

1 **Illegal wildlife trade and other organised crime: A scoping review**

3 **Abstract**

4 The global illegal wildlife trade has been anecdotally linked to other serious crimes, such as
5 fraud, corruption, and money laundering, as well as the cross-border trafficking of drugs, arms,
6 counterfeit goods, and persons. As research on this topic is scarce and sporadic, we conducted a
7 scoping literature review to gather information across multiple disciplines and evidence types on
8 crime convergences in the illegal wildlife trade. We reviewed 150 papers published between
9 2000 and 2020. We found that the illegal trade in many of the most frequently trafficked species
10 have reportedly converged with numerous other serious and organised crimes, most commonly
11 drug trafficking. Convergences can occur in a variety of ways, although the diversification of
12 organised crime groups, parallel trafficking of contraband, and use of enabling crimes (such as
13 corruption and violence) were the most frequently described. Possible explanations for our
14 results and future research directions are discussed.

16 **Key Words:** Conservation, Corruption, Crime Convergence, Environmental Crime, Organised
17 Crime, Wildlife Trafficking

Introduction

Transnational organised crime is recognized as an escalating issue within the global conservation community, with criminal networks expanding their reach to all corners of the world and becoming increasingly difficult to eradicate (Rabasa et al. 2017). The illegal wildlife trade is one of the most lucrative global criminal enterprises (Nellemann 2016). Given the difficulties associated with measuring criminal activity, particularly wildlife crime, there is no certainty regarding the true scale and value of illegal wildlife trade (‘t Sas-Rolfes et al. 2019). Although it is difficult to accurately measure the scale and value of wildlife that is traded illegally, the consequences of the trade are extensive (Picard 2013). The ongoing looting of wildlife to supply illicit supply chains is contributing to the deterioration of the environment and the destruction of endangered habitats, the erosion of good governance and losses in biodiversity, and can harm livelihoods, public health, animal welfare, and global industries that rely on healthy environments (Wyatt 2013). In addition, current responses to counter illegal wildlife trade may be insufficient, and may even have perverse effects that exacerbate criminal activity (Picard 2013; Anagnostou 2021). As a result, populations of various species have declined significantly, some even to extinction (e.g. Tella and Hiraldo 2014; McClenachan et al. 2016). Modern wildlife contraband may include live pets, trophies, jewelry and fashion accessories, cultural artifacts, traditional medicine, and wild protein for human consumption. Some of the taxa most commonly included in discussions about illegal wildlife trade include elephants, rhinoceroses (henceforth referred to as “rhinos”), pangolins, bears, big cats, birds, great apes, turtles and tortoises, and eels, among many others (UNODC 2020).

The United Nations Security Council has established that there is a growing convergence of criminal activity and illicit markets (de Boer and Bosetti 2015). Scholars have recently begun to provide a theoretical framework to explain crime convergences in environmental crimes (van Uhm and Nijman 2020, Moreto and van Uhm 2021, van Uhm et al. 2021, Anagnostou 2021). Convergences may range from the occasional involvement of organised crime groups in environmental crimes, to their complete domination over environmental crimes (van Uhm and Nijman 2020). As one specific type of environmental crime, illegal wildlife trade has been anecdotally linked to other serious crimes, and the cross-border trafficking of other illicit commodities (Felbab-Brown 2018; OECD 2018; Nellemann 2018). Importantly, while not all illegal wildlife trade is highly organised, little is known or agreed upon regarding how much of illegal wildlife trade can in fact be characterised as transnational organised crime (Anagnostou 2021). Though the illegal wildlife trade presents a major challenge to conservationists and environmentalists aiming to protect biodiversity, applying interdisciplinary research and incorporating theory and concepts from crime science and criminology is essential to better understand the nature of this illegal industry and how best to stop it. However, research on this topic is extremely limited and few studies have assessed what species in illegal wildlife trade converge with which other serious and organised crimes, which species are trafficked by transnational organised crime groups, and where convergences are occurring globally. As an initial step towards piecing together these linkages, we conducted a scoping review to gather information on crime convergences in the illegal trade of wildlife from multiple disciplines and evidence types. The scope of the present study is limited to wild fauna, including terrestrial and aquatic vertebrates and invertebrates.

Methods

Data Collection

We searched online resources for English language publications published between December 2000 to January 2020. This ensured that long-term trends could be uncovered and the evolution of the concept of convergence could be traced. December 2000 was chosen as our start date as this was the year that the United Nations General Assembly adopted the Palermo Convention, or the United Nations Convention against Transnational Organized Crime (UNTOC), which currently has 190 States Parties. While wildlife trafficking is not the key focus of the convention, Palermo was a turning point for understanding transnational organised crime as it produced definitions of relevant terms such as “trafficking,” “confiscation,” and “organised crime.” It also provided validation that transnational organised crime is an urgent issue that requires global cooperation.

Search Strategy

We identified peer-reviewed papers using 6 online databases including Web of Knowledge (n=69), Scopus (n=119), Google Scholar (n=624), ProQuest (n=73), Dow Jones Factiva (n=93), and Nexis Uni (n=90). We also identified additional grey literature reports from websites for 57 of the main international organizations and coalitions related to wildlife trafficking control and monitoring (Table 1). We included organizations that focus on understanding and combatting general transnational organised crime.

89 **Table 1. List of relevant organisations searched for grey literature publications.**

- | | |
|---|--|
| 1. ADM Capital Foundation | 31. International Otter Survival Fund |
| 2. African Wildlife Foundation | 32. International Primate Protection League |
| 3. Animal Protection Agency | 33. Interpol |
| 4. Bird Life International | 34. Natural Resources Defense Council |
| 5. Born Free Foundation | 35. Orangutan Foundation |
| 6. Brookings Institute | 36. Organisation for Economic Co-operation and Development |
| 7. Center for Advanced Defense Studies | 37. Oxpeckers |
| 8. Chatham House | 38. Pan African Sanctuary Alliance |
| 9. Cheetah Conservation Fund | 39. Panthera |
| 10. Center on Illicit Networks and Organized Crime | 40. People not Poaching |
| 11. Coalition against Wildlife Trafficking | 41. RHIPTO - Norwegian Center for Global Analyses |
| 12. Conservation International | 42. Royal United Services Institute |
| 13. Convention on International Trade in Endangered Species of Wild Fauna and Flora | 43. Royal Society for the Protection of Birds |
| 14. David Shepherd Wildlife Foundation | 44. Save the Elephant |
| 15. Defenders of Wildlife | 45. Species Survival Network |
| 16. Earth League International | 46. The International Union for Conservation of Nature |
| 17. EcoAmericas | 47. The World Bank |
| 18. ENACT - Enhancing Africa's ability to Counter Transnational Crime | 48. TRAFFIC |
| 19. Endangered Species International | 49. United Nations Environment Programme |
| 20. Environmental Investigation Agency | 50. United Nations Office on Drugs and Crime |
| 21. Europol | 51. WildAid |
| 22. Freeland Foundation | |
| 23. Global Environment Facility | |
| 24. Global Initiative | |

- | | |
|---|---|
| 25. Humane Society International | 52. Wildlife Conservation Society |
| 26. Illicit Trade News Network | 53. Wildlife Justice Commission |
| 27. InSight Crime | 54. World Animal Net |
| 28. Institute for Security Studies | 55. World Customs Organization |
| 29. International Fund for Animal Welfare | 56. World Society for the Protection of |
| 30. International Institute for Environment | Animals |
| and Development | 57. World Wide Fund for Nature |

90

91 The search query consisted of terms identified by the authors to describe illegal wildlife
 92 trade, the concept of crime convergence, and other organised crime activities. The search
 93 strategy was customized for each academic database and grey literature website. A sample search
 94 strategy can be found in the Supplementary Materials (Table S1).

95

96 **Screening articles**

97

98 The (n=654) reports were screened using pre-defined inclusion and exclusion criteria.
 99 The first inclusion criteria were documents that focused on the illegal wildlife trade and also
 100 mentioned trafficking convergence with other types of illegal goods. Therefore, papers were
 101 included if their title, abstract/ summary, key words, or main text mentioned the following terms/
 102 concepts: illegal wildlife trade, wildlife trafficking, wildlife crime, or wildlife smuggling. In
 103 additional, the included papers must have also either mentioned convergence, nexus, mixed
 104 seizure, or cooperation, or referred to any of the following: contraband, drugs, narcotics, arms,
 105 weapons, electronics, cars, household items, counterfeit products, timber, plants, antiquities,
 106 artefacts, stones, foodstuff, piracy, commercial goods, human trafficking, migrants, human
 107 smuggling, medicine, alcohol, tobacco, money laundering, cybercrime, terror financing, fraud, or

illicit commodities, in relation to illegal wildlife trade. As we limited the scope of our search to identify crime convergences in the illegal trade of wild fauna, we did not include reports of convergences between timber trafficking and other organised crime activities. However, we included convergences that were reported between the illegal trade in wild fauna and timber trafficking (as a separate type of organised crime).

The second inclusion criteria were documents that focused on the international trafficking of other commodities and also mentioned the illegal wildlife trade. Therefore, papers were included if their title, abstract/ summary, key words, or main text mentioned the following terms/ concepts: illicit trade, trafficking, transnational organised crime, illicit markets, transnational crime, global organised crime, criminal networks, cross-border crime. This set of included papers must have also either mentioned convergence, nexus, mixed seizure, or cooperation, and referred to any of the following wildlife trade terms: wildlife, wildlife crime, wildlife smuggling, wildlife trafficking, illegal wildlife trade, animals, pets, fauna, ivory, pangolins, rhinos, poaching, birds, reptiles, fur, leather, bones, environmental, tigers, mammals, seafood, or conservation, in relation to other organised crime.

