and there was an attempt to "indigenize" the logging industry in that country. The traders brought with them Beninese skilled workers to train local Nigerians in the use of milling machines, and one informant said he still employed four of them.[33]

The Nigerians interviewed described Asian buyers as very exacting in the specifications they required for the wood.[34] When asked about apparently abandoned stocks of logs, respondents said these were often because the wood did not meet specifications owing to flaws (such as hollow spaces known as "cancers") or failure to meet the required dimensions.[35] The buyers appeared to be filling the orders of counterparts back home, who had specific purposes for the wood and had no use for timber that did not meet their specifications.

Asian traders were reported to have assumed a commanding position in the processing of timber. The Taraba Timber Association invited foreign traders to establish sawmills in the state in 2014.[36] While some locally owned sawmills did exist, the technical issues of acquiring and installing the equipment required cooperation with overseas buyers. As a result, even today, the Nigerian owned sawmills were dependent on imported parts and the machines could only be serviced by foreign technicians.[37] Furthermore, not all the sawmills ostensibly Nigerian owned were really so—one Nigerian sawmill owner admitted being a front for an overseas firm that wanted to avoid the additional fees that came with foreign ownership.[38] As discussed below, these sawmills are key to the way rosewood continues to be exploited in Nigeria. The foreign owners of the sawmills were also said to be owners of other businesses in Nigeria, including other types of industrial processing plants. One trader interviewed who worked closely with expatriates from Asia said they use timber to build a startup stake and then use the proceeds to start other, more "legitimate" businesses.[39]

According to those interviewed, the process of getting the wood to the point of export starts with receiving permission to log. This permission required authorization from several authorities. For example, in Taraba state, licences from state and local authorities were required. Those seeking to log in communally owned forests, like the forests of Taraba, were further required to approach the traditional leader in the area after receiving their official licences. Although gifts to these leaders were not required, respondents suggested they were expedient and could take the form of small monthly payments.[40] Traditional leaders interviewed said consent was given because logging brought the promise of employment for local youth.[41]

In addition to securing permission to log in an area, chainsaws were required to be registered and licensed, chainsaw operators were unionized, traders were required to be members of a national association, PROWPMAN (the Processed Wood Producers and Marketers Association of Nigeria, formerly the Timber Contractor Association), and logging depots required authorization. Each authorization required a fee.[42] The local logging industry thus produced revenues for a range of regulators, formal and informal. Although these fees were modest in relation to the value of timber extracted, they were important in the local economy.[43]

Summarizing insights from all interviewees for this research, a wide range of roles in sourcing and trade can be identified:

» The logging itself required a range of personnel and inputs. Scouts were employed to locate the best trees for cutting. Hunters, pastoralists, community guides and experienced loggers could be employed as scouts. Bulldozers (and bulldozer operators) were required to create logging roads that tipper trucks could navigate. Chainsaw operators were required to fell the trees. "Pushers" were required to move the fallen logs to a point where they could be loaded into a tipper truck.

» Loaders were responsible for getting the logs into the tipper trucks, often with the use of a mounted crane. The tipper trucks, which were in short supply, required an experienced driver, who could either be an independent contractor or in the employ of a major trader. They drove the logs to a depot for storage, which could be a privately owned facility where all loggers could store their logs for a fee, or a private facility owned by a major trader or sawmill for their own stocks. Here the loaders would unload the logs where they could be viewed by buyers.

» Once purchased, the logs were loaded onto trailers for transportation. A specialized agency, the Dan Commission, was responsible for assigning trailers to shipments of logs from source states like Taraba onward to export trading points in other states. Loading directly onto containers was possible but rare because the low-quality roads meant that containers could fall off or cause the truck to tip over. Instead, most Taraba log loads were reportedly squared and containerized at one of the five major wood processing sites, three associated with the ports of Apapa (Lagos), Tin Can (Lagos) and Onne (Rivers), plus Sagamu, a site outside of Lagos, which was prominently mentioned, as well as Owerri for Onne Port.

» Several drivers interviewed reported being paid the same, apparently standardized, fee for the trip: 10% of the income realized by the trip after expenses were deducted. Several routes were described for reaching the destination, with the more direct routes being more expensive due to the cost of "tips" at roadblocks along the way. These tips were paid at checkpoints manned by a wide range of actors, including local, state, and federal government actors; trade organizations; police and military authorities; and informal "tax" collectors. One respondent said there were over 50 locations where police needed to be tipped between Taraba and Lagos, as well as 25 military checkpoints (which were more expensive). The standard amount of money deposited with the truckers to make these payments along the passage from Taraba to Lagos was cited by multiple sources as being between 80,000 and 150,000 naira (about $170–330),[44] with each individual tip being small (equivalent to a few dollars).[45] Those payments made under the guise of official revenue collection on the roads generally did not find their way into the government coffers.[46]

» At one of the export trading points, like Sagamu or Owerri, the wood was further squared and loaded into containers. Other sites where a similar function was performed included Ogere, Sapade, and Agbara, as well as Nsukka and Enugu, although more research is needed to determine whether they supply Onne or Lagos ports, or both. A different set of drivers were employed to transport the containers from the processing yards to the sea. Once at port, clearing agents were an expensive necessity to ensure that all the paperwork was in order and the container was cleared to be shipped. For various reasons, respondents said that some timber from Nigeria continues to be smuggled to Benin or even Ghana for export.[47]

All told, a single shipment of timber likely results in income for hundreds of families in Nigeria, directly and indirectly. A traditional leader interviewed reported that the timber industry, by providing employment for many of the youth, had reduced some types of crime in his area.[48] A sawmill manager interviewed commented that the timber trade reduced poverty in the area by providing new opportunities for increased income from employment.[49] A published academic study on socioeconomic impacts of the *Pterocarpus erinaceus* trade from Taraba reached similar conclusions about positive impacts on crime and jobs, but made it clear that there was a trade-off between economic benefits and depletion of timber resources and biodiversity in the state.[50]

The timber trade was reported to be a seasonal activity, with most activities suspended during the rainy season between June and October as the river fords and logging roads become impassible. The more industrious continued logging in the off season,

creating stockpiles to be moved as soon as the weather allowed. Owing to decreased availability, prices for logs skyrocketed during the rainy season.[51]

By the time of the UNODC interviews in 2022, the rosewood supply had dwindled to a negligible level. The CITES controls seem to have coincided with the time *Pterocarpus erinaceus* became commercially extinct in Taraba state. As one agent interviewed put it:

> "It is true that CITES was a problem for rosewood. But even without CITES, rosewood trade would have come to an end because the tree is exhausted in the forest. The ban came at a time when the species has **already finished.** Until this day, there is still demand for rosewood, but there is none left in the forest."[52]

According to some of those interviewed, rosewood was sometimes cut into smaller components at local sawmills rather than being exported as logs.[53] The detailed specifications for these components were provided by the buyers in the destination countries. It was alleged that this processing helped exporters to evade CITES controls. Firstly, it was debatable whether semi-processed items met the definition of "transformed wood", one of the categories of items subject to CITES trade controls.[54] Secondly, as some interview subjects suggested, inspectors might have been focused on looking for logs and were likely unable to differentiate between timber species when confronted with smaller components.[55] Such deception may have been effective as no seizure of timber components coming from Nigeria appears in the WWCR3 analytical dataset.

In addition to a shortage of trees to harvest and CITES regulations, the timber industry was said by those interviewed to be threatened by the rising cost of fuel, and this was before the recent suspension of Nigerian fuel subsidies. Concern about environmental impacts beyond the threat to tree species was also said to be a threat to continued logging. According to one interviewed expert, in 2021 a local traditional leader banned logging due to the impact it was having through wind exposure on local crop yields,[56] but pressures from both the expatriates and locals involved in the trade compelled the leader to lift the ban after nine months.[57]

Concerns about security were also voiced. Owing to the perception of the wealth involved, kidnappers commonly targeted those involved in the timber industry, including loggers,[58] drivers, and even forestry officials.[59]

Following the exhaustion of rosewood supplies in Taraba, traders recounted how the suspension of trade in 2018 caused economic hardship for many who had invested heavily in the timber industry and had not anticipated such an outcome, bankrupting some and exposing others to court proceedings due to unfulfilled contracts and defaulted loans.[60] However, the large institutional and capital infrastructure that developed in Nigeria under the rosewood boom did not remain idle for long. Rather, the industry, including participants in Taraba, targeted another species of interest to the market: "*apa*" (*Afzelia* spp.). Trader interviews and review of export data show how rosewood exports from Nigeria to Viet Nam shifted to this species from 2014 onwards, with a sharp increase after 2018.[61]

Like *Pterocarpus erinaceus*, *Afzelia* species are nitrogen fixing legumes, and *Afzelia africana* is reported to reduce erosion and be somewhat fire-resistant.[62] It grows to much greater sizes than rosewood and this has posed technical challenges for those involved in its extraction. Like *Pterocarpus erinaceus*, it is used as cattle fodder by Fulani pastoralists, and for this reason, they have been known to respond violently when it is cut down.[63]

Despite these difficulties, the *apa* trade has apparently allowed those who invested in chainsaws, tipper trucks, depots, and other aspects of the timber trade infrastructure to continue to operate in the aftermath of the rosewood boom, although with less profitability. The CITES Appendix II listing of *Afzelia africana* came into effect in February 2023, after the UNODC interviews were conducted, so its impact on the industry remains unclear although traders interviewed said *apa* is already close to being exhausted in the forests of Taraba.[64]

In addition to *apa*, respondents said "*tali*" (*Erythrophleum* spp.) was currently in demand in Taraba state. *Tali* is a multipurpose timber long known in the markets. It contains toxic compounds and special equipment is required for its extraction as skin contact or inhalation of its sawdust can be dangerous.[65] The wood is dense and very heavy, posing challenges for the types of manual extraction employed in Taraba.[66] Despite these drawbacks, if implementation issues related to the CITES listing interrupt *apa* exports, the importance of tali to the local timber industry may grow.

Illegal trading

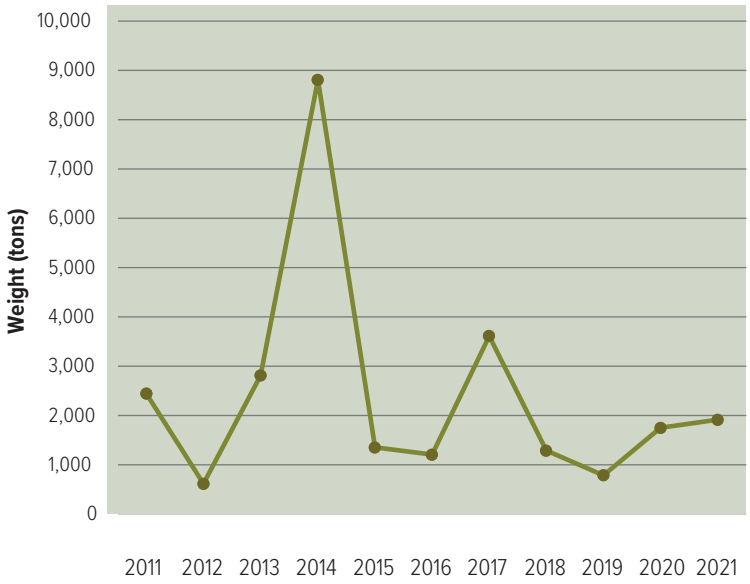
Traders interviewed explained the ways that timber could be trafficked through other countries in West Africa to avoid national export enforcement. For example, one logger interviewed had personally been involved in illegal logging in Cameroon for export through Nigeria,[67] and traders that had worked in Benin recalled unofficially importing logs from Nigeria.[68] Previous UNODC threat assessment research indicated that some of the rosewood exported through the Gambia was of Senegalese origin, and that exports from Sierra Leone may be diverted from Guinea.[69] This illustrates that the country exporting outside Africa and the source country for the timber are not necessarily the same, for nominally legal or for illegal trade. Misdeclaration of species was also said to be one means of evading enforcement. A forestry official interviewed in Nigeria said that mixing loads of different species was a common trafficking technique.[70]

Records in the WWCR3 analytical dataset of global rosewood seizures between 2011–2021 analysed by weight show peaks in 2014 and 2017 (Figure CS3.1).

Both the species composition and countries of origin appear to have varied considerably over this period. Up to 2015, Malagasy rosewoods (various *Dalbergia* species) from Madagascar, red sanders (*Pterocarpus santalinus*) from India and Siamese rosewood (*Dalbergia cochinchinensis*) from South-East Asia predominated in seizure records.[71]

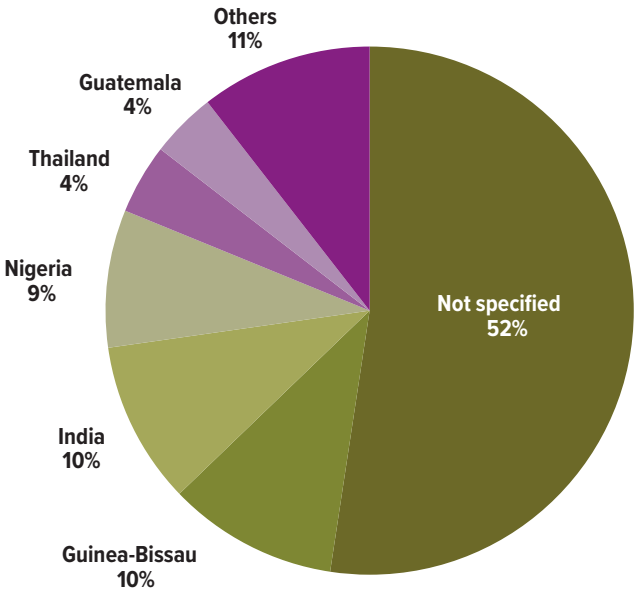
According to rosewood seizure data for 2015–2021, for records where a country of departure for shipments was reported, Guinea-Bissau, India and Nigeria were the most prominent (Figure CS3.2). Detailed

FIG. CS3.1 Weight in tons of rosewood seized 2011–2021



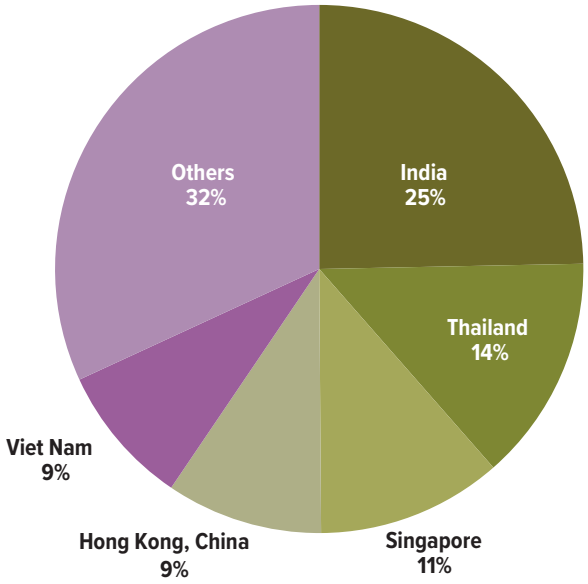
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

FIG. CS3.2 Reported country of departure of rosewood timber shipment seizures by weight 2015–2021



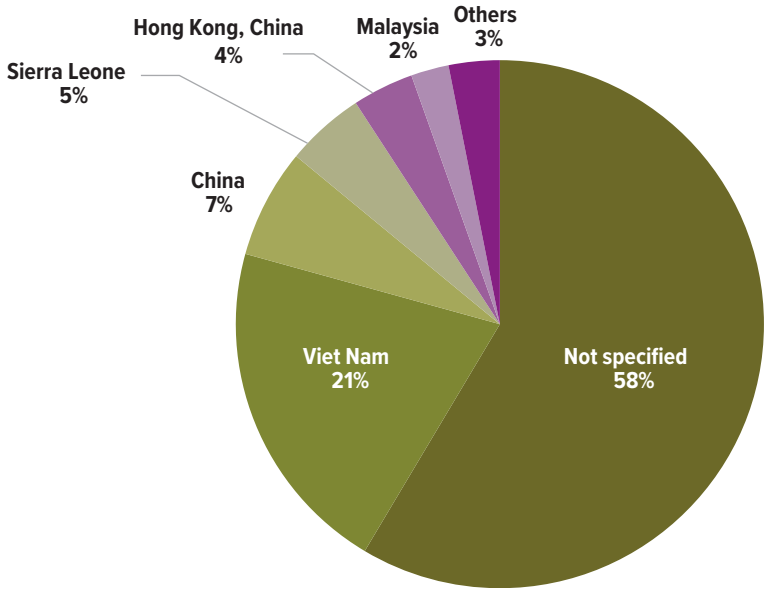
Source: CITES Illegal Trade Database and World WISE (WWRC3 analytical dataset)

FIG. CS3.3 Country or territory of rosewood timber shipment seizures by weight 2015–2021



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

FIG. CS3.4 Reported country or territory of destination of rosewood timber shipment seizures by weight 2015–2021



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

examination of records in the WWCR3 analytical dataset indicates that the prominence of Guinea-Bissau is largely owing to one spectacular seizure of over 1,200 tons of rosewood made in Singapore in 2017. For India, regular large seizures of red sanders were reported. The prominence of Nigeria is owing to two very large seizures, one made in Ghana in 2019 and one reportedly made in Viet Nam in 2020.

Other information on rosewood trafficking trade chains is discernable from analysis of where seizures took place and the intended destinations of shipments, where available (Figures CS3.3 and CS3.4). Particularly notable are the red sanders shipments regularly intercepted in India before export.

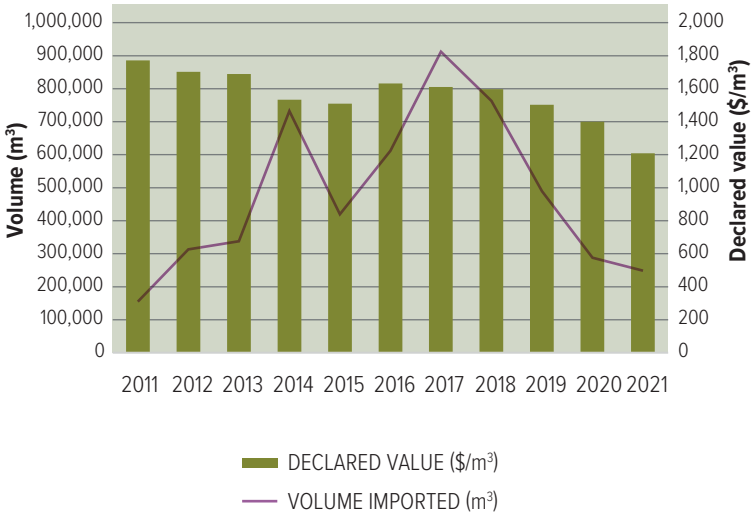
End markets

After rosewood has reached destination countries where manufacturing operations and consumer markets are located, differentiation between timber that was legally or illegally sourced is extremely difficult. At the end market stage of the trade chain, rosewood manufacturing and retail is typically overt, and the nature of the products sold is such that the timing and location of raw material sourcing is unlikely to be clear to end consumers.[72]

In the absence of specific information on trafficked rosewood in end markets, analysis of official data for legal trade could provide useful insights into trends that might influence incentives for illicit sourcing. For example, published trade data for China allow comparison of declared import volumes and values of rosewood from West Africa (Figure CS3.5).

The trend shows a decline over time in the average value, from almost $1,800/m^3 in 2011 to just over $1,200/m^3 in 2021. Unit prices fell around the 2014 import peak, but were higher during the 2017 peak, perhaps reflecting supply concerns. Since 2018, volumes and values have fallen, perhaps indicating an overall decline in demand for rosewood imported from West Africa in China. However, such observations can only illustrate the overall market environment and without more precise understanding of the proportion of legally and illegally sourced rosewood timber entering end markets, it is not possible to draw firm conclusions or policy implications.

FIG. CS3.5 Declared value and volume of rosewood log imports from West Africa to China 2011–2021



Source: Global Trade Atlas, China Customs for 2011–2016; Sustainable Timber Information Exchange (STIX) for 2015–2021[72]

Another factor for consideration in trying to understand rosewood market dynamics is the possible influence of investment speculation. Timber dealers interviewed during research carried out in 2018–2019 into the rosewood market in China indicated that they were inclined to hold onto stocks of more valuable timbers as a capital investment.[74] Interviews with furniture dealers during the same period as part of an academic study found that the investment potential of the furniture is always emphasized. One interviewee put it succinctly: "They use it as a bank."[75]

The fact that rare woods are being used as a value store could lead to imports in excess of immediate consumer demand, with substantial stockpiling possible. Trends in imports may therefore only partially correspond to trends in consumer demand, with other market factors, including indications of forthcoming international regulation, also affecting the trend.

For example, data gathered by the International Tropical Timber Organization show the export price of *Pterocarpus erinaceus* logs from Mali more than tripled between 2017–2019.[76] This was at a time of increasing scrutiny of the legality and sustainability of sourcing for trade following the listing of *P. erinaceus* in CITES

Appendix II, culminating in the recommendation to suspend trade with Mali and six other countries in 2022.[77] It was also likely a time of increasing scarcity of the timber, so the two effects are difficult to disentangle.

Implications

This updated analysis of the evolving climate in which rosewood trafficking takes place provides important insights into factors that influence wildlife crime. As a high value non-perishable wildlife commodity sought in bulk for a specialist, but voluminous end market, it is clear that demand overall has been overstretching supply. Analysis of this sector in earlier editions of the *World Wildlife Crime Report* indicated that demand was already shifting between species in response to supply scarcity. The introduction of sourcing and trade regulations at national and international levels, aimed to protect forest resources and prevent threat to the species involved, has further shaped market dynamics.

These factors influence opportunities for participants in both legal and illegal sectors of this business and sometimes motivate participants to shift from lawful to unlawful activity. Evidence from field research in Nigeria detailed above shows that both over-exploitation of forest resources and the introduction of restrictive regulations aimed to prevent such environmental harm can have significant impacts on the livelihoods and security of people working at early stages of the trade chain. Although benefits from employment in unsustainable extractive industry are likely destined to be short-lived, they have immediate importance. Such participants have low resilience to deal with the sudden consequences of regulatory interventions aimed to encourage legal, sustainable trade. If income can be sustained through involvement in sourcing rosewood for illegal trade, temptation is likely to be great.

This research also illustrates how individuals and businesses involved in different roles sourcing, processing and transporting rosewood timber prior to export adapt to these changing circumstances. For some, the willingness and capacity to operate outside the law is a specialism in itself, while for others criminal involvement is more likely a pragmatic business reaction to prevailing circumstances. In a situation where even legitimate trade is "taxed" by demands for roadside tips, the distinction between legal and illegal commerce is likely quite blurred. Evidence indicates that specialists shift to new locations and even to different countries as opportunities arise, whether to operate within or outside applicable laws.

