

IN PLANE SIGHT

Wildlife Trafficking in the Air Transport Sector



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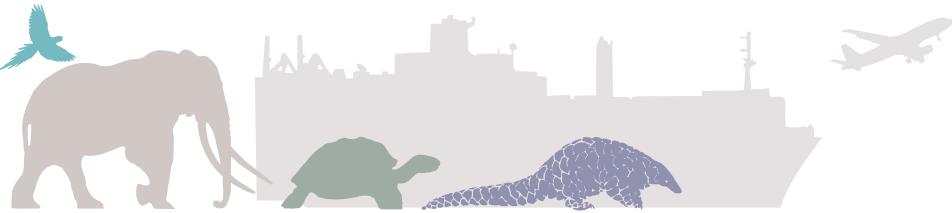


TRAFFIC
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ROUTES

Reducing Opportunities
for Unlawful Transport of
Endangered Species



The USAID Reducing Opportunities for Unlawful Transport of Endangered Species (ROUTES) Partnership brings together transport and logistics companies, government agencies, development groups, law enforcement, conservation organizations, academia and donors to disrupt wildlife trafficking activities, and forms a key element of the concerted international response to addressing wildlife poaching and associated criminal activities worldwide.

At the heart of ROUTES is a core group of partners collaborating with the U.S. Government and the transport sector that includes the Center for Advanced Defense Studies (C4ADS), Freeland, the International Air Transport Association (IATA), TRAFFIC and WWF.

For resources referenced in this document or for more information visit:

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ABOUT C4ADS

C4ADS (www.c4ads.org) is a 501(c)(3) nonprofit organization dedicated to data-driven analysis and evidence-based reporting of conflict and security issues worldwide. We seek to alleviate the analytical burden carried by public sector institutions by applying manpower, depth, and rigor to questions of conflict and security.

Our approach leverages nontraditional investigative techniques and emerging analytical technologies. We recognize the value of working on the ground in the field, capturing local knowledge, and collecting original data to inform our analysis. At the same time, we employ cutting-edge technology to manage and analyze that data. The result is an innovative analytical approach to conflict prevention and mitigation.

ABOUT ROUTES AND In Plane Sight

The USAID Reducing Opportunities for Unlawful Transport of Endangered Species (ROUTES) Partnership brings together transport and logistics companies, government agencies, development groups, law enforcement, conservation organizations, academia and donors to disrupt wildlife trafficking activities, and forms a key element of the concerted international response to addressing wildlife poaching and associated criminal activities worldwide.

Under the ROUTES Partnership, C4ADS aims to identify and track wildlife trafficking trends and methods, as well as assess the effects of ROUTES' efforts. Since 2015, ROUTES has focused on trafficking through the air transit sector, and thus *In Plane Sight* examines the trends, transit routes, and trafficking methods used by wildlife smugglers exploiting the aviation industry. This report adds to the information published in *Flying Under the Radar* released in 2017, and has extended our focus from the trafficking of ivory, rhino horn, reptiles, and birds by air to include pangolins, marine products (e.g. seahorses, abalone, etc.), and mammals from 2009 to 2017.

LEGAL DISCLAIMER

The mention of any individual, company, organization, or other entity in this report does not imply the violation of any law or international agreement, and should not be construed as such.

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COVER IMAGE

The cover image was produced by Devin Thorne.

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Executive Summary

Wildlife traffickers are benefiting from an increasingly interconnected world. As marketplaces have become progressively more international, wildlife trafficking networks have been able to exploit the advance of technology, profiting off the development of the international financial system and increasingly intertwined transportation networks. By 2016, environmental crime had grown into a multi-billion dollar industry, worth as much as \$91 to \$258 billion annually, with wildlife crime specifically making up \$7 to \$23 billion of the total.¹

But while wildlife criminal networks were learning to take advantage of finance and transportation networks, they made a mistake: they became dependent on them. Wildlife criminal groups now rely on international systems of trade, finance, and transport to make a profit, forcing them to emerge from behind their carefully constructed disguises to engage with the lawful, regulated world, thus exposing themselves to discovery.

Wildlife seizures are the clearest outward sign of this weakness. If carefully collected, stored, and analyzed, wildlife seizure data can reveal a great deal about wildlife trafficking trends, routes, and methods, including how wildlife networks seem to respond to different enforcement and market pressures. *In Plane Sight* examines wildlife trafficking through the air transport sector by analyzing nine years' worth of open source seizure information, and is intended to provide an update on wildlife trafficking activity in airports since last year's *Flying Under the Radar*.²

Unhindered by laws, regulations, or bureaucracy, criminal networks are creative and evolve quickly, generally outpacing enforcement, which remains perpetually a step behind. Ultimately, large-scale disruption of wildlife criminal networks requires shifting alongside them, identifying new trafficking methods as they arise, and overtaking them by anticipating their responses to enhanced enforcement activity and preparing accordingly.

Over the past year, C4ADS analysts have continued to collect ivory, rhino horn, reptile, and bird seizures, and have developed three new datasets covering pangolin, marine products, and mammal seizures. Together, these seven categories account for about 81% of known trafficked wildlife, according to the United Nations Office on Drugs and Crime (UNODC).³ Although seizure data can present a slightly inaccurate view of wildlife trafficking, if considered with the appropriate caveats, it provides the best available picture of overall trafficking activity and can be used to direct future anti-trafficking efforts.

This report is divided into the seven different wildlife categories included in the C4ADS Air Seizure Database. The analysis in each section is broken down into smaller subsections that review, in order: overall trafficking trends, trafficking routes, and trafficking methods. The first four sections (ivory, rhino horn, reptiles, and birds) focus primarily on 2017 data, while the next three sections (pangolins, marine products, and mammals) cover 2009 through 2017. The wildlife category sections are followed by five appendices, which include:

- 1) an analysis of WCO CEN wildlife seizure data,
- 2) an analysis of FWS LEMIS seizure data,
- 3) annual trafficking route maps (2015 through 2017) for each wildlife category,
- 4) a Human Trafficking Assessment Tool for the air transport sector,
- 5) a seizure reporting template, and
- 6) the R packages used to create the graphics for this report.

In general, this report finds wildlife trafficking activity to be truly global in scope, and increasingly so, as trafficking networks continue to seek out new source regions and demand markets for their illicit products.

Abbreviations & Definitions

Abbreviations

- **ACI:** Airports Council International
- **C4ADS:** Center for Advanced Defense Studies
- **CBP:** US Customs and Border Protection
- **CEI:** Czech Environmental Inspectorate
- **CEN:** WCO's Customs Enforcement Network
- **CITES:** Convention on the International Trade in Endangered Species
- **EIA:** Environmental Investigation Agency
- **FWS:** Fish & Wildlife Service
- **FOIA:** Freedom of Information Act
- **IATA:** International Air Transport Association
- **LEMIS:** Law Enforcement Management Information System
- **ROUTES:** Reducing Opportunities for the Unlawful Transport of Endangered Species
- **UAE:** United Arab Emirates
- **UK:** United Kingdom
- **UNODC:** United Nations Office on Drugs and Crime
- **US:** United States
- **USAID:** United States Agency for International Development
- **WCO:** World Customs Organization
- **WHO:** World Health Organization
- **WWF:** World Wide Fund for Nature (World Wildlife Fund in North America)

Definitions

- **Case (WCO):** A unique interdiction of illicit products by customs officers, often made up of multiple seizures.
- **Destination Location:** The intended destination of a trafficking instance.
- **Flight or Flight Route:** The individual flights that make up a trafficking route (e.g. a trafficking route from Harare, through Dubai, to Hong Kong would involve two flights).
- **Obfuscation Method:** The way in which contraband is concealed.
- **Open Source:** All publicly available sources of information.

- **Origin Location:** The origin of a trafficking instance, not to be confused with the **source location** (the source of trafficked wildlife).
- **Seizure (C4ADS):** A unique interdiction of wildlife or wildlife products.
- **Seizure (WCO):** Each unique product seized in a case (e.g. a case might involve a seizure of ivory and a seizure of rhino horn).
- **Source Location:** The origin of trafficked wildlife or wildlife products (e.g. Hwange National Park), not to be confused with the **origin location** of a trafficking instance (e.g. Robert Mugabe Airport).
- **Trafficking Instance:** A singular incident of wildlife trafficking through a country, whether or not it was stopped (i.e. a country that makes few seizures may still have a high trafficking instance count).
- **Trafficking Route:** The path a trafficking instance took, or intended to take, from its origin to destination locations (e.g. “The trafficking instance left from Harare, transited through Dubai, and arrived in Hong Kong”).
- **Transit Location:** The intended transit point(s) for a trafficking instance on the way from its origin location to its destination location.
- **Transport Method:** How contraband is moved through the air transport sector (e.g. *passenger clothing/items, checked luggage, air freight, mail, or private plane*).
- **Unique Flight Route:** The number of individual flight routes to or from a location (e.g. “Known trafficking instances into Hong Kong traveled on three unique flight routes: Dubai to Hong Kong, Nairobi to Hong Kong, and Addis Ababa to Hong Kong”).

Introduction

Wildlife crime, once largely dismissed as comparatively irrelevant, has grown in recent years to become one of the most prevalent and valuable types of international organized crime in the world, ranking fourth behind drugs, human, and arms trafficking in estimated annual value.⁴ Ivory trafficking in particular has experienced a well-documented rise, almost tripling between 2007 and 2015 as measured by seizure weights, according to a September 2016 study by Tom Milliken, Fiona Underwood, and Robert Burns.⁵ In some areas, elephant poaching activity has run rampant to such an extent that entire populations have almost collapsed; in Tanzania, one of the early epicenters of the current poaching epidemic, elephant populations fell by roughly 60%, from 109,051 in 2009 to 43,330 in 2014.⁶

As elephant populations across the African and Asian continents dropped in response to unprecedented pressure from poachers, human-elephant conflict, and habitat loss over the past decade, news media and the international conservation community took up the elephants' cause, widely reporting on elephant seizures as well as the species' continued fight to survive in their own habitat. Gradually, an international outcry raised in elephants' defense put sufficient pressure on governments around the world to make a difference. In September 2015, US President Barack Obama and Chinese President Xi Jinping publicly agreed to "enact nearly complete bans on ivory import and export" and to take steps "to halt the domestic commercial trade of ivory."⁷ The bans, once enacted, would remove traffickers' ability to launder illicit ivory into the legal market.

In July 2016, the United States implemented a near-total ban on the commercial trade of ivory.⁸ A few months later, in December 2016, China announced that it would ban "all commerce in ivory by the end of 2017."⁹ By March 2017, the governments' public disavowal of the ivory tradeⁱ seemed to have had an effect; the average wholesale price of tusks in China had fallen 65%, from \$2,100 per kg in early 2014, to \$1,100 per kg in late 2015, to \$730 per kg in February 2017.¹⁰ Similarly, over the past few years, ivory seizure numbers have also fallen slightly,ⁱⁱ which could suggest reduced trafficking activity in response to the ivory bans, increased awareness, or growing enforcement pressure on the ground. By early 2018, the Chinese government had followed through on its promise, and the Hong Kong government had voted to follow suit;¹¹ all ivory imports and sales will soon be banned within Chinese borders.

But the fight still rages on for hundreds of other species, from rhinos, pangolins, and lions to the less charismatic totoaba, ploughshare tortoise, and hammerhead shark. As attention has been focused elsewhere, poachers and wildlife traffickers have destroyed local wildlife populations, particularly in Asia, before altering their operations to target new, vulnerable populations in Africa, Latin America, and elsewhere. Even as anti-ivory trafficking efforts seem to be having an effect, wildlife criminals have become more sophisticated, organized, and entrenched in their ways, threatening the lives of those standing up against them. In just one example of the lengths that wildlife criminals will go to protect their illicit industry, in August 2017, Wayne Lotter, a prominent conservationist who played a significant role in revolutionizing Tanzania's approach to wildlife crime, was shot dead in Dar es Salaam after receiving multiple death threats related to his work.¹² Without a concerted, international effort to prevent and dismantle wildlife trafficking networks at every step of the supply chain, hundreds of at-risk species could be lost to human greed and short-sightedness; wildlife traffickers thrive on indifference.

i Other factors that reportedly contributed to the decline in the price of ivory included "an economic slowdown" and "a crack-down on corruption."

ii According to the C4ADS Air Seizure Database, ivory seizure numbers fell in 2017 to their lowest point since 2009. Similarly, LEMIS air seizures for the years 2009 through 2016 show that 2016 counted the fewest ivory seizures overall. Few other analyses of 2016 and 2017 ivory seizures have been released to date.

Air Transport Sector

One of the drivers behind wildlife trafficking's substantial success is also one of its biggest weaknesses—its reliance on the world's increasingly interconnected transport supply chains. Wildlife traffickers are generally forced to largely rely on either the air or maritime transport sectors to move product from one distant country to the next. As passenger and cargo traffic within these sectors has continued to increase annually, wildlife smugglers are often able to disappear into the crowd, counting on overwhelmed customs and enforcement officials to overlook them. Furthermore, wildlife traffickers also benefit from the presence of "disorganized crime"—individuals, often tourists, who transport or ship protected species unknowingly. Traffickers often claim this excuse—"I didn't realize it was illegal"—to masquerade as unaware travelers and avoid penalty.

The air industry in particular presents an efficient option for traffickers looking for a way to move live animals or wildlife products quickly. Chances that trafficking attempts will be identified are reliably low; even in the United States, a program to discreetly test airports' enforcement success rates found that screeners failed to identify banned material 95% of the time.¹³

Traffickers of all types are adept at exploiting lagging technology, rampant or latent corruption, capacity problems, and other issues within airports to move contraband. They often target specific airports or flight routes, choosing certain airports for their location, size, connecting flight routes, customs screening procedures, and perceived ability to identify contraband, amongst other things. Large international ports with lax customs screening procedures for trafficked goods, but many connecting flights, are at the highest risk;¹⁴ these airports present traffickers with both plentiful flight options and a low risk of interdiction. Of these high-risk airports, those in the process of expansion are the most vulnerable.^{15 16}

Wildlife traffickers also benefit from current customs and enforcement screening procedures and priorities. For example, screening on departure and in transit is primarily done for security purposes, and is not focused on identifying trafficking. Screening on arrival is designed to uncover trafficking, but is conducted by customs agencies, who are primarily focused on revenue and agricultural disease protection—seizing wildlife is not a top priority. This set-up helps wildlife and other traffickers evade detection by skirting through screening checkpoints under the radar.

As a first step, airport authorities should be aware of wildlife trafficking and take steps to prioritize the identification of wildlife trafficking instances within their airports. In arming themselves against exploitation, airport authorities should look to past trafficking instances for guidance. For example, past wildlife seizures reveal that traffickers try to avoid airports with good enforcement records (i.e. high numbers of seizures)¹⁷ or with a well-known history of wildlife trafficking activity.¹⁸ Instead, they may choose to fly through airports rarely affected by wildlife trafficking, or with a history of corruption, or a reputation for paying little attention to passengers and shipments in transit. With this knowledge in hand, customs and enforcement officials can anticipate and prepare for shifts in trafficking activity, as well as coordinate with other officials along high-risk flight routes.

Security & Health Risks

Wildlife trafficking activity, once believed to only negatively impact the environment, has also increasingly been linked to security and health concerns.

As the illegal wildlife trade has grown in prominence and in value, the high profits and low risks associated with engaging in wildlife crime have attracted the attention of other criminal networks. Totoaba trafficking in Mexico is a good example of this phenomenon; when the high value of totoaba, a protected fish species in

the Gulf of California, became common knowledge, organized criminal groups moved into the trade, taking advantage of the initially indifferent attitude of Mexican authorities. By 2014, organized criminal involvement had grown to such an extent that two different traffickers—one an alleged member of the Sinaloa cartel, the other a member of the Arellano Felix cartel—were murdered over the right to control the totoaba trade in a coastal town. To this day, totoaba traffickers seem to rely primarily on flights between Mexico, the United States, and China to move totoaba to destination markets.¹⁹

Furthermore, wildlife traffickers rely on the same weaknesses and loopholes within airports that are exploited by criminals of all types. Wildlife seizures can therefore be seen as a glimpse into trafficking activity as a whole—a “canary in the coal mine” for vulnerable airports.

In addition to the negative environmental and security implications of wildlife trafficking, the illegal wildlife trade can also put the health of humans and other animals at risk. In regards to the air transport sector specifically, demand for highly venomous animals can put officials, airline employees, and passengers at risk: in at least one reptile trafficking incident in 2012, three venomous snakes were euthanized on discovery, since airport authorities did not have the requisite anti-venom on hand.²⁰

Short travel time, diverse flight routes, and the increasing prevalence of air travel also mean that transferrable diseases carried by wildlife can move quickly between countries, potentially exposing thousands of people around the world to infection with deadly diseases in a short timeframe. Birds alone can carry over 60 diseases that are transferrable to humans, including Salmonellosis, E. coli, avian tuberculosis, and multiple bird flu virus strains.^{21 22} One strain, H5N1, has a mortality rate of 60% according to the World Health Organization (WHO).²³ Other species can also transmit dangerous diseases to humans. The 2014 Ebola epidemic, for example, is believed to have begun after a baby boy in Guinea came in contact with infected wild animals, most likely bats in his backyard.²⁴ Diseases carried by primates, rats, and other species are also highly transmissible to humans; primates can transmit diseases like HIV, Hepatitis B, and tuberculosis, while rats and fleas are famously the origin of the bubonic plague.²⁵

Preparing ahead of time to anticipate and prevent wildlife trafficking activity in the air transport sector therefore becomes all the more important, not only to halt the decimation of the world’s wildlife, but also to impede the operations of organized criminal networks, and preclude the spread of dangerous diseases across international borders.

Wildlife Trafficking & Seizure Data

Mapping, measuring, and understanding trafficking activity is an inherently challenging task – how can purposefully clandestine behavior be reliably unearthed and traced? Seizures are the publicly visible signs of trafficking activity that lies underneath an opaque shroud. Compiling seizure data over time can help to fill in the missing pieces, and develop an understanding of how trafficking networks operate, focusing in particular on the routes they use and the trafficking methods they rely on.

Information pulled from seizure data does, however, only reflect the least successful trafficking attempts. Wildlife trafficking analyses are further plagued by a system-wide lack of consistent, accurate, adequately detailed, and publicly available seizure information. Although several wildlife seizure and wildlife trade databases exist, most databases do not include the information required for inclusion in the C4ADS Air Seizure Databases (see **Methodology: The Data**), and so were excluded. For example, the following databases, while useful in certain circumstances, could not be used for this report:

- *CITES Trade Database:* The publicly available CITES Trade Database tracks the legal trade in

endangered species as reported by CITES signatory countries. Some countries choose to also report instances of illegal trade, but often without sufficient detail to cross-reference them with seizures already in the C4ADS Database to avoid duplication. Furthermore, not all CITES signatories report to the Management Authority as requested, and even for those countries that do report, CITES notes that seizure information is “often absent or provided in insufficient detail.”²⁶

- *The Elephant Trade Information System (ETIS) Database:* The ETIS Database records all seizures of elephant specimens reported to CITES beginning in 1989, and is managed by TRAFFIC on behalf of CITES.²⁷ Although the Database is likely the most comprehensive database on ivory seizures in the world, it is not publicly available.
- *The European Union (EU) Trade in Wildlife Information Exchange (TWIX):* The EU-TWIX database holds all seizures reported by the 28 EU Member States.²⁸ The database is only available to enforcement officials working on wildlife crime within the EU.
- *The Africa Trade in Wildlife Information Exchange (TWIX):* Similar to the EU-TWIX database, the AFRICA-TWIX database contains seizures reported by Central African member countries.²⁹ The database is only available to enforcement officials working on wildlife crime in Central Africa.