Documents published between 2000 and July 2020 were included. Our allowable document types for our grey literature searches included reports from think tanks, inter-governmental organisations (IGO), non-governmental organisations (NGO), law enforcement organisations, and industry, as well as government documents, policy literature, evaluations, newsletters, and transcribed speeches. We excluded results that were in the format of conference abstracts, theses, or videos; papers that mentioned only the illegal trade of wildlife or derivative

products; and papers that only mentioned the illegal trade of non-wildlife commodities. We did not conduct critical appraisal of included documents given the exploratory nature of our study, and the nature of crime reporting. The articles were then gathered and de-duplicated in Zotero, a citation management software. The remaining (n=205) articles were selected for detailed full-text reading and further screened into n=106 publications. We then reviewed the reference lists of the 106 publications to identify any further citations and potentially relevant results. This resulted in a list of 92 additional papers, which were then screened using the same inclusion and exclusion criteria discussed previously. After screening these additional papers, 44 were chosen to be included in our final results. Therefore, the total number of papers included in our literature review was 150 (see Figure 1).

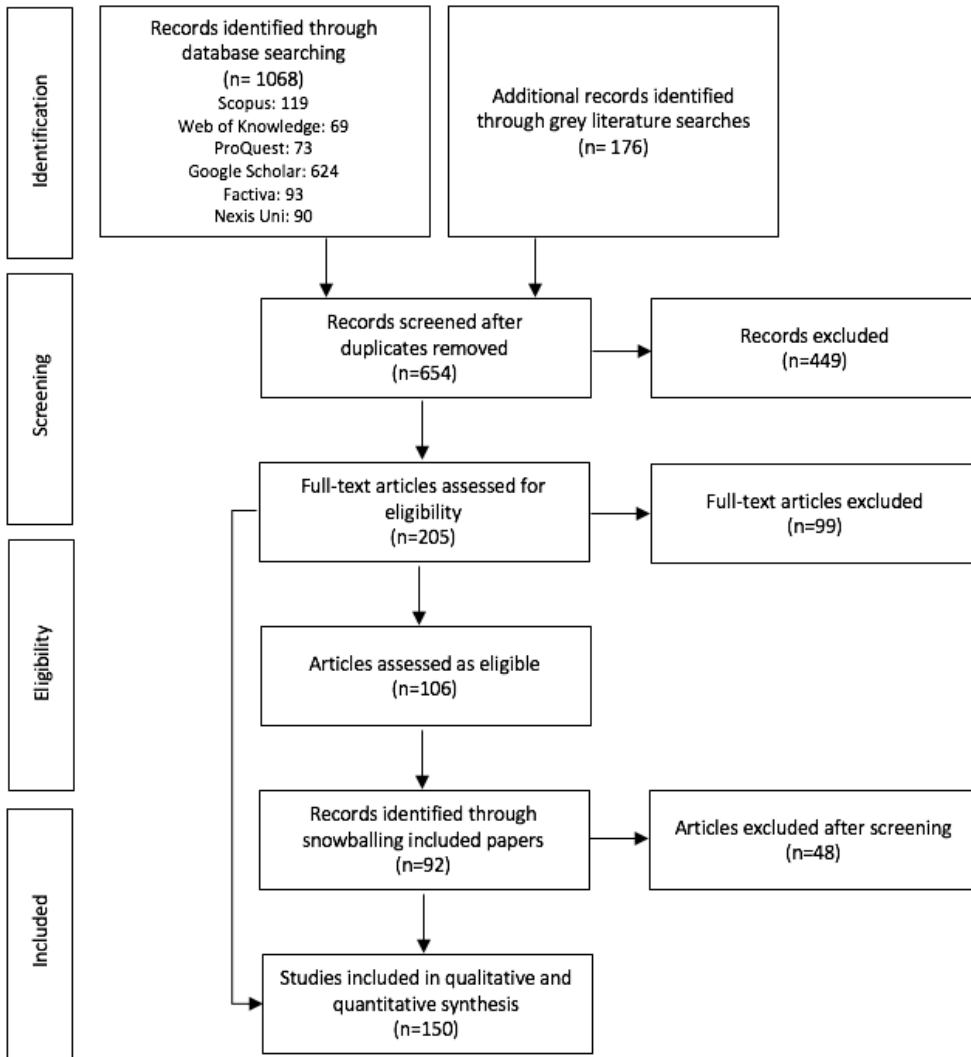


Figure 1. Modified PRISMA flow diagram of our systematic scoping review (Moher et al. 2009).

Data Extraction

Our extracted data included the publication year, author, title, publisher, URL, the type of evidence and type of publication, whether the authors used the term “convergence” in the context of overlapping criminal activities, and the details of reported convergences. The details of convergences included the location of the convergence, the type of wildlife product or taxa

involved, the other illicit crimes and commodities involved, the type of convergence (taxation, barter trade, parallel trafficking, bonded labourers, common fixer, geographic convergence, shared smuggling routes, diversification, high-ranking criminal consumer, threat finance, enabling crimes), and quotes from the source of the original description of the convergence. As many publications reported multiple types of convergences, the number of convergences that were extracted is greater than the number of papers included.

A Geography Librarian and a Political Science Librarian were consulted while preparing the literature searches. Information is presented as a synopsis of the results followed by an explanation of key findings.

Definitions

For the purposes of our article, we used the following conceptualisations for the various types of convergences that we included in our results:

- Barter Trade occurs when wildlife contraband is exchanged with other illicit commodities in a cashless transfer of illegal goods.
- We considered that a Common Fixer is an individual, rather than an entire criminal group or network, who serves an essential intermediary role in the illegal supply chain for illegal wildlife trade and other criminal networks.
- We use Diversification as a broad term to describe when an organised criminal group/network has chosen to become involved in illegal wildlife trade along with, or instead of, their other organised criminal activities.

- Enabling Crimes are any crime that further empowers criminal organizations to grow and prosper. This includes criminal violence, corruption (petty and grand), illicit financial flows, fraud, forced labour, and arms trafficking when it is for the purpose of hunting to supply illegal wildlife trade supply chains.
- We considered Forced and Bonded Labourers as instances when people who are victims of human trafficking and modern slavery are forced to be perpetrators of illegal wildlife trade in order to pay off a debt or through threat of punishment.
- Geographic Convergence occurs when two organised crime activities commonly occur in the same physical location.
- High-Ranking Criminal Consumers are a type of convergence wherein the end user of illegally traded wildlife is an offender with an important position and/or leadership role in a crime network that is involved in other transnational organised crime, and typically uses wildlife as a status symbol.
- Parallel Trafficking occurs when multiple types of contraband are smuggled together in the same shipment by the same individuals.
- Shared Smuggling Routes are trafficking routes or pathways that are used for more than one illicit commodity.
- We consider Taxation as the convergence when territorial criminal groups impose a ‘tax’ for other illicit groups to traffic in wildlife through a territory or port that they control.
- Threat Finance occurs when illegal wildlife trade is used to fund non-state armed groups including terrorists, militias, and insurgents.

We also refer to the broad definition of organised crime provided by the United Nations Convention against Transnational Organized Crime, which states that an organised crime group is 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... in order to obtain, directly or indirectly, a financial or other material benefit" (United Nations 2004). We also consider that the illegal wildlife trade can be defined as, "when committed intentionally, the trafficking in any specimen, knowing that the specimen was taken, possessed, distributed, transported, purchased or sold in contravention of: (a) Any international agreement concerning or relating to the protection, conservation, management, trade or use of wild fauna or flora binding on the State Party; or (b) Any applicable domestic or foreign law concerning the protection, conservation management, trade or use of wild fauna or flora" (End Wildlife Crime 2020).

We used aggregate data for our analysis to better identify patterns in our dataset. For example, leopards and tigers were grouped into "Big Cats," while methamphetamine trafficking and marijuana trafficking were grouped into "Drug Trafficking." We entered our extracted data into a Microsoft Excel spreadsheet and visualized it using Python in Jupyter Notebook. The guide to data aggregations we used can be found in the Supplementary Information (Table S2).

Results

Research attention on crime convergences in the illegal wildlife trade increased dramatically in 2016 (Figure 2). The concept of illegal wildlife trade converging with other types of transnational organised crime is a narrative that recently became cemented during the 2018

London Illegal Wildlife Trade Conference (Massé et al. 2020). More than half (n=90) of papers reporting on convergences since the year 2000 were published between 2016 and mid-2020. Only 40 papers from our results actually used the term, 'convergence', often opting for more vague terms such as 'links to,' 'connects to,' 'relates to,' or 'overlaps with,' suggesting that more research is needed to conceptualize and define the term “crime convergence.” In addition, most of the papers in our results are grey literature reports, while only 22 are peer-reviewed studies (Figure 2).