At the other end of the trade chain, it is not clear to what extent rosewood buyers, manufacturers, and retailers are able to discern legal from illegal supply. Past research has shown that there are market preferences for particular species and timber qualities, but this is clearly also an adaptive market where speculative investment and prospecting for new sources of raw materials have deep roots. Whatever the level of knowledge or understanding of sources of supply, the end market plays a role in motivating rosewood trafficking.

While enforcement of regulatory interventions must play a crucial role in deterring illegal supply, there is also a case for positive engagement by and between business interests along the trade chain in finding solutions to rosewood trafficking. These might include investment in sustainable forest management, adoption of codes of good practice, and development of traceability mechanisms. There are existing models for such approaches through forest trade assurance standards. Without such interventions, there is a significant risk that crime in this wildlife trade sector will decline only when the species that supply rosewood trade suffer commercial extinction.

Endnotes

1 There is no definitive list of tree species traded under the common commercial name "rosewood." A list compiled in 2020 for the CITES Plants Committee listed 58 species traded under this name, but this is now under review. CITES Secretariat, "Rosewood Tree Species (Leguminosae (Fabaceae)) PC26 Doc 29," Plants Committee document (Geneva, Switzerland: CITES Secretariat, June 2023), https://cites.org/sites/default/files/documents/E-PC26-29_0.pdf.

2 UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

3 Ke Zhang, Hin Keong Chen, and Yuqi Yang, "China's Rosewood Market Survey" (Cambridge, UK: TRAFFIC, 2022), https://www.traffic.org/publications/reports/chinas-rosewood-market-survey/.

4 Ibid.

5 UNODC, *World Wildlife Crime Report 2020*.

6 See earlier note about lack of a definitive list of tree species traded under the common commercial name "rosewood" and the CITES Plants Committee process to refine such a list.

7 Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

8 For annotation codes see: https://cites.org/eng/app/appendices.php.

9 See: https://speciesplus.net.

10 UNODC, *World Wildlife Crime Report 2020*.

11 CITES Secretariat, "West African Authorities and Experts Agree on a Sustainability Pathway for CITES-Listed Rosewoods" CITES, August 2019, https://cites.org/eng/news/west-african-authorities-and-experts-agree-on-a-sustainability-pathway-for-cites-listed-rosewoods_05082019.

12 UNODC, *World Wildlife Crime Report 2020*.

13 UNODC, "West and Central Africa Wildlife Crime Threat Assessment" (Geneva, Switzerland: CITES Secretariat, 2019), https://cites.org/sites/default/files/eng/prog/enforcement/E-CoP18-034-Threat-Assessment.pdf.

14 UNODC, *World Wildlife Crime Report 2020*.

15 Ibid. See: rosewood case study Fig. 6 based on World Trade Atlas and UN Comtrade data.

16 UNODC, "West and Central Africa Wildlife Crime Threat Assessment."

17 CITES, "Notification to the Parties. No. 2018/084. Concerning Application of Article XIII in Nigeria," 1 November, 2018, https://cites.org/sites/default/files/notif/E-Notif-2018-084.pdf.

18 UNODC, "West and Central Africa Wildlife Crime Threat Assessment."

19 UNODC, "Organized Crime in Nigeria: A Threat Assessment" (Abuja: UNODC, September 2023), https://www.unodc.org/documents/nigeria/NOCTA_Web_Version_25.09.2023.pdf.

20 Semi-structured interviews were held with various actors across Nigeria in the wood supply chain (supply chain nodes) from the forest, through all processing stages to export from both the public and private sectors. The interviews were conducted in May and June 2022. A total of 35 interviews were conducted with individuals, and 6 interviews were conducted with small groups ranging between 2 to 6 people in each group. Interviews are coded in other references.

21 UNODC, "West and Central Africa Wildlife Crime Threat Assessment."

22 CH1.

23 TE1 (Interview with a timber expert who worked in Guinea-Bissau and Gambia.) Also see Petra Tschakert, "Shifting Discourses of Vilification and the Taming of Unruly Mining Landscapes in Ghana," *World Development 86* (October 2016): 123–132, https://doi.org/10.1016/j.worlddev.2016.05.008.

24 SM3, SM4.

25 AG1, AG7.

26 Y. M. Ahmed, E. D. Oruonye, and H. K. Ayuba, "Socio-Economic Impact of Commercial Production of Rosewood (*P. erinaceus*) in Taraba State, Nigeria," *Journal of Agriculture and Ecology Research International*, 29 March, 2016, 1–9, https://doi.org/10.9734/

JAERI/2016/25151.

27 Ibid.

28 WKN Bandoh *et al.*, "Towards Sustainable Management of African Rosewood in West and Central Africa: A Scoping Review of Current Research," *International Forestry Review 24*, no. 2 (2022): 129–144, https://doi.org/10.1505/146554822835629523.

29 William Kwadwo Dumenu, "Assessing the Impact of Felling/Export Ban and CITES Designation on Exploitation of African Rosewood (*Pterocarpus erinaceus*)," *Biological Conservation 236* (1 August 2019): 124–133, https://doi.org/10.1016/j.biocon.2019.05.044.

30 See, for example, the discussion of the log export ban in Sierra Leone between 2017 and 2019 in the *World Wildlife Crime Report 2020*.

31 Environmental Investigation Agency, "The Rosewood Racket" (Washington, D.C.: EIA, October 2017), https://content.eia-global.org/assets/2017/rosewood-racket/PDF/Rosewood+Racket+Report+(High+Res).pdf.

32 SM3.

33 SM3.

34 TR1, TR2, SM2, SM3, DP1.

35 Ibid.

36 AG7, CH1.

37 SM5, SM1, SM4.

38 SM3.

39 AG3.

40 CL1, AG1, AG4, AG6.

41 CL1, CL2, CL3.

42 AG7.

43 Ahmed, Oruonye, and Ayuba, "Socio-Economic Impact of Commercial Production of Rosewood (*P. erinaceus*) in Taraba State, Nigeria."

44 Conversion at January 2023 rates, since when there has been significant depreciation of the Nigerian naira against the US dollar.

45 DS1-4, CAG1.

46 FCO1.

47 CH1.

48 CL2.

49 SM3.

50 Ahmed, Oruonye, and Ayuba, "Socio-Economic Impact of Commercial Production of Rosewood (*P. erinaceus*) in Taraba State, Nigeria."

51 AG1.

52 AG2 Many others agreed with this statement, including FO1. Note that the CITES recommendation to suspend trade is commonly misrepresented as a "ban".

53 CH1, SM5, AG7, SM2.

54 In some cases, listings of species in the CITES Appendices are annotated to indicate that only certain parts and derivatives are subject to trade controls. For *Pterocarpus erinaceus*, the annotation code #17 indicates that 'logs, sawn wood, veneer sheets, plywood and transformed wood' are included. 'Transformed wood' is defined by Harmonized System code 44.09 as: 'wood (including strips, friezes for parquet flooring, not assembled), continuously shaped (tongued, grooved, v-jointed, beaded or the like) along any edges, ends or faces, whether or not planed, sanded or end-jointed'.

55 CH1, CSV1.

56 CL2.

57 TR1.

58 CL2.

59 FCO1.

60 AG2, TR1.

61 UNODC, "Organized Crime in Nigeria: A Threat Assessment."

62 CITES, "Consideration of Proposals for Amendment of Appendices I and II. CoP19 Prop. 46" (CITES, November 2022).

63 TR1, LM1, DF3, CO1.

64 AG2, CL3, AG7.

65 AG4, CO1.

66 AG4.

67 CH1, CO1.

68 CH1, SM4.

69 UNODC, "West and Central Africa Wildlife Crime Threat Assessment."

70 FCO1.

71 UNODC, *World Wildlife Crime Report 2016* (Vienna: United Nations publications, 2016).

72 Zhang, Chen, and Yang, "China's Rosewood Market Survey."

73 Where data have only been available by weight, data have been converted from weight to volume using a conversion factor of $0.841m^3$/1,000 kg for African logs and $0.966m^3$/1,000 kg for other logs.

74 Zhang, Chen, and Yang, "China's Rosewood Market Survey."

75 Annah Lake Zhu, "China's Rosewood Boom: A Cultural Fix to Capital Overaccumulation," *Annals of the American Association of Geographers 110*, no. 1 (2 January 2020): 277–296, https://doi.org/10.1080/24694452.2019.1613955.

76 International Tropical Timber Organization, 'Biennial Review and Assessment of the World Timber Situation, 2019–2020' (Yokohama, Japan: International Tropical Timber Organization, 2021).

77 CITES Notification 2022/63 of 22 August 2022: https://cites.org/sites/default/files/notifications/E-Notif-2022-063.pdf.

Elephant ivory

Around 2006, Africa began to experience a renewed wave of elephant poaching, with East and Central Africa most severely affected.[1] Seizure data analysed in the *World Wildlife Crime Report 2016* showed that most of the extensive illegal flow of elephant ivory was headed for Asian markets.[2] However, the *World Wildlife Crime Report 2020* presented evidence that the global ivory market was in decline during the period 2014–2018. It argued that this decline could have been the result of multiple factors, including the possible bursting of a speculative investment bubble after indications that legal ivory markets in several key countries were to be closed or sharply restricted.[3]

At that time, trends in indicators of poaching, trafficking, and the retail market all suggested that the supply of ivory began exceeding demand from the mid-2010s and that this trend accelerated as national ivory controls came into effect.[4] Qualitative research found that some poachers were holding onto ivory in hopes of a price rise, and market surveys showed a shift away from large sculptures and toward jewellery.[5]

These market changes were not subtle. For example, based on several independent data sources analysed by UNODC, the destination market wholesale prices in 2018 were one-third what they had been in 2014.[6] In addition, seizure data showed a shift in the geographic focus of the market. After a series of pivotal arrests in Kenya and the United Republic of Tanzania,[7,8] from about 2015, data indicated that Nigeria had become the primary country of ivory exports from Africa. Similarly, the same analysis showed that Viet Nam and Cambodia became increasingly prominent countries of destination for shipments of ivory during the period 2015–2019, perhaps due to increasing regulatory and enforcement pressure on other trade routes. Mixed loads of tusks and pangolin scales also appeared around the same time, occasionally including other wildlife parts.[9]

The latest information suggests that these trends are continuing. The number of detected poached elephants continues to decline overall, with 2021 being one of the lowest totals on record.[10,11] After a brief spike associated with three massive seizures in the first half of 2019, ivory seizures have reduced too.[12,13] The expensive works of art that were formerly prominent in the market are less common; most recent market surveys have detected primarily bangles, pendants, and other jewellery.[14] By 2020, prices appeared to be dropping to new lows in both Africa and most of Asia.[15] While reversals are always possible, it appears progress has been made in reducing the flow of illegal ivory.

The impact this trend is having on African elephant numbers is unclear. Although an update on African elephant populations is due soon, the most recent published continental estimate was made in 2016.[16] The estimate found that, in the areas surveyed where comparable counts were available, African elephant numbers had declined by 93,000 in the decade after 2007. According to the International Union for Conservation of Nature (IUCN):

> "The decline is largely caused by the surge in poaching for ivory that began around 2006 ... the worst that Africa has experienced since the 1970s and 1980s. Losses in [the United Republic of] Tanzania account for the major share of this decline."[17]

The previous decade included the period of intense poaching that peaked around 2011. It is not clear whether the overall decline in poaching since that time has allowed African elephant populations to start to recover. The United Republic of Tanzania, one of the countries most affected by poaching, reported a growth in elephant populations in 2019.[18] The results of a 2022 aerial survey of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), which includes parts of Angola, Botswana, Namibia, Zambia and Zimbabwe and hosts the single largest savanna elephant population, were recently released.[19] The survey produced an elephant population estimate of 227,900 for the KAZA TFCA area, an increase of 10,000 from the 2016 population estimate. Of the five countries considered, only Zambia showed a decline in the elephant population from 2016–2022 (Figure CS4.1), although the large number of carcasses seen (about one for every ten live elephants counted) across the KAZA TFCA area may be cause for concern and require further investigation into the reasons for such high mortality rates.[20] It is likely that different regions of Africa have been affected differently so it is not possible to speak about the whole continent based on this sample, but the results appear encouraging.

The following discussion reviews the major indicators that illustrate the current state of the ivory market, including the possibility that law enforcement action contributed to changes in the market.

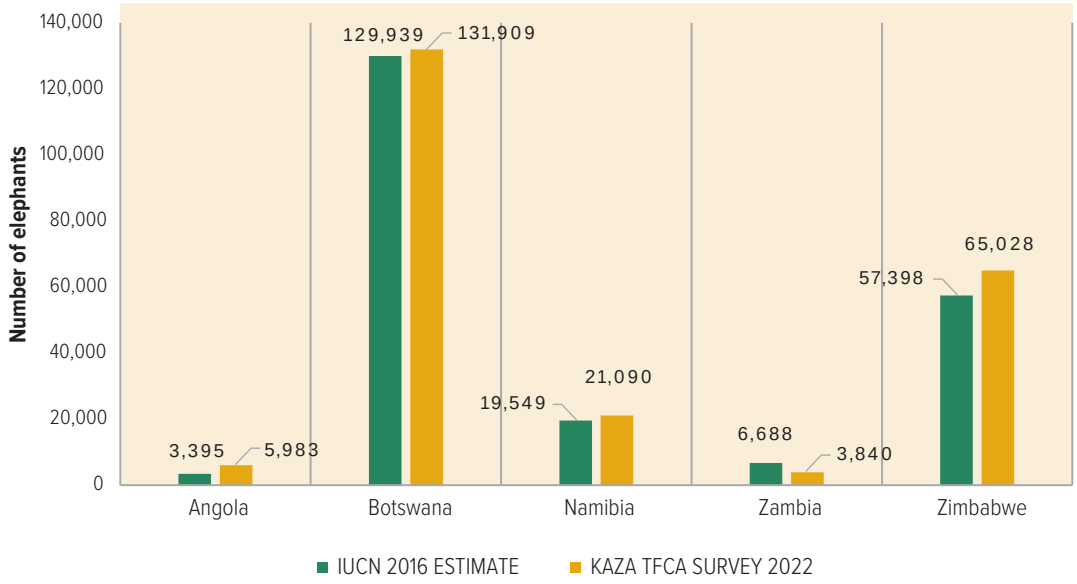
Poaching

All evidence appears to point to a general decline in African elephant poaching over the last decade, although some have disputed the geographic spread of this trend.[21] Under the auspices of CITES government authorities, the poaching of elephants is monitored through the Monitoring the Illegal Killing of Elephants (MIKE) programme, which operates in a sample of 69 designated "MIKE sites" that together hold more than 50 per cent of the African elephant population. When rangers in participating wildlife areas discover an elephant carcass, they determine if it was illegally killed (poached) or died of some other cause.

In 2012, of 1,880 elephant carcasses discovered at MIKE sites in Africa, the majority (1,048; 56 per cent) had been illegally killed, compared to 832 that died of natural causes. In 2022, of 1,832 carcasses found at MIKE sites in Africa, 306 (16 per cent, around one in six) had been illegally killed with the last three years showing some of the lowest counts of illegally killed elephants since 2003 (Figure CS4.2).[22]

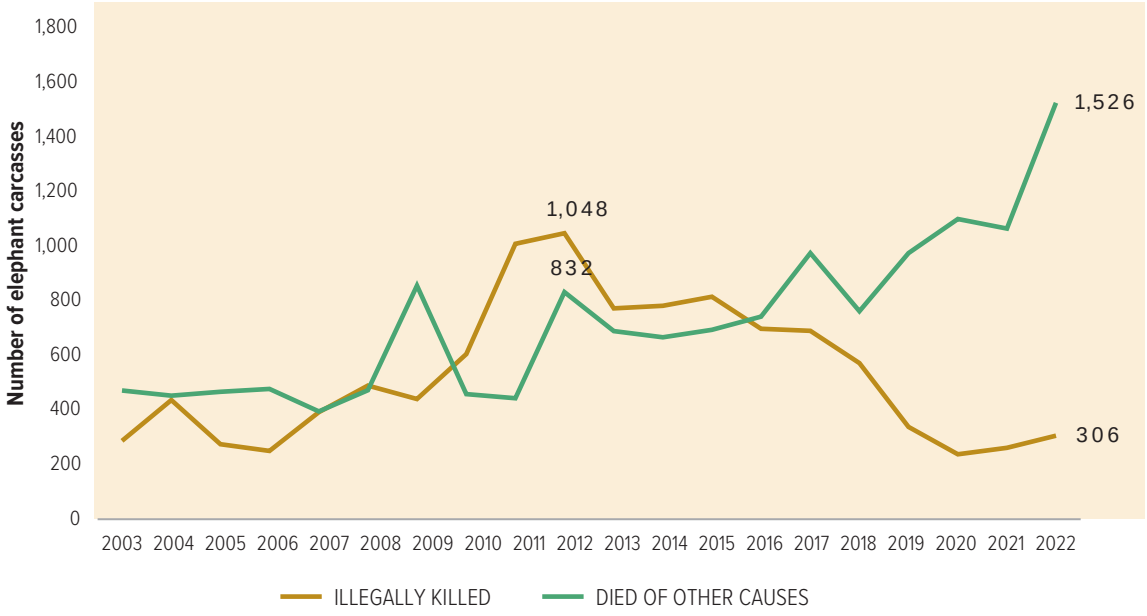
At a site level, it is clear some sites have continued to experience higher levels of illegal killing than others. In the 2019–2022 MIKE programme data, certain sites in Kenya, Zambia and the Congo showed higher shares of illegally killed elephants than those in other countries. While these countries have appeared prominently in previous DNA analyses of elephant ivory seizures,[23] other sites that had previously been strongly affected (such as sites in the United Republic of Tanzania) were not reporting such high shares of illegally killed elephants.

FIG. CS4.1 Comparison of elephant population estimates by country, IUCN 2016 estimates and 2022 KAZA TFCA survey



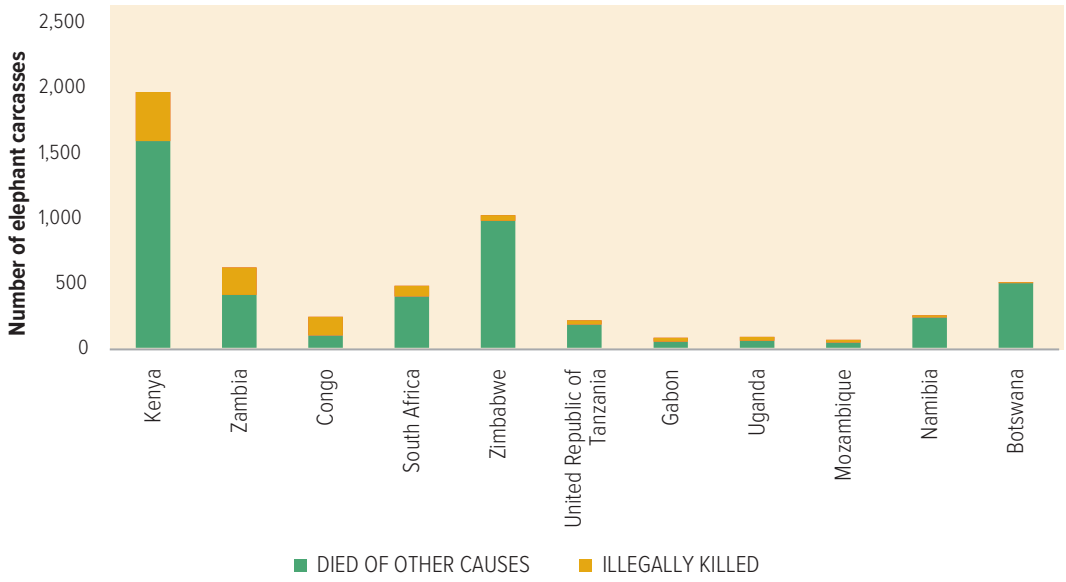
Source: KAZA TFCA Secretariat[24] and IUCN *African Elephant Status Report 2016*[25]
Note: further details and methodology are available in the 2022 KAZA TFCA survey[26] and the IUCN *African Elephant Status Report 2016*[27]

FIG. CS4.2 Detected number of carcasses of illegally killed elephants versus those that died of other causes at MIKE sites in Africa 2003–2022



Source: CITES Secretariat[28]

FIG. CS4.3 Detected number of carcasses of illegally killed elephants versus those that died of other causes at MIKE sites by country 2019–2022



Source: CITES Secretariat[29]

This suggests shifting patterns in poaching, assuming patrolling efforts remained the same. Countries in Southern Africa (Zimbabwe, Namibia, Botswana) continued to report relatively low levels of detected poaching (Figure CS4.3). Based on the latest estimates, these three countries are home to more than half of the remaining elephants in Africa.[30]

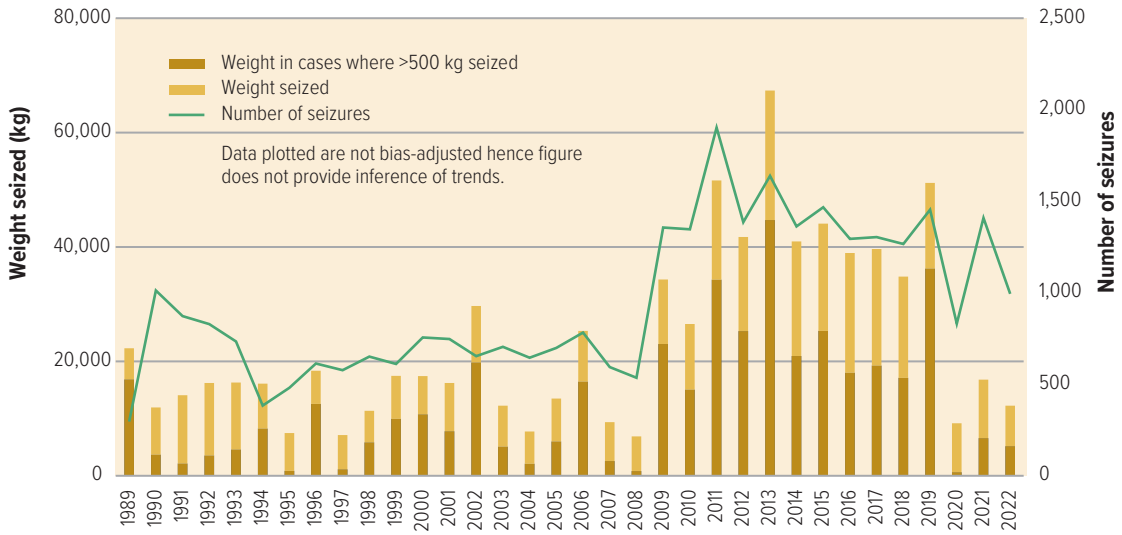
Illegal trade

The downward trend in poaching is paralleled by a decline in ivory seizures. This matched trend might be expected although the relationship is not necessarily direct. Ivory is a non-perishable good so stockpiles (both official and illegal) present in source countries and elsewhere complicate the assessment of ivory supply. Official reports submitted to the CITES Secretariat indicate that there were almost 1,500 tons of ivory held in registered government stockpiles in 2022, including around 850 tons in Africa and 620 tons in Asia.[31] Concerns have been raised that ivory from some of these stockpiles has been leaking into illegal trade.[32] If this is true, the illicit market need not be dependent on new poaching to fuel supply, and trends in the two indicators may not necessarily be synchronized.