Since the release of *Flying Under the Radar* (2017), C4ADS has received access to a number of databases including detailed seizure information:

- *US Fish and Wildlife’s (FWS) Law Enforcement Management Information System (LEMIS) Database:* FWS collects information on all wildlife seizures within the United States, and compiles them in its LEMIS Database. Although C4ADS submitted a Freedom of Information Act (FOIA) request for LEMIS data in September 2016, the data C4ADS received was not separated by air, land, or sea transit, and therefore could not be incorporated into the data that formed the basis of *Flying Under the Radar*.

In January 2017, C4ADS submitted a second FOIA request for transport-specific LEMIS data, and worked with FWS officials to narrow the dataset down to include only air seizure data. The resulting dataset primarily contained air seizures. An analysis of this data is included in **Appendix II**.

- *The World Customs Organization’s (WCO) Customs Enforcement Network (CEN):* The WCO collects voluntarily submitted seizure data from customs agencies around the world, and stores the data in its CEN database under six categories: cultural goods; drugs; environment; intellectual property rights (IPR), health, and safety; revenue; and security. In 2017, C4ADS partnered with the WCO to produce the 2016 Illicit Trade Report, analyzing and producing graphics based on 2015 and 2016 seizure information.³⁰ An analysis of this data is included in **Appendix I**, with a particular focus on the illicit wildlife trade.
- *TRAFFIC Data:* In 2018, C4ADS and TRAFFIC formalized an agreement to share certain portions of TRAFFIC’s seizure data. The first tranche of data was exchanged in March 2018.

Differing database formats, significant seizure overlap, and concerns about the focus of certain databases skewing the results of our analysis have so far prevented the incorporation of these datasets into the C4ADS Air Seizure Database. Instead, both the LEMIS and WCO seizure data were analyzed separately, and can be found in the appendices of this report (see **Appendix I: WCO CEN Wildlife Seizure Data (2015–2016)** and **Appendix II: FWS LEMIS Seizure Data (2009–2016)**).

Although seizure data are instrumental in understanding the operations of wildlife traffickers, the data is vulnerable to a number of common biases. For example, wildlife seizures are more likely to occur in jurisdictions where enforcement officials are aware of and trained to look for wildlife trafficking, which may lead to the perception that trafficking is worse in areas with better enforcement. In prominent transit

jurisdictions, where enforcement has limited ability to screen passengers and shipments between flights, officials are less likely to make seizures, creating the appearance of ineffective enforcement in those areas. An in-depth discussion of the various issues surrounding the use of seizure data can be found in **Appendix I: Seizure Data Biases & Vulnerabilities of Flying Under the Radar**.

In *In Plane Sight*, as in *Flying Under the Radar*, we analyze the seizure data in the C4ADS Air Seizure Database to determine wildlife trafficking trends, as well as the routes and trafficking methods utilized by wildlife traffickers. Our findings are not meant to represent the entirety of wildlife trafficking activity through the air transport sector, but are intended to showcase the patterns visible within our Database, with the understanding that a different or more complete dataset may reflect different results. Each section of the report should be read with this in mind.

Despite some drawbacks, seizure data provides enforcement, industry, and the public with valuable information that can be used as a tool to dismantle trafficking operations. Without seizure data, enforcement and the private sector would be fighting an unseen aggressor; with it, the international community can force wildlife trafficking into the light.

Overview: Recommendations

Each new recommendation is marked with an asterisk (*).

Each recommendation is marked with the following symbols to illustrate its intended audience:

§ - Customs and enforcement agencies

‡ - Private sector

× - Intergovernmental organizations

∅ - Nongovernmental organizations

Awareness

1. Increase awareness among air passengers, aviation staff, freight forwarders, shippers, and enforcement officials. § ‡ × ∅
2. Adopt or create a pamphlet or tool tailored to each country to help customs and enforcement officials, as well as relevant industry personnel, identify restricted species and wildlife products commonly trafficked through their territory. § ‡ × ∅
3. Ensure public reporting mechanisms are in place and well-known so passengers can report suspected wildlife trafficking instances.* § ‡

Training

4. Provide training on red flag indicators associated with wildlife traffickers and shipments. Ensure that follow-up trainings are provided as necessary to support uptake. § ‡ × ∅
5. Incorporate training for airline staff on how to safely handle trafficked live or dead animals after discovery into existing training programs. Create and provide “forensic protection protocols” training to preserve evidence for trial.* § ‡ ×

Enforcement

6. Develop clear escalation procedures upon discovery of potential illegal activity. § ‡
7. Engage with the private sector to ensure that aviation personnel are aware of the types of information needed to follow up on reports of wildlife trafficking. Provide feedback to industry and the public on the outcomes of submitted tips.* § ‡
8. Develop post-seizure procedures to safely and securely store wildlife products or ensure the proper care of trafficked live animals. Develop procedures to track seized live animals and wildlife products. § ×
9. Dedicate additional resources to combatting the illegal wildlife trade in common hub airports exploited by wildlife traffickers. § ‡ ∅

10. Develop or enhance customs screening procedures for transit flights. § ‡

11. Customs and enforcement should be aware of flight routes opening through high-risk areas.* §

12. Develop and maintain a comprehensive internal database of entities previously involved in wildlife seizures. §

13. Develop a system to test counter-wildlife trafficking protocols. §

14. Improve wildlife customs screening requirements for postal mail shipments. Ensure mail seizures are reported to the same degree as passenger, checked luggage, or air freight seizures.* § ‡

15. Increase cooperation with other customs and enforcement agencies along high-risk supply chains. Inform foreign agencies of seizures on flights that have left or are destined for their countries.* §

Seizure Reporting

16. Store collected seizure information in one centralized database. §
17. Develop a procedure to publicly report seizure information. Update seizure press releases with prosecution results. §

Policy

18. National laws should, at a minimum, enforce CITES regulations and regulate the domestic trade in non-native species. Penalties for wildlife trafficking should be raised until they are sufficiently deterrent.* §

Detection

19. Pursue shift towards electronic paperwork for air freight and updated technology for screening. Expand advanced cargo and passenger information systems to include red flags for the illegal wildlife trade. Incorporate CITES e-permits in e-documentation systems. § ‡ ×

Methodology

In Plane Sight is intended to provide insight into the operations of wildlife traffickers utilizing the air transport sector to move illegal wildlife and wildlife products from source to destination. This report focuses in particular on recent and developing trends in trafficking activity, as well as on the routes and trafficking methods that allow wildlife trafficking networks to operate. This information tends to be most helpful in developing counter-wildlife trafficking strategies.

As in *Flying Under the Radar*, the analysis within this report is based on the C4ADS Air Seizure Database, which covers wildlife seizures in the air transport sector between January 2009 and December 2017. The Database is compiled through extensive, multilingual open sourceⁱ research conducted by C4ADS analysts on a monthly basis, and supplemented wherever possible with additional information obtained through C4ADS' partner network.

In 2017, we received two new datasets: 2015 and 2016 seizure data from the WCO CEN, and 2009 through 2016 seizure data from LEMIS. Although we did not incorporate these new datasets within the C4ADS Air Seizure Database, we analyze each in the appendices (analysis of the WCO CEN data can be found in **Appendix I**, and analysis of the LEMIS data can be found in **Appendix II**). The analyses within both appendices focuses exclusively on wildlife seizures in the air transport sector. More information on these datasets can be found in **Appendix I** and **Appendix II**.

Throughout the report, we refer to both “seizures” and “trafficking instances.” We use the term “seizures” to refer to the interdiction of wildlife or wildlife products within an airport. We use “trafficking instances” to refer to the number of wildlife trafficking incidents that move through a country, whether or not they are seized there. For example, customs officials in Heathrow Airport may make a seizure of birds moving from the United States to Dubai. This incident would be a “seizure” for Heathrow Airport, and a “trafficking instance” for the United States, London in the UK, and Dubai in the UAE. If those birds had been seized in the United States instead, the incident would become a “seizure” for the United States, and a “trafficking instance” for the United States, London in the UK, and Dubai in the UAE.

The Data

In the first year of the ROUTES Partnership, C4ADS collected open source data on ivory, rhino horn, reptile, and bird seizures—which together represent 66% of trafficked wildlife products³¹—to form a baseline for analysis conducted over the next four years. In the second year of the Partnership, C4ADS continued to collect seizure data for the original four categories on a monthly basis, while simultaneously building datasets for three additional categories: pangolins, marine products, and mammals. Together, the seven categories now contained within the C4ADS Air Seizure Database account for 81% of known trafficked wildlife and wildlife products.³²

Open source seizure numbers are impacted by differences in seizure reporting, both due to differences in government seizure reporting protocols and to varying media and public interest. For instance, seizures of animals and animal products from charismatic species (like elephants) and species facing well-documented and intriguing challenges (like the totoaba) are more likely to receive media attention, and are therefore more likely to be captured in the C4ADS Database. C4ADS analysts worked to minimize inconsistencies by researching every seizure to obtain as much information as possible, thereby filling in most gaps left by

ⁱ The “open source” here refers to all publicly available sources of information, e.g. local news reports, CITES reports, customs press releases, etc.

inadequate seizure reports published by a government agency or news outlet.

Of course, some seizures still lack important information. In fact, some seizures lacked so much information that they could not be included in the C4ADS Database. At a minimum, we needed the date of the seizure (at least the year), the location of the seizure (at least the country), and some information as to the contents of the seizure to include it in the C4ADS Database.

In total, we gathered 1,346 seizures of wildlife and wildlife products in the air transport sector between 2009 and 2016. The number of seizures contained within each category in the Database (Figure 1) varied for a number of reasons. First, seizure numbers are affected by differences in the species being trafficked, including the rarity of the species, the remoteness of the species' habitat, the species' behavior (i.e. does the species congregate in groups or is it solitary?), and the difficulty of trafficking the species or product. Perhaps the clearest example of this is the difference between ivory and rhino horn seizures; elephants travel in large groups and, although their habitat has been much reduced in the past few decades, still roam a fairly large swathe of Africa. Rhinos, in contrast, travel alone or in small groups of two to three individuals, and are largely concentrated in only a few small areas within their former range. As a result, ivory seizures are made more frequently and tend to be larger, while rhino horn seizures are comparatively infrequent and generally fairly small. The same can be said for differences between pangolin scale and lion cub seizure numbers, as well as between European eel and ploughshare tortoise seizure numbers, and so on.

C4ADS compiled information on each seizure's date, location, weight or quantity, species, trafficking route information (origin location, transit location, and destination location, city-specific wherever possible), obfuscation method, transport method, manner of detection, airline and flight number, as well as any other relevant information. We defined "transport method" as *passenger clothing/items, checked luggage, air freight, mail, or private plane*, and "obfuscation method" as the way in which contraband had been concealed (e.g. inside computer towers). While some categories seemed to be fairly consistently reported, like seizure country, seizure airport, and origin location, other categories with important implications for counter-wildlife trafficking efforts like obfuscation method, transit location, and airline were available for no more than a quarter of the seizures collected.

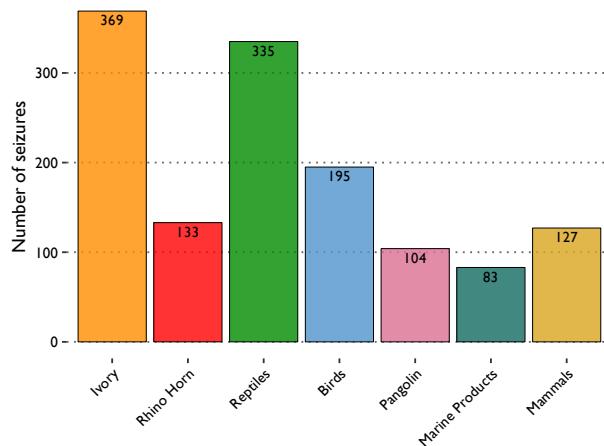


Figure 1. The number of air seizures contained within the C4ADS Air Seizure Database by category

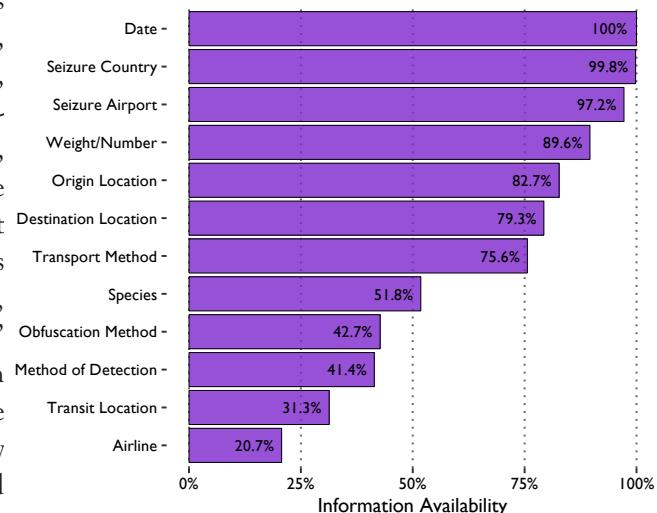


Figure 2. Data availability for the seizures within the C4ADS Air Seizure Database

The insertion of the three new wildlife categories (pangolins, marine products, mammals) in the C4ADS Air Seizure Database also had an impact on the percentage of data available in each data category. The availability of “transport method” data, for example, fell from 89.9% in *Flying Under the Radar* to 75.7% in *In Plane Sight*.

The publicly available resources we used for this report included, but were not limited to:

- Customs press releases
- Local news reports
- CITES annual reports
- Robin des Bois's *On the Trail Bulletins*
- TRAFFIC Bulletins
- Academic and statistical reports (e.g. CITES ETIS reports, etc.)
- Certain social media accounts

As mentioned above, C4ADS analysts cross-referenced seizures across multiple sources whenever possible. Photos and videos in particular were used to verify reported seizure information, and were stored in the Database alongside relevant seizures. C4ADS analysts also relied on some confidential seizure information, which was used to better understand our results and support our findings, but is not specifically discussed within the report.

Finally, data contained within the C4ADS Air Seizure Database is constantly being revised and updated to reflect the most current and accurate information available. As a result, changes are occasionally made to previous seizure data that may impact our analysis. There may therefore be some differences between the analysis presented in this year's report and *Flying Under the Radar* (2017).

Data Gaps & Biases

The reliability of the data compiled within the C4ADS Air Seizure Database, and as a result C4ADS' associated analysis, is dependent on a variety of factors. Some airports and countries more proactively report on wildlife seizures, leading to an overrepresentation of those locations in the Database. Other countries simply have better enforcement, while still other countries have effective customs and enforcement agencies but do not prioritize the identification of illegal wildlife. Some countries also report seizures en masse. For example, although the seizures in the following quotation are all interesting examples of wildlife trafficking activity, C4ADS analysts were not able to include them in the Database, since the seizure dates and locations were missing: “Some examples of recent seizures of live animals included live Hawk Eagles...coming from Bangkok via Vienna, that had to be killed as infected with bird flu; frogs in film pellets coming from Panama, via Madrid, to Belgium...parrots in milk boxes in hand luggage...etc.”³³

One of seizure data's biggest failings is inherent to its very nature—seizures can only capture trafficking strategies that have been ineffective. Along the same lines, seizures may reflect enforcement efforts operating as they should, and therefore high seizure numbers can be indicative of particularly effective enforcement activity, rather than an indication of a problem, as they are often interpreted. To that point, another significant downside to seizure data is its frequent inability to determine the cause of trafficking patterns. For instance, high seizure numbers in an airport can be due either to effective enforcement or high volumes of trafficking activity—sometimes both. Without being able to measure the full extent of trafficking instances that move through that airport undetected, it is impossible to know which factor plays the greater role, and therefore

how to respond—should enforcement strategies be revised and improved, or can the country’s anti-wildlife trafficking strategy shift to begin to address wildlife trafficking before it reaches the airport, since enforcement within the airport is already functioning as needed?

Although there are no perfect solutions to these problems, comprehensive data collection can serve to alleviate a few.ⁱⁱ Detailed route information, for example, can help to reveal whether illegal wildlife shipments are successfully moving through an airport to be seized elsewhere (poor enforcement), or if they are primarily seized prior to arrival at an airport (no impact on enforcement), or within an airport (good enforcement). As a result, we strive to base our analysis on detailed seizure data, supplemented with additional information wherever possible. In this report, we provide our findings with the acknowledgement that seizure data are an imperfect measure of an immeasurable crime, but with the understanding that even with its shortcomings, seizure data provide us with a rare window into otherwise clandestine trafficking operations.

ii A comprehensive look at the various biases and vulnerabilities associated with using seizure data to assess trafficking activity can be found in **Appendix I** of *Flying Under the Radar*.

Overview

Identifying and tracking trends in seizure data over time helps to expose wildlife trafficking operations and how they shift in response to certain pressures. For example, seizures moving from one region to another can alert park rangers and other enforcement officials to an approaching threat, as poachers leave behind decimated animal populations to seek out new, unsuspecting ones. Seizures can also hint at emerging demand markets, transit regions, and trafficking methods as effective enforcement in one region forces traffickers to change their modus operandi. Seizure information can therefore provide a data-supported guide to not only wildlife trafficking activity, but also the strengths and weaknesses in governments' and the private sector's counter-wildlife trafficking efforts. In this report, we utilize seizure data to reveal both known and unknown trends, routes, and methods associated with wildlife trafficking operations.

The following heat maps depict the number of known trafficking instances associated with each country. Each instance is included in the maps using its country-level route information (origin, transit, and destination), rather than its seizure location. For instance, if a pangolin scale shipment was discovered at Jomo Kenyatta Airport in Nairobi, Kenya on its way from Nigeria to Hong Kong, we counted Nigeria as the shipment's origin, Kenya as its *transit* location, and China as its *destination*. The *origin* location was defined as the origin of the trafficking instance, rather than the origin of the trafficked species or product, which we defined as the *source*. For example, if a rhino horn trafficking instance originated in and was seized in Paris prior to departure for Beijing, France would be the instance's *origin* and China its *destination*, even though the rhino horns would have likely been sourced from a country in Africa. If no origin, transit, or destination information was available for a trafficking instance, it could not be included in the heat maps.

Figure 3 maps all of the countries that illegal ivory, rhino horn, reptile, bird, pangolin, marine products, and mammal traffickers moved or intended to move their contraband through between January 2009 and December 2017. Overall, according to the C4ADS' Air Seizure Database, 136 countries counted at least one instance of wildlife trafficking in their airports between January 2009 and December 2017.