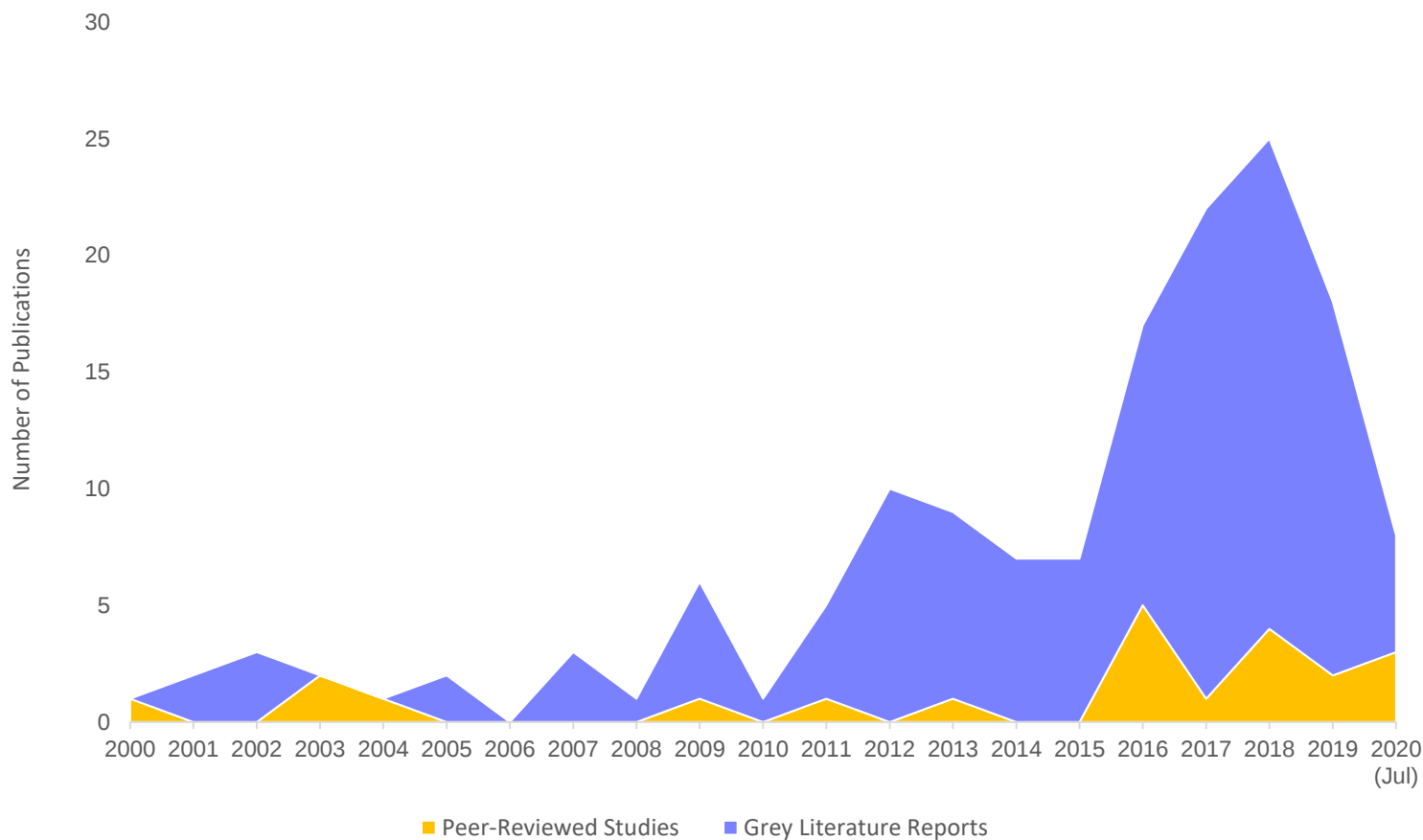


Figure 2. Evolution of research interest on the topic of crime convergence and the illegal wildlife trade over the past two decades, and the disparities between peer-reviewed and grey literature reporting.

Wildlife Taxa Involved in Crime convergences

According to the literature, convergences have occurred in the trafficking of a variety of species and wildlife products (see Figure 3). We grouped these into the following categories: abalone (n=107), animal skins (n=8), apes (n=40), armadillo (n=1), bears (n=13), big cats (n=65), birds (n=97), caviar (n=26), deer (n=6), fish (n=134), terrestrial invertebrates (n=12), ivory (n=317), live animals and exotic pets (n=8), marine invertebrates (n=23), monkeys (n=12), not specified/ 'wildlife' in general (n=293), civets (n=3), pangolins (n=45), reptiles and amphibians (n=108), rhino horn (n=265), antelope (n=2), vicuñas (n=2), and cetaceans (n=4). Full details on aggregations are available in the Supplementary Information (Table S2).

Other Crimes that Converged with Illegal Wildlife Trade

The other serious and organised criminal activities that illegal wildlife trade converged with were grouped into the following categories: arms, weapons, ammunition and parts trafficking ('arms trafficking'; n=115), bulk cash smuggling and counterfeit currencies ('cash smuggling'; n=17), contraband trafficking (general) ('other contraband'; n=57), corruption (petty and grand) (n=64), counterfeit goods trafficking ('counterfeit goods'; n=134), use of counterfeit,

forged, and fraudulent documentation ('fraud'; n=35), criminal violence (incl. homicide, torture, rape, assault) ('criminal violence'; n=62), drug trafficking (n=365), food and agricultural goods trafficking ('agri. goods trafficking'; n=36), fraud (n=33), illegal logging and timber trafficking ('timber trafficking'; n=70), illegal mining and trafficking in minerals, metals, and gemstones ('mined goods trafficking'; n=109), money laundering, tax evasion, and other illicit financial flows ('financial crime'; n=106), non-state armed groups (incl. terrorist, militias, and insurgents) ('armed groups'; n=88), involvement of another type of transnational organised crime group ('organised crime group'; n=76), other serious and organised crime (n=23), racketeering (incl. banditry, extortion, kidnapping for ransom, gambling, and loansharking) ('racketeering'; n=37), theft, organised robbery, and stolen goods ('robbery'; n=59), and trafficking in persons and migrant smuggling ('human trafficking'; n=105).

Types of Convergences

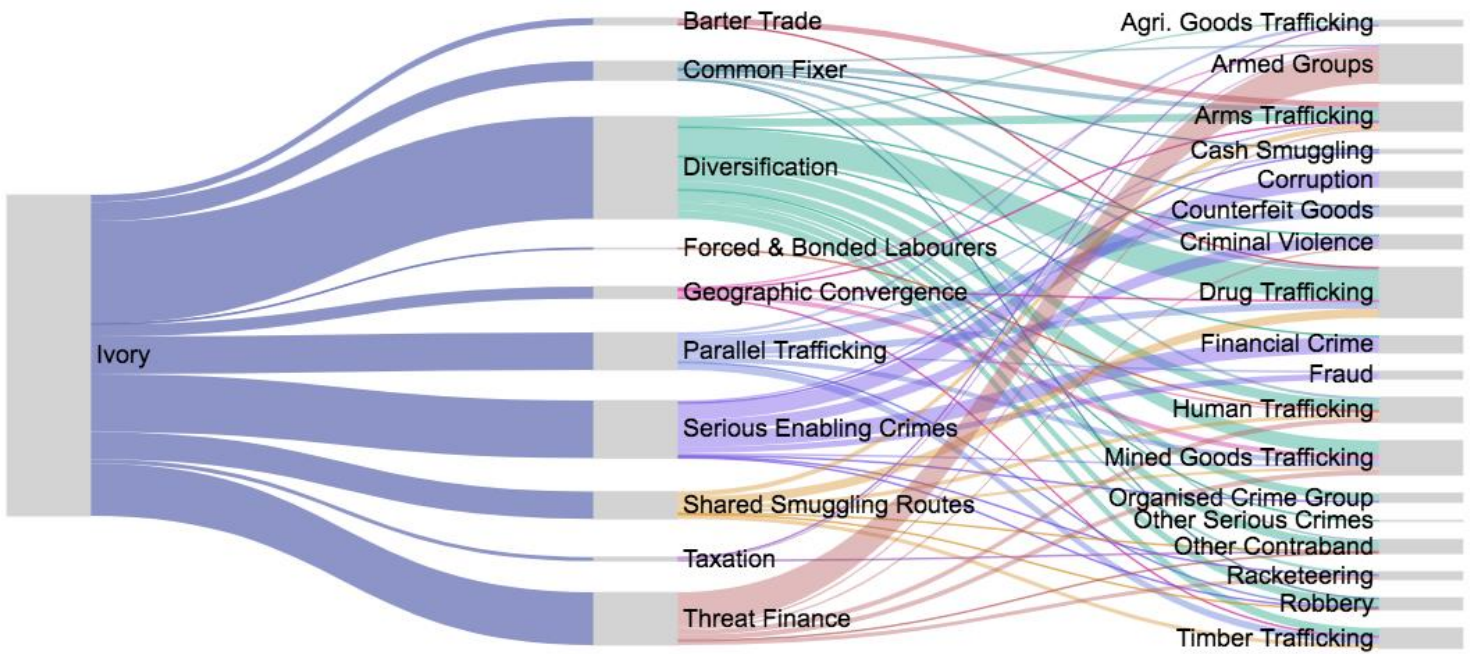
We identified the following distinct types of crime convergences that link illegal wildlife trade with other serious and organised crime activities: barter trade (n=46), bonded labourers (n=18), common fixers (n=43), diversification (n=576), geographic convergence (n=61), high-profile criminal consumer (n=7), parallel trafficking (n=309), enabling crimes (n=328), shared smuggling routes (n=96), taxation (n=7), and threat finance (n=100).

The most common reporting about illegal wildlife trade crime convergences did not specify the species name and used broad statements about illegal wildlife trade in general ("not specified/ wildlife in general"). When we excluded these data, we found that the most common

287 convergence that was reported in the literature is the diversification of criminal networks
288 trafficking in rhino horn and drugs (Table 2). Following this, ivory trafficking was frequently
289 reported to converge with threat finance of non-state armed groups, including rebel militias,
290 insurgents, warlords, and terrorists (Table 2).