Although declining, the trend in the volume of ivory in seizures has not been smooth. By weight, the ivory seizures recorded through the CITES Elephant Trade Information System (ETIS) generally trended downward after 2012, but the volume of very large seizures (defined as 500 kg or more in weight) increased and stayed high through to 2019 (Figure CS4.4). According to the 2022 ETIS analytical report, the first half of 2019 witnessed three of the largest ivory seizures ever made, together totalling over 25 tons, including almost 7.5 tons of tusks seized in China after being exported from Nigeria, around 8.8 tons seized in Singapore apparently en route from the Democratic Republic of the Congo to Viet Nam, and 9.1 tons of raw ivory seized in Viet Nam, also exported from the Democratic Republic of the Congo.[33]

Without these three seizures, which may possibly have come from stocks rather than fresh poaching,[34] 2019 would have been yet another declining year. This was followed by 2020, a year possibly anomalous due to the introduction of transport and movement restrictions related to the COVID-19 pandemic, which had one of the lowest seizure totals on record with no recorded multi-ton seizures.[35] Seizures reported for 2021, during which COVID-related restrictions persisted in some areas, remained low. Seizure totals

FIG. CS4.4 **CITES ETIS records of reported number of ivory seizures and weight seized by year 1989–2022**



Source: CITES SC77 Doc. 63.1 (Rev. 2)[36]

in both 2020 and 2021 were the lowest since 2008, just after the time when the current elephant poaching crisis began.[37] Preliminary analysis for 2022 reported in the most recent ETIS update indicates a further decline in the number and weight of reported seizures for that year and fewer larger (more than 100 kg) seizures than the previous year.[38] However, the report cautioned that periodic seizures of several tons of ivory in 2021 and 2022 may indicate that organized criminal activity was still evident after the COVID-19 pandemic. The routing of shipments seized since 2020 provides further insight into geographic transitions previously observed. Larger seizures in the WWCR3 analytical dataset for 2021 were made in Nigeria (4.7 tons), South Africa (1.5 tons) and the Democratic Republic of the Congo (1 ton). The most recent ETIS update noted two large seizures linked to Mozambique in 2022, one made in that country (1 ton) and the other later along the trade chain in Malaysia (4.2 tons).[39] Based on media sources, other large seizures still to be verified included another sizeable seizure in the Democratic Republic of the Congo in 2022 (1.5 tons),[40] a seizure in Viet Nam of a shipment from Angola in 2023 (7 tons)[41] and most recently a March 2024 seizure of 4.8 tons of ivory in Mozambique reportedly en route to the United Arab Emirates.[42]

This geographic shift in the source and destination of the largest seizures suggests that traffickers are responding to law enforcement, the kind of international displacement of trafficking routes seen with other illicit commodities. For example, before 2016, the port of Mombasa in Kenya had been the leading point of export for containerized ivory seizures. However, a series of important seizures and arrests reported by media sources, including those of freight forwarding agents and international traffickers,[43,44] seems to have caused a major rerouting away from this port, even though some arrests failed to produce convictions. According to the WWCR3 analytical dataset, there were no major ivory seizures associated with Mombasa between 2016–2021.

Poor institutional frameworks as well as weak governance in West and Central Africa have also been quoted as possible factors influencing some of the shift towards these regions.[45]

While law enforcement action may have affected trafficking routes, it is not clear whether it contributed to the overall decline of the market. As discussed below, several separate lines of analysis have suggested that the number of organized crime groups trafficking ivory internationally is limited. If so, then

prosecution of a limited number of high-ranking individuals could have had significant impact on the ivory supply.

For example, one group of researchers was able to connect some seizures that occurred between 2006–2015 to one another through DNA analysis.[46] Seizures containing ivory from the same elephant were assumed to be sourced from the same poachers. On the assumption that these poachers supplied individual trafficking groups exclusively, this could indicate that these seizures were connected to the same trafficking group. The analysis suggested that a large share of the major ivory seizures may have been trafficked by as few as three groups.[47] More recent analysis linking seizures containing the ivory of closely related elephants found even more connections.[48]

In addition to this scientific evidence, a number of non-governmental organizations and independent analysts have also concluded that the number of major trafficking groups has been limited, based on everything from court documents and law enforcement records to undercover investigations.[49] Between 2016 to 2022, many of the individuals associated with these groups have been prosecuted according to various sources (including media) in China,[50,51] Kenya,[52] Thailand,[53] the United Republic of Tanzania,[54] the United States,[55,56] and Viet Nam.[57] If the claim that only a small number of groups dominate ivory trafficking is correct, then these prosecutions could have had a significant impact on the ivory flow.

Trafficking groups and the 30 largest ivory seizures

To test this theory, UNODC looked at 30 of the largest ivory seizures on record in the 20 years between 2002–2021 to see which could be assigned, by some form of evidence, to one of several recently prosecuted trafficking groups. Combined, these seizures accounted for 137 tons, or about 60 per cent of the total weight of ivory seized during that period.[58]

If the seizures are reflective of the underlying trafficking patterns, then the share of these large seizures that can be associated with one of the main groups could reflect the share of the market controlled by these groups. Furthermore, just under a third of these 30 largest seizures in terms of both number of incidents and weight of ivory seized can be assigned to known networks based in Kampala (Uganda) and Putian (China) through a combination of DNA analysis, court documents, and research by non-governmental organizations (Table CS4.1).

However, there were also several very large seizures that do not appear to be related to these primary networks. For example, in 2019, 8,795 kg of ivory and some 12 tons of pangolin scales were seized in Singapore coming from the Democratic Republic of the Congo and reportedly destined for Viet Nam. Court records from the resulting trial revealed that three of the owners of the shipment were businessmen from the Guangxi Zhuang Autonomous Region of China. These men were offered a ton of pangolin scales in payment of a debt incurred by a Congo-based Chinese businessman after a construction contract failed. Rejecting this initial offer, the three flew to Kinshasa in the Democratic Republic of the Congo and arranged a much larger shipment, to be sold to a buyer in Viet Nam. While not professional wildlife traffickers, their role in the shipment was more than that of mere investors and they were all sentenced to ten years or more in prison by the Chinese authorities in 2020.[59,60]

These three were not the only ones to engage in wildlife trafficking as a side line to other business activities in Africa. The seizure of 3.9 tons of ivory in Togo in 2014 led to the investigation of a Vietnamese timber company and its employees in Africa and Viet Nam.[61] Traders versed in international trade, including in protected species, appear to find it advantageous to include other commodities in their shipments, and timber is a frequent cover load for ivory.[62]

Despite parallel flows associated with marginal business activities, a limited number of dedicated wildlife traffickers appear to be responsible for many of the large ivory seizures. If arrests of these dedicated traffickers affected the ivory supply in an environment where demand remained consistent, it should have pushed prices higher. Indeed, the theory behind supply control is to push prices out of the reach of users.[63] Instead, as the following discussion illustrates, prices indicate that there was declining interest in whatever remained of the ivory market.

TAB. CS4.1 Analysis of groups associated with a selection of large ivory seizures 2002–2021

Seizure	Associated groups
1. In January 2002, 3,207 kg of ivory tusk segments packed in 14 boxes were seized by police in the United Republic of Tanzania from a house in Dar es Salaam.	Unknown
2. In June 2002, 6,246 kg of ivory tusks and over 40,000 hanko ivory blanks (totalling 7.2 tons) from Zambia were seized by customs officers in Singapore.	Lilongwe-based group[64]
3. In September 2005, 6 tons of ivory arrived in the Philippines from Zambia labelled as personal effects.	Unknown
4. In May 2006, customs officers in Hong Kong, China seized some 3,900 kg of ivory from Cameroon, hidden in a secret compartment of a container declared as timber, en route to Macao, China.	Unknown
5. In July 2006, customs officers in Taiwan Province of China inspected an unclaimed container and found 3,206 kg of ivory from the United Republic of Tanzania.	Unknown
6. In March 2009, 1,244 tusks (6.2 tons of ivory) from the United Republic of Tanzania were seized in Viet Nam by customs officers at Hai Phong port concealed in plastic waste.	Unknown
7. In March 2009, in two shipments, some 3.5 tons of tusks from the United Republic of Tanzania were seized by customs officers in the Philippines concealed in plastic waste.	Unknown
8. In December 2012, customs officers in Malaysia seized 2,341 pieces (6,034 kg) of ivory from Togo in two containers disguised as timber at Port Kelang.	Kampala-based group[65]
9. In January 2013, customs officers in Kenya seized 3,827 kg of ivory from Uganda on its way to Thailand concealed under mazeras stones. This was one of three similar seizures made that month totalling almost 7 tons of ivory.[66]	Kampala-based group[67]
10. In July 2013, in two seizures, authorities in Kenya seized almost 4.8 tons of ivory on its way to Malaysia.	Kampala-based group[68,69]
11. In July 2013, authorities in China reportedly seized 4,464 kg of ivory from Nigeria sent via Hong Kong, China and declared as rosewood.[70]	Putian-based group[71]
12. In July 2013, a fisheries officer was arrested in connection with the smuggling from Malawi of 1,120 ivory tusks (approx. 4,000 kg) by police in the United Republic of Tanzania in Mbezi, Dar Es Salaam.	Unknown
13. In October 2013, authorities in Uganda seized 2,903 kg of ivory.	Kampala-based group[72]
14. In November 2013, authorities in the United Republic of Tanzania seized 2,915 kg of ivory at Zanzibar concealed among seashells and destined for the Philippines.	Unconfirmed
15. In January 2014, authorities in Togo seized 3,900 kg of ivory believed to be destined for Thailand and Viet Nam under a cover of timber.	Vietnamese timber trading group with local facilitators[73]
16. In May 2014, 3,008 kg of ivory sent from Kenya via Malaysia was seized by customs officers in Cambodia at Kampong Saom in a shipment of beans.	Unknown

TAB. CS4.1 (Continued) Analysis of groups associated with a selection of large ivory seizures 2002–2021

Seizure	Associated groups
17. In April 2015, 4 tons of ivory sent from the Democratic Republic of the Congo via Malaysia was seized at Bangkok port, Thailand, in a shipment of beans on its way to the Lao People's Democratic Republic.	Johor-based facilitator[74]
18. In April 2015, customs officers in Thailand seized 3,230 kg of ivory from Mombasa, Kenya sent via Malaysia on its way to the Lao People's Democratic Republic in a container of tea leaves.[75]	Kampala-based group, Kenya-based facilitator group[76]
19. In May 2015, customs officers in Singapore seized 3.7 tons of ivory from Kenya in a load of tea leaves.	Kampala-based group, Kenya-based facilitator group[77]
20. In July 2017, customs officers in Hong Kong, China seized 7,031 kg of tusks in a container from Malaysia concealed beneath frozen fish.	Unknown
21. In August 2017, customs officers in Malaysia seized 3 tons of ivory from Nigeria on its way to China.	Unknown
22. In March 2018, customs officers in Singapore seized 3.5 tons of ivory from Nigeria on its way to Viet Nam.	Kampala-based group to Vietnamese group[78] Singapore-based freight forwarder[79]
23. In April 2018, customs officers in Mozambique seized 3,354 kg of ivory on its way to Cambodia.	Unknown
24. In December 2018, customs officers in Cambodia seized 1,026 ivory tusks (3.2 tons) from Mozambique.	Unknown
25. In January 2019, customs officers in Uganda seized 3,299 kg of ivory from the Democratic Republic of the Congo in three containers of timber at the border crossing with South Sudan, alongside 423 kg of pangolin scales. The ivory included some marked as belonging to the stockpile maintained by the Government of Burundi.[80]	Kampala-based group to Vietnamese group Burundi stockpile[81]
26. In March 2019, customs officers in Viet Nam seized 9,104 kg of ivory from the Congo at Tien Sa port of Da Nang.	Unknown
27. In March 2019, authorities in China seized 7,482 kg of ivory from Nigeria at a warehouse.[82,83]	Putian-based group[84]
28. In April 2019, customs officers and police in Viet Nam seized 3,446 kg of ivory and 3,977 kg of pangolin scales at Hai Phong.	Unknown
29. In July 2019, customs officers in Singapore seized 8,795 kg of ivory from the Democratic Republic of the Congo on its way to Viet Nam.	Democratic Republic of the Congo based facilitator[85]
30. In January 2021, 4,752 kg of ivory and 5,239 kg of pangolin scales were seized in Nigeria on their way to Viet Nam in a shipment of timber.	Nigeria-based group[86]

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

Prices

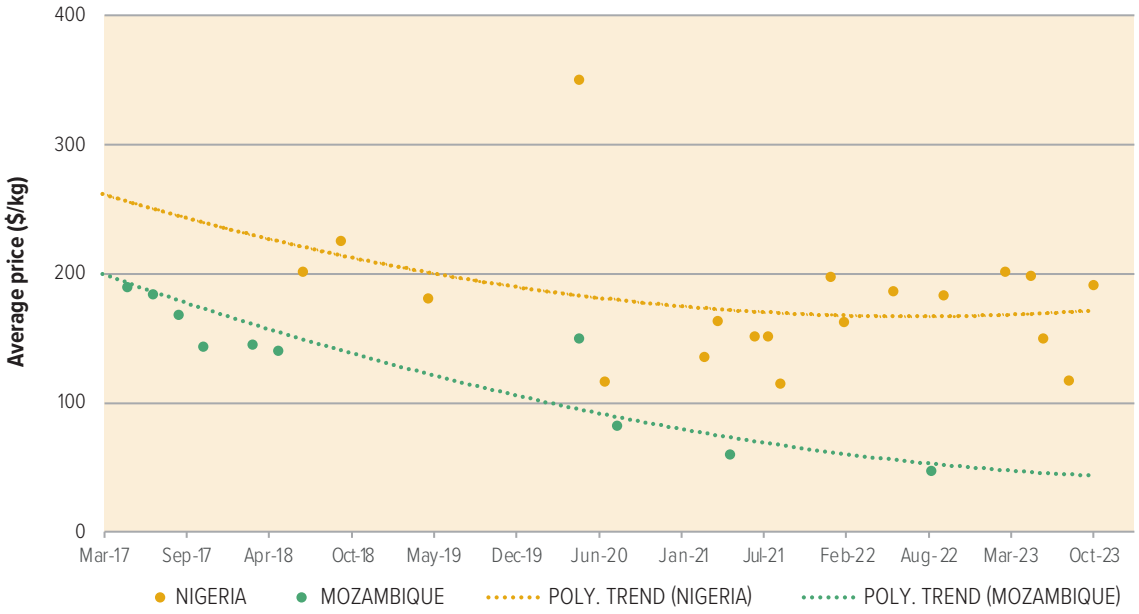
Data on prices from several sources show a declining trend from 2014, which appears to have been the price apex.[87] Based on the poaching figures, the supply of new ivory was also declining from 2011 and the general trend in the volume of seizures has been declining since 2013, despite strong incentives through the CITES National Ivory Action Plan process for countries to increase enforcement effort.[88] The fact that prices declined as supply was constrained suggests that a decline in demand for ivory was driving the market downwards.

Within Africa, wholesale prices for raw ivory during 2014–2018 averaged just under $400 per kg, according to data compiled by UNODC for the *World Wildlife Crime Report 2020*.[89] However, price data from research in Mozambique and Nigeria during 2017–2023 by a non-governmental organization indicate a decline to under $200 per kg (Figure CS4.5).

Such a decrease would represent a significant decline in potential profit for traffickers in Africa. The price data for Nigeria do, however, appear to show stabilization in the post-COVID-19 pandemic period during 2022–2023.

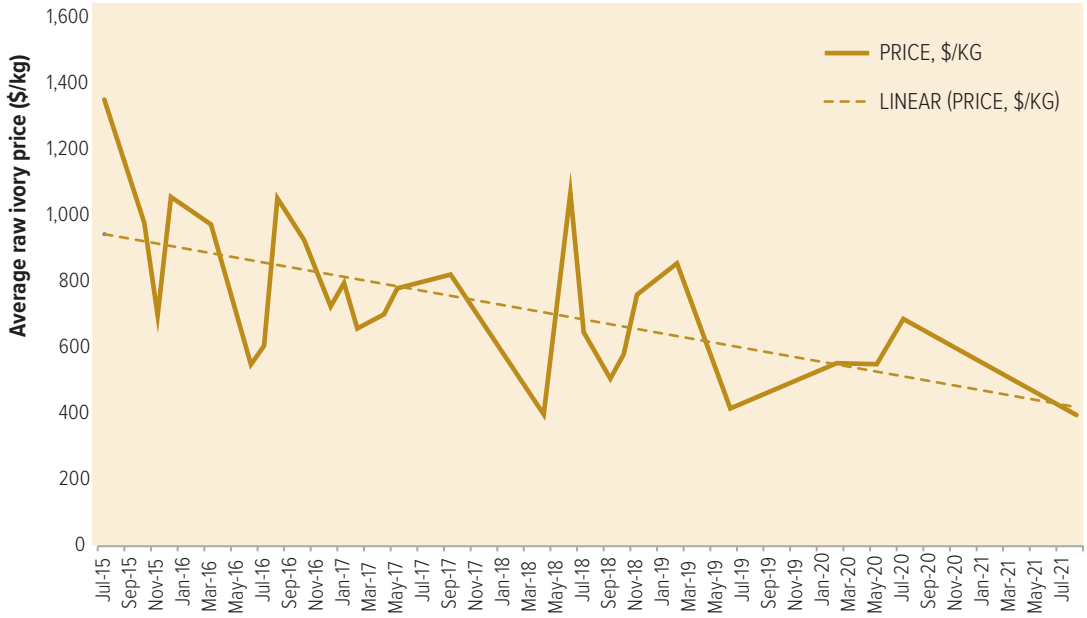
In the Asian market, prices have also continued to decline. Prices from research by a non-governmental organization in Viet Nam, a primary destination market, dropped from over $1,000 per kg in 2015 to about $400 per kg in mid-2021 (Figure CS4.6).[90] According to a periodic market research survey of urban areas of China commissioned by a non-governmental organization, the demand for ivory in 2021 was down considerably from the first survey in 2017, but up by 3% from 2020.[91]

FIG. CS4.5 **Average raw ivory price ($/kg) in Mozambique and Nigeria 2017–2023**



Source: Wildlife Justice Commission[92]
Note: Showing order 2 polynomial trendlines

FIG. CS4.6 Average raw ivory price ($/kg) in Viet Nam 2015–2021



Source: Wildlife Justice Commission[93]

Conclusions and implications

All indications are that the wave of elephant poaching that began around 2006 has substantially subsided. The shrinking of the ivory market documented by the collapse in the price of ivory, decreasing seizures of ivory, and decreasing elephant poaching figures, seems to be the result of a combination of demand and supply interventions. Government policies leading to the closure of key domestic markets, such as those in China and Thailand, have constrained demand. On the supply side, a series of convictions of high-level traffickers who operated in Africa and Asia may have facilitated a constrained flow of illicit ivory, as captured in the decline in aggregated seizure volumes. However, this supply constraint has not resulted in an increase in ivory prices, suggesting demand for ivory has truly declined. The fall in price may also have reduced incentives for speculative consolidation and storage of ivory for investment purposes to some extent.

That said, the continued threat to some elephant populations, particularly forest elephant populations, remains unclear. The persistent detection of large shipments of ivory highlights the continued existence of both a market and those willing to invest in it. While progress has been made on many fronts, the threat to local elephant populations has not gone away.

To the extent that seizures represent the underlying trafficking, it appears that some of the high-volume shipments can be attributed to a limited number of networks that have been exposed to enforcement intervention. It also seems clear that interdiction and arrests have substantially changed the routing and techniques used by ivory trafficking networks. However, the decline of prices in the face of declining supply suggests that it is a genuine decline in demand, not just supply control, that has led to the decline in elephant poaching in Africa.

Endnotes

1 CITES Secretariat, 'Report on Monitoring the Illegal Killing of Elephants (MIKE) – Nineteenth Meeting of the Conference of the Parties to CITES', 2022, https://cites.org/sites/default/files/documents/E-CoP19-66-05.pdf.

2 UNODC, *World Wildlife Crime Report 2016* (Vienna: United Nations publications, 2016).

3 UNODC, *World Wildlife Crime Report 2020 (*Vienna: United Nations publications, 2020).

4 Ibid.

5 Ibid.

6 Ibid.

7 Kenya Wildlife Service, 'Implementation of Kenya's National Ivory Action Plan Towards Combating Illegal Ivory Trade – Report to the CITES Standing Committee', 28 June 2018, https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-27-04-A12.pdf.

8 Ministry of Natural Resources and Tourism, Wildlife Division, United Republic of Tanzania, 'CITES National Ivory Action Plan Progress Report', 2018, https://cites.org/sites/default/files/eng/com/sc/70/E-SC70-27-04-A23.pdf.

9 UNODC, *World Wildlife Crime Report 2020*.

10 See analysis below and CITES, 'CITES CoP19 Doc. 66.6' (Panama City, 2022), https://cites.org/sites/default/files/documents/COP/19/agenda/E-CoP19-66-06.pdf.

11 CITES, 'CITES CoP19 Inf. 71', 2022, https://cites.org/sites/default/files/documents/E-CoP19-Inf-71.pdf.

12 CITES, 'CITES CoP19 Doc. 66.6'.

13 CITES, 'CoP19 Inf. 33' (CoP19, Panama City, 2022), https://cites.org/sites/default/files/documents/E-CoP19-Inf-33.pdf.