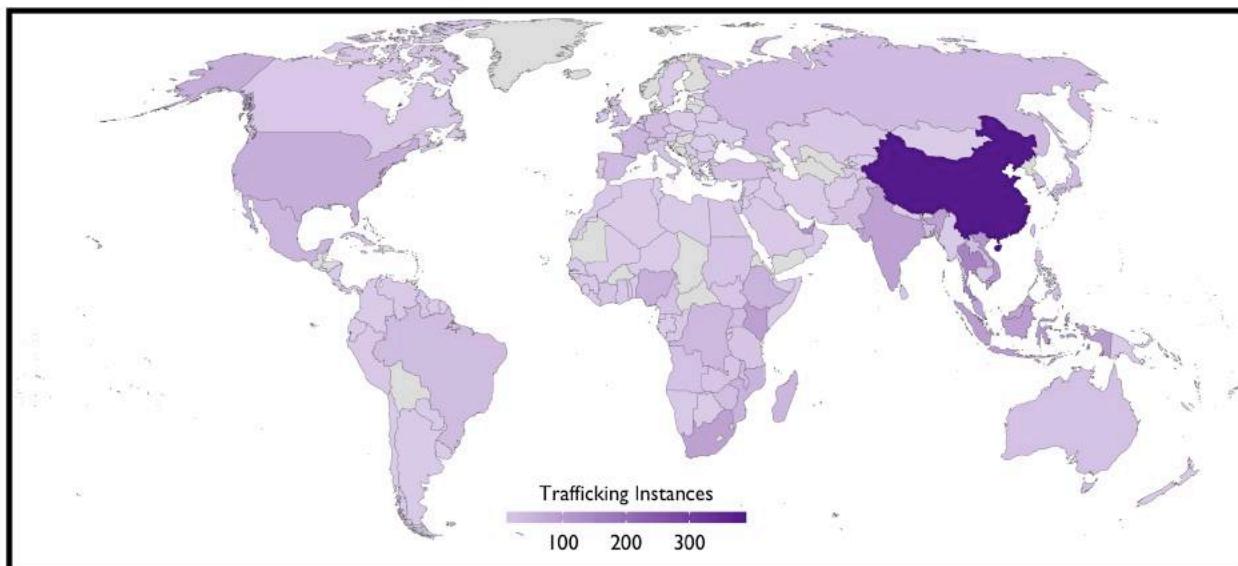


Figure 3. Global heat map for all trafficking instances in the air transport sector (2009–2017)

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

Far from being confined to just Africa and Asia, the overall heat map reveals the illegal wildlife trade to be overwhelmingly global in scope, affecting every region of the world (except Antarctica). While countries on every continent appear to be significant to the illegal wildlife trade (including the US in the Americas; South Africa, Kenya, and Nigeria in Africa; the UAE in the Middle East; and France in Europe), Asia, and China in particular, appears to play an outsized role. While *Flying Under the Radar* revealed a large disparity between China and the rest of the world by trafficking instance count (China counted 174 trafficking instances to Thailand's 102), the inclusion of new categories in the C4ADS Database has considerably widened the gap between China and second-ranking Thailand (Table 1).

The top countries for wildlife trafficking in the air transport sector have largely remained the same over the past year, with common transit countries Kenya and the UAE once again appearing prominently due to their roles as the primary transit hubs for wildlife moving between Africa and Asia.

Country	Trafficking Instances
China	387
Thailand	150
UAE	117
Vietnam	108
Indonesia	97
Kenya	94
India	90
South Africa	88
Malaysia	80
USA	61

Table 1. Top ten countries by number of trafficking instances (2009–2017)

- *Appearance of South Africa:* Another change visible in Table 1 is the swap of Mozambique (ranked tenth last year, now ranked twelfth) with South Africa (ranked twelfth last year, now ranked eighth) in terms of trafficking instances. Every other country in Table 1 was also in the top ten countries by trafficking instance count in *Flying Under the Radar*. The growth in South African instances was both due to the inclusion of the marine products and mammal categories in this year's analysis, as well as to a spike in rhino horn seizures in the past year.

Last year's analysis revealed that open source ivory, rhino horn, reptile, and bird seizure data all showcased the same pattern of relatively few seizures between 2009 and 2011, generally followed by substantial growth in known trafficking activity (bird seizures diverged slightly from this trend, numbering more seizures in 2009 and then experiencing less growth overall than any other category). Pangolin, marine products, and mammal seizure data seemed to follow the same pattern. Although this seemingly common trend could be reflecting actual increases in wildlife trafficking activity, the steady growth visible in Figure 4 is more likely due to an amalgamation of factors affecting wildlife seizure numbers in airports. For instance, media attention to and public interest in wildlife trafficking has grown since 2009, largely in tandem with a surge in ivory trafficking activity since the late 2000s. Ivory seizures in airports since then have therefore likely increased in number due to not only growing trafficking activity, but also to improvements in enforcement and seizure reporting, as well as general awareness of the ivory trafficking issue. Increasing regulation of the wildlife trade and the addition of new species to the CITES Appendices may also have supported this apparent growth in seizure numbers.

Other trends in Figure 4 can be more directly attributed to actual changes in wildlife trafficking. For example, a significant spike in rhino horn seizures between 2016 and 2017 occurred around the same time

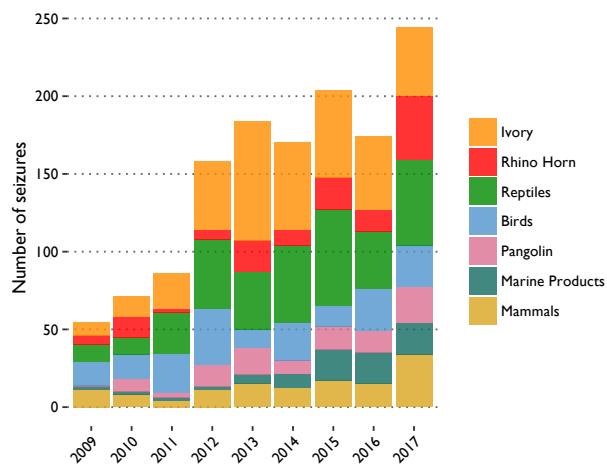


Figure 4. Number of seizures by category (2009–2017)

as the passage of a law legalizing domestic rhino horn sales in South Africa.³⁴ This surge in seizure numbers could therefore be an indication that traffickers are exploiting South Africa's burgeoning rhino horn trade to obfuscate their activities. At the same time, more comprehensive ivory bans have been put into place in some of the world's largest ivory demand markets. These bans, combined with enhanced enforcement capabilities in multiple elephant range states,³⁵ seemed to have caused a drop in ivory prices³⁶ and a subsequent drop in ivory trafficking by air.

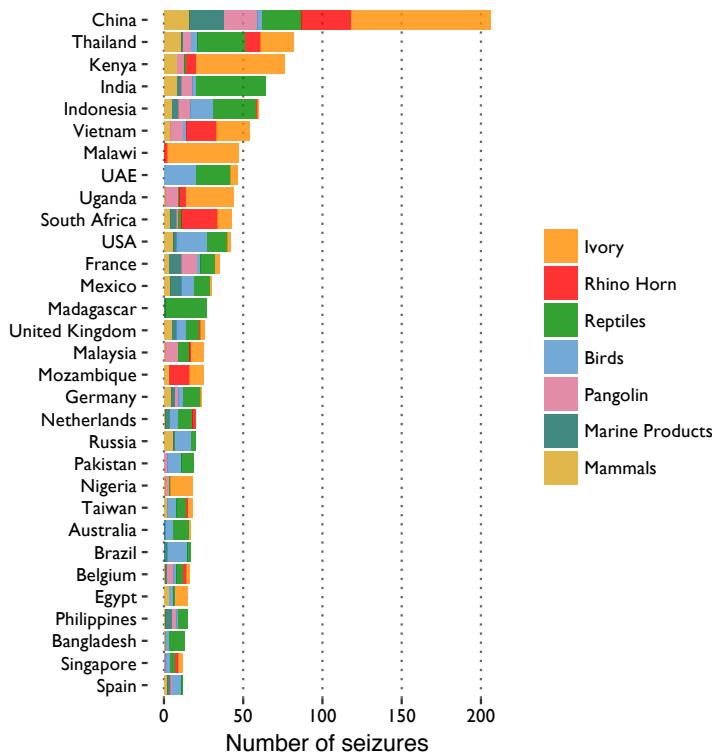


Figure 5. Number of seizures by country for those countries with 10 or more seizures (2009–2017)

Figure 5 displays the countries with the highest number of seizures in the C4ADS Database. As in the heat map, which displays countries by number of trafficking instances, China dwarfs the next most significant country, Thailand, by more than 250%. While China's prominence is clearly driven by its essential role in the illicit ivory trade, China also numbers more rhino horn, pangolin, marine products, and mammal air seizures than any other country.ⁱ Although China likely experiences a higher volume of wildlife trafficking activity than the rest of the world, it is worth noting that China's high seizure count would be far lower if not for Chinese customs and enforcement, as well as good seizure reporting standards in both Hong Kong and mainland China.

ⁱ China's reptile seizure count, however, is overtaken by India, Thailand, Indonesia, and Madagascar, and its bird seizure count is practically nonexistent.

Trafficking Routes Analysis

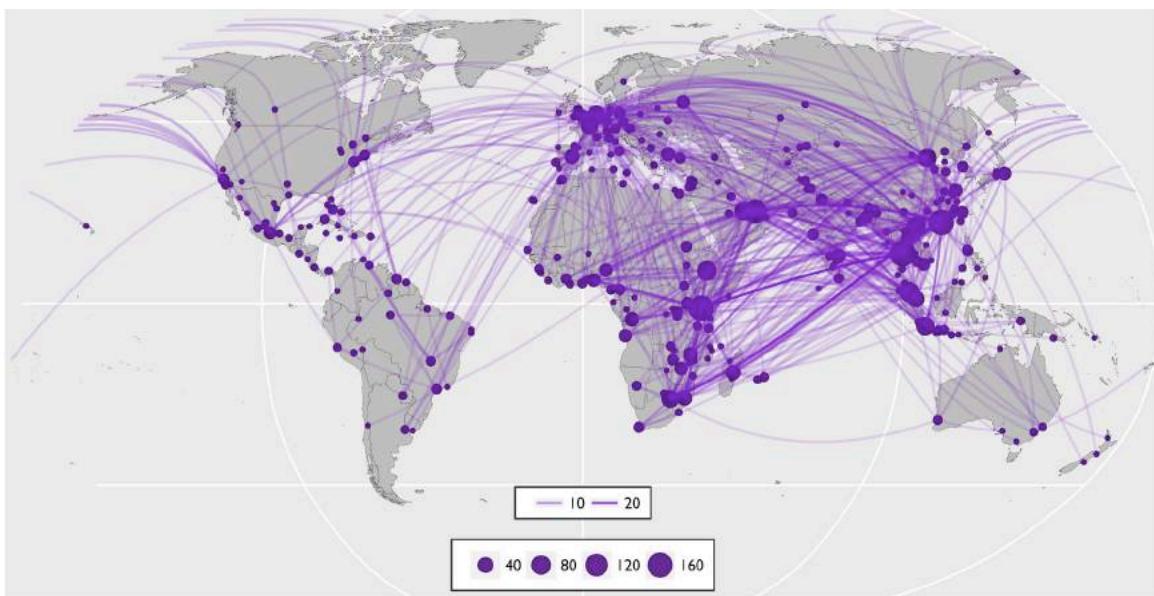


Figure 6. All air trafficking routes recorded in the C4ADS Air Seizure Database (2009–2017)

The trafficking routes map represents the flights used to traffic wildlife products through the air transport sector. This includes instances where the product did not actually enter a country because it was seized earlier in the route. The transparency of the line for each route represents the number of times it was used. The bubbles represent the total number of flights to and from each city.

The overall routes map again reflects wildlife trafficking's global reach, although the importance of Asian, African, Middle Eastern, and European hub airports is more clearly displayed. Given the international nature of wildlife trafficking, the most common routes for illicit wildlife and wildlife products tend to follow the most frequent air passenger routes from hub airports in biodiverse regions to hub airports near demand markets, according to the C4ADS Database. Since hub airports are more likely to have a variety of international flight routes available for traffickers to choose from, they are more likely to be exploited by traffickers than smaller, regional airports. International airlines based at major hub airports are therefore disproportionately exposed to trafficking. Targeting these chokepoints will have a larger impact on traffickers' operations than focusing on regional airports alone.

Still, regional airports do play an important role in wildlife trafficking. Traffickers operating in large or decentralized countries, like Brazil, Russia, and Indonesia, often fly wildlife from regional airports near the animals' natural habitats to larger, international airports in more urban areas.ⁱⁱ From there, the animals may enter the domestic black market for wildlife, or may be flown internationally to larger demand markets elsewhere.

The specific roles that countries and airports play within the international trafficking system tend to depend on their geographic location and their native species. For countries involved in the ivory, rhino horn, and pangolin trades, which countries are classified as primarily origin, transit, and/or destination locations is fairly straightforward. African countries are generally origin points, while countries in Europe, the Greater Horn of Africa, and the Middle East tend to act as transit points, and Asian countries make up the bulk

ⁱⁱ Note that traffickers operating in remote regions may not have much control over the flight routes they use—they are limited to whatever flights the closest airport provides.

of destination points. Ivory, rhino horn, and pangolin supply chains therefore generally follow a clear and consistent flow from Africa, through either Europe or the Middle East, and into Asia.

In contrast, reptile, bird, marine products, and mammal supply chains follow no one clear path, crisscrossing between and within different regions as traffickers take advantage of the plethora of source regions available for the variety of species within each category. Both types of supply chains are visible in the overall routes map (Figure 6) and Figures 7 and 8 below.

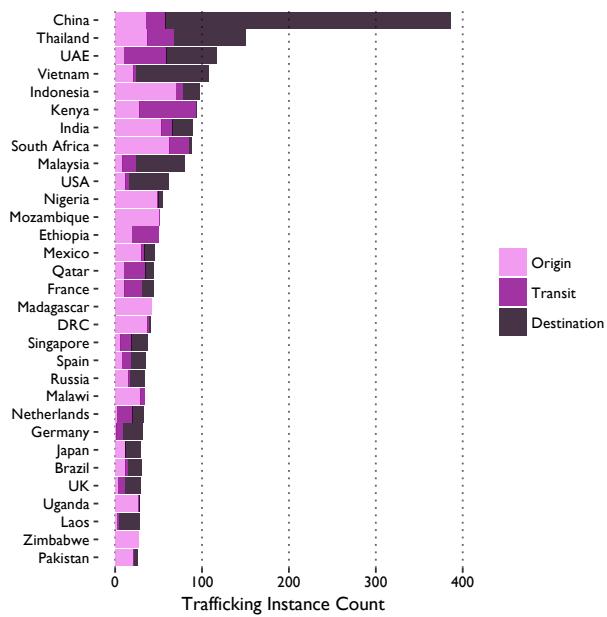


Figure 7. Country-level flight route information for countries with 25 or more trafficking instances (2009–2017)

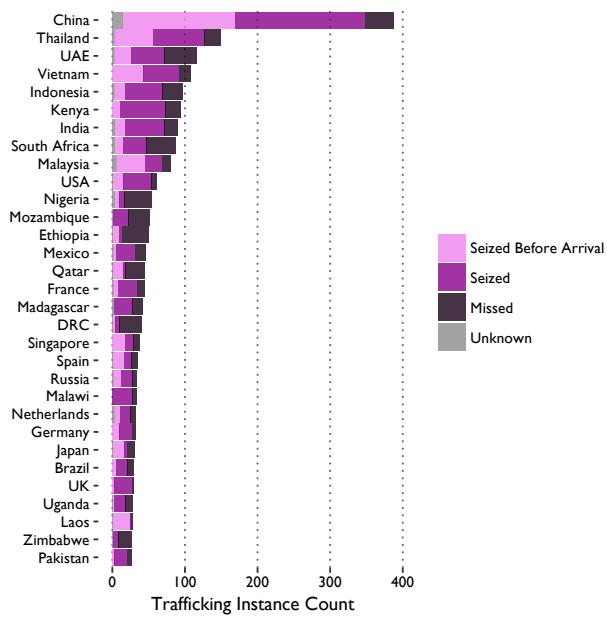


Figure 8. Point of seizure within the supply chain by country (2009–2017)

The total country-level transit graph (Figure 7) counts the number of times a country has been linked to an ivory, rhino horn, reptile, bird, pangolin, marine products, or mammal trafficking instance. The graph is a representation of the flight route data for each country, and is intended to show each country's relative role in illegal wildlife supply chains. The adjacent graph (Figure 8) maps country-level transit information by seizure location for each trafficking instance. Taken together, the graphs approximate enforcement success rates in each country, and reveal which segments of the supply chain are more likely to make seizures. Note that the success rate of destination countries in identifying trafficking instances is likely artificially high, since any trafficking instances that are not stopped at their destination airport cannot be seized at another airport and therefore cannot be included in the C4ADS Database. The true proportion of “missed” seizures for destination countries is therefore unknowable.

Overall, destination countries seemed to count the highest numbers of trafficking instances, perhaps in part because wildlife trafficking supply chains are generally broad at their base, since their origins spread throughout a diverse array of countries, and narrow as they approach comparatively few destinations. Origin countries counted the second-highest number of trafficking instances, although no individual country counted more than 100 origin instances. Indonesia came closest with 70, likely as a result of the country's exceptionally high biodiversity and associated high number of in-demand species.ⁱⁱⁱ

iii According to Mongabay, “Indonesia is the only place on Earth where rhinos, orangutans, elephants, bears, and tigers can be found living in the same forest.”

Seizures in transit countries were comparatively rare, in part due to the difficulty of identifying illegal wildlife and wildlife products in transit, and partly because most live animal traffickers appear to avoid transit flights, preferring instead the short travel time associated with nonstop flights.

- *Enforcement in transit:* Kenya again features prominently as one of the few significant transit country visible in Figures 7 and 8, with 65 transit instances. Despite the difficulty of stopping wildlife trafficking in transit, Kenya seized a larger proportion of the trafficking instances transiting through its airports than any other transit country in Figure 8.

Customs agencies—in most countries, customs is charged with seizing contraband in airports—also play a large role in screening passengers and shipments on arrival, adding to the likelihood that destination countries will have higher seizure numbers than origin or transit countries. Most illegally trafficked goods are also destined for more affluent areas, which tend to have better infrastructure and screening equipment.

Still, these advantages appear to have a fairly minimal impact on the division of seizures between origin and destination countries. Instead, trafficking instance count appears to be the best indicator for the number of seizures that a country will make, regardless of point along the supply chain.

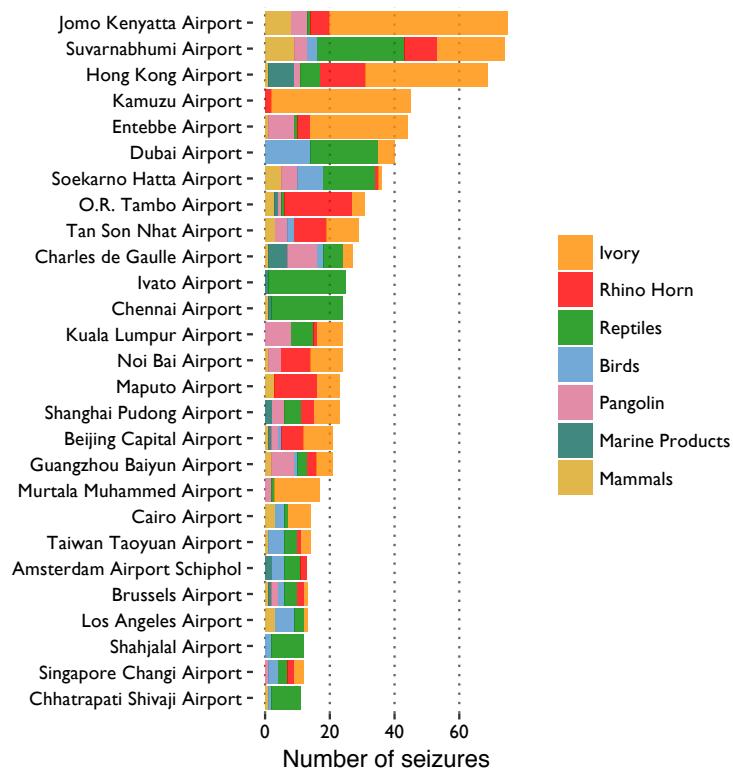


Figure 9. Airport seizure count by category for airports with 10 or more seizures (2009–2017)

Figure 9 presents airport-level seizure data by category. The graph showcases the overlapping nature of many wildlife trafficking routes, in particular demonstrating how wildlife trafficking tends to funnel through prominent hub airports. Between 2009 and 2017, officials in major hubs Jomo Kenyatta, Suvarnabhumi, Hong Kong, OR Tambo, Tan Son Nhat, Charles de Gaulle, etc. all made seizures from at least five different categories.