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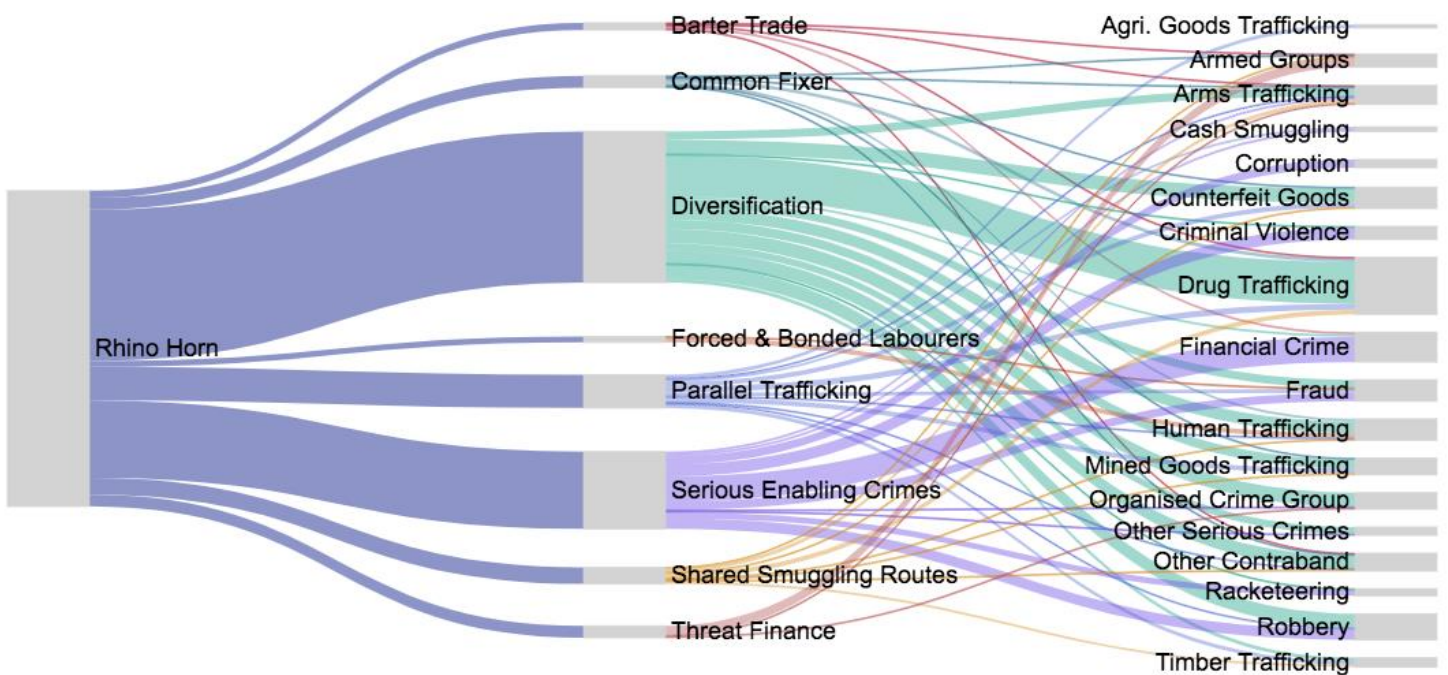
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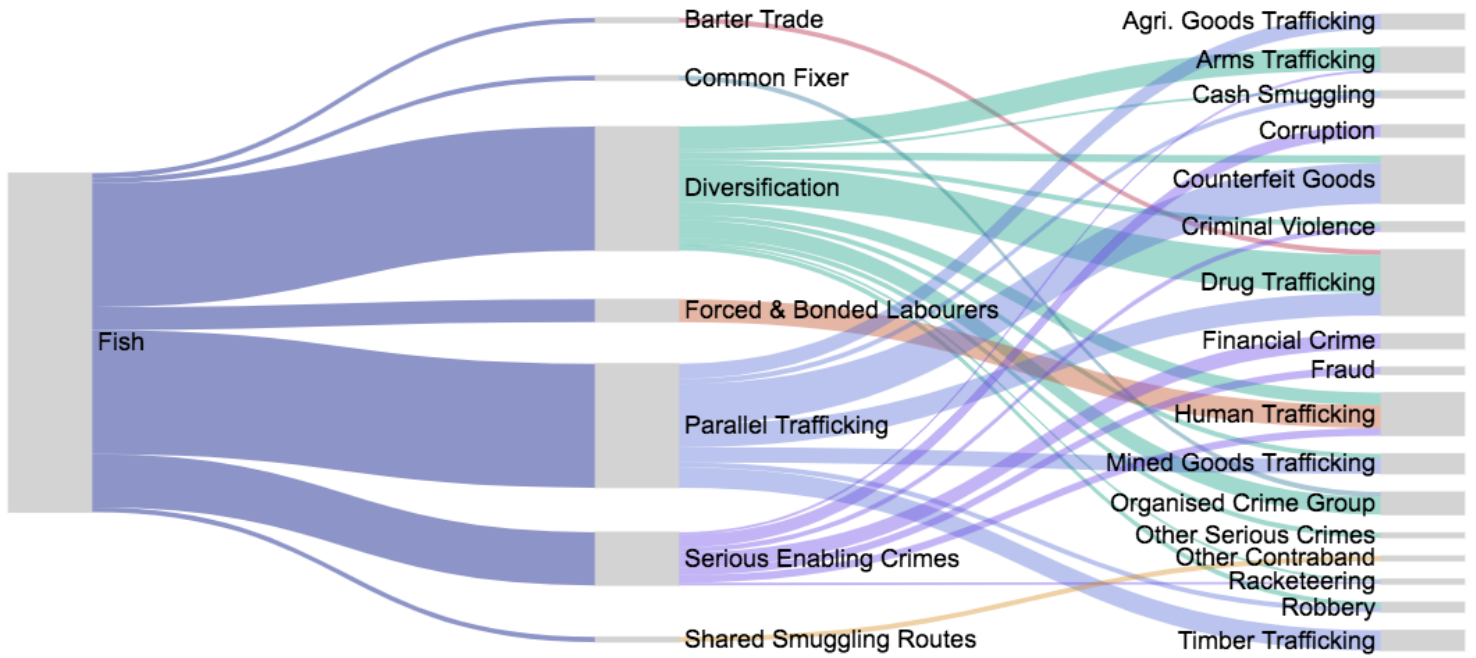
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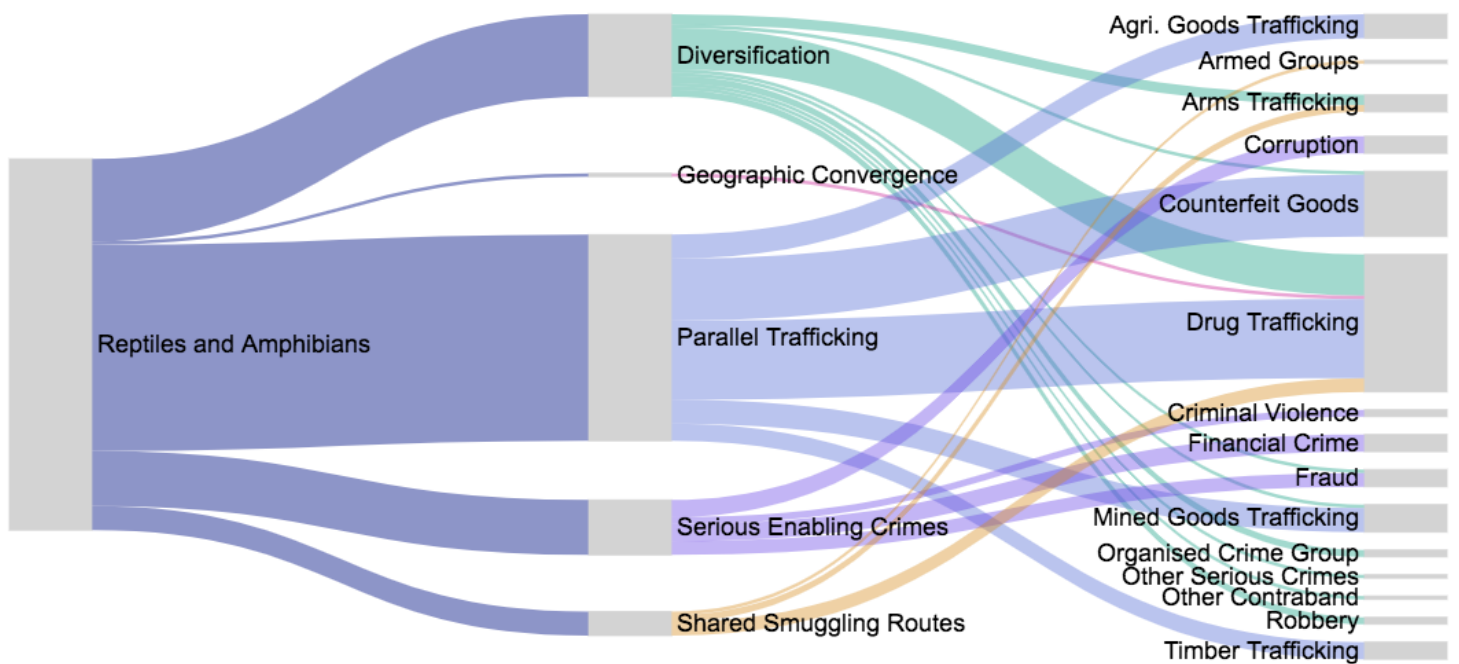
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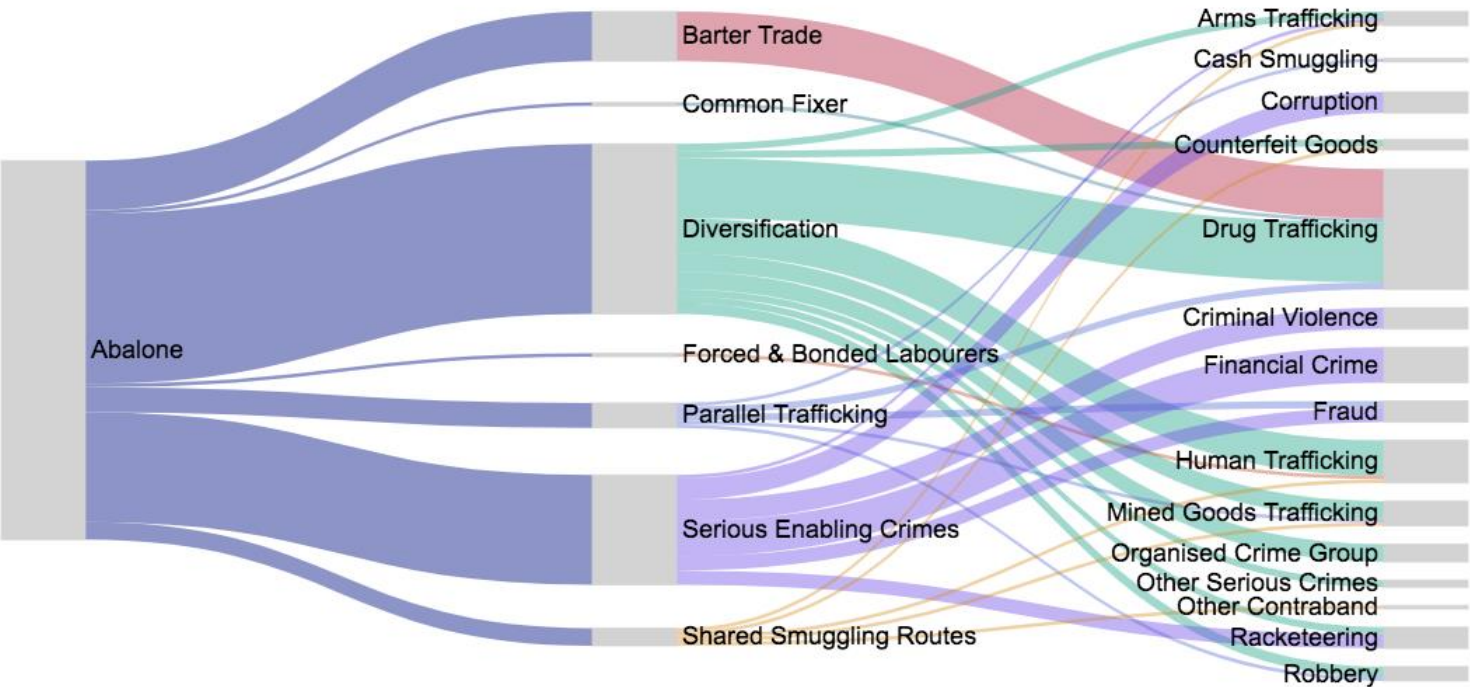