14 Many recent market surveys have reflected this shift. In Viet Nam, as early as 2017, TRAFFIC noted "ivory jewellery items accounted for over 90% of all the items found online and in physical outlets." See Minh D. T. Nguyen, Rosa A. Indenbaum, and Madelon Willemsen, 'From Tusk to Trinket: Persistent Illegal Ivory Markets in Viet Nam' (Cambridge: TRAFFIC, December 2018). In a comparative survey of Hong Kong, China markets, TRAFFIC notes, "When grouped into categories, jewellery was the most common (46%), especially items such as amulets, beaded bracelets and necklaces, earrings and pendants. This was followed by figurines (30%) and household items (22%)." See Wilson Lau, 'Ebbing Away: Hong Kong's Ivory Trade' (Cambridge: TRAFFIC, July 2021). A 10-market survey was conducted by IFAW in 2019. In Cambodia, it noted, "Small pieces of jewellery and accessories and Buddha amulets account for most products being sold, often made from African ivory." In Japan, in most online platforms surveyed, more than three-quarters of the objects for sale were jewellery or hankos. In Lao People's Democratic Republic, the survey found, "Recent surveys suggest that the ivory products most readily available in Lao People's Democratic Republic are small items of jewellery and accessories – pendants, necklaces, bangles and bracelets..." In Singapore, the report quotes TRAFFIC surveys indicating "... where it remains available, ivory jewellery and accessories, including bangles, bracelets, earrings, necklaces, pendants, combs, brushes, handicrafts and decorative items dominate the objects for sale." It notes similar findings from a number of studies in Thailand. See D. Bergin, E. Tops, and W. Meijer, 'The Ivory Trade Landscape in Asia: A Ten-Market Synthesis' (Hong Kong, China: IFAW, 2019).

15 See Wildlife Justice Commission (WJC), 'Rapid Assessment of the Illegal Ivory Trade in 2020' (The Hague, Netherlands, 2020); and analysis of price data supplied by Environmental Investigation Agency (EIA) and WJC, below.

16 International Union for Conservation of Nature (IUCN) Species Survival Commission African Elephant Specialist Group, 'African Elephant Status Report 2016', Occasional Papers of the IUCN Species Survival Commission (Gland: IUCN, 2016).

17 Ibid.

18 A report of a 2018 study of the Selous-Mikumi reserve, states, "The Selous-Mikumi elephant population is stable at about 15,500 animals based on recent censuses (2014 and 2018). No fresh carcasses (less than one-year-old) were recorded and the carcass ratio dropped from 39% in 2014 to 16% in 2018, indicating significant management intervention of curbing poaching. More effort and time is needed to reach 8%, which represents natural mortality." TAWIRI, *Aerial wildlife survey of large animals and human activities in the Selous-Mikumi ecosystem, dry season, 2018*, p.i. However, according to Reuters, the Tanzanian Presidency announced in 2019, "As a result of the work of a special task force launched in 2016 to fight wildlife poaching, elephant populations have increased from 43,330 in 2014 to over 60,000 presently." Fumbuka Ng'wanakilala, 'Tanzania says elephant, rhino populations rebounding after anti-poaching crackdown'. Reuters, 10 July 2019. See also: 'Are Africa's Elephant Populations Increasing or Decreasing?', Tsavo Trust, 11 March 2022, https://tsavotrust.org/are-africas-elephant-populations-increasing-or-decreasing/.

19 E. M. S. Bussière and D. Potgieter, 'KAZA Elephant Survey 2022, Volume I: Results and Technical Report.' (Kasane, Botswana: KAZA TFCA Secretariat, 2023), https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/5si83x57zx_1._KAZA_Elephant_Survey_Volume_I.pdf.

20 Ibid.

21 Scott Schlossberg *et al.*, 'State-Space Models Reveal a Continuing Elephant Poaching Problem in Most of Africa', *Scientific Reports 10*, no. 1 (23 June 2020): 10,166, https://doi.org/10.1038/s41598-020-66906-w.

22 CITES Secretariat, 'Levels of Illegal Killing of Elephants, Illegal and Legal Trade in Elephants Specimens, the Status of Elephant Populations

and the Implementation of the African Elephant Action Plan – A Report to the CITES Standing Committee SC77 Doc 63.1 Annex 2' (Geneva, Switzerland: CITES Secretariat, 2023), https://cites.org/sites/default/files/documents/E-SC77-63-01-R2_0.pdf.

23 S. K. Wasser *et al.*, 'Genetic Assignment of Large Seizures of Elephant Ivory Reveals Africa's Major Poaching Hotspots', *Science 349*, no. 6,243 (3 July 2015): 84–87, https://doi.org/10.1126/science.aaa2457.

24 E. M. S. Bussière and D. Potgieter, 'KAZA Elephant Survey 2022, Volume I: Results and Technical Report.'

25 International Union for Conservation of Nature (IUCN) Species Survival Commission African Elephant Specialist Group, 'African Elephant Status Report 2016'.

26 E. M. S. Bussière and D. Potgieter, 'KAZA Elephant Survey 2022, Volume I: Results and Technical Report.'

27 International Union for Conservation of Nature (IUCN) Species Survival Commission African Elephant Specialist Group, 'African Elephant Status Report 2016'.

28 CITES Secretariat, 'Report of the Secretariat on the Implementation of Resolution Conf. 10.10 (rev CoP19)', 2023, https://cites.org/sites/default/files/documents/E-SC77-63-01-R2_0.pdf.

29 CITES Secretariat, 'Report on Monitoring the Illegal Killing of Elephants (MIKE) – Nineteenth Meeting of the Conference of the Parties to CITES'.

30 International Union for Conservation of Nature (IUCN) Species Survival Commission African Elephant Specialist Group, 'African Elephant Status Report 2016'.

31 The CITES Secretariat analysis of annual ivory stock declarations is available at https://cites.org/eng/prog/terrestrial_fauna/elephants.

32 CITES, 'CITES SC74 Doc. 61.2 Annual Inventories of Stockpiles: Report of the Secretariat' (Geneva, Switzerland: CITES Secretariat, March 2022), https://cites.org/sites/default/files/eng/com/sc/74/E-SC74-61-02.pdf.

33 CITES Secretariat, 'The Elephant Trade Information System (ETIS) and the Illicit Trade in Ivory – A Report to the 19th Meeting of the Conference of the Parties to CITES in CoP19 Doc. 66.6', 2022, https://cites.org/sites/default/files/documents/COP/19/agenda/E-CoP19-66-06.pdf.

34 UNODC, *World Wildlife Crime Report 2020*.

35 This may mirror the trend observed in the lower interdiction of other trafficking during 2020 (trafficking in persons, for example), although not all interdictions showed a decline. Global cocaine seizures, for example, were at an all-time high. See UNODC, 'World Drug Report 2022' (United Nations publication, 2022), https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2022.html.

36 CITES Secretariat, 'Report of the Secretariat on the Implementation of Resolution Conf. 10.10 (rev CoP19)', 2023, https://cites.org/sites/default/files/documents/E-SC77-63-01-R2_0.pdf.

37 CITES, 'CoP19 Inf. 33'.

38 CITES Secretariat, 'Levels of Illegal Killing of Elephants, Illegal and Legal Trade in Elephants Specimens, the Status of Elephant Populations and the Implementation of the African Elephant Action Plan – A Report to the CITES Standing Committee SC77 Doc 63.1 Annex 2'.

39 Ibid.

40 'DR Congo Authorities Seize 1.5 Tonnes of Elephant Ivory', *Al Jazeera*, 19 May 2022, https://www.aljazeera.com/news/2022/5/19/1-5-tonnes-of-elephant-ivory-seized-in-southeast-dr-congo.

41 https://haiphong.gov.vn/tin-tuc-su-kien/Cuc-Hai-quan-Hai-Phong-phat-hien-bat-giu-khoang-7-tan-nga-voi-nhap-lau-tai-Cang-Nam-Hai-Dinh-Vu-114199.html.

42 https://aimnews.org/2024/03/22/at-apreende-perto-de-cinco-toneladas-de-marfim-no-porto-de-maputo/.

43 One person was convicted in 2022, nine years after being charged with facilitating the transport of almost seven tons of ivory in three separate container shipments through the port of Mombasa. See Chris Morris, 'After Nine Years, a Kenyan Court Hands Down Guilty Verdict in Ivory Case', *International Policy Digest*, 14 April 2022, https://intpolicydigest.org/after-nine-years-a-kenyan-court-hands-down-guilty-verdict-in-ivory-case/.

44 Daniel Stiles, 'Ivory Trafficking, Transnational Organized Criminal Networks in Eastern and Southern Africa 2009–2020, and the Emerging New Threat.', *Pachyderm 63* (2022): 140–52.

45 Environmental Investigation Agency, 'Out of Africa: How West and Central Africa Have Become the Epicentre of Ivory and Pangolin Scale Trafficking to Asia' (London: EIA, December 2020).

46 Samuel K. Wasser *et al.*, 'Combating Transnational Organized Crime by Linking Multiple Large Ivory Seizures to the Same Dealer', *Science Advances 4*, no. 9 (7 September 2018): eaat0625, https://doi.org/10.1126/sciadv.aat0625.

47 Ibid.

48 Samuel K. Wasser *et al.*, 'Elephant Genotypes Reveal the Size and Connectivity of Transnational Ivory Traffickers', *Nature Human Behaviour 6*, no. 3 (14 February 2022): 371–82, https://doi.org/10.1038/s41562-021-01267-6.

49 See, for example, Daniel Stiles, 'Ivory Trafficking, Transnational Organized Criminal Networks in Eastern and Southern Africa 2009–2020, and the Emerging New Threat.'

50 For example, in December 2020, the Chinese authorities convicted 17 members of a network from Putian, accused of smuggling at least 20 tons of ivory out of Nigeria, with sentences up to life imprisonment and confiscation of all assets. See Guangzhou Intermediate People's Court New Media Studio: https://mp.weixin.qq.com/s/z-rPEdanqpArpY-fWp9VoQ, accessed 8 April 2024 (in Chinese).

51 For example the Zhanjiang Intermediate People's Court convicted 11 members of a group associated with Shuidong accused of involvement in smuggling 8.5 tons of ivory and almost 800 kg of pangolin scales during 2014–2017, with sentences ranging from 3–15 years along with confiscation of property. Zhanjiang Intermediate People's Court, 'The Municipal Intermediate People's Court sentenced Wang Kangwen and 11 others in the case of smuggling ivory and pangolin scales in the first instance.', Zhanjiang Intermediate People's Court Website, 7 March 2018, http://www.zjcourt.gov.cn/web/content?gid=10033&lmdm=1017.

52 For example, in 2016, the Kenyan authorities sentenced an individual to 20 years in prison for dealing in ivory. 'Conviction of Feisal Ali Mohamed for Ivory Trafficking', Kenya Wildlife Service, 22 July 2016, https://www.kws.go.ke/content/conviction-feisal-ali-mohamed-ivory-trafficking. Kenya also arrested three other individuals (relatives) in 2015, in a case that only concluded in March 2023. See Chris Morris, 'After 8 Years, Kenyan Ivory Case Comes to a Close.', *International Policy Digest*, 23 March 2023.

53 In 2022, the Thai authorities sentenced an individual to five years in prison. Rachel Nuwer, 'Thai Poaching Kingpin Is on the Run after Prison Sentence', *National Geographic*, 15 February 2023, https://www.nationalgeographic.com/animals/article/manhunt-thai-poaching-kingpin-southeast-asia-traffickingivory.

54 For example, the individual dubbed "the ivory queen" was sentenced to 15 years in prison in Tanzania for ivory trafficking in 2019. 'Chinese "Ivory Queen" Yang Fenglan Jailed in Tanzania', *BBC News,* 19 February 2019, https://www.bbc.com/news/world-africa-47294715.

55 For example, the United States extradited an individual and his associates from Uganda and convicted him to 63 months in prison. Another individual was also extradited from Thailand. United States Attorney's Office, Southern District of New York, 'Wildlife Trafficker from Uganda Sentenced to 63 Months for Large-Scale Trafficking of Rhinoceros Horns and Elephant Ivory', US Department of Justice, 18 August 2022, https://www.justice.gov/usao-sdny/pr/wildlife-trafficker-uganda-sentenced-63-months-large-scale-trafficking-rhinoceros-horns.

56 United States Attorney's Office, Southern District of New York, 'U.S. Attorney Announces Extradition of Malaysian National for Large-Scale Trafficking of Rhinoceros Horns', US Department of Justice, 7 October 2022, https://www.justice.gov/usao-sdny/pr/us-attorney-announces-extradition-malaysian-national-large-scale-trafficking-rhinoceros.

57 For example, in February 2022, the Vietnamese authorities sentenced an individual to 13 years in prison for trafficking ivory, rhino horn, pangolin scales and other endangered species products. See https://wildaidvietnam.org/da-nang-setting-up-a-ghost-company-to-smuggle-ivory-and-rhino-horn-across-the-country-in-exchange-for-13-years-in-prison/; https://www.reuters.com/world/asia-pacific/vietnam-jails-trafficker-13-years-over-10-tonne-haul-ivory-rhino-horn-2023-02-21/.

58 Unlike ETIS, World WISE does not impute a weight for seizures of ivory jewellery or ivory carvings due to the variability of weights in these classes. As a result, it contains over 5,000 ivory seizures without weights.

59 Hong Kong University Species Victim Impact Statements Initiative, 'How Do Traffickers Ship Ivory and Pangolin Scales from the Congo into Vietnam and China?', 15 September 2021, https://www.svis.law.hku.hk/post/how-do-traffickers-ship-ivory-and-pangolin-scales-from-the-congo-into-vietnam-and-china.

60 Original case information available at China Judgements Online portal. https://wenshu.court.gov.cn/.

61 Environmental Investigation Agency,, 'Exposing the Hydra: The Growing Role of Vietnamese Syndicates in Ivory Trafficking.', Technical Report, 2018, https://eia-international.org/wp-content/uploads/EIA-report-exposing-the-hydra.pdf.

62 Luciana Capdepon, 'Snapshot Analysis: Ivory Smuggling: 2015–2019 Concealment, Routes and Transportation Methods' (The Hague: Wildlife Justice Commission, September 2019), https://wildlifejustice.org/wp-content/uploads/2022/12/ivory-smuggling-snapshot-analysis-sept-wjc.pdf.

63 Gary S. Becker, Kevin M. Murphy, and Michael Grossman, 'The Market for Illegal Goods: The Case of Drugs', *Journal of Political Economy 114*, no. 1 (1 February 2006): 38–60, https://doi.org/10.1086/498918.

64 This seizure was extensively discussed in Jo Hastie, Julian Newmann, and Mary Rice, 'Back in Business: Elephant Poaching and the Ivory Black Markets of Asia', *Environmental Investigation Agency*, London, 2002, https://eia-international.org/wp-content/uploads/Back-in-Business-20021.pdf.

65 This was one of the key seizures identified by Wasser *et al.*, with links to a number of seizures associated with the Kampala-based group. Ivory from a very wide range of locations in East and Central Africa was detected in the DNA analysis.

66 The other two, according to World WISE, being 1,323 kg seized in Hong Kong, China on 3 January and 1,833 kg seized in Singapore on 23 January, both originating in Kenya.

67 This was one of three seizures with a cover of mazeras stone made around the same time and having other logistic similarities, totalling 6,990 kg (2,516 tusks and tusk pieces). See Chris Morris, 'After Nine Years, a Kenyan Court Hands Down Guilty Verdict in Ivory Case'.

68 Seej Africa, '#23. June 2013 Mombasa – 1.5 Tonnes of Ivory', *Seej Africa*, 3 July 2013, https://www.seej-africa.org/2013/07/03/23-june-2013-mombasa-1-5-tonnes-of-ivory-2/.

69 Seej Africa, '3081/13 Mombasa – R. vs. Nicholas Maweu John 3.3 Tonnes', *Seej Africa*, 20 January 2018, https://www.seej-africa.org/2018/01/20/acquittal-25-cf-3081-2013-republic-vs-nicholas-maweu-john-3-3-tonnes-2/.

70 CITES Secretariat, 'SC65 Doc. 42.1 Elephant Conservation, Illegal Killing and Ivory Trade. Document from the 65th Meeting of the CITES Standing Committee' (CITES Secretariat, June 2014), https://cites.org/eng/com/sc/65/index.php.

71 Jenny Feltham and Hendelene Prinsloo, 'Bringing Down the Dragon: An Analysis of China's Largest Ivory Smuggling Case', Wildlife Justice Commission (The Hague, Netherlands, February 2022). An Africa-based associate of the group was arrested in Ghana and extradited to China in 2021. Hong Kong University Species Victim Impact Statements Initiative, 'Leader of Ivory Smuggling Gang Extradited Back to China', 16 March 2021, https://www.svis.law.hku.hk/post/leader-of-ivory-smuggling-gang-extradited-back-to-china.

72 DNA evidence connects this seizure with one of the two seizures in seizure 10 in Table CS4.1. See Wasser *et al.*, 'Combating Transnational Organized Crime by Linking Multiple Large Ivory Seizures to the Same Dealer'.

73 Environmental Investigation Agency, 'Exposing the Hydra: The Growing Role of Vietnamese Syndicates in Ivory Trafficking.'

74 According to the Government of the United States, "Teo Boon Ching specializes in the transportation of rhino horn, ivory, and pangolins from Africa, generally utilizing routes through Malaysia and Lao People's Democratic Republic and onward to consumers in Vietnam and China." United States Department of the Treasury, 'Treasury Sanctions Wildlife Trafficking Organized Crime Group', 7 October 2022, https://home.treasury.gov/news/press-releases/jy1001. His United States indictment quotes Ching describing himself as a "middleman" who "takes product and delivers". See Southern District of New York, United States Department of Justice, 'Sealed Superseding Indictment: US vs Teo Boon Ching', n.d., https://www.justice.gov/media/1250511/dl.

75 Previously recorded as 3,127 kg: revised weight of ivory in the shipment confirmed by Thailand CITES Management Authority in correspondence to UNODC, 8 May 2024.

76 Chris Morris, 'After 8 Years, Kenyan Ivory Case Comes to a Close.'

77 Ibid.

78 This seizure was linked by DNA to another seizure associated with the Kampala-based group. See Wasser *et al.*, 'Elephant Genotypes Reveal the Size and Connectivity of Transnational Ivory Traffickers'.

79 Shaffiq Alkhatib, 'Prosecution Calls for up to 18 Months' Jail for Woman Linked to Unlawful Import of Elephant Tusks', 29 November 2022, https://www.straitstimes.com/singapore/courts-crime/prosecution-calls-for-up-to-18-months-jail-for-woman-linked-to-unlawful-import-of-elephant-tusks.

80 Seej Africa, 'The "Enterprise", the Burundi Stockpile, and Other Ivory behind the Extradition.', *Seej Africa*, 9 February 2021, https://www.seej-africa.org/2021/02/09/the-enterprise-the-burundi-stockpile-and-other-ivory-behind-the-extradition/.

81 Ibid.

82 CITES, 'CITES CoP19 Doc. 66.6'.

83 Feltham and Prinsloo, 'Bringing Down the Dragon: An Analysis of China's Largest Ivory Smuggling Case'.

84 Ibid.

85 Hong Kong Species Victim Impact Statements Initiative, "How Do Traffickers Ship Ivory and Pangolin Scales from the Congo into Vietnam and China?" 15 September 2021.

86 'Joint operation with NCS leads to arrest of fugitive suspected of involvement in major wildlife seizure of January 2021', Wildlife Justice Commission, 30 September 2023, https://wildlifejustice.org/joint-operation-with-ncs-leads-to-arrest-of-fugitive-suspected-of-involvement-in-major-wildlife-seizure-of-january-2021/.

87 UNODC, *World Wildlife Crime Report 2020.*

88 CITES National Ivory Action Plans (NIAPs) are a practical tool applied by selected Parties to the Convention to strengthen their controls of the trade in ivory and ivory markets to help combat the illegal trade in ivory. See: https://cites.org/eng/niaps.

89 UNODC, *World Wildlife Crime Report 2020.*

90 Data communicated directly from the Wildlife Justice Commission to UNODC, April 2024.

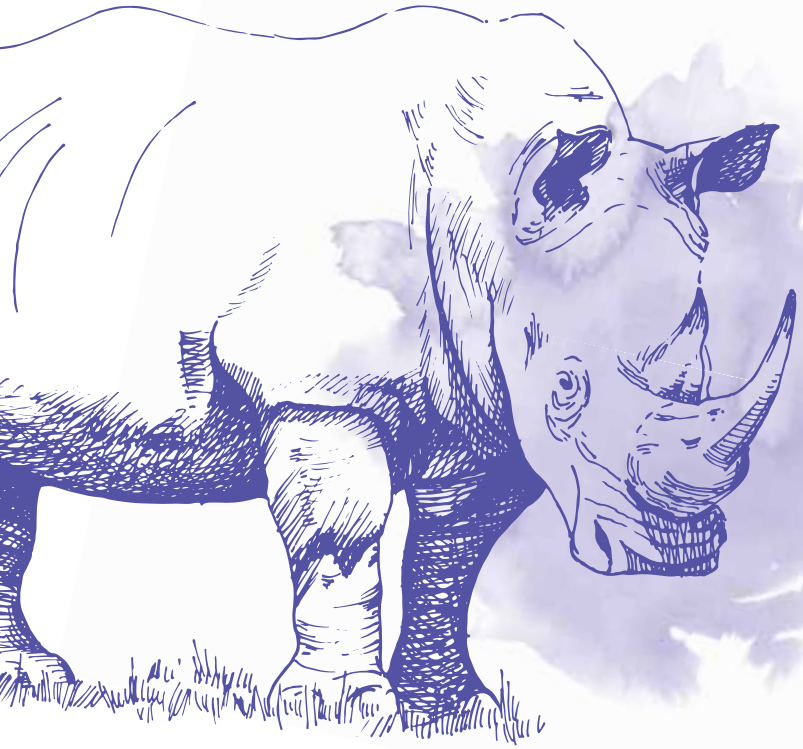
91 Luciana Capdepon, 'Snapshot Analysis: Ivory Smuggling: 2015–2019 Concealment, Routes and Transportation Methods'.