Source: Butler, Rhett A. "The top 10 most biodiverse countries." Mongabay News. Monagabay Latam, 21 May 2016. <https://news.mongabay.com/2016/05/top-10-biodiverse-countries/>.

- *Seizures in Dubai Airport:* Dubai Airport stands out in Figure 9 as an extremely large hub airport that has made known seizures of wildlife and wildlife products in only three categories: birds, reptiles, and ivory. Dubai Airport is one of the primary transit hubs for wildlife moving from both Africa and Europe to Asia. This suggests that the seizures displayed in Figure 9 represent only a small portion of the wildlife trafficking instances moving through Dubai, which likely encompass every category included in this report.

As a transit airport, Dubai likely has little ability to stop wildlife simply transiting through the airport. Dubai's seizures may therefore be a better reflection of the trafficking instances that were destined for Dubai, rather than all of the instances linked to the airport. This theory is supported by the fact that birds and reptiles are in demand in Dubai. It is also possible that ivory is imported into Dubai only to be re-exported shortly thereafter. The biggest drawback to this theory is the fact that mammals, like big cats and primates, are also in demand in the city, but do not appear in publicly reported Dubai seizure data.

- *Category-specific airports:* A handful of airports made seizures of animals in primarily one category. These airports were generally smaller, more regional airports with less of an international footprint than the major hubs that feature most prominently in Figure 9.

Ivato Airport (Madagascar) and Chennai Airport (India) made almost exclusively reptile seizures between 2009 and 2017. Each made only one known seizure of a non-reptile species (seahorses in both cases). Both are located in major origin locations for trafficked reptiles, and, while both offer international flights, have significantly less passenger and cargo traffic than many of the other major airports in the C4ADS Database.

- *Overlap in wildlife product trafficking routes:* Commonly trafficked wildlife products ivory, rhino horn, and pangolin scales^{iv} originate in roughly the same areas in Africa and Asia, and are generally destined for the same destination markets in East and Southeast Asia. As a result, trafficking instances involving all three products tend to follow the same transit routes, beginning in Africa, transiting through either Europe, the Middle East, or the Horn of Africa, and arriving in Asia. This overlap is visible in Figure 9: of the 16 airports that made pangolin seizures between 2009 and 2017, all 16 also made ivory seizures, and 14 also made rhino horn seizures.

^{iv} Although the pangolin category contains seizures of scales, bushmeat, and whole pangolins, the vast majority of pangolin seizures are of scales.

Trafficking Methods Analysis

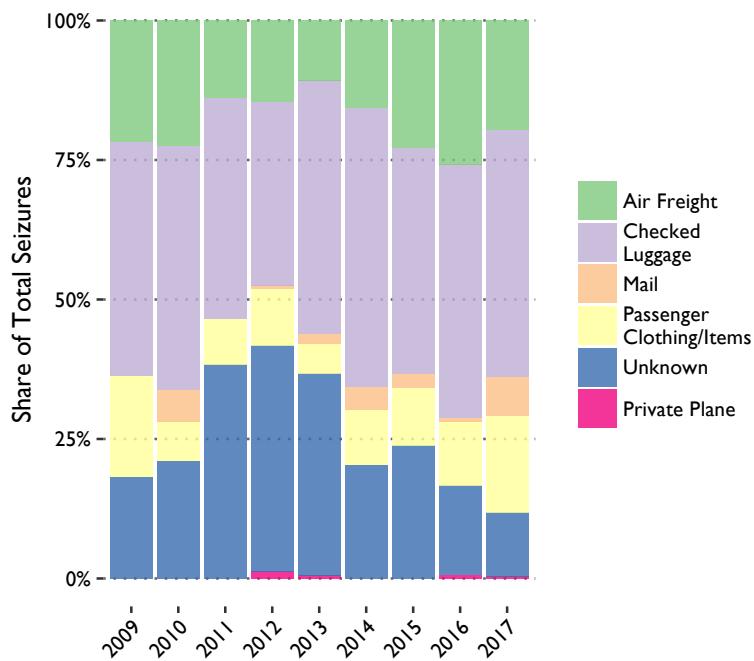


Figure 10. Transport methods for all seizures in the C4ADS Air Seizure Database (2009–2017)

Tracking wildlife seizures over time reveals certain patterns in the various ways that traffickers move their contraband through the air transport sector. Seizures reveal that traffickers often rely on the same methods to move goods over time. For instance, tin foil has been used for years to hide ivory and other illicit products. In other cases, traffickers' methods shift in response to heightened or changed enforcement efforts, and to some extent, vary depending on the species or product being trafficked. Note that less effective trafficking methods are more likely to be caught, and therefore included in our analysis, and that the most effective tactics may never be identified. Still, understanding the various strategies that traffickers utilize, frequently successfully, to evade detection will allow enforcement to develop better targeting mechanisms, and can lead to substantially decreased vulnerability to trafficking within airports.

Although *air freight* is often considered the most common transport method for illegal wildlife and wildlife products moved by air, *checked luggage* appears in Figure 10 as by far the most prominent transport method for seizures in the C4ADS Database, accounting for an average of about 43% of seizures each year. *Air freight* followed, making up about 19% of all known wildlife seizures in the air transport sector each year, while *passenger* seizures represented about 11%. *Mail* seizures appeared infrequently in Figure 11, representing at most about 7% of seizures in any one year. This is likely an underrepresentation of the true number of illegal wildlife and wildlife products discovered in mail each year, since mail shipments are generally subject to less customs screening, and *mail* seizures seem to be publicly underreported.

It is also possible that the transport method results reflect the relative success of customs screening for each respective transport method. For example, *checked luggage* seizures could be high as a result of comparatively effective customs screening methods for luggage, and *air freight* seizures could be low due to comparatively ineffective customs screening procedures for air freight consignments. Regardless, transport method information derived from seizure data provides one of only a few visible hints at the hidden operations of wildlife traffickers. Tracking transport method trends over time can be particularly illuminating.

The low percentages of *unknown* seizures in 2009 and 2010 likely result from low seizure numbers in those years, rather than particularly good reporting or enforcement. In a year with few reported seizures, even two seizures with known transport method information can have a substantial impact on the transport method breakdown for that year. The growth in *unknown* seizures between 2011 and 2013 coincides with the initial upsurge in wildlife seizures, and therefore probably reflects higher seizure numbers without a corresponding improvement in seizure reporting. The continuous decline in unknown seizure numbers since 2013 may be an indication that seizure reports have been consistently improving in response to intensifying wildlife trafficking activity or increasing public interest.

The total or average size of seizures for each transport method could not be calculated for all the seizures in the C4ADS Database, given the incomparable nature of seizures of different wildlife species and products. For example, an *air freight* seizure of 300 kg of pangolin scales cannot be equated to an *air freight* seizure of 10,000 European eels. The average size of seizures in each transport method are calculated, however, by category, with the exception of the marine products and mammals categories, which include seizures that are so dissimilar as to prevent even the aggregation of “total marine products seizure weight” or “total mammal seizure number.”

Common wildlife trafficking methods and red flags for wildlife trafficking activity include, but are not limited to:

- Wrapped in tin foil, or hidden amongst agricultural products, electrical equipment, etc.
- Hidden compartments in luggage or air freight
- Hidden in cages or boxes in suitcases or in carry-on bags (live animals)
- Repeat offenders
- Abandoned or exchanged luggage
- Use of an unusually high number of suitcases
- Missing, incorrect, incomplete, or misleading documentation (e.g. turtles declared as ‘stones’)
- Circuitous air transit routes
- Use of shell or cover companies on shipment documentation
- Custom-made clothing
- Taxidermy
- Use of ketamine and other drugs to sedate live animals
- Falsification of CITES permits (e.g. incorrect species identification, counterfeit permits)
- Collusion between customs officers, airport officials, industry employees, and traffickers

These and other trafficking methods are discussed in more detail within each category, and in case studies distributed throughout the report.

Country Enforcement Index

Measuring the ability of customs and enforcement agencies to identify illicit activity is inherently difficult. Combining and analyzing seizure data and flight route information, however, can provide approximate enforcement success rates for countries linked to at least one seizure. The Country Enforcement Index is a quantitative representation of each country's ability to detect and seize illicit wildlife products traveling through its airports. The percentages provided below were derived using the following equation:

$$\text{Country Enforcement Indicator} = \frac{\text{Total Number of Seizures}}{\text{Successfully Attempted Trafficking Instances}}$$

A higher Country Enforcement Indicator signifies that a country has relatively effective enforcement, whereas a lower Country Enforcement Indicator suggests that a country does not effectively detect illicit products being trafficked through its airports. We define "successfully attempted trafficking instances" as the number of times illicit wildlife products were successfully brought into a country, regardless of whether they were seized in that country's airports or later on in the supply chain. We excluded seizures made prior to arrival in a country from that country's assessment, since the country never had the ability to stop that trafficking instance.

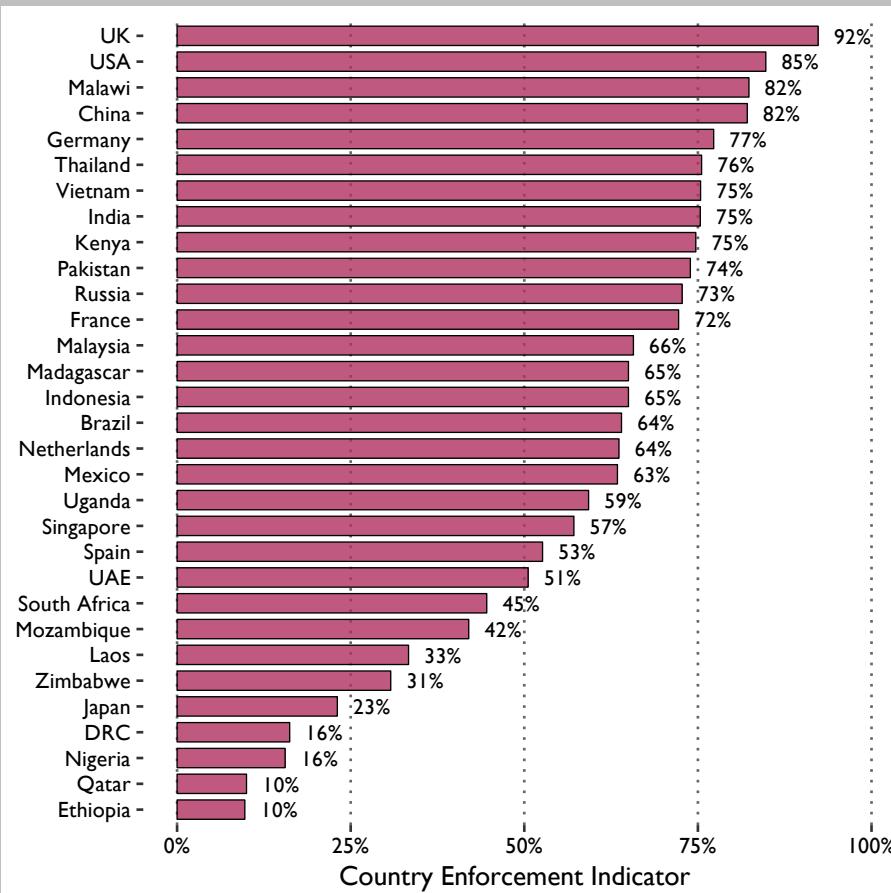


Figure 12. Country Enforcement Index for countries with twenty-five or more trafficking instances (2009–2017)

Countries with high enforcement ratios usually share some combination of the following characteristics: well-developed infrastructure, effective and well-trained customs and enforcement officials, high levels of trafficking activity, or good reporting standards. Common destination countries are also more likely to have high enforcement ratios, in part because customs screening on arrival tends to be more rigorous for wildlife and wildlife products than security screening on departure. Destination countries also benefit from being the last stop on many supply chains; since trafficking instances that are not stopped at their destination cannot be seized at another airport along their route, common destination countries are more likely to have a higher Enforcement Indicator.

In contrast, common transit countries are more likely to have low enforcement ratios, as they are often unable to screen passengers, luggage, and shipments between flights. Enforcement in air transit jurisdictions like the UAE may appear to be performing poorly compared to enforcement in origin (e.g. Madagascar) and destination locations (e.g. China). This particular bias is mitigated to some extent by simultaneously analyzing wildlife products with vastly different supply chains (i.e. bird trafficking origin countries are very different from ivory origin countries). Still, a few common transit countries fall lower on the Index, such as the Netherlands, Singapore, the UAE, Ethiopia, and Qatar.

The countries with the highest enforcement ratios between 2009 and 2017—the UK, the US, China, and Germany—are all frequent destination countries with good infrastructure and fairly decent reporting protocols. From 2009 to 2017, the UK had the highest enforcement ratio: around 92% of trafficking instances involving the UK were stopped at an airport within the country itself.

- Unexpected success rates: Malawi, Kenya, and Japan all had fairly unexpected enforcement success rates. For example, Malawi, an origin country experiencing comparatively little known trafficking activity, had the highest enforcement ratio in Flying Under the Radar, and continues to have one of the highest enforcement percentages, likely due to a period of good reporting.

As a primarily transit country, Kenya should have a low enforcement ratio, but places relatively high in Figure 12 due to Kenyan customs and enforcement agencies' unusual ability to detect illicit wildlife and wildlife products in transit.

Japan, a destination country with high-quality infrastructure, has a low Country Enforcement Indicator at around 23%. This may be caused by fairly lax legislation concerning the wildlife trade, little enforcement attention to existing regulations, lack of media coverage, or lack of public interest in the wildlife trafficking issue.³⁷

The Country Enforcement Index can be seen as an approximate indicator of enforcement success rates around the world. Since the Index is based on seizure data (an inherently biased indicator of trafficking activity), the Index's findings should be viewed with its particular failings in mind (see **Appendix IV: Seizure Data Biases & Vulnerabilities** from *Flying Under the Radar* for more information). Still, the Index provides a good approximation of customs and enforcement effectiveness, and highlights a few countries where enforcement capabilities could be improved.

Ivory

Taken together, the C4ADS Database numbers 369 known elephant ivory seizures weighing 44,698.63 kg between 2009 and 2017. In the past year, known elephant ivory seizures in the air transport sector continued to decline, counting 44 seizures weighing 2,991 kg in 2017, down from 47 seizures (6,308 kg) in 2016. Other trends visible in Figure 13 are as follows:

- *Decrease in total seizure numbers:* There were three fewer air ivory seizures in 2017 than in 2016, primarily due to a drop in large- and medium-scale seizures. These slight decreases represent the continuation of an overall downward trend in ivory seizures since a high of 77 in 2013. Still, seizure numbers remain high compared to seizures made in the early years of the current poaching crisis.³⁸
- *Small-scale seizure numbers increased:* Although large- and medium-scale seizures decreased slightly in 2017, small-scale seizures increased. This is notable given that the majority of the increase in ivory air seizure numbers since 2011 has been due to a corresponding increase in small-scale seizures, rather than an increase in medium- or large-scale seizures (more often associated with organized criminal activity).

The decrease in known ivory seizures by air is more stark when measured in terms of total ivory seizure weight.

- *Decrease in total seizure weight:* Total ivory seized in the air transport sector in 2017 (2,991 kg) dropped more than 50% in comparison to 2016 (6,307 kg), the third highest year in terms of seizure weight since 2009, according to the C4ADS Database.

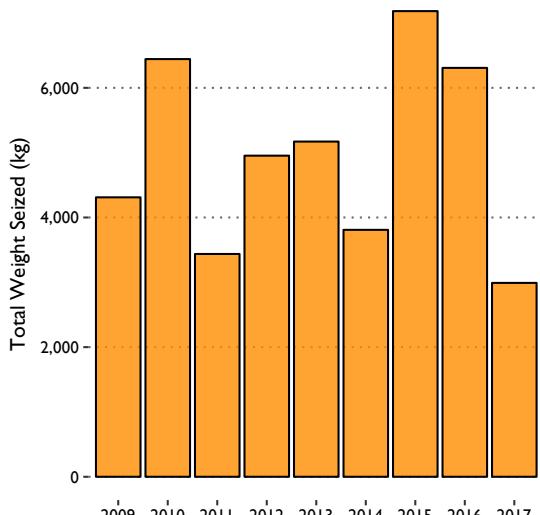


Figure 14. Weight (kg) of ivory seizures per year

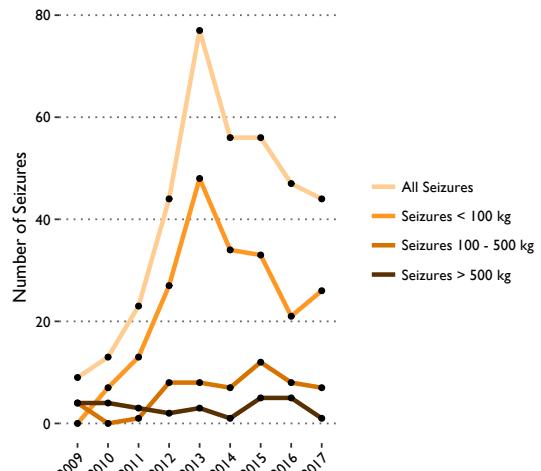


Figure 13. Number of ivory seizures made in airports per year

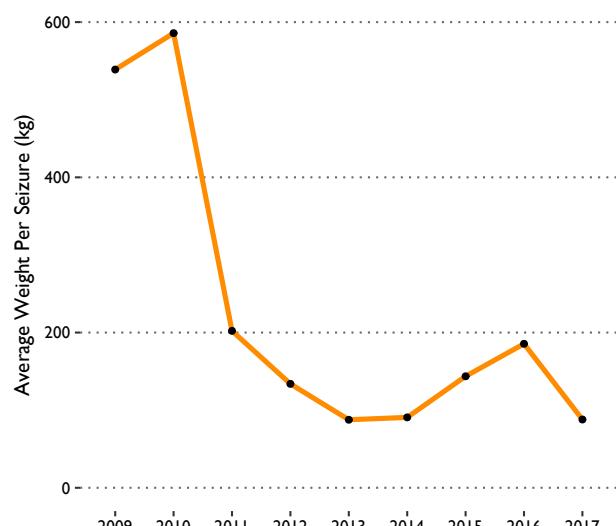


Figure 15. Average weight (kg) of ivory seizures per year

The growth in total seizure numbers up to 2013 and the gradual drop visible in Figure 13 is not reflected in seizures measured by total weight (Figure 14). Instead, Figure 14 appears to more closely mirror the variations in annual large-scale seizure numbers, suggesting the total weight of ivory seized annually is largely dependent on a relatively small number of large-scale seizures, and therefore may not be reflective of the pervasiveness of ivory trafficking in the air transport sector each year.

- *Decrease in average seizure weight:* The fall in ivory seizure numbers in 2017 was coupled with a decrease in average seizure weight (Figure 15). The average weight hit its lowest point in 2013, in accordance with the high number of small-scale seizures that year (visible in Figure 13). Since then, as smaller-scale seizure numbers gradually decreased, the average weight of ivory seized slowly increased. This trend reversed in 2017, when another increase in small-scale seizure numbers, combined with a sharp decrease in large-scale seizures (only one known large-scale ivory seizure occurred in the air transport sector in 2017), caused an abrupt drop of more than 50% in average seizure weight.