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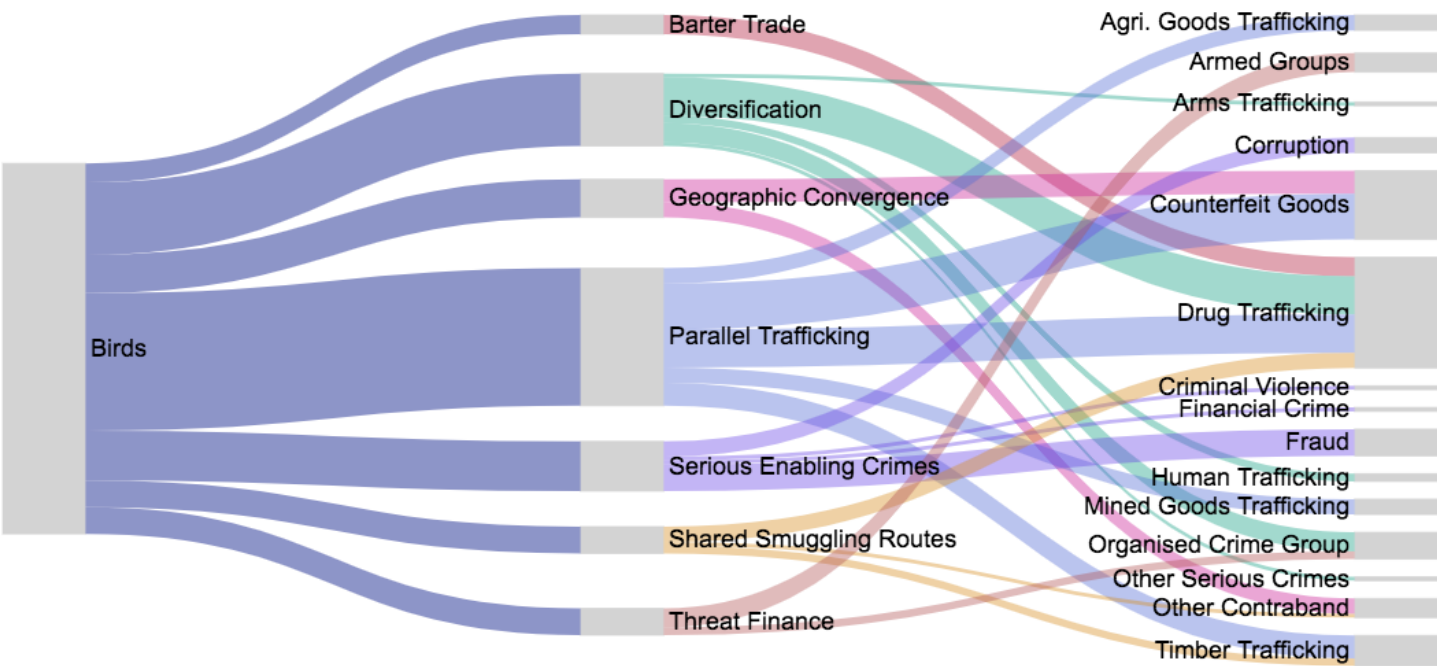
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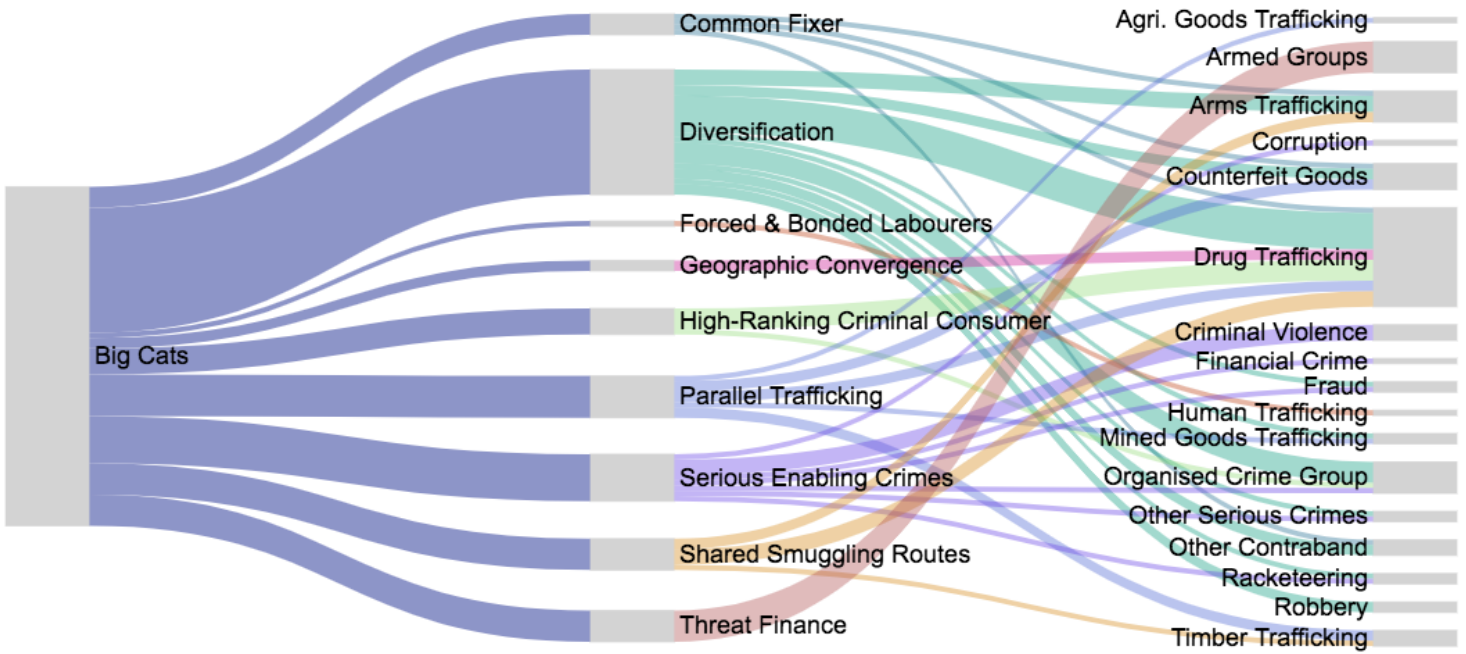
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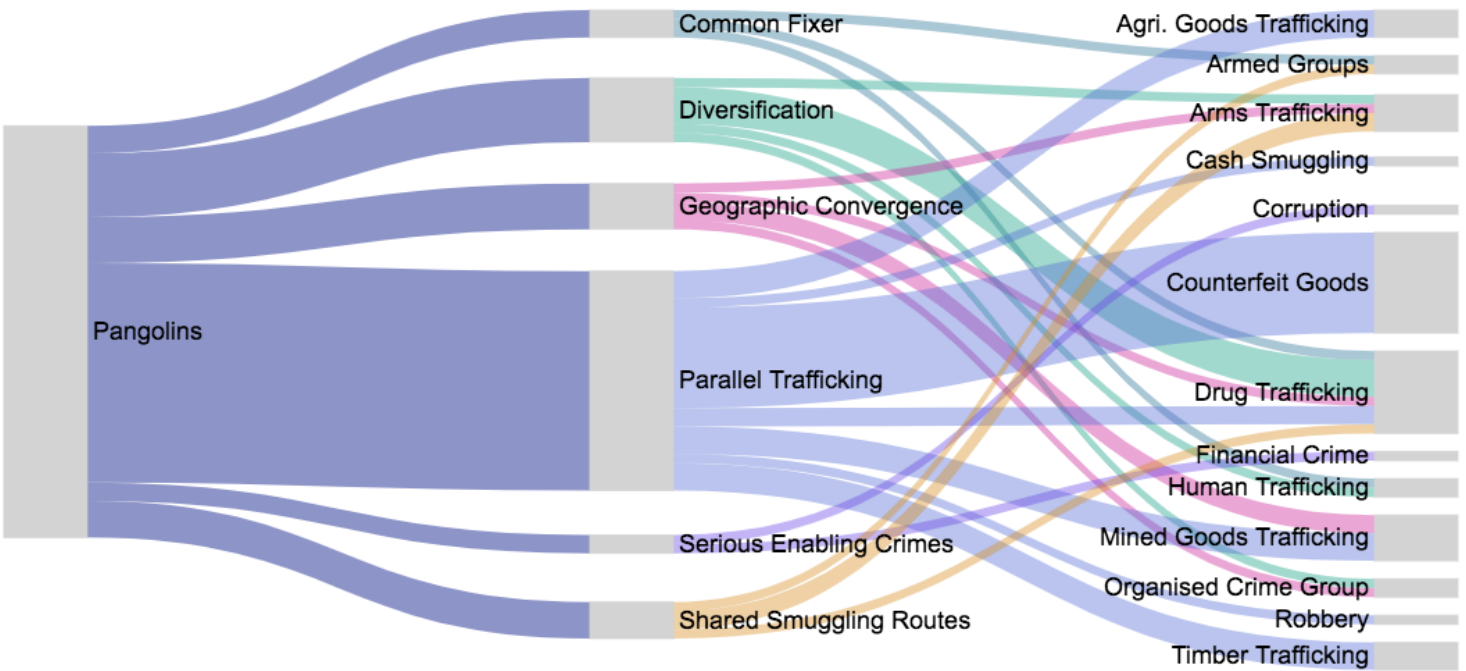