92 Wander Meijer *et al.*, 'Demand under the Ban: China Ivory Consumption Research 2021' (WWF, October 2021).

93 Data communicated directly from the Wildlife Justice Commission to UNODC, April 2024.

Case study 5

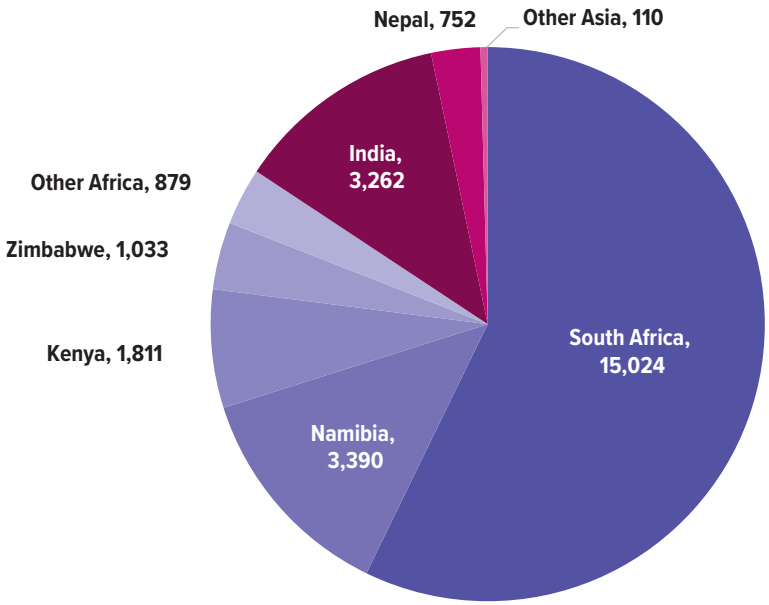
Rhinoceros horn



Rhinoceros horn

Rhinoceros horn trafficking was the subject of case studies in both previous editions of the *World Wildlife Crime Report*. The analysis in the 2020 report noted mixed signals, with decreases in poaching levels and price indicators standing in contrast to a consistent upward trend in seizures during the period 2014–2018, after which comprehensive data were at that time unavailable.[1] It was speculated that increased seizures could be owing either to improved enforcement interdiction or the entry into the market of new supply from private stocks. The current case study aims to update knowledge on rhinoceros horn trafficking, particularly the evidence on overall market trends. It benefits in particular from regular comprehensive updates on rhinoceros status, poaching and illegal trade carried out for CITES by the International Union for the Conservation of Nature (IUCN) and TRAFFIC.[2]

FIG. CS5.1 Estimated rhinoceros population in 2021 by range country



Source: Compiled from data in CITES CoP19 Doc 75, Tables 1 and 3[3]

Knowledge about rhinoceros populations is clearer than that available for species such as elephants and pangolins because there are far fewer rhinoceros left in the world and those that remain are relatively well monitored. There are five rhinoceros species today with a combined global population at the end of 2021 estimated to total just over 26,000 animals, with over half residing in a single country, South Africa (Figure CS5.1).[4]

The vast majority of this global population is comprised of the two African species, the black rhinoceros and the white rhinoceros, for which more recent population estimates at the end of 2022 totalled 6,468 and 16,801 animals respectively.[5]

Between 1970 and 1990 the combined populations of the two African rhinoceros species declined from about 70,000 to close to 10,000 animals under heavy poaching pressure for their horns, after which they recovered to over 25,000 by the early 2010s owing to increased protection and suppression of end markets.[6] After that time, the most recent wave of renewed poaching caused a decline of almost 20 per cent in the total number of rhinoceros in Africa between 2012–2021.[7] Although revised population data for the end of 2022 indicate that these populations were 5 per cent higher than estimated a year earlier,[8] poaching remains the biggest threat to the two African species.[9]

Rhinoceros horn is a solid continuously growing material that consists mostly of keratin, calcium and melanin and can be removed with minimal adverse physical effects to the animal, beyond those related to immobilization for dehorning, so long as the horn is not cut too close to the growth plate.[10] Dehorning of rhinoceros has been conducted as a management measure to deter poaching by reducing the potential rewards from poaching. The widespread adoption of dehorning as an anti-poaching tactic has also resulted in a considerable increase in stockpiled rhinoceros

horn; at least 2,217 rhinoceros were dehorned between 2018–2021, mostly in South Africa and Namibia, which means over 4,000 rhinoceros horns were added to private and government stockpiles during this period.[11]

The possibility of non-lethal horn removal has also been a feature of advocacy that the legal trade in rhinoceros horn from managed rhinoceros populations be allowed as a way of financing conservation measures on public and private land.[12] As of 2021, more than 50 per cent of the remaining white rhinoceros were privately owned in South Africa,[13] where acquisition and breeding has been motivated by different reasons, including attraction of tourist visitors and the hope that commercial horn sales might be allowed.[14] However, a 2017 survey of some 10 per cent of the private rhinoceros owners in South Africa found that, owing to the high price of security, they believed the costs of having rhinoceros generally exceeded the revenues generated by them, and some private rhinoceros owners had considered removing the animals from their lands.[15]

In 2009, the Government of South Africa placed a moratorium on the legal domestic sale of rhinoceros horn, which was lifted by the Constitutional Court in 2017.[16] Once domestic sales in South Africa again became possible, a major auction was organized by the largest commercial rhinoceros breeding operation but, likely due to uncertainty about export possibilities, revenues were not as high as anticipated.[17] Eventually, according to media sources, owing to its high maintenance costs the breeding facility itself was put up for auction in April 2023, but failed to attract any bids.[18] The herd of some 2,000 white rhinoceros was finally purchased by African Parks in September 2023, and the buyers expressed their intent to release the animals into the wild over a ten year period.[19]

With all commercial international trade in rhinoceros horn prohibited under CITES,[20] trade in horn from poached animals is trafficked to be marketed in several Asian countries in contravention of their long-standing legal prohibitions on domestic trade and use. In 2018, Viet Nam strengthened its legislation on possession, transport and trading of rhinoceros horn products to include up to 15 years imprisonment and high fines, after which enforcement efforts are reported to have increased.[21] In China, some uncertainty about the continuation of the 1993 ban on rhinoceros horn trade and use arose when a new regulatory circular was issued in October 2018 that appeared to provide room for sale under "special circumstances", including for traditional medicines.[22] However, in December 2018, the State Council issued a statement asserting that, after study, the ban on the import, sale and medical use of rhinoceros horn would remain in place.[23]

Poaching

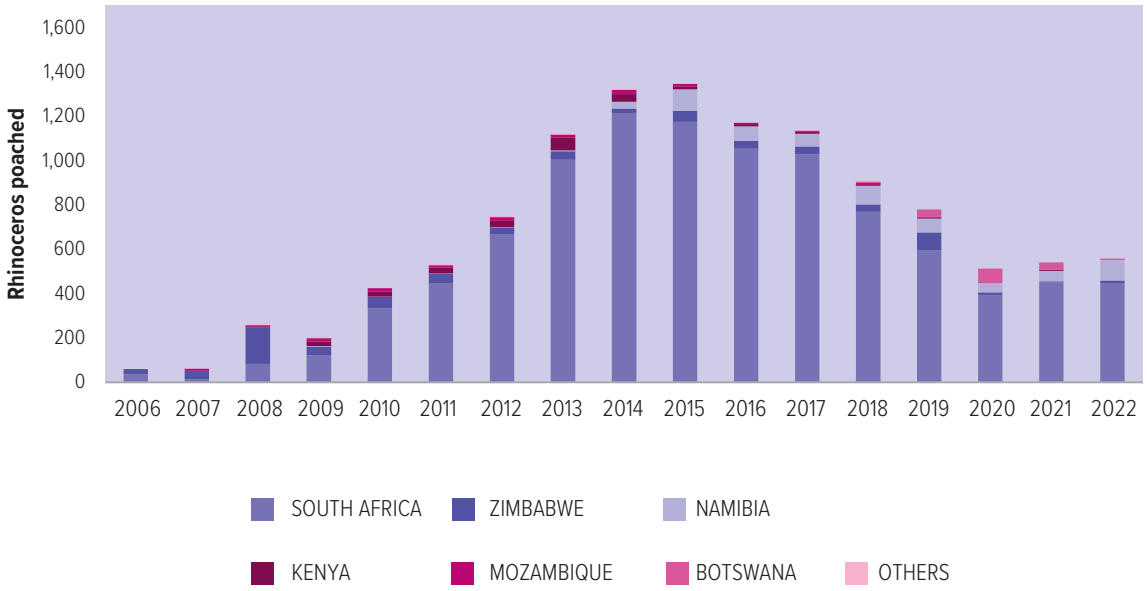
Owing to their limited numbers and because of their location, it is possible to give a relatively reliable estimate of the number of rhinoceros poached annually.[24] According to IUCN data, between 2006–2022, at least 11,700 rhinoceros were poached in Africa.[25] If each was bearing about 5 kg of horn,[26] then at least 58 tons of rhinoceros horn entered illegal trade.

Like elephant ivory, however, rhinoceros horn can also enter the market from other sources, including government and privately held stocks. A CITES survey with responses from seven out of 13 African rhinoceros range states concluded that at least 87 tons of horn was being held in 2020, a significant proportion of which was held privately, with the rest comprised of state stocks from legal sources (e.g. retrievals from natural mortalities and dehorning activities), and illegal sources (seizures).[27] Court proceedings from a 2020 conviction of traffickers in Namibia demonstrate how such horn enters the trafficking chain: those convicted had stolen 33 rhinoceros horns from one private property and were connected by investigators with a syndicate spanning several towns in Namibia and Angola that specialized in illegally obtaining rhinoceros horns and selling them internationally.[28]

The recent continental wave of rhinoceros poaching in Africa began around 2006, about the same time as the current wave of elephant poaching began. It peaked later, around 2015, and like elephants, the trend showed a decrease in the following years, with less than half the number of poaching incidents in the last three years as during the peak years (Figure CS5.2).

As might be expected, South Africa accounted for the bulk of the detected incidents, having lost almost 10,000 rhinoceros to poaching between 2006–2022.

FIG. CS5.2 Number of African rhinoceros poached per year 2006–2022



Source: Compiled from data in CITES CoP19 Doc 75[29] and SC77 Doc. 45[30]

Efforts to suppress poaching have been substantial, with greater focus in recent years on anti-corruption measures, financial crime investigations and large-scale dehorning.[31]

While South Africa saw the largest gross losses, some countries with smaller populations experienced greater relative losses (Figure CS5.3). Mozambique is clearly one of the countries most impacted by poaching, with 141 recorded poaching incidents over the 16 years (2006–2021) and a remaining population of only 16 rhinoceros. Losses in Zimbabwe also comprise a larger share of the remaining population than in South Africa, although reported incidents have declined in recent years. The overall losses in Namibia and Kenya are relatively small since 2006 compared to the current population as both countries have imported rhinoceros from South Africa over the years.[32]

Although poaching levels for African rhinoceros species are significantly lower than they were in the peak years in the mid-2010s and are now below the threshold level likely to cause continental population decreases,[33] there remains cause for concern.

In recent years alarms were raised when Botswana, a country known for the relative safety of its wildlife, saw a rash of rhinoceros poaching incidents between 2018–2021.[34] The Government of Botswana reported to the CITES Secretariat subsequently a 90 per cent reduction in poaching incidents for 2022 and 2023, attributing this to several measures including the dehorning of over one-third of the white rhinoceros population.[35] In 2022, Namibia experienced a sharp increase in the number of rhinoceros poached, from 47 in 2021 to 93 incidents in 2022,[36] and the most recent poaching data for South Africa indicate an increase in 2023, with 499 rhinoceros poached, compared to 448 in 2022.[37] However, Kruger National Park, where heavy poaching pressure was a problem in the past and strong remedial measures have been recently implemented, recorded a 37 per cent decrease from 2022 with a total of 78 rhinoceros poached in 2023.[38]

FIG. CS5.3 **African rhinoceros lost to poaching 2006–2022 compared to the 2021 rhinoceros population by country**

Source: Compiled from population data in CITES CoP19 Doc 75[39] and IUCN poaching data[40]

Trafficking

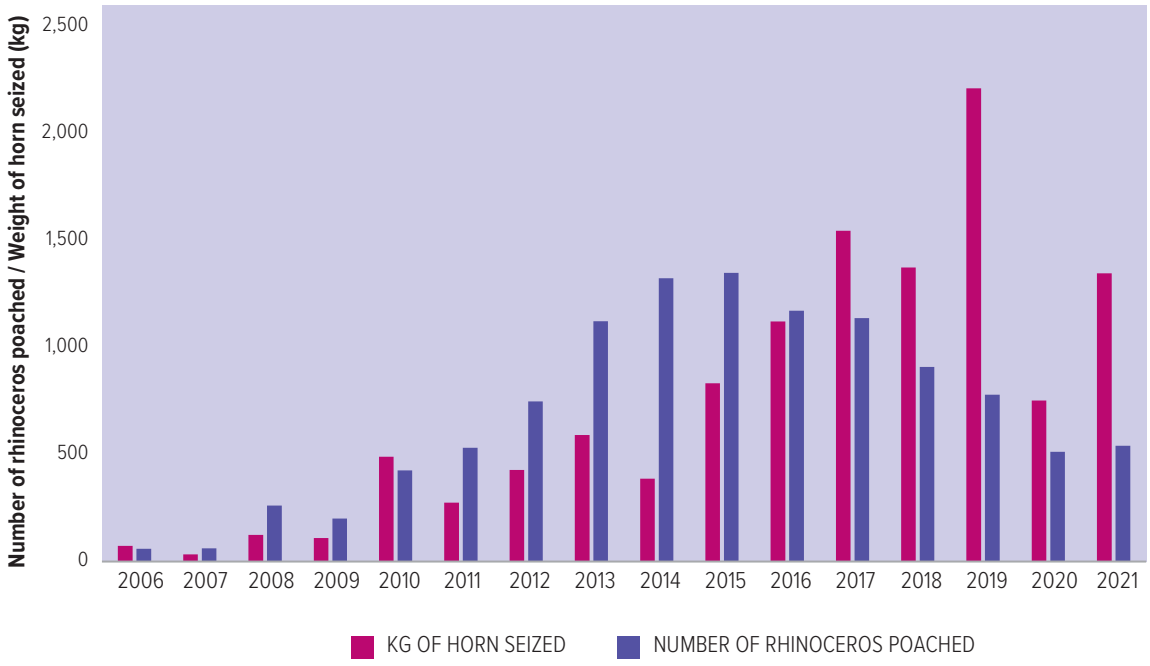
As a high value and reasonably portable commodity, most rhinoceros horn is trafficked by air.[41,42] From 2017, however, a number of mixed-species containerized shipments have been found to contain rhinoceros horn. Combined shipments of rhinoceros horn and lion bone have been detected coming from South Africa where lion farming for the bone trade has been widespread but subject to increasing regulatory restriction,[43] according to the WWCR3 analytical dataset. Research by a non-governmental organization has highlighted the important role multi-species brokers can play in connecting seller and buyers in this market.[44]

With a lag of about two years, up until 2018 there is some correspondence between the pattern of rhinoceros poaching and the amount of rhinoceros horn seized. Annual seizures varied from about 5–25 per cent of the new horn entering the market,[45] with one exceptional year: 2019 (Figure CS5.4). Just as the three largest seizures ever made of elephant ivory and pangolin scales occurred in 2019, two of the three largest recent rhinoceros horn seizures were made that year, as well as the largest annual total. This spike has in part been attributed to mixed signals about legalizing the sale of rhinoceros horn under "special circumstances" and then an immediate ban on the trade and medical use in China in late 2018; tougher wildlife legislation in Viet Nam as of 2018; and better international cooperation.[46] The peak was followed by a trough during the early phase of the COVID-19 pandemic in 2020, but seizures in 2021 increased again. Once data from 2022 are available the underlying trends should become clearer.

Just over a third of recent global rhinoceros horn seizures in the WWCR3 analytical dataset were made in South Africa (Figure CS5.5). For many of the seizures in South Africa, no source or destination are specified, since the horn was not yet in international transit. When a country of shipment departure was reported, in the majority of cases between 2015–2022 it was either South Africa or Mozambique (Figure CS5.6).

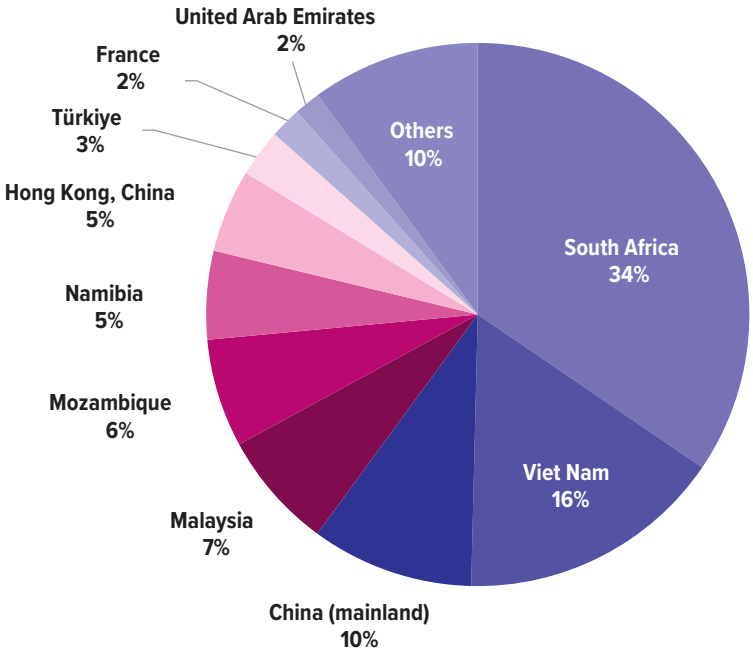
For the majority of reported seizures (69 per cent), no shipment destination was reported. In cases where a shipment destination was reported, Viet Nam, mainland China, Malaysia, Hong Kong, China and South Africa were most often cited (Figure CS5.7). As with ivory and pangolin scales, it appears, based on examination of records in the WWCR3 analytical dataset, that the size of individual shipments had become larger over time.

FIG. CS5.4 Rhinoceros horn seized (kg) and number of rhinoceros poached in Africa 2006–2021



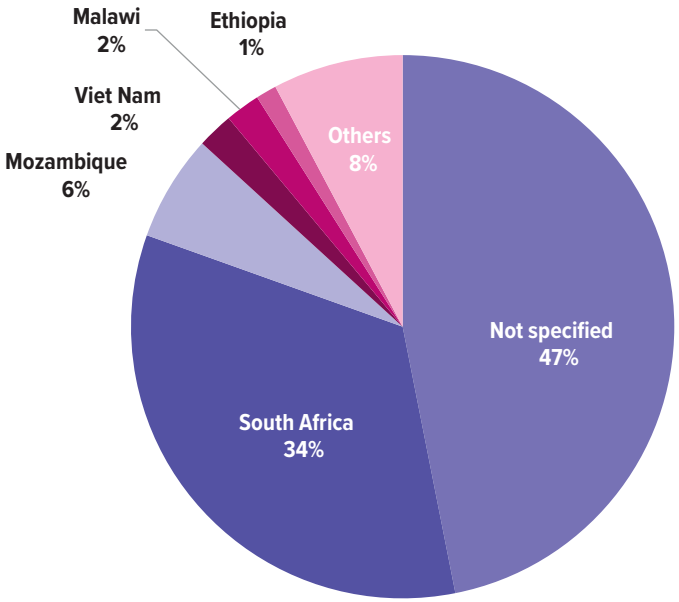
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset) and CITES CoP19 Doc 75[46]

FIG. CS5.5 Distribution of rhinoceros horn seizures (kg) by country or territory 2015–2021



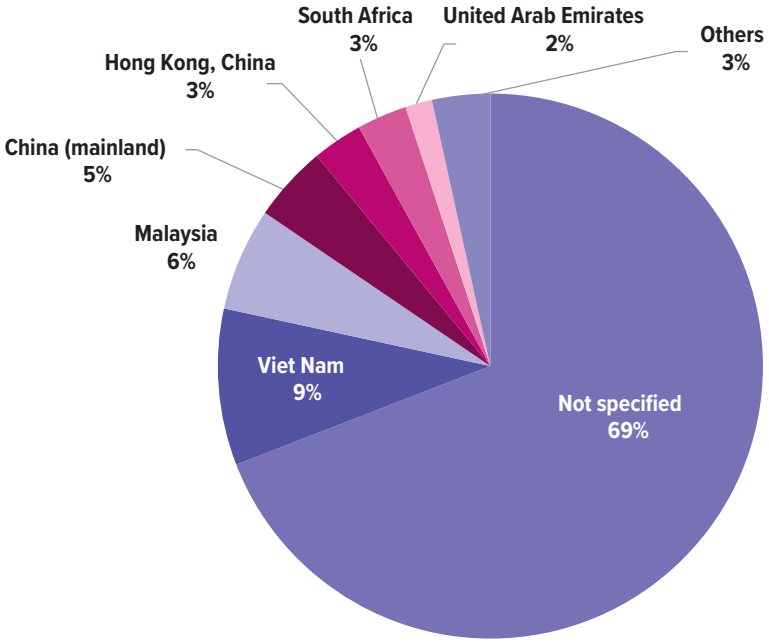
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

FIG. CS5.6 Distribution of rhinoceros horn seizures (kg) by country of shipment departure 2015–2021



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

FIG. CS5.7 Distribution of rhinoceros horn seizures (kg) by country or territory of shipment destination 2015–2021



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

End market use

As noted above, Viet Nam remains the primary destination of detected rhinoceros horn shipments where the destination is known and appears to be the primary place where it is processed into objects for sale, but processing has also been detected in Southern Africa.[48] On 12 June 2017, police seized a large quantity of beads, rhinoceros horn powder, and manufacturing equipment from a house outside Johannesburg.[49] This was not the only seizure of beads and powder made in South Africa.[50] Transforming the horn in Africa, or simply cutting it into blanks or disks, makes it more difficult for law enforcement to detect.[51]

The nature of the demand for rhinoceros horns appears to have changed over the years. Reports closer to the beginning of the present poaching wave emphasized its use as a traditional medical product, albeit one with some non-traditional applications and undertones of being a status symbol.[52]

In Viet Nam, in addition to being used in a last resort to treat terminal diseases such as cancer, it was employed to cure hangovers and as a general tonic.[53] According to academic research published in 2021, some Vietnamese consumers expressed the belief that its price and use by the wealthy proved its efficacy.[54] In Viet Nam, rhinoceros horn has been associated with corruption, since it is purportedly used as a gift to those in power in return for preferential treatment.[55] One study found that part of the attraction of rhinoceros horn for consumers in Viet Nam was that it was illegal.[56]

From around 2017, however, rhinoceros horn has found a different use as a carving medium, similar to ivory. This use is also rooted in tradition, as antique objects carved of rhinoceros horn can be found. Rhinoceros horn is carved into beads, libation cups, and other objects, sold in Asian end markets.[57,58] The most recent data and research indicate that this channel of demand (ornamental) may have eclipsed medical uses.[59] An academic paper claimed that the importance of the arts and antiques market for rhinoceros horn products has been overlooked for some time.[60] On the basis of weight, the carved objects sell for ten times the price of the raw horn.[61]

Yet another new market development emerged during research monitoring online advertisements in Viet Nam for wildlife products in 2022, where multiple offers were made to sell rhinoceros horn “glue”, a relatively new commodity made from a combination of rhinoceros horn, rhinoceros skin, pangolin, seahorse, gecko, and other medicinal ingredients.[62]

If the market for rhinoceros horn has transitioned between different demand types, there is some likelihood that the supply of rhinoceros horn is driving the market, with traffickers finding new uses for the product as old markets wane. There is past evidence of other supply driven markets in the illegal wildlife trade, such as a 2012 study of trade in manta gill-rakers.[63]

Implications

There are positive signs that multiple interventions to deter and intercept rhinoceros horn trafficking along the trade chain and suppress end markets may have contributed to decreases in both poaching and seizure trends. However, neither poaching nor illegal trade have stopped and evidence from end markets suggests that traffickers continue to innovate to create new opportunities for illegal sales. This is a business characterized by high unit values for smuggled horn and large profit margins for traffickers, which has clearly attracted the involvement of organized crime groups and a significant degree of corruption. Nevertheless, compared to some other wildlife crime challenges, rhinoceros horn trafficking operates within relatively restricted geographical areas at both ends of the trade chain. Significant resources are being committed to remedial interventions and key indicators of progress are accessible. This is a problem that can be solved if these efforts continue.