The combined picture portrayed by Figures 13 through 15 is of decreasing, yet still substantial, ivory trafficking activity in the air transport sector.

Country-by-Country Analysis

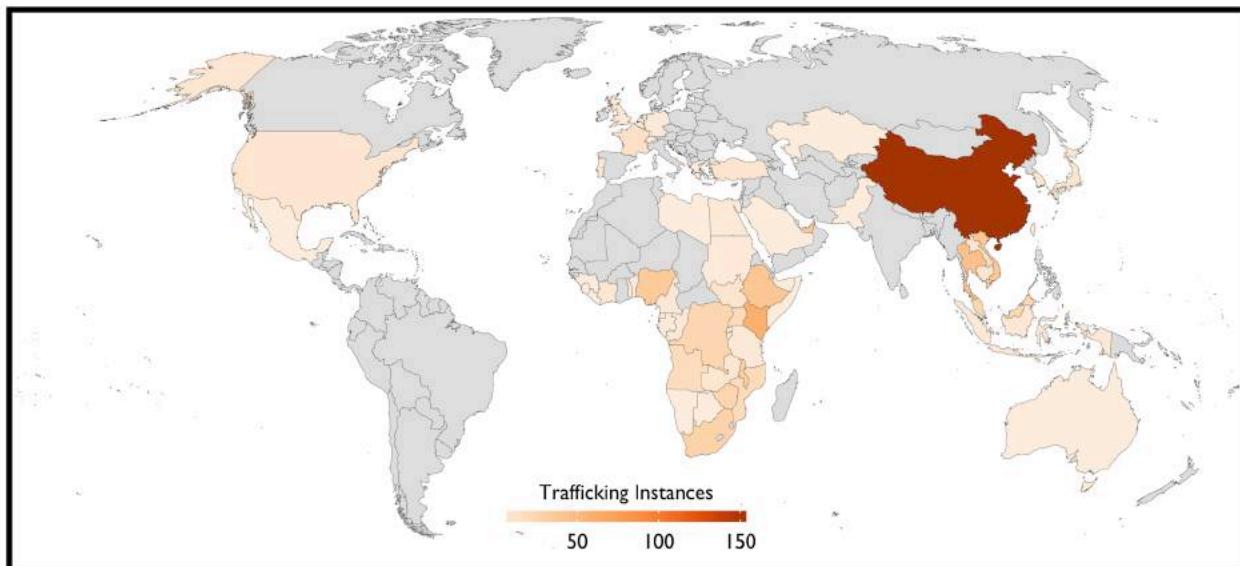


Figure 16. Global heat map for ivory trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

The heat map for ivory trafficking instances (Figure 16) identifies each country with intended or actual ivory trafficking activity through its airports between January 2009 and December 2017. The map highlights China, Southeast Asia, and Sub-Saharan Africa as the most significant regions for ivory trafficking by air.

- **China dominates:** Subtle differences between countries are muted by China's outsized role in the ivory trade. For example, China counts 95 more trafficking instances than the next most prominent country, Kenya, which numbers 59 instances total.

Compared to 2016 data, China, Vietnam, Zimbabwe, and the UAE saw the largest increases in ivory trafficking instances by air over the past year, with 20, ten, nine, and eight additional instances respectively.

- **Diffuse origins:** Origin countries South Africa, the DRC, Kenya, Malawi, and Angola saw less growth, with between four and two additional instances each in 2017. This is consistent with the ivory trafficking supply chain's tendency to narrow as it approaches its destination (i.e. ivory origin countries are more numerous, while transit and destination countries are fewer and tend to concentrate in specific areas). Zimbabwe, however, strays from the origin country pattern, with nine additional trafficking instances in the past year, compared to only four in 2016.

Country	Trafficking Instances
China	154
Kenya	59
Thailand	43
Ethiopia	38
UAE	38
Vietnam	37
Nigeria	34
Malawi	30
South Africa	26
Zimbabwe	24

Table 2. Top ten countries by number of ivory trafficking instances between January 2009 and December 2017

Figures 17–22 below include 2017 data only.

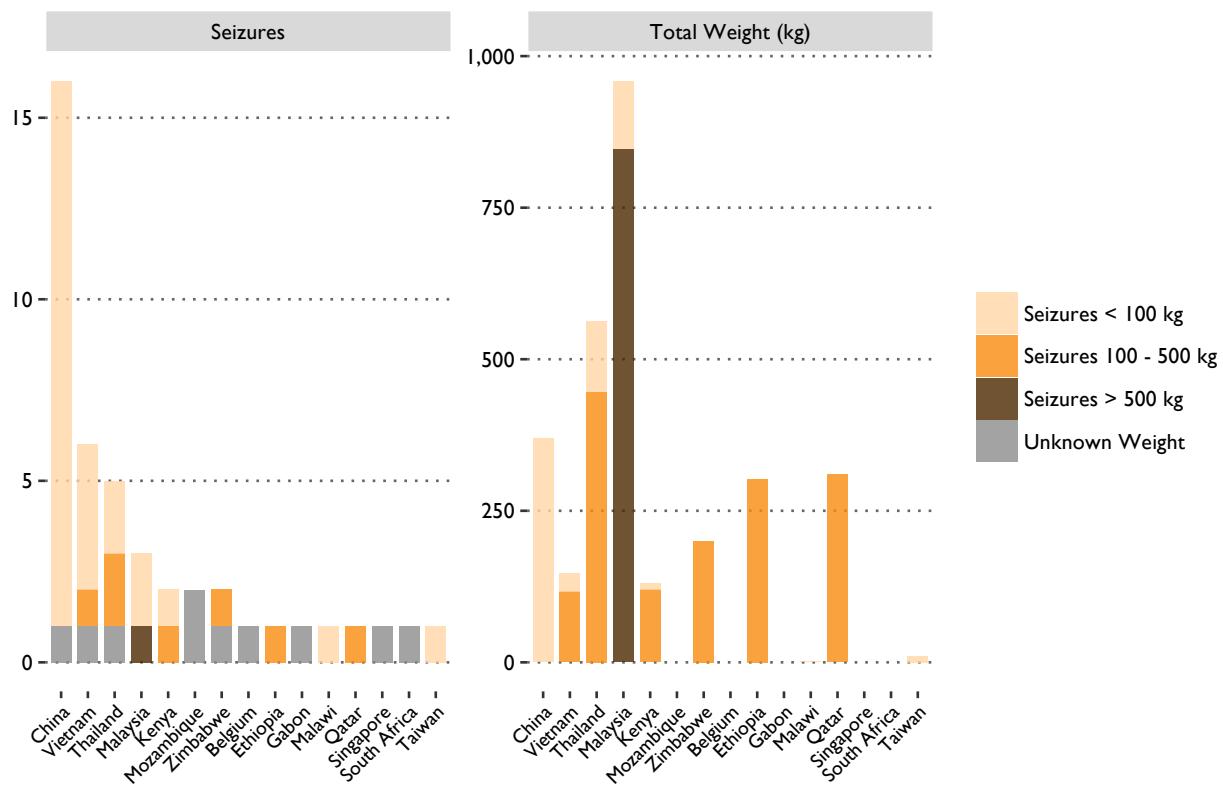


Figure 17. The total seizure count and total seizure weight by country for ivory seizures made in airports in 2017

Figure 17 measures the total seizures made, as well as the weight of each seizure, in each country with known air ivory seizures in 2017. As in the heat map, China has the greatest number of seizures (16), although each seizure was either small-scale or of unknown weight. Southeast Asian countries Vietnam (six), Thailand (five), Malaysia (three), and Singapore (one) followed, with a combined total of 15 seizures. African countries made up the majority of the remaining locations, although likely transit countries Belgium and Qatar counted one seizure each.

- *Infrequency of large-scale seizures:* Only one of the top countries by seizure count made a large-scale seizure—Malaysia, with one seizure weighing 846.2 kg. The vast majority of seizures were small-scale, although six countries made medium-scale seizures, ranging in weight from 116 to 446 kg.

The infrequency of large ivory seizures in the air transport sector may be due to heightened security for parcels shipped by air, weight restrictions on aircraft, or the associated high costs of moving large and heavy shipments as air freight. Ivory traffickers wishing to move large quantities of ivory at once will likely opt for a maritime route, since large maritime shipments are cheaper and subject to fewer restrictions and customs screenings than air freight.

- *Frequency of medium-scale seizures:* Medium-scale seizures were more common than large-scale seizures, and were made throughout the supply chain, in origin (Zimbabwe), transit (Kenya, Ethiopia, Qatar), and destination (Vietnam, Thailand) countries.

The comparative frequency of medium-scale seizures suggests some kind of cut-off point for traffickers; as the size of an ivory shipment grows, the benefits of the speed of air travel are eclipsed by rising costs and the risk of discovery. Still, up to a certain point, air travel seems to present a worthwhile option for ivory traffickers.

Note that the seizure numbers displayed in Figure 17, while generally reflective of ivory seizures in airports, are likely affected to some extent by factors external to ivory trafficking. For example, strong reporting mechanisms in places like Hong Kong ensure that most seizures in Hong Kong Airport are reported publicly, and can therefore be included in the C4ADS Air Seizure Database. Customs and enforcement authorities in common destination countries China, Thailand, Vietnam, and Malaysia may also be more effective in identifying and stopping potential ivory trafficking instances than less prominent countries, like Belgium.

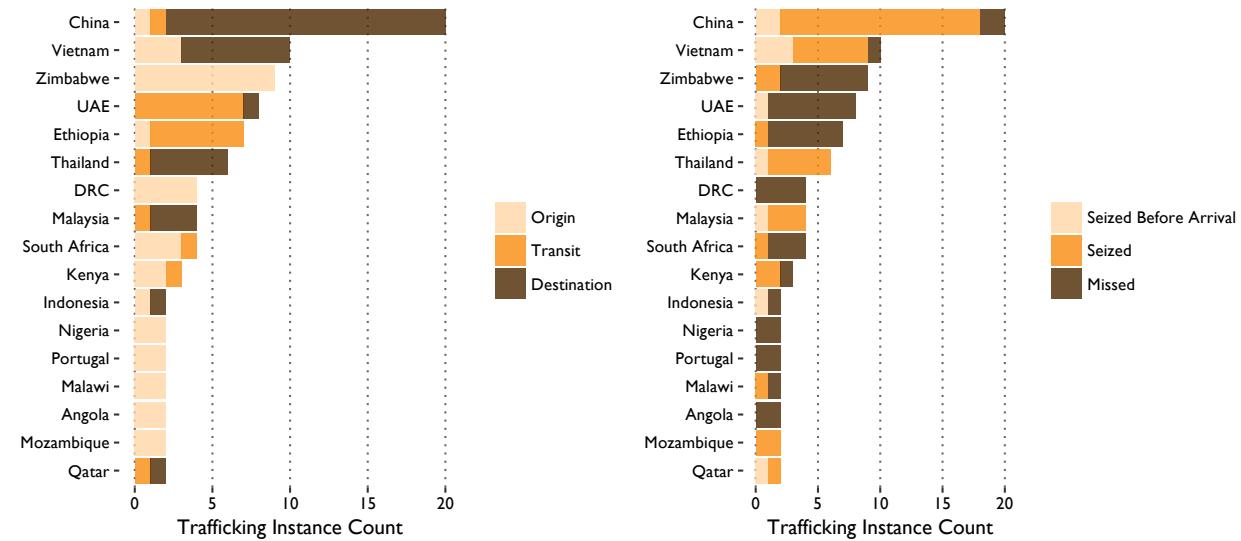


Figure 18. Country-level flight route information for countries with two or more trafficking instances in 2017

Figure 19. Point of seizure within the supply chain by country for 2017

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

Figure 18 displays the most prominent countries for ivory trafficking by air, ranked by the number of times each country was listed as an origin, transit, or destination point for a known seizure, regardless of where the seizure occurred. A number of trends are visible in Figure 18, including:

- *Few, but prominent, destination countries:* China remained the most common destination for ivory in 2017 according to the C4ADS Air Seizure Database, with 18 total destination instances. Vietnam and Thailand followed, with seven and five instances respectively. Thailand and Malaysia were both prominent destination and transit countries, perhaps reflecting the tendency for ivory trafficking instances to land in a Southeast Asian country and then be transported over the border into China,ⁱ which has far larger ivory demand markets but more effective enforcement at its airports.
- *Many origin points:* Origin countries were far more numerous than either destination or transit countries (17 compared to 11 and ten, respectively) in the 2017 ivory seizure data, reflecting the broad base of the ivory supply chain. Elephant populations endure in 15 of these 17 origin countries; ivory trafficking instances in the remaining two (Portugal and the US) primarily involved worked ivory.
- *Few transit countries:* Ivory traffickers must choose one of comparatively few flight routes between

ⁱ In other words, ivory is often flown into Thailand and Malaysia before being re-exported. These instances will appear as “destined for Thailand” or “destined for Malaysia” in the C4ADS Database, even though their true destination is elsewhere. See Lucy Vigne and Esmond Martin’s 2017 report, “The Ivory Trade of Laos: Now the Fastest Growing in the World,” for recent evidence of this phenomenon in Thailand, and TRAFFIC’s 2016 report, “Malaysia’s Invisible Ivory Channel,” for information on ivory transiting through Malaysia.

ivory's source zones in Africa and relatively few major destinations in Asia. As a result, major transit countries were limited in number, and were generally clustered in the Horn of Africa and the Middle East, with a couple of instances transiting through Southeast Asia on the way to China.

- *Unlikely destinations:* Unexpected destination countries such as the UAE and Qatar may appear in Figure 18 as a result of ivory trafficking instances that arrived in the Middle East and were then re-exported to their ultimate destination.

Re-exportation may aid ivory traffickers by obfuscating the true origin of ivory shipments, thereby reducing the chances the consignments will be discovered through risk profiling.

- *Ivory origins shifting to Southern Africa:* One potentially significant insight in particular emerges from Figure 18 in regards to ivory's most common origins. Over the past few years, elephant poaching has undergone a clear shift from previous hotspots in Kenya and Tanzania southward, to the large remaining elephant populations in Southern Africa.³⁹ Zimbabwe in particular has a sizable elephant population, and has been open about its desire to sell off its ivory stockpile to the highest bidder. It is therefore notable that Zimbabwe was the largest origin point for ivory trafficked by air in 2017, outpacing the second place contender, the DRC, by five instances, and indicating a change from 2016, when Zimbabwe only counted four origin instances.

This may be because of an ivory trafficking network that has been moving worked ivory to Hong Kong in handmade vests since at least 2015 (see **Handmade Vests in Hong Kong** in *Flying Under the Radar*, pg. 55). To date, there have been no known seizures or arrests linked to this network in Zimbabwe or in Dubai Airport, the airport the network always uses as a transit point; the mules hired by the network to smuggle ivory have exclusively been stopped in Hong Kong Airport.

Figure 19 breaks down the data in Figure 18 in terms of enforcement success. The three most successful countries (China, Vietnam, Thailand) are all primarily destination countries, highlighting the comparative ease of making seizures on arrival, rather than on departure or in transit. Destination countries also generally display the fewest number of "missed" seizures—if a trafficking instance successfully passes through each airport on its route and is not stopped by customs and enforcement at its destination airport, then there is no further chance for it to be stopped within the air transport sector, and it cannot be included in the C4ADS Database. This likely leads to a vast underrepresentation of the number of seizures that all airports along the supply chain miss, affecting destination airports in particular.

Two of the countries with the highest numbers of missed seizures, the UAE and Ethiopia, are also by far the most prominent transit countries for ivory trafficking by air, according to the C4ADS Database. Seizing illicit products in transit is particularly challenging, as passengers and shipments transiting through an airport are not usually scanned or subjected to customs screening. Furthermore, imposing customs screening procedures for transit passengers, luggage, and shipments is often unfeasible, given tight layovers and the separation of passengers from their checked baggage. Kenya, however, has refined its ability to stop ivory transiting through Jomo Kenyatta Airport. The airport's success is likely due to airport officials' high levels of awareness of ivory trafficking, frequent training programs, the comparatively small size of the airport (both in terms of square footage and daily traffic), and heavy reliance on a well-trained cadre of sniffer dogs.

Airport-by-Airport Analysis (2017)

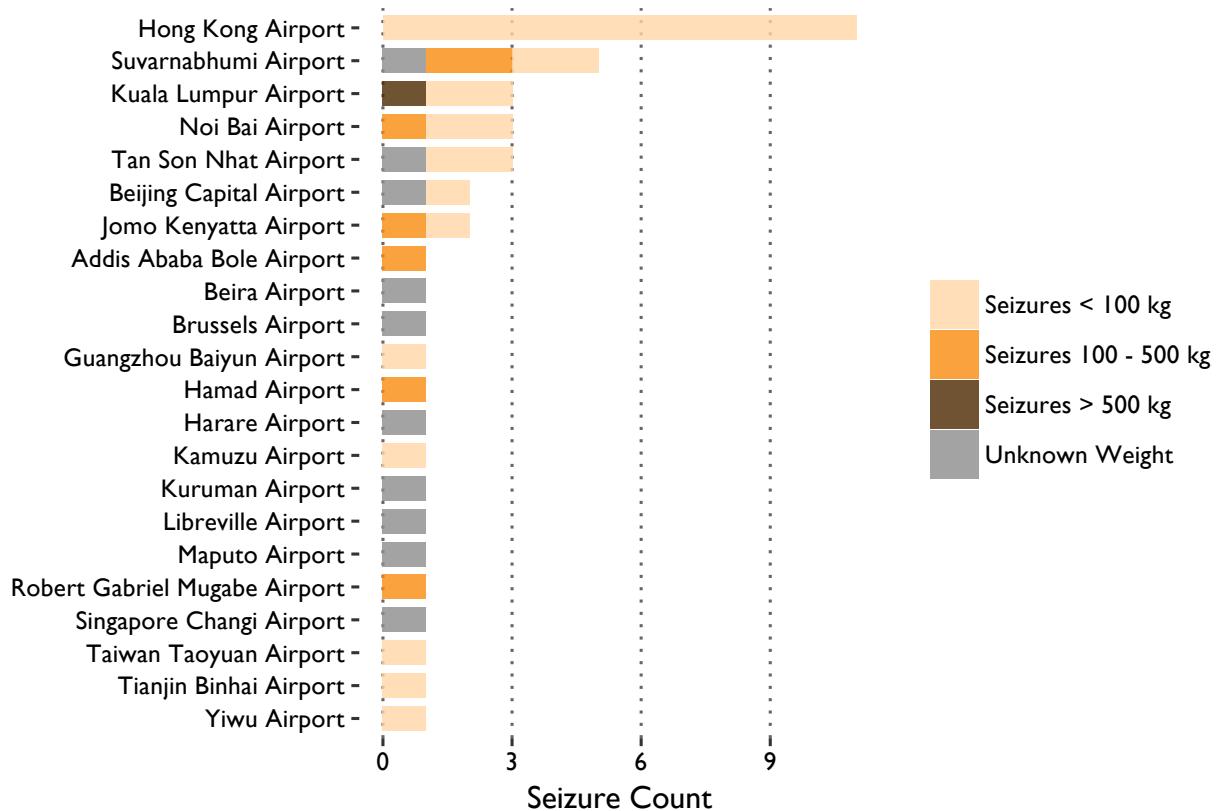


Figure 20. Airport seizure count for airports with one or more ivory seizures in 2017

Figure 20 to a large extent reflects the findings in Figures 18 and 19. The top six airports by seizure count are all located in the top four ivory destination countries (China, Vietnam, Thailand, and Malaysia), again reflecting the tendency for seizures to occur on arrival in destination airports.