Figure 3 (a-h). Visualisation of reported crime convergences in the illegal trade of: ivory (a), rhino horn (b), fish (c), reptiles and amphibians (d), abalone (e), birds (f), big cats (g), and pangolins (h). The nodes on the left represent the taxa or product, the middle nodes represent the type of crime convergence, and the end nodes represent the other crime types. The width of the arcs are proportional to the number of times the convergence was reported in the literature.

More visualizations of our data are available in the Supplementary Information (Figure S1-S4).

Convergence Settings

We found that illegal wildlife trade crime convergences have been reported around the world, yet with 'hotspot' locations appearing (Figure 4). Crime convergences relating to illegal wildlife trade in South Africa were recorded the highest number of times in the literature (n=63), mostly focused on convergences of abalone and rhino horn trafficking supply chains with other organised crime. Following South Africa, other hotspot locations included Mexico (n=28), Democratic Republic of the Congo (n=23), Colombia (n=18), Vietnam (n=18), Thailand (n=16), Hong Kong (n=14), Kenya (n=14), Brazil (n=13), Somalia (n=13), United States (n=13), and Russia (n=11), although the reported types of convergences differed greatly across each location.

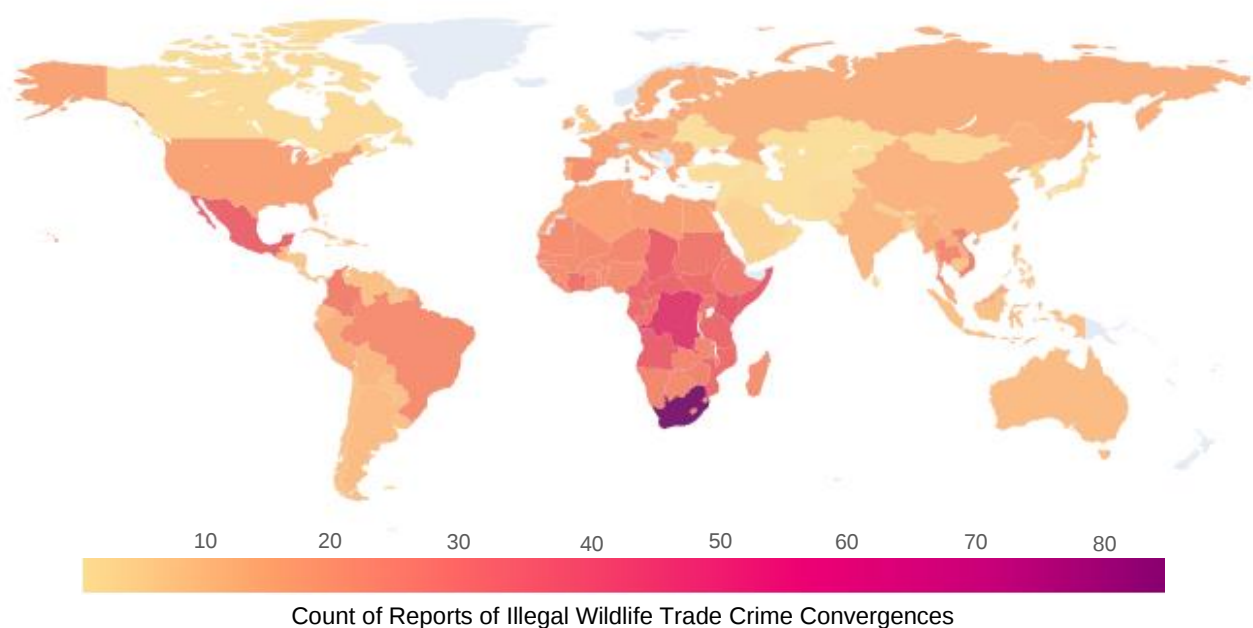


Figure 4. Choropleth map indicating the frequency of reported convergences between illegal wildlife trade and other serious and transnational organised crime according to the literature. Note: This map includes data on convergences at the regional-level, in addition to country-level data. For instance, while South Africa was specified 63 times, this map also displays the data from regional observations such as “Sub-Saharan Africa,” and “Southern Africa,” which brings the total count for South Africa to a total of 87.

Specific Organised Crime Groups

Since it can be difficult to differentiate the criminal activities of non-state armed groups and organised crime groups (Anagnostou 2021), we included both in our analysis. We included groups that either are known for their non-wildlife-related crimes (such as trafficking in humans, counterfeit goods, and/or drugs), and groups that traffic wildlife while employing serious

organised crime tactics (such as violence, money laundering, and corruption). In total, we identified 59 named criminal organisations that have been involved in illegal wildlife trade along with other serious and organised criminal activities (see Table S3; Table 3). Additional crime groups and networks involved in crime convergences were often not given a distinguishing name/label in the literature, and therefore were not included here as a recognised organised crime group. For the organised crime groups, we extracted information at the same level of specificity used in the original articles. For instance, in some cases it was reported that “Triads” in general were involved in illegal wildlife trade, whereas others specified “14K” which was entered separately.

Discussion

The illegal trade of nearly all taxa recognised as highly trafficked in the 2020 World Wildlife Crime Report (UNODC 2020), emerged as converging with other serious and organised crime. One of the possible arguments to suggest that convergences may be rare in illegal wildlife trade, is that it requires some degree of specialization to traffic live animals across borders (e.g. animal feed, tranquilizers, and sound proofing). The illegal trade of live wild animals is thought to be highly sophisticated and systematic to supply wealthy individuals with exotic pets, illicit zoos, and the tourist entertainment industry, including circuses (Nellemann 2014). However, our results show that according to the literature, the trafficking of various taxa of live animals have converged with other types of transnational organised crime. This includes the live animal trade of great apes, monkeys, birds, big cats, and reptiles. Animal welfare may in many cases be of little concern to illegal traders, as many trafficked animals suffer from stress, rough handling,

crushing, wounds, infections, illness, asphyxiation, starvation, dehydration, temperature shocks, trauma-induced anorexia, self-mutilation, and disease (Cantú Guzmán 2007; Clark et al. 2008; Rosen and Smith 2010; Fuller et al. 2018). It is not uncommon for animals to die in transit (Rosen and Smith 2010; Baker et al. 2013).