Endnotes

1 UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

2 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)' (CoP 19, Panama City, 2022), https://cites.org/sites/default/files/documents/E-CoP19-75-R1.pdf.

3 CITES Standing Committee and CITES Secretariat, "Rhinoceroses (Rhinocerotidae spp.)", CoP19 Doc. 75 (rev. 1), https://cites.org/sites/default/files/documents/E-CoP19-75-R1.pdf.

4 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

5 Mike Knight, Keit Mosweu, and Sam M. Ferreira, 'African Rhino Specialist Group Chair Report', *Pachyderm 64*, no. October 2022-September 2023 (n.d.).

6 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

7 Ibid.

8 International Union for the Conservation of Nature, 'Press Release: African Rhino Numbers Are Increasing Despite Poaching' (IUCN, International Union for Conservation of Nature, 21 September 2023), https://www.iucn.org/press-release/202309/african-rhino-numbers-are-increasing-despite-poaching.

9 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

10 Peter A. Lindsey and Andrew Taylor, 'A Study on the Dehorning of the African Rhinoceroses as a Tool to Reduce the Risk of Poaching' (South Africa: Endangered Wildlife Trust for the South African Department of Environmental Affairs, October 2011), https://www.dffe.gov.za/sites/default/files/docs/studyon_dehorning_african_rhinoceros.pdf.

11 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

12 For example: Andrew Taylor *et al.*, 'The Viability of Legalising Trade in Rhino Horn in South Africa' (Department of Environmental Affairs, South Africa, 2014), https://www.dffe.gov.za/sites/default/files/docs/rhinohorntrade_southafrica_legalisingreport.pdf.

13 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

14 Hayley S. Clements *et al.*, 'Private Rhino Conservation: Diverse Strategies Adopted in Response to the Poaching Crisis', *Conservation Letters 13*, no. 6 (November 2020), https://doi.org/10.1111/conl.12741.

15 Elena C. Rubino and Elizabeth F. Pienaar, 'Rhinoceros Ownership and Attitudes towards Legalization of Global Horn Trade within South Africa's Private Wildlife Sector', *Oryx 54*, no. 2 (March 2020): 244–51, https://doi.org/10.1017/S0030605318000030.

16 'Minister Edna Molewa Notes Constitutional Court Decision on Moratorium on Domestic Trade in Rhino Horn', accessed 16 April 2024, https://www.gov.za/speeches/minister-edna-molewa-notes-constitutional-court-decision-moratorium-domestic-trade-rhino.

17 Izak Du Toit, 'Press Release: John Hume Online Rhino Horn Auction' (Private Rhino Owners Association, 25 August 2017), https://mailchi.mp/240f2571befd/john-hume-online-rhino-horn-auction-results-835477?e=ba2124a66c.

18 James Pasley, 'Inside the World's Largest Rhino Farm, Which Requires a Private Army to Protect Its 2,000 White Rhinos, and Is Now for Sale for at Least $10 Million', *Business Insider*, 11 April 2023, https://www.businessinsider.com/photos-worlds-largest-rhino-farm-in-south-africa-for-sale-2023-4?op=1#in-the-end-with-no-help-coming-despite-putting-everything-he-had-into-it-he-decided-it-was-too-expensive-to-continue-running-the-ranch-he-was-81-years-old-24.

19 '2,000 Southern White Rhino to Be Released into the Wild Over Next 10 Years | African Parks', accessed 16 April 2024, https://www.africanparks.org/2000-southern-white-rhino-be-released-wild-over-next-10-years.

20 All rhinoceross are listed in CITES Appendix I, which prohibits international commercial trade, except the Southern white rhinoceros populations of Eswatini, Namibia and South Africa, which are listed in CITES Appendix II but for which trade is only allowed in live animals for specific purposes. https://cites.org/eng/app/appendices.php.

21 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

22 Ibid.

23 Zeng Rong, 'Embassy Spokesperson's Letter to The Economist to Clarify the Latter's Wrong Information about China's Handling of Tiger and Rhino Products', *Embassy of the People's Republic of China in the United Kingdom of Great Britain and Northern Ireland*, 7 May 2020, http://gb.china-embassy.gov.cn/eng/PressandMedia/Spokepersons/202005/t20200509_3384112.htm. See also State Forestry Adminstration of China, 'Reply to the Recommendation on a Total Ban on Trade in and Utilization of Rhinos and Their Products (No. 6059 of 2019)', 8 November 2019, http://www.forestry.gov.cn/main/4861/20191108/104201448861029.html.

24 A recent study at Kruger National Park estimated that roughly 10% of carcasses go undetected. See S. M. Ferreira and L. Dziba, 'Rhinoceros Accounting in Kruger National Park.' (Unpublished data, 2022). As cited in CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

25 Knight, Mosweu, and Ferreira, 'African Rhino Specialist Group Chair Report'.

26 While there is a considerable difference between the average horn weight of black (1.33 kg) and white (2.94 kg) rhinoceros, a standard conversion figure of 2.45 kg per horn is used by IUCN. Both African rhinoceros species have two horns. See Annexure 8 of CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

27 Ibid.

28 UNODC, "Sharing Electronic Resources and Laws on Crime (SHERLOC) knowledge management portal", Case law database, Queta v S. Available at: https://sherloc.unodc.org.

29 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

30 CITES Secretariat, '77th Meeting of the CITES Standing Committee SC77 Doc. 45 Rhinoceroses (Rhinocerotidae Spp.)' (CITES Secretariat, 2023), https://cites.org/sites/default/files/documents/E-SC77-45_0.pdf.

31 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

32 Ibid.

33 Ibid.

34 Ibid.

35 CITES Secretariat, '77th Meeting of the CITES Standing Committee SC77 Doc. 45 Rhinoceroses (Rhinocerotidae Spp.)'.

36 Knight, Mosweu, and Ferreira, 'African Rhino Specialist Group Chair Report'.

37 'KwaZulu-Natal Carried the Brunt of Rhino Poaching in 2023, Says Creecy', Department of Forestry, Fisheries and the Environment, Republic of South Africa, 27 February 2024, https://www.dffe.gov.za/mediareleases/creecy_relasesrhinopoachingstats2024feb27.

38 Ibid.

39 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

40 Knight, Mosweu, and Ferreira, 'African Rhino Specialist Group Chair Report'.

41 'World Rhino Day 2022: Putting Rhinos Back on the Radar', *Wildlife Justice Commission* (blog), 22 September 2022, https://wildlifejustice.org/world-rhino-day-2022/.

42 Sade Moneron, Nicola Okes and Julian Rademeyer, 'Pendants, Powders, and Pathways: A Rapid Assessment of Smuggling Routes and Techniques Used in the Illicit Trade in African Rhino Horn' (Pretoria: TRAFFIC, September 2017), https://www.traffic.org/site/assets/files/1313/pendants-powder-pathways.pdf.

43 UNODC, *World Wildlife Crime Report 2020*.

44 Wildlife Justice Commission, 'Ah Nam: The Downfall of Vietnam's Wolf of Wall Street', September 2022, https://wildlifejustice.org/wp-content/uploads/2022/10/Ah-Nam-Report-SEP2022-V09-Spreads.pdf.

45 If calculated at approximately 5 kg horn per rhino.

46 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

47 Ibid.

48 Wildlife Justice Commission, 'Rhino Horn Trafficking as a Form of Transnational Organised Crime 2012–2021' (Brussels, 2022), https://wildlifejustice.org/publications/rhino-horn-trafficking-as-a-form-of-transnational-organised-crime-2012-2021-2022-global-threat-assessment/.

49 Pongrass Import, 'Rhino Horn Worth R500 000, Alleged Lion Bones Found at House in Wychwood', *Germiston City News* (blog), 20 June 2017, https://www.citizen.co.za/germiston-city-news/154695/rhino-horn-lion-bones-found-at-house-in-wychwood/.

50 Sade Moneron, Nicola Okes and Julian Rademeyer, 'Pendants, Powders, and Pathways: A Rapid Assessment of Smuggling Routes and Techniques Used in the Illicit Trade in African Rhino Horn'.

51 Ibid.

52 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, South Africa: TRAFFIC, 2012) https://www.traffic.org/site/assets/files/2662/south_africa_vietnam_rhino_horn_nexus.pdf.

53 Milliken and Shaw, The South Africa-Viet Nam Rhino Horn Trade Nexus.

54 Hieu P. Nguyen, Hanh T. M. Nguyen, and Huyen T. Pham, 'The Price of Hope—Insights into Rhino Horn Consumption in Health-related Contexts in Vietnam', *Journal of Consumer Affairs 55*, no. 4 (December 2021): 1249–73, https://doi.org/10.1111/joca.12342.

55 Ibid.

56 Nick Hanley *et al.*, 'The Allure of the Illegal: Choice Modeling of Rhino Horn Demand in Vietnam: Demand for Rhino Horn in Vietnam', *Conservation Letters 11*, no. 3 (May 2018): e12417, https://doi.org/10.1111/conl.12417.

57 Yufang Gao *et al.*, 'Rhino Horn Trade in China: An Analysis of the Art and Antiques Market', *Biological Conservation 201* (September 2016): 343–47, https://doi.org/10.1016/j.biocon.2016.08.001.

58 Wildlife Justice Commission, 'Rhino Horn Trafficking as a Form of Transnational Organised Crime 2012–2021'.

59 Ibid. See also Karl Ammann, 'Asia's Shifting Rhino Horn Markets', *SWARA*, September 2018, https://karlammann.com/2018/05/11/on-the-trail-of-asias-shifting-rhino-horn-market/.

60 Gao *et al.*, 'Rhino Horn Trade in China'.

61 Wildlife Justice Commission, 'Rhino Horn Trafficking as a Form of Transnational Organised Crime 2012–2021'.

62 CITES, 'CoP19 Doc. 75 (Rev. 1) Rhinoceroses (Rhinocerotidae Spp.)'.

63 For example, manta gill-rakers were unknown to traditional medicine until some entrepreneur ound use for this form of by-catch.. See John R Platt, 'Manta Rays Endangered by Sudden Demand from Chinese Medicine', *Scientific American*, 17 January 2012, https://blogs.scientificamerican.com/extinction-countdown/manta-rays-endangered-by-sudden-demand-from-chinese-medicine/. Similarly, demand for jaguar claws was unknown in China prior to their collection by foreign workers from Asia involved in development in South America. See Hong Kong University Species Victim Impact Statements Initiative, 'Jaguar Tooth Trade – a Victimless Crime?', Hong Kong University Law School, Species Victim Impact Statements (blog), n.d., https://www.svis.law.hku.hk/post/jaguar-tooth-trade-a-victimless-crime.

Pangolin scales

Unsustainable local and international trade in their meat, skin and scales for use as food and medicine has been recognized for the past two decades as a primary threat to the conservation of the eight pangolin species distributed in Africa and Asia.[1] National conservation measures in range states have been supplemented by increasingly strict CITES controls on international trade, culminating in the inclusion of all pangolin species in CITES Appendix I in 2016.[2,3] However, as analysis for the *World Wildlife Crime Report 2020* illustrated, the reduced legal supply of pangolin parts to predominantly Asian end markets from within that region and later from Africa was increasingly supplanted by trafficking.[4]

Pangolin skin trade was prominent in the past, with legal trade in over 500,000 skins reported to CITES during the period 1975–2000. The bulk of this trade was from South-East Asia to the United States where skins were used in the manufacture of leather goods, such as handbags, belts, wallets and boots. However, as legal supplies became less available, recorded pangolin skin seizures over the past two decades have been negligible and most transactions involved single figure numbers of items.[5]

Pangolins are used as food in parts of Africa[6,7,8,9] and Asia,[10] and demand for pangolin meat has continued to be a source of pressure on pangolin populations on both continents in recent years.[11] However, analysis of seizure data in the *World Wildlife Crime Report 2020* compared pangolin meat and scale trade in terms of the equivalent number of live pangolins likely to have been harvested to supply each market and concluded that the primary product in international illicit trade today is scales. While the use of pangolins for meat remains an issue of concern (see Box CS6.1), this updated analysis of pangolin trafficking focuses on the market for scales.

BOX CS6.1 Pangolin meat

The previous editions of the *World Wildlife Crime Report* noted a decrease in seizures of pangolin meat and bodies after 2008 based on records then available. Whether this decline reflected growing pangolin scarcity was unclear. The Asian pangolin meat market appeared to be supplied entirely domestically or through international trade within Asia as there had been few detected exports of pangolin meat from Africa.[a]

An updated analysis of seizure records in the WWCR3 analytical dataset demonstrates that illegal meat trade has in fact continued since 2008 (Figure CS6.1). For the purposes of this analysis, records reported as meat, bodies or live animals have been converted to weight.[b] Seizure levels showed significant fluctuation during this period, with a downward trend overall.

The spike in seizures in 2019 is largely due to a single enforcement operation in Malaysia referred to in the *World Wildlife Crime Report 2020*. A pangolin meat processing factory and warehouse in Borneo, Malaysia were found and almost 30 tons of pangolin products seized, including 1,800 boxes of frozen pangolin meat sourced locally.[c]

Seizure records in the WWCR3 analytical dataset show no significant indications of trade for meat from Africa to Asia during the period 2007–2021. Seizures made in African countries were typically small numbers of live animals that were likely destined for local consumption. Similarly, seizure records suggest that the larger volumes demonstrating ongoing meat trade in Asia were sourced within that region.

The apparent overall decline in pangolin meat seizures could also be related to a decline in demand in some markets.[d] Measures are being taken to reduce pangolin meat consumption in Asia, including targeted demand reduction campaigns.[e] In addition, eating and trading terrestrial wild (non-livestock) animals for food was banned in China on 24 February 2020.[f] The impact these measures have had on demand for pangolin meat has not yet been assessed, nor has there been a comprehensive assessment of the scale of domestic sourcing, trade and consumption of pangolin meat within range states, which could be an ongoing concern.

a. UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

b. Conversion factors are detailed in the methodological annex of this report.

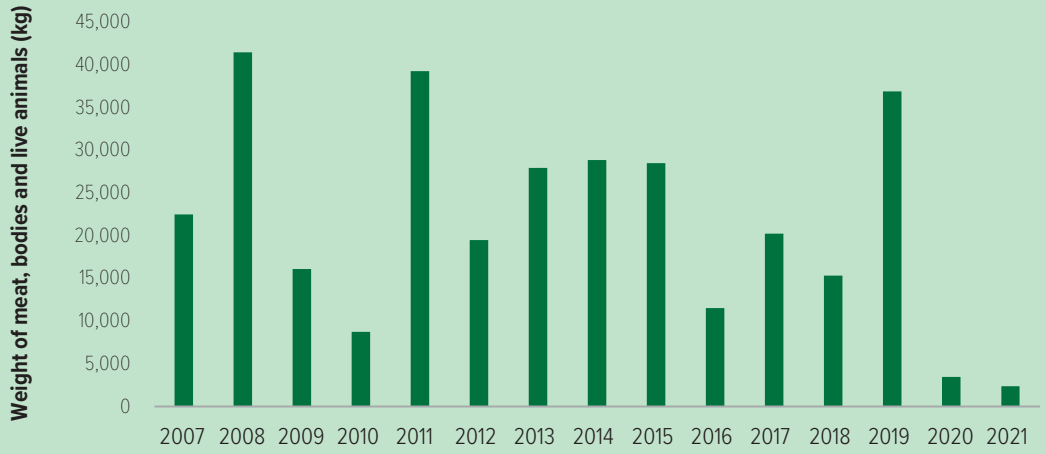
c. Junaidi Ladjana and Recqueal Raimi, 'Local Pangolin Smuggling Syndicate Busted', *New Straits Times*, 9 February 2019, https://www.nst.com.my/news/crime-courts/2019/02/458608/local-pangolin-smuggling-syndicate-busted- nsttv.

d. See for example this survey Zheng Zhang et al., 'Low Pangolin Consumption in Hong Kong Pre- and Post- the COVID-19 Outbreak: Conservation and Health Concerns Both Contribute to People's Attitudes', *Global Ecology and Conservation 35* (June 2022): e02107, https://doi.org/10.1016/j.gecco.2022.e02107.

e. For example, see TRAFFIC, 'Guidance for CITES Parties to Develop and Implement Demand Reduction Strategies to Combat Illegal Trade in CITES-Listed Species' (CITES Secretariat, September 2021), https://cites.org/sites/default/files/eng/prog/DR/CITES_Guidance_Demand_Reduction.pdf.

f. Xiao Xiao et al., 'Animal Sales from Wuhan Wet Markets Immediately Prior to the COVID-19 Pandemic', *Scientific Reports 11*, no. 1 (7 June 2021): 11,898, https://doi.org/10.1038/s41598-021-91470-2.

FIG. CS6.1 Seizures of pangolin meat, bodies and live animals (kg) 2007–2021



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

Illegal sourcing

Unlike elephants or rhinoceros, there are no reliable estimates of the size of pangolin populations.[12] Population survey techniques used for elephants, such as aerial flyovers or dung counts, cannot be applied to pangolins. Owing to their size, wide distribution, and reclusive habits, it is unlikely a comprehensive programme to monitor the global pangolin population will emerge soon. Some recent research in West Africa has indicated that the frequently trafficked white-bellied pangolin is still abundant in some areas, while giant ground pangolins are relatively rare.[13,14]

There is also no easy way to monitor poaching as pangolin carcasses do not remain detectable in the field for rangers to count as they do with elephants. Some monitoring has been done around local meat markets, but a comprehensive poaching surveillance programme would pose logistical challenges not encountered with the larger species, especially when monitored in controlled reserves. Using meat market data from a variety of sources, a 2017 academic study estimated that between 400,000 and 2.7 million pangolins were hunted annually in Central African forests.[15]

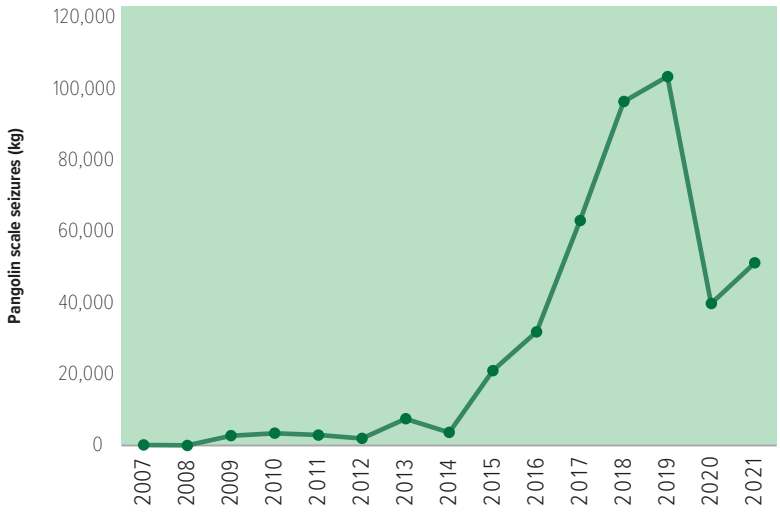
Some individual seizures of pangolin scales have weighed over 10 tons (see examples below). With different pangolin species yielding between 0.5–3.5 kg of scales per animal,[16] individual seizures of scales represent many thousands of pangolins. Pangolins are solitary so each of the animals had to be located and killed individually, unless trapped. Their scales are often removed by fire or boiling water and dried in the sun, with the results consolidated locally before being moved to urban centres for export. Thus, the sourcing of pangolin scales involves the actions of hundreds of people, coordinated primarily through market forces.[17]

Hunting of pangolins requires no specialized weaponry or expensive equipment and the necessary trapping and tracking skills are reportedly not difficult to learn, so there are minimal barriers to involvement in sourcing pangolins from the wild.[18,19] As long as the buyers or sales points are adequately known, the poaching of pangolins becomes a viable source of income to a wide range of local people.[20] Outside protected areas the poaching can be so diffuse that it is difficult to prevent, but there is some bottleneck at the consolidation points, associated with local meat markets or businesses that have the logistics to move the scales to urban areas for export. The dynamics of local trafficking chains in source countries were explored in depth in a 2019 UNODC regional wildlife crime threat assessment and in the *World Wildlife Crime Report 2020*, drawing on fieldwork in Cameroon, the Democratic Republic of the Congo, Gabon and Uganda.[21,22] Among the findings were insights into the connection between the export trade in scales and the established market chains for moving pangolin and other wild meat from rural to urban areas.

More recent UNODC fieldwork carried out in 2021 in border areas between Benin, the Niger and Nigeria found that many countries were mentioned by experts as contemporary sources of pangolins, including Benin, Burkina Faso, Cameroon, and the Democratic Republic of the Congo.[23] Two interviewed traders reported that pangolins were sourced by funding young men on motorbikes to make the rounds of rural villages in areas where pangolins were plentiful. After informing local poachers that pangolins would be bought for cash, the young men made a second round to pick up the results of the hunts.[24] In some areas pangolins were transported live, possibly because the fresh meat provided additional value in local markets. Special bags were used to transport individual pangolins and special boxes were used to transport up to 100 live animals in a single truck at a time.[25]

Based on five observations in 2020, one academic study found that tree pangolin scales (those from black-bellied and white-bellied pangolins) were sold in a Cameroon wild meat market for an average price of 8,100 CFA francs/kg (about $14/kg), with giant pangolin scales selling for just under twice that amount at 15,000 CFA francs/kg (about $25/kg).[26] Another recent academic study of wild meat markets (surveying 110–1,340 vendors at 10–18 markets per month) in three locations in Liberia found a sharp drop in prices during the survey period, from the equivalent of $30/kg in August 2020 to $5/kg in February 2021. Owing to low prices, pangolin traders were said to have moved onto other commodities such as currency or cocoa trading.[27]

FIG. CS6.2 Pangolin scales seized (kg) 2007–2021



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

Illegal trading

Analysis of the WWCR3 analytical dataset indicates there was a strong increase in pangolin scale seizures after 2014, about the same time that mixed pangolin and ivory seizures began to be detected (Figure CS6.2). This trend accelerated in 2017, the year when the listing of all species of pangolins in CITES Appendix I entered into force.[28] Seizures in the WWCR3 analytical dataset peaked in 2019, when the three largest seizures of scales on record were made in Singapore within a four-month time span: seizures of 12,913 kg and 12,768 kg, both in April 2019, and a seizure of 11,912 kg in July 2019. The total weight of pangolin scale seizures fell sharply in 2020, with a significant contribution of the overall annual total made up by a single 9.5 ton seizure in Nigeria, according to the WWCR3 analytical dataset. While the global volume of seizures decreased overall in 2020, trafficking continued—an academic study in India found an increase in seizure incidents there in 2020.[29] Preliminary data suggest that seizures rose again in 2021 but remained much lower than the peak in 2019.