- *Diminishing reliance on Jomo Kenyatta Airport:* The only non-destination airport that counted more than one seizure in 2017 was Jomo Kenyatta Airport in Kenya, which continues to be an important transit location for ivory moving from elsewhere in Africa to Asian destination markets. Jomo Kenyatta's comparatively significant number of seizures made in transit is particularly notable given the relatively low number of trafficking instances that appear to have moved through the airport in the past year.

The remaining airports were distributed across Asia (11 airports), Africa (nine airports), the Middle East (one airport), and Europe (one airport).

Circle Flow Analysis (2017)

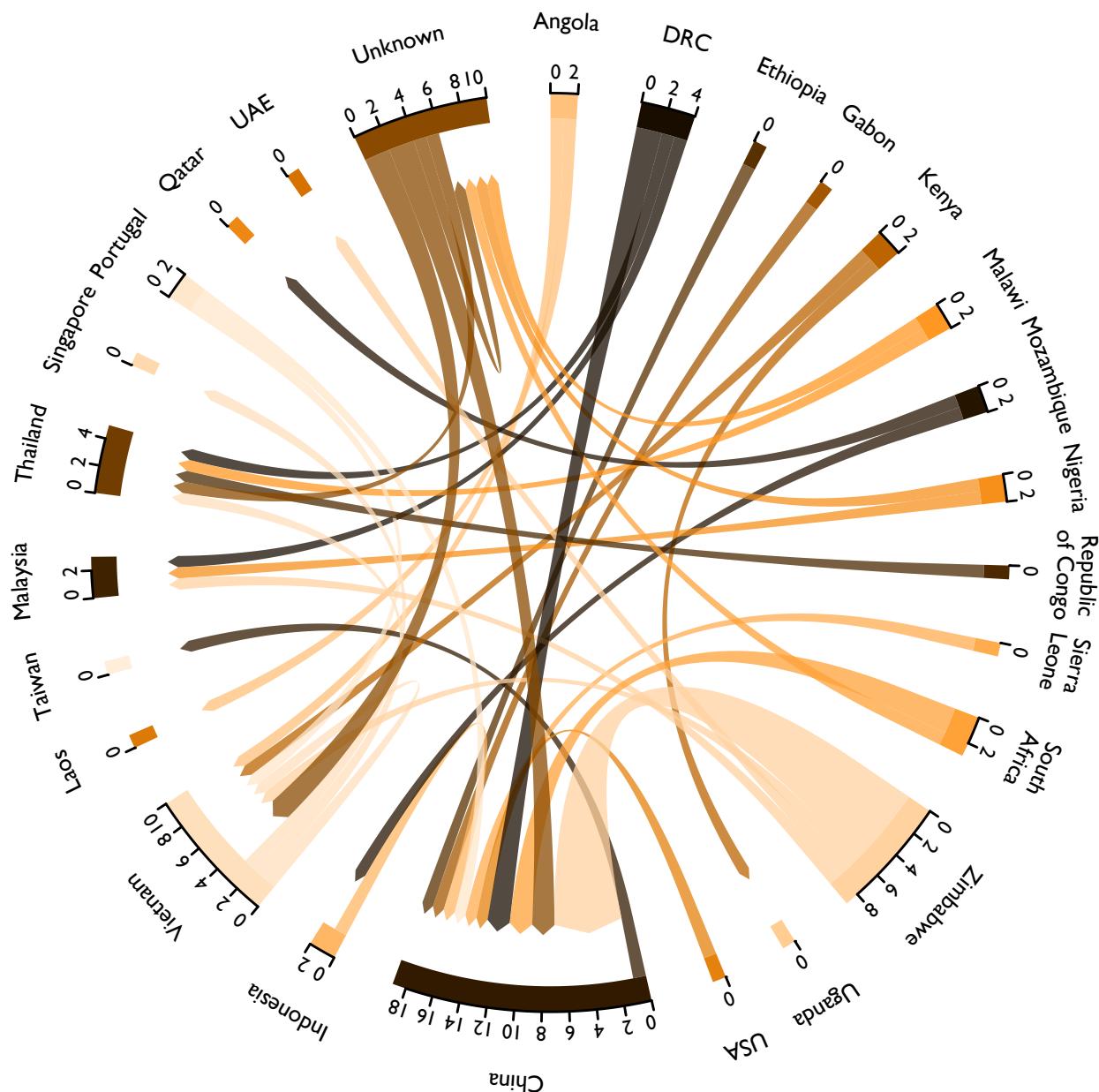


Figure 21. Circle flow map of ivory movements from origin to destination in the air transport sector in 2017

Figure 21 displays the flow of ivory seized in the air transport sector between origin and destination countries (excluding transit) in 2017, according to the C4ADS Air Seizure Database. A few key takeaways from the above circle flow map are as follows:

- **Zimbabwe to China:** Movement from Zimbabwe to China was most prominent, with six instances total. Four of these six instances involved the same handmade vest networkⁱⁱ that has been moving ivory between Zimbabwe, Nigeria, the UAE, and Hong Kong since at least 2015.

ⁱⁱ

See **Handmade Vests in Hong Kong** in Flying Under the Radar.

- *Unusual destinations:* Common transit countries Qatar and the UAE were recorded as destinations for one seizure each, from Mozambique and Zimbabwe respectively. Although it is possible that these ivory trafficking instances were destined for Qatar and the UAE, it seems more likely that the ivory was intended for re-export from the Middle Eastern nations to more usual destination points in Asia. Similarly, ivory trafficking instances destined for Thailand and Malaysia, both simultaneously prominent destination and transit countries, may have actually been destined for China.
- *Outliers:* One anomaly—an instance moving from Kenya to Uganda, the reverse of usual ivory movements in the area—involved an American missionary who seemed unaware that the bracelet she was wearing was made of ivory.⁴⁰ This instance is therefore likely not representative of general ivory trafficking trends and movements.

In general, most ivory trafficked by air during 2017 moved along the supply chain as expected, from African countries to countries in East and Southeast Asia.

Trafficking Routes Analysis (2017)

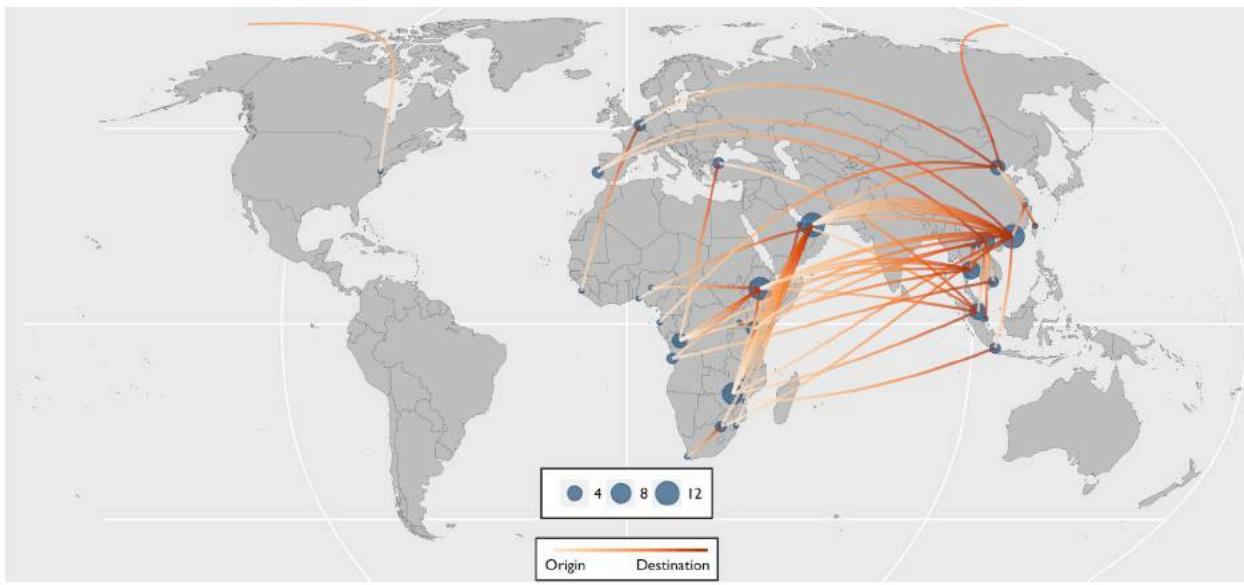


Figure 22. Ivory trafficking routes by air in 2017

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

Figure 22 depicts the flight routes used by ivory traffickers in 2017. In addition to displaying overall ivory supply chain movements from origin to destination as seen in the circle flow map, the routes map demonstrates the importance of transit airports, and can be used to more easily identify changes in smuggling trends over time. A number of the trends and fluctuations visible in Figure 22 are as follows:

- *Shifting origin points:* Ivory origin points seemed to shift towards Southern and, to a lesser extent, Western Africa, continuing a pattern that has been developing over the past few years (see **Appendix III: Routes Graphs (2015–2017)**). This shift may be reflective of enhanced enforcement in East African wildlife reserves and airports, diminishing reporting activity within East African airports, or declining elephant populations in traditional ivory origin areas (e.g. Kenya and Tanzania).
- *Shifting transit points:* Similar to trends seen in previous years, East African cities, specifically Nairobi and Addis Ababa, acted as exit points for ivory leaving Africa by air. In the past year, however, more ivory trafficking flights seemed to transit through Addis Ababa (six) than Nairobi (one), even though Jomo Kenyatta Airport in Nairobi has historically been by far the most prominent ivory transit airport in Africa, according to the C4ADS Database. This change may be a result of enforcement pressure in Nairobi; customs and enforcement officials in Jomo Kenyatta Airport seem to be unusually capable of stopping and seizing ivory trafficking instances in transit.
- *Alternative transit points:* Although ivory generally transits through airports in East Africa or the Middle East on its way to Asia, ivory traffickers occasionally use alternative routes, often to evade wary customs officials in Asia who know to watch for ivory arriving from common origin and transit airports. Ivory traffickers using this strategy generally send their ivory through airports in Europe, particularly Western African ivory traffickers.

Unlike past years, 2017 saw few known ivory trafficking instances move through Europe, with the exception of two seizures that originated in Portugal on their way to Vietnam and China.

- *Most prominent route:* The most prominent ivory route in 2017 was Harare, Zimbabwe → Dubai, UAE → Hong Kong, China (five out of 44 seizures). Four of the Harare to Hong Kong instances involved the same handmade vest network that has been operating out of Harare since at least 2015. All of the seizures associated with this route were made in Hong Kong, China.

Trafficking Methods Analysis

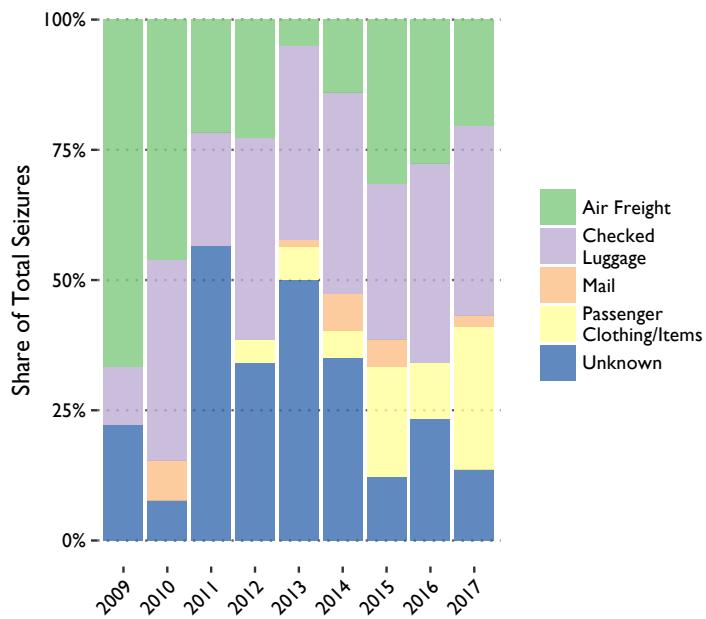


Figure 23. Transport methods for ivory trafficking instances in the air transport sector by year (2009–2017)

Figure 23 splits all of the ivory seizures in the C4ADS Air Seizure Database by transport method for each year since 2009. The *unknown* category accounts for the majority of seizures in four years out of nine, meaning that many reports of ivory seizures in the air transport sector do not include transport method information. The media's tendency to report on primarily large-scale seizures is visible between 2009 and 2011, when no reported ivory seizures were categorized as *passenger clothing/items*.

As in the past, the trafficking methods utilized by ivory traffickers in 2017 included:

- Tin foil as obfuscation method
- Abandoned luggage
- Hidden compartments in luggage or air freight boxes
- Hidden inside computer towers
- Handmade vests
- Missing, incomplete, or fraudulent documentation
- Fake destination addresses

In the past year, ivory was trafficked along with:

- Pangolin scales and bones
- Rhino horn
- Other elephant products, e.g. elephant tails
- Lion claws and teeth
- Leopard skins
- Crocodile skins

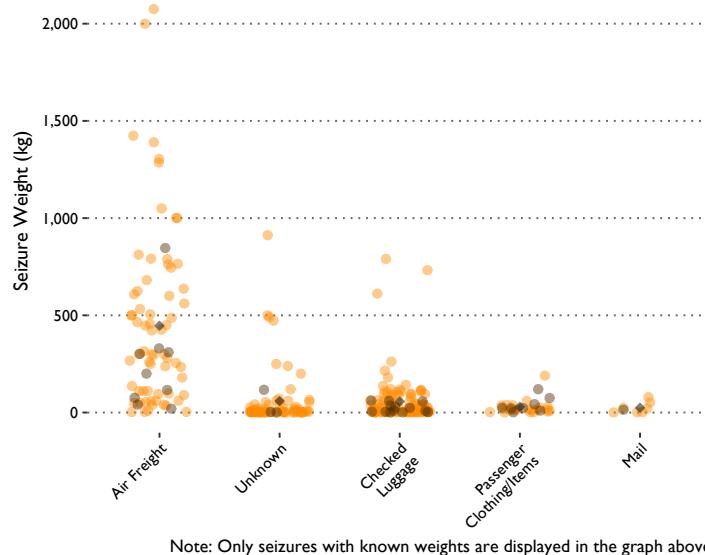


Figure 24. Ivory trafficking instances split by transport method and displayed by weight (2009–2017)

Each dot represents one seizure, and each diamond represents the mean weight of seizures for that category. Darker colored dots represent 2017 seizures.

Figure 24 presents the information included in Figure 23 slightly differently to showcase the volume of ivory moved by each transport method. While far more trafficking instances are moved by *luggage* than by *air freight*, the latter category accounts for 74% of all seized ivory moved by air, according to the C4ADS Air Seizure Database.

Passenger clothing/items seizures were relatively infrequent, generally involved worked ivory, and only accounted for a small fraction (2%) of the total weight of ivory seized in the air transport sector over the past nine years.

Transport Method	Seizures	Mean Weight	Total Weight (kg)
Air Freight	79	446.3	33,029.3
Unknown	114	58.8	4,112.7
Checked Luggage	130	57.1	6,396.5
Passenger Clothing/Items	39	29.7	890.9
Mail	10	24.2	193.5

Table 3. Ivory transport methods by number and weight (2009–2017)

Handmade Vests in Hong Kong—An Update

A trend involving the use of tailor-made vests to traffic ivory through the Hong Kong Airport, previously identified and discussed in *Flying Under the Radar*, has continued over the past year, with initial indicators suggesting the same network is responsible.⁴¹

Since August 2016, which marked the cutoff for data analyzed in *Flying Under the Radar*, Hong Kong Customs has made four separate seizures involving ivory trafficked in handmade vests. All four of the most recent instances conformed to the same trafficking route outlined in *Flying Under the Radar* (Harare, Zimbabwe to Dubai, UAE to Hong Kong).

There were, however, several slight deviations from the norm.

First, the average quantity of ivory seized per suspect increased from about 15 kg to at least 20 kg. For instance, on October 9, 2016, two men traveling from Harare, Zimbabwe to Hong Kong via Dubai were arrested with 40 kg of worked ivory hidden in two tailor-made vests.⁴² Ten days later, on October 19, 2016, Hong Kong Customs arrested three men that were traveling the same route with three vests containing 60 kg of ivory.⁴³



Image 1: Ivory seized on October 9, 2016.



Image 2: Ivory seized on October 19, 2016.

Source: Hong Kong Customs and Excise Department

The two other seizures, which occurred on August 25, 2017, and September 9, 2017, involved quantities of 23 and 22 kg, respectively.⁴⁴ In both instances, however, in addition to using a tailor-made vest, ivory was wrapped in plastic and concealed within the passenger's carry-on luggage.⁴⁵



Image 3: Ivory seized on August 25, 2017.



Image 4: Ivory seized on September 9, 2017.

Source: Hong Kong Customs and Excise Department

The August 25 seizure also varied from the norm in that it involved a 22-year-old woman, the first female to be arrested for using a tailor-made vest to traffic ivory.

The continued use of tailor-made vests by ivory trafficking networks operating between Zimbabwe and Hong Kong suggests the scheme has been relatively successful. To date, there have been no known seizures matching this *modus operandi* in Dubai or Zimbabwe.

Computer Towers from Zimbabwe

Two seizures from 2017 provide insight into a potential new ivory trafficking method.

On May 31, 2017, Hong Kong Customs searching the luggage of a 27-year-old man found four computer towers in his possession.⁴⁶ After opening the towers, Customs officers discovered false compartments that concealed 47.4 kg of suspected worked ivory and 14.5 kg of suspected raw ivory.



Image 5. Ivory obfuscated in computer towers confiscated in the May 31, 2017 seizure.

Source: Hong Kong Customs and Excise Department

Months later, on September 16, 2017, Hong Kong Customs officials discovered four more computer towers being transported in the luggage of two male passengers.⁴⁷ Each tower contained a false compartment hiding worked ivory, amounting to 60 kg of suspected worked ivory. The passengers had arrived from Zimbabwe after transiting through Dubai.



Image 6. Ivory from the September 16, 2017 seizure.



Image 7. Computer towers found in baggage in the September 16, 2017 seizure.

Source: Hong Kong Customs and Excise Department

Trafficking networks often utilize the same trafficking method multiple times within a relatively short timeframe. It is therefore likely that one Zimbabwe-based network was behind both computer tower seizures in 2017. The fact that the computer tower seizures relied on the same route as the handmade vest seizures suggests that either the same network is moving both types of trafficking instances, or that multiple Zimbabwe-based trafficking groups possess ivory cutting tools (all seizures have been of ivory cut into pieces) and have realized that Zimbabwe, through Dubai, to Hong Kong is a fairly successful trafficking route (the high number of seizures made along this route may indicate an even higher number of successful trafficking attempts).

Rhino Horn

In total, the C4ADS Air Seizure Database counted 133 rhino horn seizures weighing 1,920 kg between 2009 and 2017. The past year saw a significant spike in rhino horn seizures, with 41 total seizures weighing 636.2 kgⁱ in 2017, compared to 14 seizures weighing 299.7 kg the previous year (equivalent to a 193% increase in seizure numbers, and a 112% increase in seizure weight).

- Increasing seizure numbers:* After an overall low of two seizures in 2011, rhino horn seizures have been on a slow upward trend, despite fairly considerable annual variation. However, rhino horn seizures of every size increased significantly in 2017. Small-scale seizures increased the most, followed by medium- and large-scale seizures respectively.