The disregard for animal welfare seemingly contradicts theories of profit maximisation in transnational organised crime. Simply put, animals that die in transit for the live animal trade cannot be sold as pets and profited from. Therefore, it would seem in the best interests of the traffickers to keep the animals healthy. It is, however, possible that wildlife traffickers simply lack an understanding of animals' needs (e.g. that amphibians require moisture, or that some species are highly sensitive to captivity stress), especially if the perpetrators are crime groups that have diversified from another primary crime. In addition, the poor conditions that animals are kept in may be an accepted risk taken for the purposes of minimising the transaction costs of smuggling, and therefore may still reflect profit maximisation strategies. For example, crowding many animals together in a singular small shipment can minimize transportation costs, while withholding food and water, and neglecting hygiene may minimise disruptions to transportation times. In other words, the potential losses of life as a result of poor animal welfare may be considered worth the risk to traffickers, if the smuggling conditions minimize the chances of detection, the costs of trafficking, and if the remaining survivors are still profitable. This is likely the case where wildlife is used as the camouflage for other contraband, such as drugs, during parallel trafficking operations. The clandestine treatment of wildlife by wildlife traffickers makes it difficult to truly understand the transport conditions, the amount of injuries, deaths, and other welfare challenges in the illegal live animal trade (Fuller et al. 2018).

463

464 Our results were initially based upon – and then expanded on – the theory and
465 typologies proposed by van Uhm and Nijman (2020), Spevack (2021), and Anagnostou (2021).
466 The crime convergences identified in our study can be broadly separated into two distinct
467 categories. Firstly, crime convergences can be “active,” where offenders are actively seeking to
468 engage in multiple illegal activities through diversification in general, or more specifically
469 through contraband barter trade, parallel trafficking (or poly-commodity smuggling/ shipment
470 convergence), taxation of wildlife traffickers by other organised crime groups, and threat finance
471 (funding non-state armed groups including militias, insurgents, and terrorists). Active
472 convergences also include occurrences of wildlife traffickers employing enabling crimes such as
473 criminal violence, corruption, and illicit financial flows. Alternatively, crime convergences can
474 be characterized as “passive,” which includes convergences that occur incidentally and based on
475 environmental factors (when offenders play a passive role in the overlap between wildlife
476 trafficking and other illegal activities), such as shared/similar modi operandi, overlapping
477 trafficking routes, and geographic convergences. Geographic convergences capture the concepts
478 of hub convergence, such as a common city or port for contraband trafficking, and jurisdiction
479 convergence more broadly, such as regions with poor governance of illegal activities in general
480 (Spevack 2021; Anagnostou 2021).

481

482 The distinction between active and passive convergences is an important one, as active
483 and passive convergences will require different law enforcement interventions. For instance,
484 active convergences involve the same illicit networks and individuals, and therefore may be
485 addressed using approaches such as organised crime group mapping, social network analysis,

and tracking the transfer of illicit proceeds. On the other hand, passive convergences such as geographic hubs might be addressed using community engagement and civil society partnerships, hotspot policing, and anti-corruption interventions. Addressing all types of crime convergences will require multi-agency and multi-sectoral action, and greater collaboration within and across jurisdictions.

Common fixers were rarely reported, likely because this requires a highly nuanced understanding of the intermediaries in multiple trafficking networks (information which is difficult to obtain). However, a variety of enabling crimes of illegal wildlife trade were commonly reported in the literature regardless of the taxa being trafficked, including money laundering, tax evasion, and other illicit financial flows; arms, weapons, ammunition and parts trafficking; criminal violence; fraud; theft and organised robbery; racketeering; counterfeit, forged, and fraudulent documentation; and bulk cash smuggling and counterfeit currencies. This finding is noteworthy, as many conservationists have tried to increase the profile of illegal wildlife trade as a serious crime by claiming that it is linked to high-profile transnational organised crime groups and terrorist networks (Anagnostou 2021). However, it is evident that many types of international illegal wildlife trade should be considered serious crimes on their own, given the variety of serious enabling offenses that facilitate the trafficking of a multitude of taxa and products. The recognition of this has led to the proposal for an illegal wildlife trade protocol to be considered under UNTOC. The adoption of an illegal wildlife trade protocol would mandate member states of the UNTOC to cooperate, share information and resources, and to adopt comprehensive domestic legislation to stop the illegal wildlife trade (End Wildlife Crime 2020).

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510 Trillions of dollars are laundered through the global financial system every year, and
511 organized crime networks can exploit both legitimate and illegitimate banking systems to clean
512 dirty money (TRAFFIC 2021). Front companies, shell companies, domestic bank transfers,
513 international bank transfers, trade-based Hawala-based and cash-based payments have all been
514 used to facilitate the illegal wildlife trade. This includes the illegal trade in ivory, rhino horn,
515 abalone, great apes, birds, caviar, fish, pangolins, reptiles and amphibians, big cats, marine
516 invertebrates, and terrestrial invertebrates. While money laundering is often an enabling crime
517 for the illegal wildlife trade, in some cases the reverse is also true (van Uhm 2020). One example
518 of this is members of an international organised crime network exporting shipments of sea
519 cucumber from Mexico for distribution in the United States. Investigators found that the pallets
520 were in fact filled with heroin, cocaine and fentanyl, and the traffickers were laundering their
521 proceeds from drug trafficking using multiple food and seafood companies as fronts (Gallagher
522 2017; Dudley 2019). The possible extent of money laundering used in the illegal wildlife trade
523 and by converging criminal networks highlights the importance of improving implementation
524 and enforcement of anti-money laundering legislations (see FATF 2020).

525

526 The arrest and prosecution of poachers does little to slow poaching rates as another
527 poacher may simply step up to fill the gap (Felbab-Brown 2017), so additional control and illegal
528 wildlife trade enforcement approaches are needed beyond the poaching level. Dismantling an
529 illegal wildlife trade network may instead require targeting the middle operational layer of the
530 network (Wittig 2016), or confronting the tendency of successful criminal networks to segment
531 their operations into isolated, redundant cells (Kenney 2007). When a specialized function, such

as international transportation or money-laundering, is operated by a single non-redundant node or actor, law enforcers can exploit this structural vulnerability (Kenney 2007). These specialized functions connect upper and lower-level operating networks and may be the most productive place to insert informers and undercover officers (Wittig 2016). Arrests should be coordinated across jurisdictions and levels, and carried out all at once where possible so that the rest of the network is unable to adapt and replace each member of the group as they are removed (Felbab-Brown 2017). Middle-layer targeting requires longer and more sophisticated investigations to identify and build evidence against the network members that connect upstream and downstream components, or the fixers who have specialised roles that are essential for the operational capacity (Wittig 2016).

There is a general consensus among researchers that illegal wildlife trade is driven by its high profit margins, consumer demand in destination countries, weak governance and state capacity to enforce wildlife laws, inadequate penalties in many cases, and rampant corruption at all levels of the value chain (OECD 2018; van Uhm 2018). Corruption is the constant factor along each node of the supply chain (OECD 2018). Park rangers, conservation officials, police and military officers, customs officers, diplomats, entry–exit inspection, quarantine bureaus, investigators, prosecutors, and elected officials can all be complicit in illegal wildlife trade (van Uhm and Moreto 2017; OECD 2018). While it may not seem threatening on its own, bribing one government official to grant a permission for an illicit business deal is the first step in ‘insidious corruption’ (Neumann 2013). This can then spread quickly throughout other officials and branches of government, either out of greed, or to minimize exposure to danger (Neumann 2013). The resulting systemic corruption facilitates a low-risk environment for criminal activity (Mandel

2011; Douglas and Allie 2014). This can similarly prevent local people from engaging in anti-illegal wildlife trade efforts (Anagnostou et al. 2020). Therefore, while there are a number of interconnected factors that are also at play, such as geographic location, trade laws, and national wildlife legislation, it is not surprising that many of the illegal wildlife trade convergence hotspot locations score low on the public sector corruption index (Transparency International 2021). It is also important to consider the variety of factors related to multidimensional poverty (social, economic, health, political, and protective) that can lead people to engage in illegal wildlife trade (Anagnostou et al. 2021). Addressing organised crime in convergence settings requires strategic approaches that are founded on a nuanced understanding of the socio-economic context (Reitano et al. 2018). In some cases, this can include a number of proactive measures such as countering corruption, criminal justice reform, strengthening partnerships and engaging with civil society actors, capacity-building of local organisations, awareness campaigns, and job creation (Kemp 2020).

Hotspot locations for convergences according to the literature may also signify researchers' biases, rather than representing an accurate indicator of crime activities. For instance, as much research attention on illegal wildlife trade has focused on ivory and rhino horn, convergences may be frequently reported in elephant and rhino range states. Smaller and perhaps less-charismatic species, such as turtles and tortoises from (for example, from South America or the Indian subcontinent), were among the most frequently reported in poly-commodity/ parallel trafficking convergences, and yet are still likely underrepresented in the literature. More research is needed to shed light on the crime convergences that occur in the illegal trade in non-charismatic species, especially marine and terrestrial invertebrates. Future studies could also

investigate crime convergences in the illegal plant trade, as well as convergences between various forms of illegal wildlife trade, including convergences between the illegal trade in plants and animals.