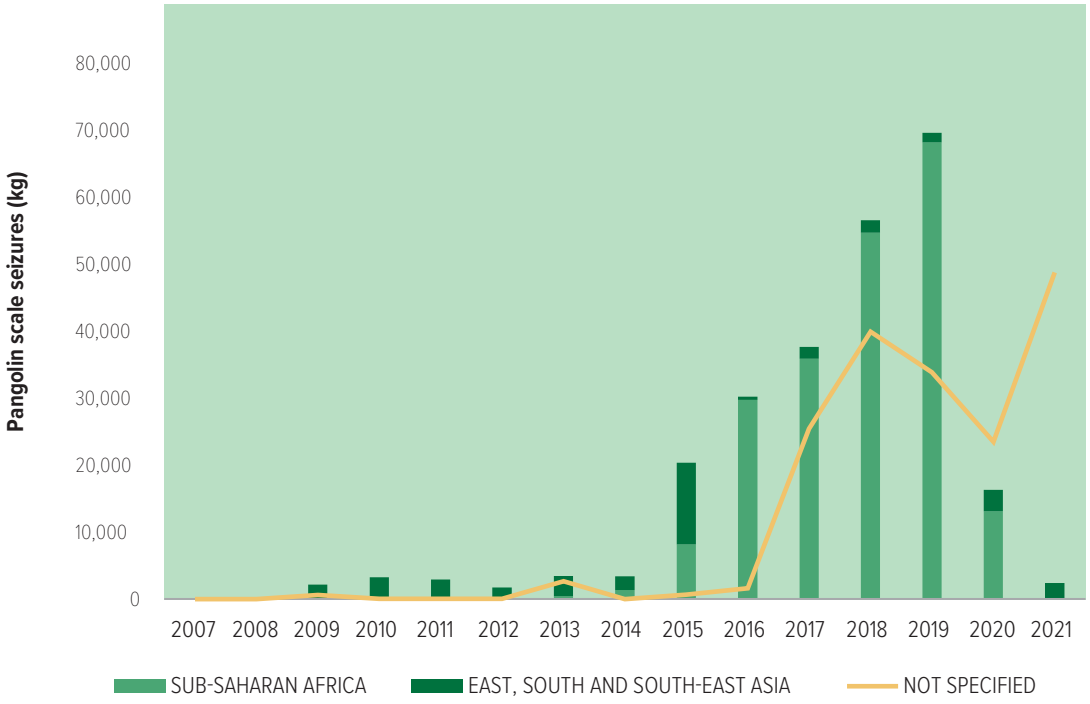
It is unclear what impact the COVID-19 pandemic had on the trafficking of pangolin scales in 2020 and beyond. While the livelihood impacts of pandemic lockdowns could have motivated an increase in poaching in some areas, the shutdown in commerce and tighter border controls could have interfered with the outputs being transported internationally. If so, it might be expected that stockpiles accumulated during the lockdowns would be transported once the destination markets opened to shipping, but this has not been seen. It is important to bear in mind that seizures are a very imperfect reflection of contraband flows, and since some countries have only recently relaxed border controls, it is possible that evidence of renewed trafficking will emerge in the future.

Analysis of seizure data by shipment source subregion indicates that the previously observed sourcing of scales from African pangolin species has continued (Figure CS6.3),[30] an outcome long predicted by conservationists.[31] Although the first detections began as early as 2008,[32] the first larger seizures in Asia of African pangolin scales were seen coming from Uganda in 2012, and the volumes increased rapidly from there. There has also been a rise in the proportion of shipments with unknown source in recent years.

Examination of detailed records in the WWCR3 analytical dataset shows that from about 2015, many of the largest seizures of pangolin scales have involved mixed loads with ivory or other wildlife commodities. There is some evidence from trafficker statements in Asia that ivory exporters, facing a declining market, made use of their existing knowledge and international connections to capitalize on growing demand for pangolin scales.[33]

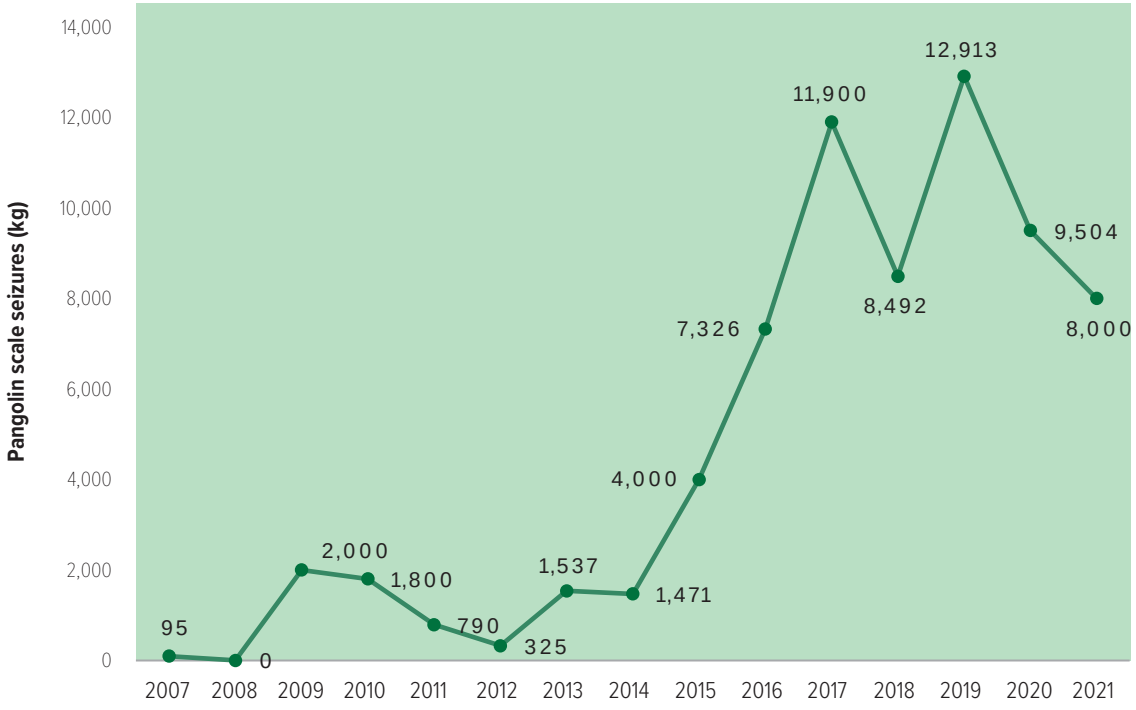
The size of individual pangolin scale seizures has generally increased over time. This also appears to have begun around 2015, coinciding with the consolidation of pangolin scale and ivory shipments and what appears to be a general increase in the pangolin scale market (Figure CS6.4). One possible explanation is that due to increasing attention to pangolins in CITES deliberations and other fora, traffickers predicted increased enforcement pressure on international trade routes and decided to move their stocks as quickly as possible from Africa to Asia. It is known that large privately held stockpiles of pangolin scales have been maintained in several African countries in addition to those in government custody from seizures.[34] For example, the CITES

FIG. CS6.3 Pangolin scale seizures (kg) by subregion of the country of shipment source 2007–2021



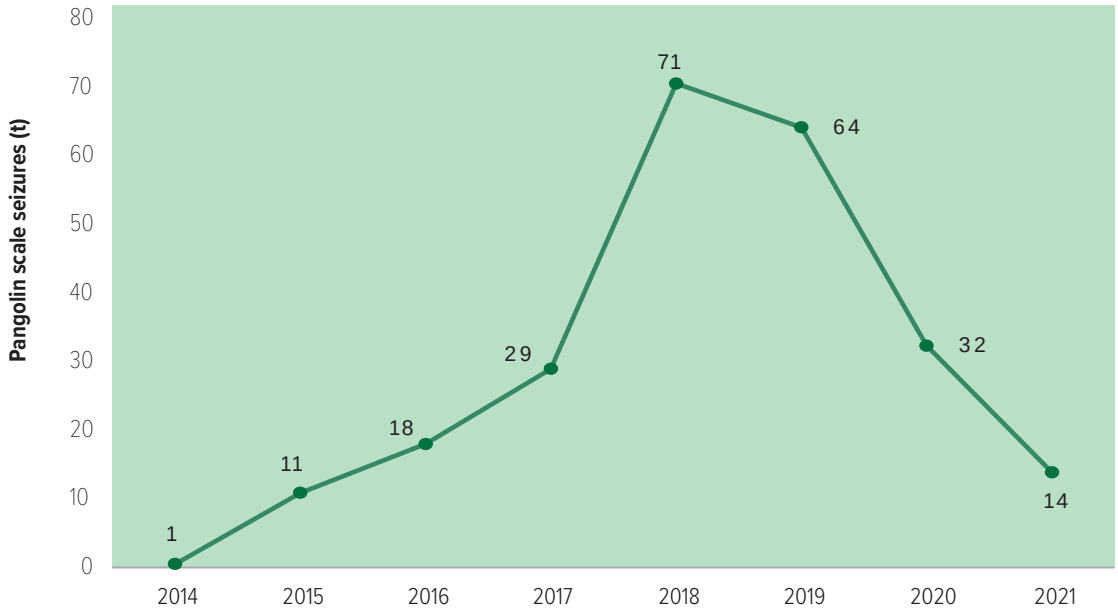
Source: CITES Illegal Trade Database and World WISE (WWCR3 analytical dataset)

FIG. CS6.4 Largest single pangolin scale seizures (kg) on record 2007–2021



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

FIG. CS6.5 Pangolin scale seizures (t) seized by Nigeria or where Nigeria was reported as the country of shipment 2014–2021



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

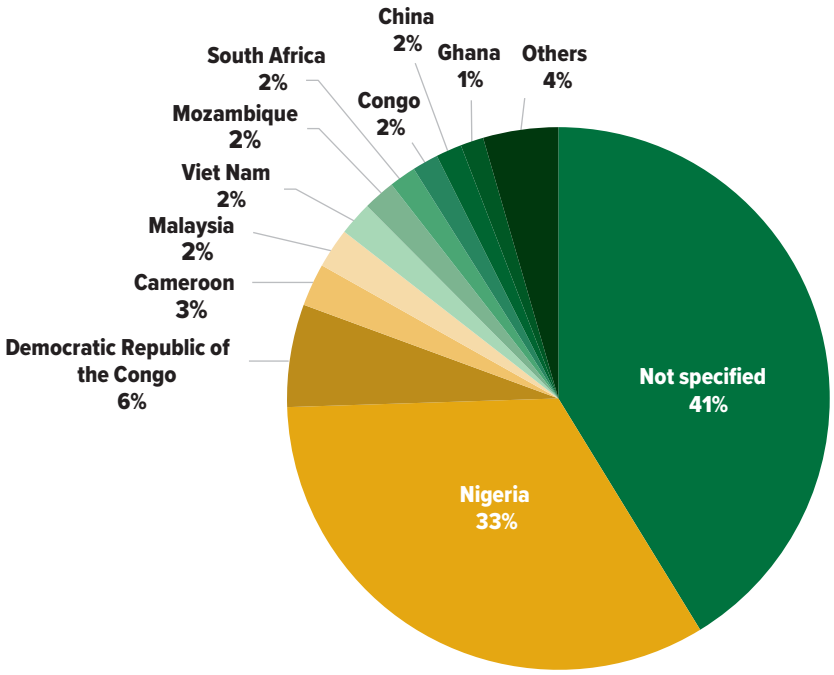
Management Authority of the Democratic Republic of the Congo estimated that there were some 22 tons of scales in private hands in their country in 2017.[35]

A recent evaluation of pangolin scale seizures associated with Nigeria analysed 77 seizures totaling over 190 tons made between January 2010 and December 2021.[36] Samples taken from 67 sacks of pangolin scales seized by the Nigerian authorities were analysed to identify the share represented by different species in these loads. It found that 90 per cent came from white-bellied pangolins. On this basis, the researchers were able to estimate that at least 799,300 pangolins were represented by these seizures alone.

Based on analysis of the WWCR3 analytical dataset, in 2018 and 2019 more than 130 tons of pangolin scales were seized in shipments emanating from Nigeria (Figure CS6.5). Although in two-fifths of cases, the country of departure was not reported in seizures, in those cases where it was, more than 60 per cent were shipped from Nigeria between 2015–2021 (Figure CS6.6). Not all the scales came from pangolins captured in Nigeria. UNODC interviews with poachers in 2018 indicated that pangolins sourced from Cameroon, the Democratic Republic of the Congo, Uganda, and possibly other countries were exported through Nigeria.[37]

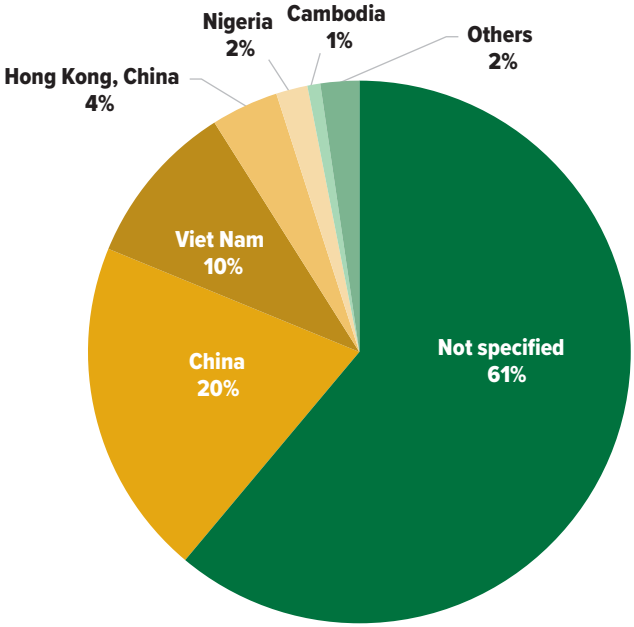
Although in three-fifths of records the destination was not reported, in those cases where it was, the largest proportion of pangolin scale shipment seizures during 2015–2021 were headed for mainland China and Hong Kong, China (Figure CS6.7). Analysis of detailed records in the WWCR3 analytical dataset indicates that since 2019 Viet Nam has emerged as a secondary destination. Other destinations reported for seizure shipments included Nigeria and locations in South-East Asia. Nigeria is presumably cited as both a source and destination because the destination of a shipment may be different from the final destination of the product. An academic study of seizures made in China between 2008–2016 identified the border between Viet Nam and southern China as a key transit point for the illicit pangolin trade.[38]

FIG. CS6.6 Pangolin scale seizures (kg) by country of departure of shipment 2007–2021



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

FIG. CS6.7 Pangolin scale seizures (kg) by country or territory of destination of shipment 2007–2021



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

End markets

It is challenging to understand if the large increases in pangolin scale seizures up to 2019 and sudden decreases in seizures in 2020 and 2021, are linked to changes in demand. This is a well-established market, since pangolin scales have been mentioned in the traditional Chinese medicine (TCM) pharmacopeia as a treatment for a wide range of conditions since at least the 5th Century.[39] They are also used in traditional medicine in Viet Nam,[40] as well as in parts of Africa.[41] There may be a range of different influences on demand trends. On the one side, there has been a sustained effort to promote traditional Chinese medicine internationally since at least 1996,[42] on the other side, China removed pangolin scales from the official TCM pharmacopoeia in 2020.[43]

The overall scale of demand in the primary destination markets has not been systematically assessed. Consumer research conducted in Viet Nam in 2018 suggested that around 4 per cent of the adult urban population of one large city consumed pangolin scales annually.[44] However, given the wide variety of conditions for which scales are consumed, dose and duration of treatment are likely to vary, and therefore the potential market is difficult to estimate.

Government and privately held pangolin scale stocks in end market countries have been reported in response to past CITES enquiries, but current volumes are unknown.[45]

Implications

There is some complexity in interpreting pangolin scale market trends overall. As explained in the *World Wildlife Crime Report 2020*, for most of the period when scales from some pangolin species could be legally traded with CITES Appendix II permits (1995–2017), reported legal trade in scales was minimal. It was only immediately before the Appendix I listing was adopted in 2016 and came into force in 2017 that reports of legal international scale trade increased. Even then, the total volumes permitted were significantly smaller than those appearing in seizures at the same time.[46] More recently, seizure volumes peaked in 2019, but it is not yet clear to what extent the subsequent decline in 2020 and 2021 was in some way linked to the COVID-19 pandemic.

There could be a combination of factors explaining recent market developments. One relates to interdiction, with the listing in 2017 possibly increasing the capacity and priority of law enforcement to interdict pangolin scales and a sudden change of this capacity during the COVID-19 pandemic. It is also possible that the trend reflects uneven flow in the trade chain, with stocks accumulating in source countries as possibilities for legal export closed, but then being exported illegally when necessary illicit business connections had been established. Increasing shipment sizes indicated through seizures could reflect such a reorganization of trade linkages.

Equally difficult is to predict what is likely to happen next with this market. Unlike the largely closed end markets for ivory or rhinoceros horn, for example, some legal end uses of pangolin scales continue. Given the CITES Appendix I listing of all pangolin species makes it unlikely that legal supply from wild populations will resume in the foreseeable future and commercial breeding is not currently viable,[47] such end uses can only be supplied by previously imported stocks. While demand for pangolin scales continues and legal outlets remain open, a critical priority in efforts to deter trafficking will be measures to prevent laundering of new illegal supply into legal stocks in end markets.[48] Such measures might include stock inventories, usage reporting and regular inspection. If laundering is not prevented, incentives for trafficking will persist.

Endnotes

1 Daniel W. S. Challender, Helen C. Nash, and Carly Waterman, *Pangolins: Science, Society and Conservation* (Academic Press, 2019), https://www.sciencedirect.com/book/9780128155073/pangolins.

2 For a history of CITES listings for pangolins see for example: 'Species+', accessed 17 April 2024, https://www.speciesplus.net/species#/taxon_concepts/9849/legal.

3 CITES Appendix I includes species threatened with extinction. Commercial trade in specimens of these species is permitted only in exceptional circumstances.

4 UNODC, *World Wildlife Crime Report 2020* (Vienna: United Nations publications, 2020).

5 Daniel W. S. Challender *et al.*, 'International Trade and Trafficking in Pangolins, 1900–2019', in *Pangolins* (Elsevier, 2020), 259–276, https://doi.org/10.1016/B978-0-12-815507-3.00016-2. Also during 2015–2021 only small numbers of skins appear in seizures in the WWCR3 analytical dataset.

6 Linh Bao Nguyen *et al.*, 'Understanding Consumer Demand for Bushmeat in Urban Centers of Cameroon with a Focus on Pangolin Species', *Conservation Science and Practice 3*, no. 6 (June 2021), https://doi.org/10.1111/csp2.419.

7 Stanislas Zanvo *et al.*, 'Ethnozoological and Commercial Drivers of the Pangolin Trade in Benin', *Journal of Ethnobiology and Ethnomedicine 17*, no. 1 (December 2021): 18, https://doi.org/10.1186/s13002-021-00446-z.

8 Markéta Swiacká *et al.*, 'Perceptions and Uses of Pangolins (Pholidota) among Remote Rural Communities in the Republic of the Congo: A Baseline Study from the Odzala-Kokoua National Park', *Conservation Science and Practice 4*, no. 12 (December 2022), https://doi.org/10.1111/csp2.12839.

9 Daniel J. Ingram, Ian B. Edwards, and Agnieszka Kedzierska Manzon, 'Of Meat and Ritual: Consumptive and Religious Uses of Pangolins in Mali', *African Journal of Ecology 60*, no. 2 (June 2022): 184–92, https://doi.org/10.1111/aje.12945.

10 Alegria Olmedo *et al.*, 'Uncovering Prevalence of Pangolin Consumption Using a Technique for Investigating Sensitive Behaviour', *Oryx 56*, no. 3 (May 2022): 412–420, https://doi.org/10.1017/S0030605320001040.

11 Challender, Nash, and Waterman, *Pangolins: Science, Society and Conservation*.

12 According to the International Union for the Conservation of Nature (IUCN) Red List entry on the white-bellied pangolin, "There are few quantitative data on populations at any level i.e. local, national or global." On the black-bellied pangolin, IUCN says "There are no formal quantitative data available on densities or abundance." On the giant ground pangolin, IUCN says "there is no reliable information on population abundance or densities." On Temminck's pangolin, the IUCN says "South Africa is estimated to have 16,329–24,102 mature individuals (Pietersen *et al.* 2016) but abundances in other regions of Africa are unknown." On the Indian pangolin, IUCN says "There is very limited information or data on population of this species at any level, and generally there is a lack of research on abundance." The remaining three species are all considered Critically Endangered. See also CITES, 'CoP19 Inf. 39' (CoP 19, Panama City, 2022), https://cites.org/sites/default/files/documents/E-CoP19-Inf-39.pdf.

13 Gabriel Hoinsoudé Segniagbeto *et al.*, 'Insights into the Status and Distribution of Pangolins in Togo (West Africa)', *African Journal of Ecology 59*, no. 2 (June 2021): 342–49, https://doi.org/10.1111/aje.12809.

14 Rajan Amin *et al.*, 'Giant Pangolin and White-Bellied Pangolin Observations from a World Heritage Site', *Mammalia 87*, no. 2 (28 March 2023): 91–100, https://doi.org/10.1515/mammalia-2021-0173.

15 Daniel J. Ingram *et al.*, 'Assessing Africa-Wide Pangolin Exploitation by Scaling Local Data: Assessing African Pangolin Exploitation', *Conservation Letters 11*, no. 2 (March 2018): e12389, https://doi.org/10.1111/conl.12389.

16 Daniel W. S. Challender and Carly Waterman, 'Implementation of CITES Decisions 17.239 b) and 17.240 on Pangolins (*Manis* Spp.) CITES SC69 Doc57A' (IUCN, September 2017), https://cites.org/sites/default/files/eng/com/sc/69/E-SC69-57-A.pdf.

17 UNODC, 'CITES CoP18 Doc. 34, Annex 4' (CITES Conference of the Parties 18, Geneva, 2019), https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-034.pdf.