Similar to the spike in the total number of rhino horn seizures in the past year, the total weight of seized rhino horn in the air transport sector more than doubled between 2016 and 2017. At the same time, the average weight of each seizure fell to 15.5 kg from 23.1 kg in 2016. This can be explained by the corresponding spike in small- and medium-scale seizures in 2017, particularly in comparison to 2016, when large-scale rhino horn seizures were more numerous than medium-scale seizures for the first time since 2009.

Overall, rhino horn trafficking by air appears to be experiencing an exceptional surge in activity, characterized by a rise in known rhino horn trafficking instances of all sizes.

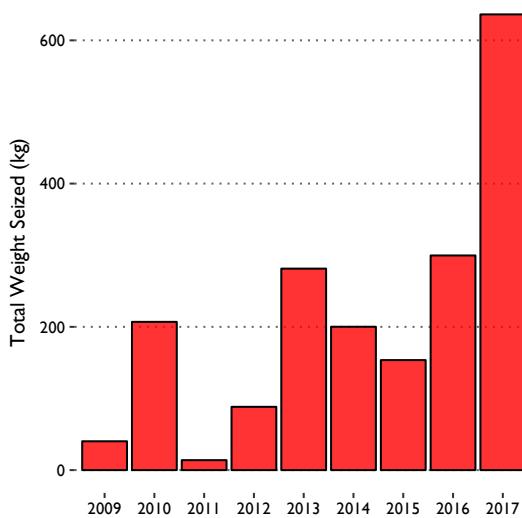


Figure 26. Total weight of rhino horn seizures by year

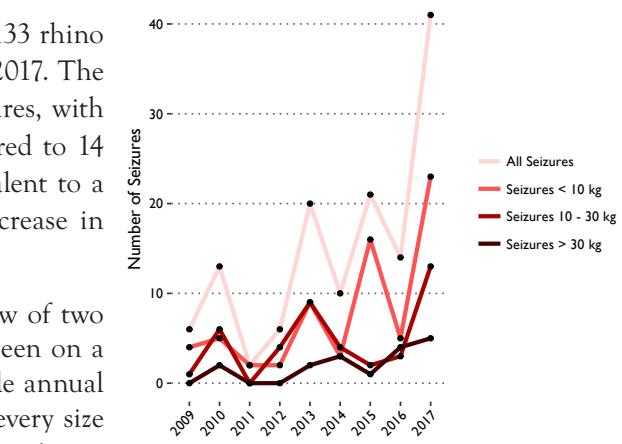


Figure 25. Number of rhino horn seizures made in airports by year (2009–2017)

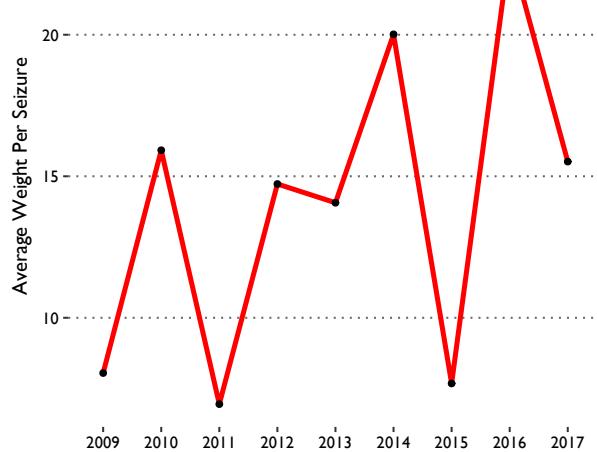


Figure 27. Average weight (kg) of rhino horn seizures by year

ⁱ Rhino horn seizures are variously reported by number and/or by weight, complicating assessments of the total size of rhino horn seizures in any given time period. In order to estimate an approximate total weight for rhino horn seizures, each seized rhino horn with an unknown weight in the C4ADS Air Seizure Database was assigned an approximate weight of 2.78 kg, in accordance with Tom Milliken's estimates in *Illegal Trade in Ivory and Rhino Horn: An Assessment to Improve Law Enforcement Under the Wildlife TRAPS Project* (2014). See: Miliken, T. (2014). *Illegal Trade in Ivory and Rhino Horn: An Assessment Report to Improve Law Enforcement Under the Wildlife TRAPS Project*. USAID and TRAFFIC. <http://traffic.org/publications/reports/illegal-trade-in-ivory-and-rhino-horn-an-assessment-to-improve-law-enforcement/>

Country-by-Country Analysis

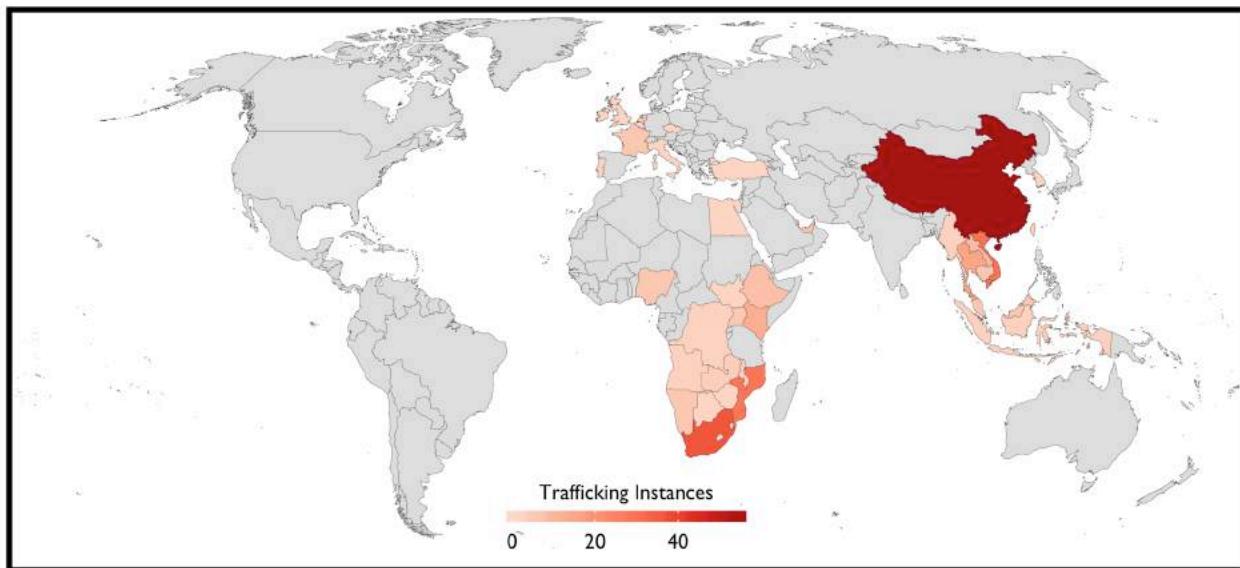


Figure 28. Global heat map for rhino horn trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

The heat map for rhino horn trafficking instances (Figure 28) highlights each country with attempted or actual rhino horn trafficking activity through its airports between January 2009 and December 2017. China, Vietnam, and Southern Africa emerge as the most significant areas for rhino horn trafficking by air.

- Mirrors ivory heat map, but with a narrower supply chain: Rhino horn trafficking occurs in generally the same jurisdictions as ivory trafficking, although it is much more limited in scope. While ivory trafficking activity (Figure 26) appears throughout Africa, Asia, Europe, the Middle East, and even the United States and Australia, rhino horn trafficking activity concentrates in Africa and Asia, extending occasionally into Europe and the Middle East. Rhino horn's narrower supply chain is largely due to its more limited source zones (rhinos only remain in significant numbers in Southern Africa), as well as more limited demand for rhino horns and rhino horn products.
- China remains preeminent: Although Vietnam is often considered the most significant demand country for rhino horn,⁴⁸ C4ADS' seizure data continues to highlight China as the most prominent country for rhino horn trafficked by air in the world.

The past year's spike in seizures drove an even bigger gap between China and Vietnam; while China previously counted only ten air trafficking instances more than Vietnam between 2009 and 2016, the countries are now separated by at least 27 trafficking instances, since China's trafficking instance count grew by 73% in 2017.

Country	Trafficking Instances
China	57
South Africa	37
Vietnam	30
Mozambique	29
Qatar	15
Thailand	15
Kenya	12
Laos	8
Ethiopia	7
UAE	7

Table 4. Top ten countries by number of rhino horn trafficking instances between January 2009 and December 2017

- *Growing prominence of South Africa:* Prior to 2017, Mozambique and Vietnam followed China as the most significant countries for rhino horn trafficking activity by air. But as rhino horn seizures have surged, South Africa has overtaken both countries by trafficking instance count, with 19 more instances in one year (a 106% increase). By comparison, Mozambique and Vietnam only measured seven more instances in the same timeframe each.

The large upsurge in known trafficking activity out of South Africa may be related to the changing legality of rhino horn sales in the country over the past year. Although the domestic trade in rhino horn was banned in South Africa in 2009, a 2015 lawsuit filed by John Hume, a well-known South African rhino breeder, and another breeder resulted in the repeal of the ban in 2017.⁴⁹ iiHume scheduled an auction of 264 rhino horns for late August 2017, and although “[t]he auction yielded fewer sales and fewer bidders than anticipated,” the “legal domestic trade has now been established and the road has been paved for future sales.”⁵⁰ Critics have argued that any legalization of the rhino horn trade will result in more rhino horn trafficking activity, and, more importantly, more rhino poaching deaths, as traffickers exploit the legal trade to obfuscate their illicit dealings. The spike in rhino horn air seizures in 2017 may be the first indication of the realization of this concern.

- *Absence of India:* Although India is home to the greater one-horned rhino species, which currently numbers around 3,500 rhinos,⁵¹ the C4ADS Database contains no rhino horn trafficking instances involving India between 2009 and 2017. But rhino poaching in India has been increasing over the past few years, with 41 rhinos killed in 2013 alone,⁵² begging the question—where are Indian rhino horns going, and how?

A map of publicly available rhino horn seizures from 2006 to 2017 produced by the Environmental Investigation Agency (EIA) displays rhino horn seizures regardless of mode of transport (air, maritime, or land), and may shed some light on the situation.⁵³ While the map includes quite a few rhino horn seizures in India, particularly in the northeast of the country, none of the seizures seem to take place in an airport. Instead, the seizures occur on land, and tend to cluster on the India-Nepal and Myanmar-China borders. This suggests that Indian rhino horns are smuggled by land from India into and through neighboring countries, particularly since there is no known population of rhinos currently living in Myanmar.⁵⁴

ii Buyers and sellers must acquire special permits to trade rhino horns in South Africa. Despite the legalization of the domestic rhino horn trade, the international trade in rhino horn remains prohibited.

Figures 29–34 below include 2017 data only.

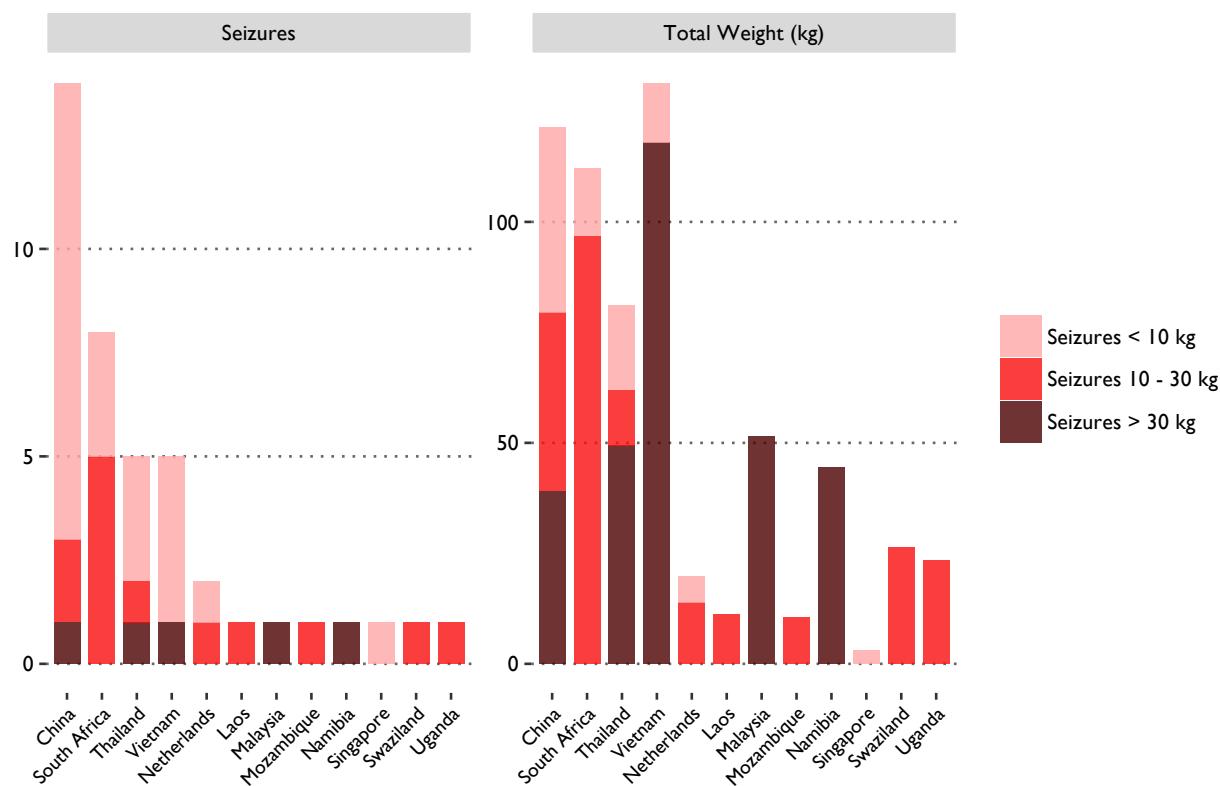


Figure 29. The total seizure count and total seizure weight by country for rhino horn seizures made in airports in 2017

Three of the top four countries by seizure count (Vietnam and Thailand are tied with five seizures) are the most common destinations for rhino horn trafficked by air in the world. China made the most seizures (14), followed by South Africa with eight.

- *Shifting origin points:* In 2017, South Africa outpaced Mozambique by both trafficking instances and seizure count; Mozambican authorities made only one known rhino horn air seizure in the past year, while South African authorities made at least eight.

With the exception of the Netherlands, the rest of the countries that made rhino horn seizures in 2017 made only one each, and were largely concentrated in Central and Southern Africa and Southeast Asia.

Small-scale seizures were most prevalent, but almost exclusively occurred within Asian destination countries. With the exception of South Africa, seizures in potential origin countries (Mozambique, Namibia, Swaziland, and Uganda) were either medium- or large-scale. The high number of small-scale seizures in destination countries therefore suggests that quite a few small-scale trafficking instances are moving through African airports undetected. This could be due to customs' focus on imports rather than exports or transit, or it could be a result of the particular effectiveness of certain Asian customs and enforcement agencies, which are able to detect even small amounts of contraband arriving from high-risk jurisdictions.

Large-scale seizures were relatively infrequent, but once again occurred almost entirely in Asian destination countries.ⁱⁱⁱ The lack of large-scale seizures in South Africa, the most prominent origin country for rhino horn,

ⁱⁱⁱ The sole large-scale rhino horn seizure occurring in Namibia involved a mail parcel containing 16 rhino horn pieces concealed amongst coffee beans. Since the seizure's weight was not reported, an estimated weight of 44.48 kg has been used. This seizure mirrored the *modus operandi* of a seizure that occurred one month earlier in Hong Kong; in both

may suggest that South African customs and enforcement officials are missing or not reporting large rhino horn shipments, that smaller shipments originating in South Africa are consolidated in other countries, or that, at least in the past year, large rhino horn trafficking instances originated elsewhere.

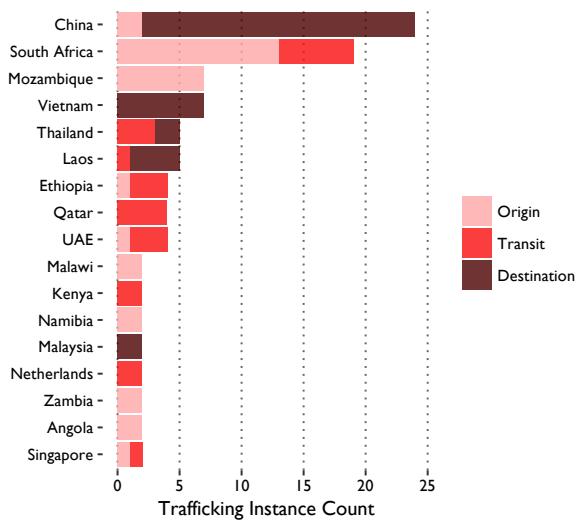


Figure 30. Country-level flight route information for countries with two or more trafficking instances in 2017

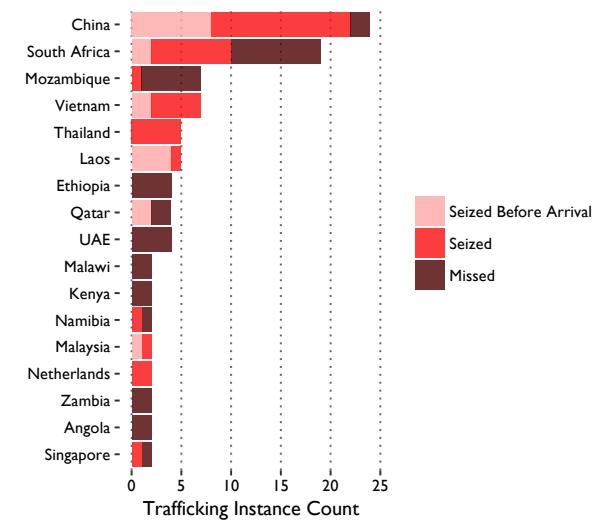


Figure 31. Point of seizure within the supply chain by country for 2017

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

Figure 30 reiterates a number of the trends seen earlier in this section, including:

- *Southern Africa as an origin point:* Although rhino horn trafficking routes appear similar to ivory routes, rhino horn traffickers clearly rely much more heavily on Southern Africa as a source region. Every significant origin country in Figure 30 (those countries counting more than one origin instance)—with the exception of China—are located in Southern Africa (South Africa, Mozambique, Malawi, Namibia, Zambia, and Angola).
- *Narrowing supply chain and unusual origin points:* Similar to ivory, the rhino horn supply chain is broad at its base and narrows as it approaches its destination. The rhino horn supply chain overall is slightly more condensed than ivory's, with 15 origin countries in the past year compared to ivory's 17, and eight destination countries compared to ivory's 11.

Rhino horn trafficking's origins may be even more condensed than they seem; three unusual rhino horn trafficking instances allegedly originating in the UAE, Ethiopia, and Singapore may be examples of rhino horn that had been trafficked previously, and was then stockpiled in a common transit country before being sent to its ultimate destination.

- *Increased prominence of South Africa and decline of Mozambique:* Once again, South Africa appears unusually prominent in Figures 30 and 31 compared to trends seen in past years. Between 2009 and 2016, South Africa ranked fourth in terms of rhino horn air trafficking instance count, and Mozambique third. This year, rhino horn trafficking in South Africa surpassed Mozambique, counting over twice as many rhino horn trafficking instances.

instances, a mail parcel containing coffee beans and rhino horn pieces flew out of Namibia destined for Asia (the first seizure weighed only 6.6 kg). Namibian authorities believed both seizures to be associated with the same Namibia-based trafficking syndicate.

Source: "Rhino horns intercepted at airport." Namibian Sun. 19 May 2017. www.namibiansun.com/news/rhino-horns-intercepted-at-airport.