The gateway theory of trafficking suggests that many career criminals obtain the necessary skills, knowledge, experience, and social networking through participation in parallel illicit pursuits (Kenney 2007). Organised crime groups have the network and infrastructure in place that allows them to diversify their interests, and may be simultaneously involved in multiple legal and illegal enterprises (Hübschle 2011), especially shifting interests to wildlife, due to low risk and consequences if caught (van Uhm et al. 2021). Out of all of the serious and organised crimes identified in this review, drug trafficking emerged the most commonly reported convergence with illegal wildlife trade. In the Australian illegal drug trade, Hughes et al. (2019) found that poly-drug trafficking, network size, and network nationality were all associated with the likelihood of concurrent charges for other serious and organised crimes (Hughes et al. 2020). Many of the concurrent charges for drug traffickers referred specifically to enabling crimes for the purposes of directly or indirectly facilitating drug trafficking (i.e. dealing in proceeds of crime, firearms offences, corruption and fraud), as opposed to other primary crimes (such as firearms trafficking or human trafficking) (Hughes et al. 2020). As illegal wildlife trade can be used as an enabling crime for drug traffickers (e.g. when wildlife is used as a cover to conceal illicit drug shipments through parallel trafficking), this may make it a common convergence for diversified drug trafficking networks. In other cases, drug trafficking might be considered an enabling crime for illegal wildlife trade, for instance, when diversified traffickers exploit and coerce drug users to supply illegally harvested wildlife in return for addictive narcotics.

Therefore, more research is needed to test this pattern of crime convergence in illegal wildlife trade.

Regarding the role of organised crime groups in illegal wildlife trade, there is a potential bias that researchers may place more emphasis on well-known transnational crime groups (Anagnostou 2021). We warn that as little research has been done, their involvement in illegal wildlife trade may be over-stated, and that more empirical work is needed. We found that many highly sophisticated and diversified syndicates are involved in illegal wildlife trade and other serious and organised crime, as indicated by the size of their network and shipments, and the level of corruption involved, yet were simply not named in the literature.

Importantly, the focus placed on each convergence in the literature is also likely not a reflection of the frequency of these convergences in reality. Many of the reported convergences are repeatedly stated as facts by expert authors throughout the inclusion years of this study, yet often without providing new empirical information. In addition, this study only included English language publications which may have had a limiting effect on the crime convergence data that we were able to collect. This meant that certain organisations and publishers which could have relevant publications, were considered ineligible for inclusion in the present study. Future reviews of non-English local media reporting on convergences may allow for the development of a more nuanced understanding of context-specific convergences. Furthermore, the majority of the publications focusing on how illegal wildlife trade relates to other types of organised crime were not peer-reviewed studies. This is a serious issue, as the narrative that illegal wildlife trade converges with other types of organised crime and the funding of non-state armed groups is often

exaggerated and generalised (Anagnostou 2021). This narrative can also be used to inform potentially inappropriate policy responses, especially at the illegal hunting-level, that are not founded on scientific data nor a nuanced understanding of how the crime convergences are occurring (Anagnostou 2021). The implications of the possible growing convergence of the illegal wildlife trade with other serious and organised crimes are that new approaches are needed. Efforts to protect wildlife from illegal trade could focus more on disrupting fixers, facilitators, and other intermediaries that operate in the middle of transnational wildlife trafficking networks, in combination with implementing anti-corruption and poverty alleviation mechanisms, and community-based conservation in convergence settings, which can prevent wildlife crime proactively at the local level.

Conclusions

While there are various opposing perspectives regarding the convergence of illegal wildlife trade with other forms of transnational organised crime (Anagnostou 2021), our research highlights that according to the literature, the international illegal wildlife trade may relate to numerous other serious and transnational organised crimes in a variety of ways. Our review of publications over the past two decades also indicates that both the type of convergence and the type of converging crime can vary greatly depending on the wildlife being traded. The secondary findings from the present exploratory study can be used to inform future empirical research, including participatory research with experts and practitioners. What remains unknown (and cannot be derived from the current literature) is how often the convergences reported here occur in reality, as well as the challenges and opportunities for practitioners who are tasked with

647 addressing converging crimes. Future studies should collect information directly from wildlife
648 law enforcement officers, and officers focusing on other organised crime types based on their
649 knowledge and experiences pertaining to crime convergence. This will support the development
650 of a more robust understanding of crime convergence, trends in illegal wildlife trade criminal
651 networking, and how convergences differ along the supply chain. Understanding crime
652 convergence may in turn support the improvement of wildlife laws, and the implementation of
653 more effective and equitable wildlife law enforcement worldwide.

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Tables

Table 2. Top 30 most commonly cited convergences between illegal wildlife trade and other organised crime. This table excludes data about ‘wildlife’ in general, and instead focuses on reported convergences that specified a taxa or product.

Taxa/ Product	Convergence Type	Other Crime	Sum of Count in Literature
Rhino Horn	Diversification	Drug Trafficking	35
Ivory	Threat Finance	Non-State Armed Groups (Incl. Terrorist, Militias, and Insurgents)	33
	Diversification	Drug Trafficking	28
Reptiles and Amphibians	Parallel Trafficking	Drug Trafficking	23
Rhino Horn	Enabling Crimes	Money Laundering, Tax Evasion, and other Illicit Financial Flows	21
Reptiles and Amphibians	Parallel Trafficking	Counterfeit Goods Trafficking (Incl. Electronics, Accessories, Clothing)	18
Abalone	Diversification	Drug Trafficking	17
Ivory	Enabling Crimes	Money Laundering, Tax Evasion, and other Illicit Financial Flows	16
		Corruption (Petty and Grand)	16
Fish	Parallel Trafficking	Counterfeit Goods Trafficking (Incl. Electronics, Accessories, Clothing)	16
Fish	Diversification	Drug Trafficking	15
Ivory	Diversification	Illegal Mining and Trafficking in Minerals, Metals, and Gemstones	14
Abalone	Barter Trade	Drug Trafficking	14
Rhino Horn	Diversification	Counterfeit Goods Trafficking (Incl. Electronics, Accessories, Clothing)	12
Birds	Parallel Trafficking	Counterfeit Goods Trafficking (Incl. Electronics, Accessories, Clothing)	12
Rhino Horn	Diversification	Organised Crime Group Involvement	12

Reptiles and Amphibians	Diversification	Drug Trafficking	12
Rhino Horn	Diversification	Theft and Organised Robbery	12
Pangolins	Parallel Trafficking	Counterfeit Goods Trafficking (Incl. Electronics, Accessories, Clothing)	11
Rhino Horn	Diversification	Contraband Trafficking (General)	11
Ivory	Enabling Crimes	Criminal Violence (Incl. Homicide, Torture, Rape, Assault)	11
Rhino Horn	Diversification	Trafficking in Persons and Migrant Smuggling	10
Ivory	Parallel Trafficking	Counterfeit Goods Trafficking (Incl. Electronics, Accessories, Clothing)	10
Birds	Parallel Trafficking	Drug Trafficking	10
Abalone	Diversification	Trafficking in Persons and Migrant Smuggling	10
Ivory	Diversification	Trafficking in Persons and Migrant Smuggling	10
Abalone	Enabling Crimes	Money Laundering, Tax Evasion, and other Illicit Financial Flows	10
Rhino Horn	Enabling Crimes	Criminal Violence (Incl. Homicide, Torture, Rape, Assault)	10
Birds	Diversification	Drug Trafficking	10
Fish	Parallel Trafficking	Drug Trafficking	9

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667 **Table 3. Top 10 most commonly cited organised crime networks and non-state armed**
668 **groups whose activities have purportedly converged (actively or passively) with the illegal**
669 **wildlife trade.**

Organised Crime Group	Reported Involvement in illegal wildlife trade	Sum of Count in Literature
<i>14K</i>	abalone	5
	elephant ivory	3
	rhino horn	6
	shark fins	6
	tigers and tiger parts	2
	whale meat	2
		24
<i>Wo Shing Wo</i>	abalone	5
	elephant ivory	3
	rhino horn	6
	shark fins	6
	tigers and tiger parts	2
	whale meat	2
		24
<i>Janjaweed</i>	elephant ivory	16
	hippo ivory	1
	Not specified/ wildlife in general	1
	rhino horn	2
		20
<i>Lord's Resistance Army</i>	elephant ivory	17
	hippo ivory	1
	Not specified/ wildlife in general	2
		20
<i>Triads (General)</i>	abalone	9
	elephant ivory	3
	Not specified/ wildlife in general	1
	rhino horn	4
	shark fins	1
		18
<i>Japanese Yakuza</i>	caviar	1
	elephant ivory	2
	rhino horn	2
	shark fins	2

	tigers and tiger parts	2
	whale meat	4
		15
<i>Jama'atul Mujahideen Bangladesh (JMB)</i>	bear parts	1
	big cat pelts	1
	elephant ivory	3
	elephant parts	1
	monkeys	1
	rhino horn	4
	tigers and tiger parts	3
		14
<i>Harkat-ul-Jihad-al-Islami (HuJI) and HuJI-Bangladesh</i>	bear parts	1
	big cat pelts	1
	elephant ivory	3
	elephant parts	1
	monkeys	1
	rhino horn	4
	tigers and tiger parts	3
		14
<i>Russian Mafia/ Russian Organised Crime Group and Red Mafia</i>	bear parts	2
	caviar	5
	rhino horn	1
	caviar	2
	tigers and tiger parts	2
	whale meat	1
		13
<i>Al Shabaab</i>	elephant ivory	9
	Not specified/ wildlife in general	2
	rhino horn	1
		12