18 Franklin T. Simo *et al.*, 'Pangolin Hunting and Trafficking in the Forest–Savannah Transition Area of Cameroon', *Oryx 57*, no. 6 (November 2023): 704–13, https://doi.org/10.1017/S0030605322001429.

19 Durojaye A. Soewu and Olufemi A. Sodeinde, 'Utilization of Pangolins in Africa: Fuelling Factors, Diversity of Uses and Sustainability', *International Journal of Biodiversity and Conservation 7*, no. 1 (2015): 1–10.

20 See UNODC, *World Wildlife Crime Report 2020*.

21 UNODC, 'West and Central Africa Wildlife Crime Threat Assessment' (Geneva, Switzerland: CITES Secretariat, 2019), https://cites.org/sites/default/files/eng/prog/enforcement/E-CoP18-034-Threat-Assessment.pdf.

22 UNODC, *World Wildlife Crime Report 2020*.

23 NY1, GY1.

24 GY1, GY2.

25 GY1, AY2.

26 Jessica Harvey-Carroll *et al.*, 'Continued Availability and Sale of Pangolins in a Major Urban Bushmeat Market in Cameroon despite National Bans and the COVID-19 Outbreak', *African Journal of Ecology 60*, no. 2 (June 2022): 146–152, https://doi.org/10.1111/aje.12969.

27 Dickarmien Deemie, Richard A. Nisbett, and Reginald A. Hoyt, 'Liberian Pangolins during the COVID-19 Pandemic: Market Surveys for Live Animals, Bushmeat and Scales', *Oryx 55*, no. 6 (November 2021): 815–16, https://doi.org/10.1017/S0030605321001186.

28 In 1975, the Asian species (*M. pentadactyla, M. javanica* and *M. crassicaudata*) were listed in Appendix II and the Southern African species (*M. temminckii*) in Appendix I. In 1994, *M. temminckii* was transferred from Appendix I to Appendix II, and all remaining African species were included in Appendix II. Despite this listing, very little legal trade was seen in pangolin products relative to the detected illegal trade. In 2000, the Asian species (*M. pentadactyla, M. javanica* and *M. crassicaudata*) were proposed for transfer to Appendix I. However, the proposal was not accepted because the species were at that time still under the CITES Review of Significant Trade process. Instead, the CITES Parties adopted zero export quotas for wild-caught Asian pangolins traded for primarily commercial purposes. African pangolins were not subject to the zero quota but the species were protected in many of their range States and various significant trade recommendations to halt exports were adopted. In 2016, all pangolins were transferred to CITES Appendix I (came into force in January 2017), source: Species+ (speciesplus.net).

29 Vikram Aditya *et al.*, 'Scale of the Issue: Mapping the Impact of the COVID-19 Lockdown on Pangolin Trade across India', *Biological Conservation 257* (May 2021): 109136, https://doi.org/10.1016/j.biocon.2021.109136.

30 Challender *et al.*, 'International Trade and Trafficking in Pangolins, 1900–2019'.

31 As early as 1994, Brautigam *et al.* warned, "as Asian species become more scarce, traders may be turning to African species to satisfy the Asian market." A. Brautigam *et al.*, 'Recent Information on the Status and Utilisation of African Pangolins', *TRAFFIC Bulletin 15*, no. 1 (1994): 15–22.

32 Daniel Challender and Lisa Hywood, 'African Pangolins under Increased Pressure from Poaching and Intercontinental Trade.', *TRAFFIC Bulletin 24*, no. 2 (2012): 53–55.

33 For example, see Environmental Investigation Agency (EIA), 'The Shuidong Connection: Exposing the Global Hub of the Illegal Ivory Trade.', Technical Report, 2017. Also see Hendelene Prinsloo and Luciana Capdepon, 'Scaling up: The Rapid Growth in the Industrial Scale Trafficking of Pangolin Scales 2016-2019' (The Hague, Netherlands: Wildlife Justice Commission, February 2020).

34 IUCN, 'Implementation of CITES Decision 18.240 Paragraph c) on Pangolins (*Manis* Spp.)' (CITES Secretariat, December 2021), https://cites.org/sites/default/files/eng/com/sc/74/E-SC74-73-A2.pdf.

35 CITES, 'SC69 Inf. 15', December 2017.

36 Charles A. Emogor *et al.*, 'The Scale of Nigeria's Involvement in the Trans-National Illegal Pangolin Trade: Temporal and Spatial Patterns and the Effectiveness of Wildlife Trade Regulations', *Biological Conservation 264* (December 2021): 109365, https://doi.org/10.1016/j.biocon.2021.109365.

37 UNODC, 'CITES CoP18 Doc. 34, Annex 4'.

38 Wenda Cheng, Shuang Xing, and Timothy C. Bonebrake, 'Recent Pangolin Seizures in China Reveal Priority Areas for Intervention', *Conservation Letters 10,* no. 6 (November 2017): 757–64, https://doi.org/10.1111/conl.12339.

39 Yifu Wang, Samuel T. Turvey, and Nigel Leader-Williams, 'Knowledge and Attitudes about the Use of Pangolin Scale Products in Traditional Chinese Medicine (TCM) within China', ed. Maricela de la Torre-Castro, *People and Nature 2,* no. 4 (December 2020): 903–12, https://doi.org/10.1002/pan3.10150.

40 Rebecca Sexton, Trang Nguyen, and David L. Roberts, 'The Use and Prescription of Pangolin in Traditional Vietnamese Medicine', *Tropical Conservation Science 14* (January 2021): 194008292098575, https://doi.org/10.1177/1940082920985755.

41 Swiacká *et al.*, 'Perceptions and Uses of Pangolins (Pholidota) among Remote Rural Communities in the Republic of the Congo'.

42 Annie Xianghong Lin *et al.*, 'Internationalization of Traditional Chinese Medicine: Current International Market, Internationalization Challenges and Prospective Suggestions', *Chinese Medicine 13*, no. 9 (December 2018), https://doi.org/10.1186/s13020-018-0167-z.

43 Zhuang Pinghui, 'Pangolins Removed from Chinese Directory of Medicines', *South China Morning Post*, 10 June 2020, https://www.scmp.com/news/china/society/article/3088470/pangolins-removed-chinese-directory-medicines. But see Environmental Investigation Agency (EIA), 'Smoke and Mirrors: China's Complicity in the Global Illegal Pangolin Trade' (London: EIA, October 2020), https://eia-international.org/wp-content/uploads/EIA-Smoke-and-Mirrors-2020-FINAL.pdf.

44 Olmedo *et al.*, 'Uncovering Prevalence of Pangolin Consumption Using a Technique for Investigating Sensitive Behaviour'.

45 CITES Secretariat, 'Pangolins (*Manis* Spp.): Report of the Secretariat CITES SC74 Doc 73' (Geneva, Switzerland: CITES Secretariat, March 2022), https://cites.org/sites/default/files/eng/com/sc/74/E-SC74-73.pdf.

46 UNODC, *World Wildlife Crime Report 2020.*

47 Daniel W. S. Challender *et al.*, 'Evaluating the Feasibility of Pangolin Farming and Its Potential Conservation Impact', *Global Ecology and Conservation 20* (1 October 2019): e00714, https://doi.org/10.1016/j.gecco.2019.e00714.

48 CITES Decision 19.202 encourages Parties in whose territories stocks of parts and derivatives of pangolins exist to take urgent steps to establish and apply, where not yet done, strict control measures to secure these stocks, as called for in paragraph 3 of Resolution Conf. 17.10 (Rev. CoP19) on Conservation of and trade in pangolins and report on the implementation of this Decision to the Secretariat.

Annex

Details of Interviews Conducted

Code	Occupation/Background	Country/Region	Date
Indonesia prisoner interviews			
BAN-001-L	Prisoner	Indonesia	2022
BAN-002-L	Prisoner	Indonesia	2022
BAN-003-L	Prisoner	Indonesia	2022
KAL-001-L	Prisoner	Indonesia	2022
KAL-002-L	Prisoner	Indonesia	2022
SUK-001-L	Prisoner	Indonesia	2022
SUK-002-L	Prisoner	Indonesia	2022
SUK-003-L	Prisoner	Indonesia	2022
KAL-003-L	Prisoner	Indonesia	2022
KAL-004-L	Prisoner	Indonesia	2022
KAL-005-L	Prisoner	Indonesia	2022
KAL-006-L	Prisoner	Indonesia	2022
KAL-007-L	Prisoner	Indonesia	2022
KAL-008-L	Prisoner	Indonesia	2022
KAL-009-L	Prisoner	Indonesia	2022
KAL-010-L	Prisoner	Indonesia	2022
KAL-011-L	Prisoner	Indonesia	2022
SAL-001-J	Prisoner	Indonesia	2022
SER-001-B	Prisoner	Indonesia	2022
SER-002-B	Prisoner	Indonesia	2022
SER-003-B	Prisoner	Indonesia	2022
PEK-001-R	Prisoner	Indonesia	2022
PEP-001-R	Prisoner	Indonesia	2022
PEK-002-R	Prisoner	Indonesia	2022
PEK-003-R	Prisoner	Indonesia	2022
PEK-004-R	Prisoner	Indonesia	2022
PEK-005-R	Prisoner	Indonesia	2022
REG-001-R	Prisoner	Indonesia	2022
REG-002-R	Prisoner	Indonesia	2022
REG-003-R	Prisoner	Indonesia	2022
REG-004-R	Prisoner	Indonesia	2022
CAL-001-A	Prisoner	Indonesia	2023

Code	Occupation/Background	Country/Region	Date
CAL-002-A	Prisoner	Indonesia	2023
JAN-001-A	Prisoner	Indonesia	2023
JAN-002-A	Prisoner	Indonesia	2023
JAN-003-A	Prisoner	Indonesia	2023
BLP-001-A	Prisoner	Indonesia	2023
BLP-002-A	Prisoner	Indonesia	2023
KCN-001-A	Prisoner	Indonesia	2023
KCN-002-A	Prisoner	Indonesia	2023
BME-001-A	Prisoner	Indonesia	2023
BME-002-A	Prisoner	Indonesia	2023
BME-003-A	Prisoner	Indonesia	2023
BME-004-A	Prisoner	Indonesia	2023
BME-005-A	Prisoner	Indonesia	2023
BME-006-A	Prisoner	Indonesia	2023
IRA-001-A	Prisoner	Indonesia	2023
IRA-002-A	Prisoner	Indonesia	2023
IRA-003-A	Prisoner	Indonesia	2023
IRA-004-A	Prisoner	Indonesia	2023
IRA-005-A	Prisoner	Indonesia	2023
IRA-006-A	Prisoner	Indonesia	2023
IRA-007-A	Prisoner	Indonesia	2023
MDN-001-M	Prisoner	Indonesia	2023
KBJ-001-M	Prisoner	Indonesia	2023
KBJ-002-M	Prisoner	Indonesia	2023
LPM-001-M	Prisoner	Indonesia	2023
LPM-002-M	Prisoner	Indonesia	2023
LPM-003-M	Prisoner	Indonesia	2023
LBD-001-M	Prisoner	Indonesia	2023
LBD-002-M	Prisoner	Indonesia	2023
Orchids research			
AC1	Academic	Europe	Nov 2022-Jan 2023
AC2	Academic	South America	Nov 2022-Jan 2023
AC3	Academic	Europe	Nov 2022-Jan 2023
AC4	Academic	Europe	Nov 2022-Jan 2023
BO1	Botanist	Asia	Nov 2022-Jan 2023
BO2	Botanist	Asia	Nov 2022-Jan 2023
BO3	Botanist	Europe	Nov 2022-Jan 2023
BO4	Botanist	South America	Nov 2022-Jan 2023
TR1	Owners of an orchid nursery	Europe	Nov 2022-Jan 2023

Code	Occupation/Background	Country/Region	Date
TR2	Orchid breeder and vendor	Europe	Nov 2022-Jan 2023
CTS1	Government	Europe	Nov 2022-Jan 2023
CTS2	Government	Europe	Nov 2022-Jan 2023
CTS3	Government	Europe	Nov 2022-Jan 2023
CTS4	Government	Europe	Nov 2022-Jan 2023
HOB1	Hobbyist and orchid show organizer	Europe	Nov 2022-Jan 2023
EN1	Customs officer	Europe	Nov 2022-Jan 2023
Pangolin and ivory research			
NY1	Trader	Nigeria border areas	Jun 2021
GY1	Traders	Nigeria border areas	Jun 2021
AY1	Trader	Nigeria border areas	Jun 2021
AY2	Traders	Nigeria border areas	Jun 2021
NY2	Traders	Nigeria border areas	Jun 2021
GY2	Traders	Nigeria	Jun 2021
HM1	Trader	Nigeria	Jun 2021
Seahorses research			
C1	Local buyers	Peru	2022
C2	Local buyers	Peru	2022
C3	Local buyers	Peru	2022
C4	Local buyers	Peru	2022
C5	Local buyers	Peru	2022
F1	Fishers	Peru	2022
F2	Fishers	Peru	2022
F3	Fishers	Peru	2022
F4	Fishers	Peru	2022
F5	Fishers	Peru	2022
F6	Fishers	Peru	2022
F7	Fishers	Peru	2022
F8	Fishers	Peru	2022
F9	Fishers	Peru	2022
F10	Fishers	Peru	2022
F11	Fishers	Peru	2022
F12	Fishers	Peru	2022
F13	Fishers	Peru	2022
F14	Fishers	Peru	2022
F15	Fishers	Peru	2022
F16	Fishers	Peru	2022
F17	Fishers	Peru	2022
F18	Fishers	Peru	2022

Code	Occupation/Background	Country/Region	Date
F19	Fishers	Peru	2022
F20	Fishers	Peru	2022
F21	Fishers	Peru	2022
F22	Fishers	Peru	2022
Rosewood research			
DF1	Forest drivers	Nigeria	2022
DF2			
DF3			
DF4			
CL1	Community leaders	Nigeria	2022
CL2			
CL3			
SM1	Sawmill manager	Nigeria	2022
SM2			
SM3			
SM4			
SM5			
DP1	Depot manager	Nigeria	2022
DS1	Driver to Sagamu	Nigeria	2022
DS2			
DS3			
DS4			
AG1	Agents	Nigeria	2022
AG2			
AG3			
AG4			
AG5			
AG6			
AG7			
TR1	Trader	Nigeria	2022
TR2			
CA1	Carpenter	Nigeria	2022
CO1	Chainsaw operators	Nigeria	2022
CH1	Insider from Asia	Nigeria	2022
FCO1	Forestry checkpoint officer	Nigeria	2022
FO1	Former forest officer Taraba	Nigeria	2022
NCS1	Onne Port Customs	Nigeria	2022
GC1	Loaders	Nigeria	2022
CAG1	Clearance agent	Nigeria	2022

Code	Occupation/Background	Country/Region	Date
CSV1	Supervisor from Asia	Nigeria	2022
LM1	Logging manager/extractor	Nigeria	2022
PL1	PROWPMAN leader (https://prowpman.com/main/home)	Nigeria	2022
PL2	PROWPMAN leaders (https://prowpman.com/main/home)	Nigeria	2022
FDF1	Wildlife and CITES management unit	Nigeria	2022
NPA1	National Ports Authority	Nigeria	2022
TME1	Taraba State Ministry of Environment & Solid Minerals	Nigeria	2022
Latin America field research			
I27	Biologist	Colombia	2023
I28	Government	Colombia	2023
I55	Government	Colombia	2023
I29	Intelligence officer	Colombia	2023
I30	Officer	Colombia	2023
I31	Government	Colombia	2023
I32	Non-governmental organization (NGO)	Colombia	2023
I33	Environmental Engineer	Colombia	2023
I34	NGO	Colombia	2023
I35	Engineer	Colombia	2023
I36	Government	Colombia	2023
I37	Government	Colombia	2023
I38	NGO	Colombia	2023
I39	Biologist	Colombia	2023
I40	Biologist	Colombia	2023
I54	Biologist	Colombia	2023
I41	NGO	Colombia	2023
I42	Police Authority	Colombia	2023
I43	Academia	Colombia	2023
I44	Lawyer	Colombia	2023
I45	Prosecutor	Colombia	2023
I18	Gender specialist	Ecuador	2023
I19	Land defender	Ecuador	2023
I20	Indigenous Authority	Ecuador	2023
I60	Director of Association for Indigenous Women	Ecuador	2023
I21	Government	Ecuador	2023
I22	Prosecutor	Ecuador	2023

Code	Occupation/Background	Country/Region	Date
I23	Government	Ecuador	2023
I24	Engineer	Ecuador	2023
I61	Environmental specialist	Ecuador	2023
I25	Ranger	Ecuador	2023
I26	Previous high level government official	Ecuador	2023
I46	Wildlife and conservation specialist	Ecuador	2023
I47	Veterinarian	Ecuador	2023
I48	Indigenous Authority	Ecuador	2023
I49	Land defender	Ecuador	2023
I50	Director of rescue centre (Accepting Seized Wildlife)	Ecuador	2023
I9	Indigenous Authority	Ecuador	2023
I57	Indigenous Authority	Ecuador	2023
I58	Indigenous Authority	Ecuador	2023
I12	Prosecutor	Ecuador	2023
I13	Indigenous Authority	Ecuador	2023
I14	Prosecutor	Ecuador	2023
I15	Indigenous Authority	Ecuador	2023
I59	Indigenous Authority	Ecuador	2023
I17	NGO	Ecuador	2023
I1	Indigenous Authority	Peru	2023
I2	Indigenous Authority	Peru	2023
I3	Government	Peru	2023
I4	Journalist	Peru	2023
I5	Owner of rescue center (Accepting Seized Wildlife)	Peru	2023
I55	Educator, rescue center (Accepting Seized Wildlife)	Peru	2023
I56	Educator, rescue center (Accepting Seized Wildlife)	Peru	2023
I6	Field scientist	Peru	2023
I7	Field analyst	Peru	2023
I8	Consultant, previously government employee	Peru	2023
I10	Owner of rescue center (Accepting Seized Wildlife)	Peru	2023
I11	Specialist in biodiversity wildlife	Peru	2023
I16	Journal consultant	Peru	2023
I51	National police	Peru	2023

Code	Occupation/Background	Country/Region	Date
I52	Biologist	Peru	2023
I53	Biologist	Peru	2023
S54	Seller	Colombia	2023
S55	Seller	Colombia	2023
S56	Seller	Colombia	2023
S57	Seller	Colombia	2023
S58	Seller	Colombia	2023
S59	Seller	Colombia	2023
S60	Seller	Colombia	2023
S61	Seller	Colombia	2023
S39	Seller	Ecuador	2023
S44	Seller	Ecuador	2023
S51	Seller	Ecuador	2023
S52	Seller	Ecuador	2023
S66	Seller	Ecuador	2023
S1	Seller	Peru	2023
S10	Seller	Peru	2023
S101	Seller	Peru	2023
S102	Seller	Peru	2023
S103	Seller	Peru	2023
S100	Seller	Peru	2023
S11	Seller	Peru	2023
S12	Seller	Peru	2023
S13	Seller	Peru	2023
S14	Seller	Peru	2023
S15	Seller	Peru	2023
S16	Seller	Peru	2023
S17	Seller	Peru	2023
S18	Seller	Peru	2023
S19	Seller	Peru	2023
S2	Seller	Peru	2023
S20	Seller	Peru	2023
S21	Seller	Peru	2023
S22	Seller	Peru	2023
S23	Seller	Peru	2023
S24	Seller	Peru	2023
S25	Seller	Peru	2023
S26	Seller	Peru	2023
S27	Seller	Peru	2023

Code	Occupation/Background	Country/Region	Date
S28	Seller	Peru	2023
S29	Seller	Peru	2023
S3	Seller	Peru	2023
S30	Seller	Peru	2023
S31	Seller	Peru	2023
S32	Seller	Peru	2023
S33	Seller	Peru	2023
S34	Seller	Peru	2023
S35	Seller	Peru	2023
S36	Seller	Peru	2023
S37	Seller	Peru	2023
S38	Seller	Peru	2023
S4	Seller	Peru	2023
S40	Seller	Peru	2023
S41	Seller	Peru	2023
S42	Seller	Peru	2023
S43	Seller	Peru	2023
S45	Seller	Peru	2023
S46	Seller	Peru	2023
S47	Seller	Peru	2023
S48	Seller	Peru	2023
S49	Seller	Peru	2023
S5	Seller	Peru	2023
S50	Seller	Peru	2023
S6	Seller	Peru	2023
S62	Seller	Peru	2023
S63	Seller	Peru	2023
S64	Seller	Peru	2023
S65	Seller	Peru	2023
S67	Seller	Peru	2023
S68	Seller	Peru	2023
S69	Seller	Peru	2023
S7	Seller	Peru	2023
S70	Seller	Peru	2023
S71	Seller	Peru	2023
S72	Seller	Peru	2023
S73	Seller	Peru	2023
S74	Seller	Peru	2023
S75	Seller	Peru	2023

Code	Occupation/Background	Country/Region	Date
S76	Seller	Peru	2023
S77	Seller	Peru	2023
S78	Seller	Peru	2023
S79	Seller	Peru	2023
S8	Seller	Peru	2023
S80	Seller	Peru	2023
S81	Seller	Peru	2023
S82	Seller	Peru	2023
S83	Seller	Peru	2023
S84	Seller	Peru	2023
S85	Seller	Peru	2023
S86	Seller	Peru	2023
S87	Seller	Peru	2023
S88	Seller	Peru	2023
S89	Seller	Peru	2023
S9	Seller	Peru	2023
S90	Seller	Peru	2023
S91	Seller	Peru	2023
S92	Seller	Peru	2023
S93	Seller	Peru	2023
S94	Seller	Peru	2023
S95	Seller	Peru	2023
S96	Seller	Peru	2023
S97	Seller	Peru	2023
S98	Seller	Peru	2023
S99	Seller	Peru	2023

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This third edition of the *World Wildlife Crime Report* probes recent trends in the illicit trafficking of protected species of wild fauna and flora and provides a broad assessment of current knowledge about the causes and implications of associated crime at a global level.

As with the first two editions, published in 2016 and 2020 respectively, research carried out for this report included quantitative market assessment and a series of in-depth case studies. The findings inform an overview of recent characteristics and trends in global wildlife crime and provide insights into the dynamics of how it is affecting selected wildlife species. Additional emphasis for this edition is on systematic analysis of wildlife crime harms and impacts, factors driving crime trends, and the evidence for what remedial interventions work best.

The report was prepared in response to the United Nations General Assembly Resolution on Tackling Illegal Trafficking in Wildlife adopted in 2021. This resolution requested the United Nations Office on Drugs and Crime (UNODC), in close cooperation and in collaboration with Member States, to continue and strengthen the collection of information on patterns and flows of illicit trafficking in wildlife.

With the support of
The International Consortium on Combating Wildlife Crime (ICCWC)

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