Although trafficking activity alone could be behind Mozambique's and South Africa's evolving relevance to the rhino horn trade, Mozambique may also appear less prominent in this year's data due to a decline in enforcement or seizure reporting in Mozambique or rhino horn destination countries. Similarly, South Africa's rise above Mozambique could be partly due to the effectiveness of South African customs and enforcement, which were able to stop an unusually high number of rhino horn trafficking instances for an origin and transit country (destination countries tend to make the most seizures) (Figure 31).

Figure 30 also reveals at least one apparent anomaly:

- *China as an origin point:* Although China is almost exclusively a destination point for rhino horn, two separate seizures in November 2017 originated in China and were destined for elsewhere in the country. In the first seizure, Hong Kong Customs discovered 0.8 kg of rhino horn pieces taped to the body of a passenger arriving from Xiamen.⁵⁵ In the second seizure, officials in Guilin Liangjiang Airport discovered 6.5 kg of rhino horn in the luggage of a passenger arriving from Hong Kong.⁵⁶ This second seizure was reported as the first known instance of rhino horn trafficking in Guilin Liangjiang Airport.⁵⁷

Figure 31 reveals where the trafficking instances in Figure 30 were ultimately seized. As with ivory, three of the four that made the most seizures (China, Vietnam, and Thailand) are all prominent destinations for rhino horn, once again pointing to the heightened ability of customs and enforcement officials to make seizures on arrival.

Airport-by-Airport Analysis (2017)

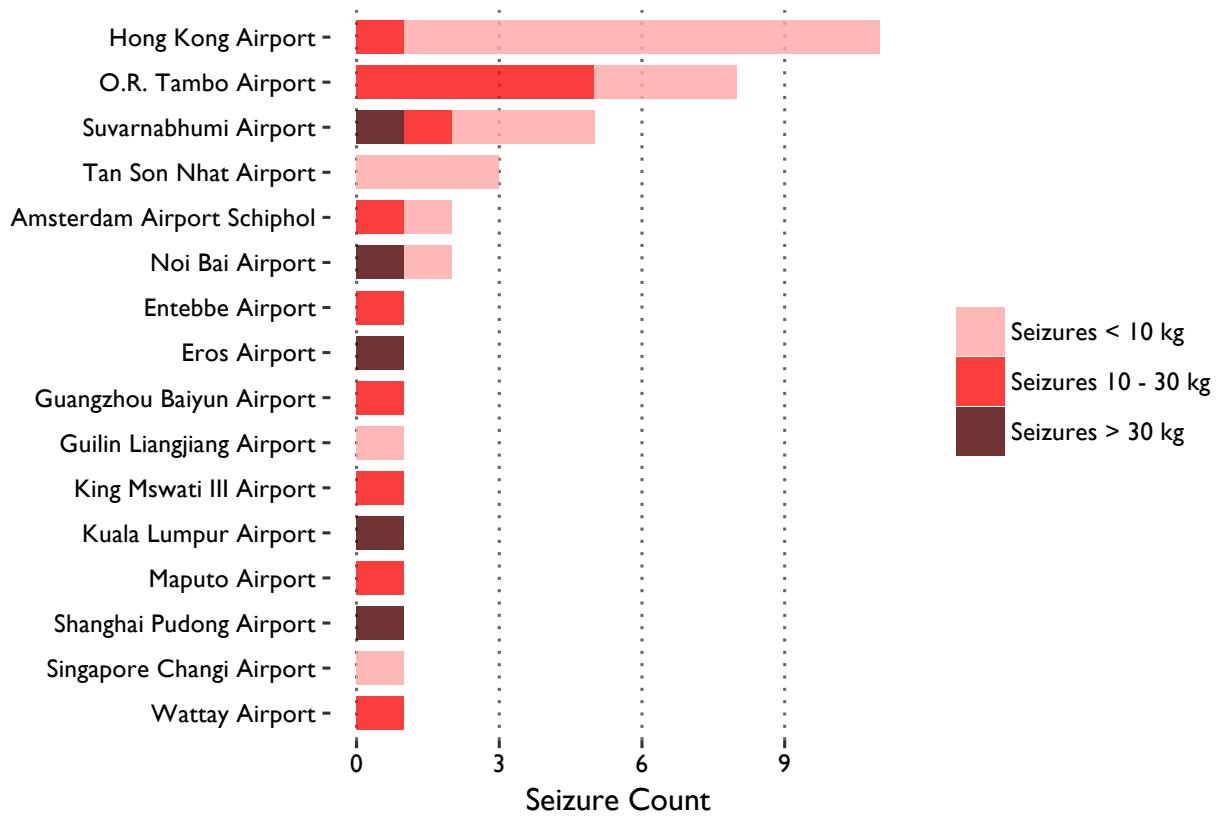


Figure 32. Seizure count for airports with one or more seizures in 2017

The top airports by rhino horn seizure count in 2017 were closely aligned with the top countries by trafficking instance count.

- *Prevalence of Hong Kong Airport:* Figure 32 demonstrates that China's prominence as a destination country for rhino horn in 2017 was largely driven by the high number of rhino horn seizures made in Hong Kong Airport in the past year. Other Chinese airports (Guangzhou Baiyun, Guilin Liangjiang, and Shanghai Pudong) contributed only one seizure each to China's total of 14 seizures.
- *Prevalence of Suvarnabhumi Airport:* Although Vietnam experienced more rhino horn trafficking instances in 2017 than Thailand, authorities in Thailand's Suvarnabhumi Airport may have been comparatively more successful than their Vietnamese counterparts in terms of actual rhino horn seizures made in the past year, with authorities in Suvarnabhumi stopping more rhino horn trafficking instances than Vietnamese authorities in either Tan Son Nhat or Noi Bai. However, both countries have stopped an equal number of rhino horn air trafficking instances (five) when seizures made in both Vietnam's Tan Son Nhat and Noi Bai Airports are taken together. The apparent prevalence of Suvarnabhumi may therefore be due to its role as Thailand's only major international airport.
- *Breakdown of small- and medium-scale seizures by location:* Figure 32 suggests that there may be a relationship between the size of a seizure and the point where it occurred along the supply chain. For example, the majority of small-scale seizures seem to be made in destination airports, although some were made in South Africa (origin, transit) and the Netherlands (transit) as well. This may be more evidence of customs agencies' focus on arrivals, rather than on departures or transiting flights,

making seizures at origin and transit points more unlikely (small-scale trafficking instances being particularly difficult to find, in part because they display fewer red flags than large- or medium-scale instances).

To that point, it is notable that a majority of medium- and large-scale rhino horn seizures were made in common origin and transit airports—in other words, where detection is more difficult, customs and enforcement are more likely to uncover larger trafficking instances.

- Appearance of Amsterdam Airport Schiphol: Europe is occasionally used by ivory and rhino horn traffickers as an unusual stopover on the way to Asian destination countries. In both seizures involving Amsterdam Airport Schiphol in 2017, traffickers were moving rhino horn from South Africa to Asia. In the first instance, Dutch customs officials discovered a crate containing 12 rhino horns hidden inside “wooden carvings of human heads” en route from South Africa to Laos.⁵⁸ In the second, Dutch officials found five rhino horns and four likely rhino horn items in the luggage of a Chinese national returning from South Africa to Shanghai.⁵⁹

Circle Flow Analysis (2017)

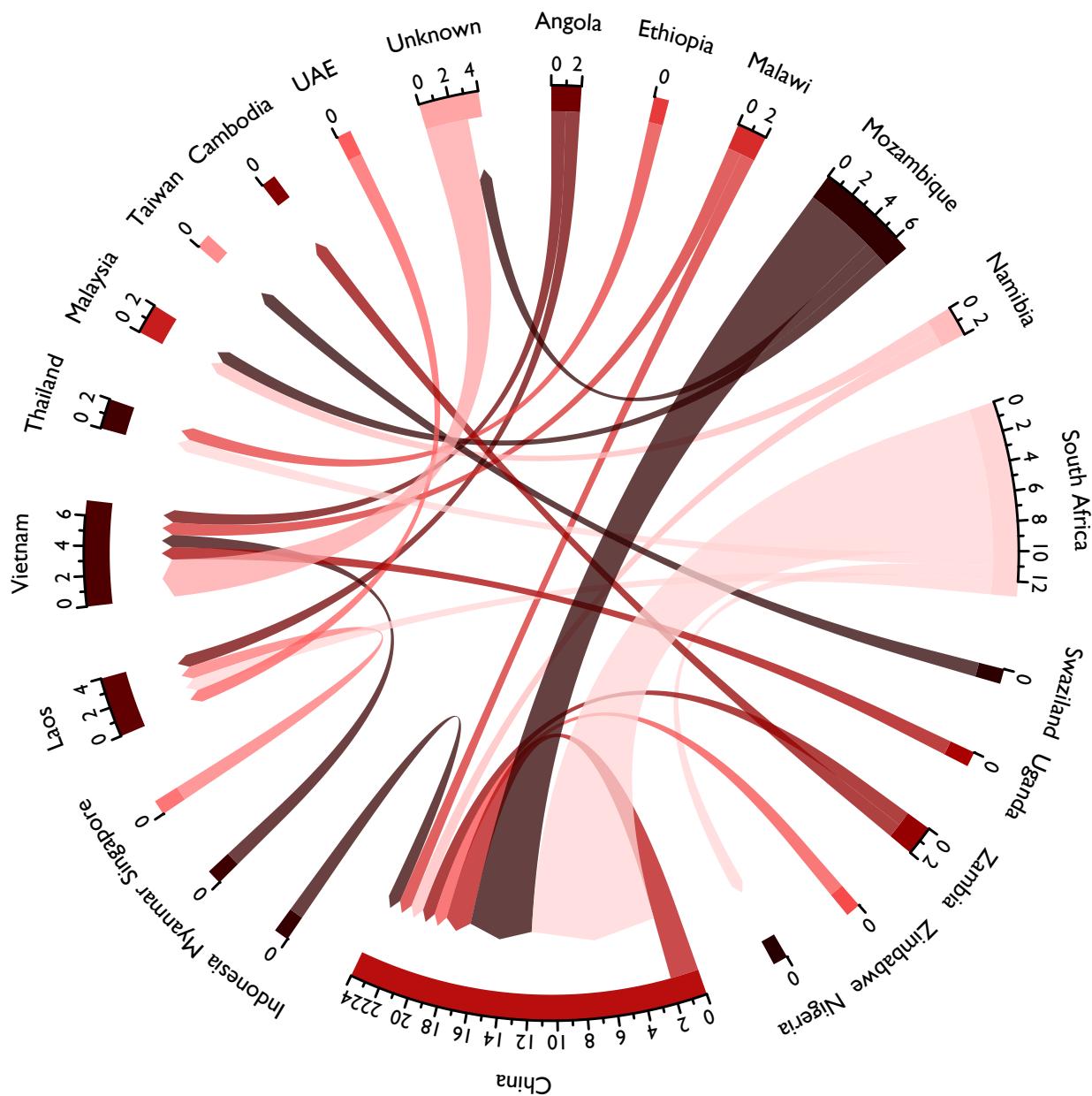


Figure 33. Circle flow map of rhino horn movements from origin to destination in the air transport sector (2017)

Figure 33 displays the flow of seized rhino horn between origin and destination countries (excluding transit) in 2017. A few key takeaways from the above circle flow map are as follows:

- **South Africa to China:** China was the destination for more than half of the rhino horn seizures made in 2017. South Africa was the origin point for just under half (45%) of the rhino horn trafficking instances destined for China.
- **Southern African origins:** South Africa and Mozambique accounted for nearly 50% of all illicit rhino horn exports moved through the air transport sector. Taken together, 73% of all rhino horn air trafficking instances in 2017 originated in a Southern African nation.

- *Prominence of China:* Although Vietnam is often described as the world's largest market for rhino horn, China was listed as the destination for more than three times as many rhino horn trafficking instances as Vietnam in 2017 (22 trafficking instances were destined for China, while only seven were destined for Vietnam).
- *Inter-Asian travel:* At least eight rhino horn trafficking instances originated outside of Southern Africa and were destined for Asia. Five of those instances left from an Asian country (China, Indonesia, Myanmar, or Singapore) for another Asian country (China, Vietnam, or Laos). These are likely either examples of intra-Asian rhino horn trafficking (small populations of rhinos still exist in Indonesia) or of rhino horn moving through lesser demand markets in Southeast Asian countries before arrival in China, Vietnam, or Laos, the biggest demand countries for rhino horn in 2017, according to the C4ADS Air Seizure Database.

Overall, no rhino horn air trafficking routes in 2017 were particularly unusual; in general, rhino horn moved down the supply chain as expected, from Southern Africa to Asia.

Trafficking Routes Analysis (2017)

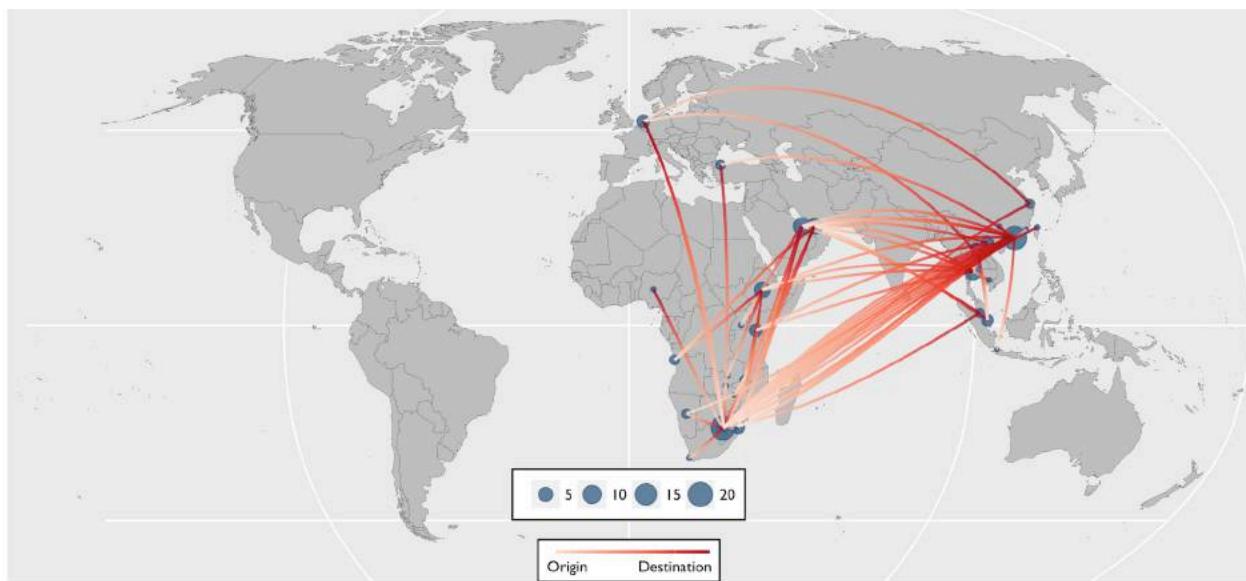


Figure 34. Rhino horn trafficking routes by air in 2017

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

The rhino horn routes map both reinforces the overall Southern Africa to East Asia movement seen in the rhino horn circle flow map, and demonstrates the importance of transit airports. A number of the fluctuations visible in Figure 34 are as follows:

- *Shifting transit points:* Rhino horn trafficking routes shifted slightly away from Jomo Kenyatta Airport in Nairobi in the past year, and slightly more towards other common transit cities Doha, Qatar; Dubai, UAE; and Addis Ababa, Ethiopia (see **Appendix III: Routes Maps 2015–2017**). This shift could have occurred in response to enforcement pressure in Nairobi, or it could have happened in response to changing flight routes between Africa and Asia.

For instance, a quick search of available flights from OR Tambo Airport in Johannesburg, South Africa to Hong Kong Airport reveals that the majority of flights between both airports transit through Dubai, Bangkok, Addis Ababa, Abu Dhabi, or Doha.⁶⁰ A number of the available flights are nonstop, avoiding transit airports all together. Very few fly through Nairobi.

- *Emerging transit points:* Istanbul, Turkey also emerged as a potential new transit location for rhino horn in 2017. A June seizure in OR Tambo Airport that was intended to travel from Johannesburg, through Istanbul, to Hong Kong marked the first known time that Istanbul has been chosen as a transit city by rhino horn traffickers.⁶¹
- *Shifting destination points:* Although a prominent destination in past years, Beijing disappeared completely from known rhino horn trafficking flight routes in 2017. At the same time, Hong Kong dominated, accounting for 18 out of 22 rhino horn instances (82%) destined for China. The prevalence of Hong Kong trafficking instances in the data could be a result of good reporting standards in both Hong Kong Airport and OR Tambo Airport, the primary origin point for rhino horn destined for Hong Kong in 2017, or it could be because traffickers are increasingly relying on the direct flights between both airports.

A number of the ongoing trends visible in Figure 34 are as follows:

- *Johannesburg, South Africa → Hong Kong, China:* Similar to past years, the most common flight route in 2017 connected Johannesburg, South Africa to Hong Kong, China. This route, which was used nine times, was one of only seven rhino horn trafficking routes that were used more than once in 2017, and was the only route to be used more than twice. The high number of identified trafficking instances between Johannesburg and Hong Kong is likely reflective of high levels of rhino horn trafficking activity along that route, effective enforcement, and standardized seizure reporting protocols.
- *Johannesburg as a transit point:* Although the flight paths in the routes map somewhat obscure this detail, Johannesburg continued to be a significant transit point for rhino horn originating elsewhere in Southern Africa (e.g. Namibia, Mozambique, Zambia) and destined for East and Southeast Asia.

Trafficking Methods Analysis

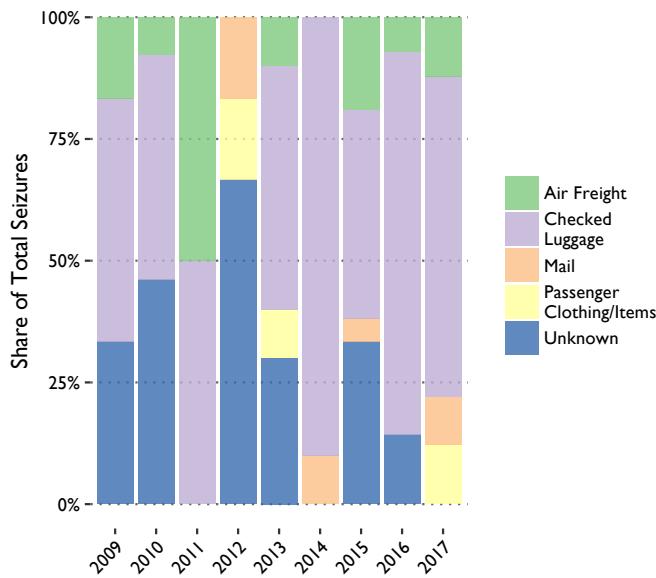


Figure 35. Transport methods for rhino horn trafficking instances in the air transport sector by year (2009–2017)

Figure 35 divides the rhino horn seizures in the C4ADS Air Seizure Database by transport method for each year since 2009. *Unknown* seizures have been on a fairly steady decline since 2012, likely reflecting heightened media and public interest in rhino horn trafficking by air.

Checked luggage seizures of rhino horn continued to dominate in 2017, accounting for 65.9% of all rhino horn seizures. The *air freight* category also continued to play an important role in rhino horn trafficking in 2017, making up 12% of all seizures, close to the 2009 through 2016 average of 14%.

- *Re-emergence of passenger clothing and carry-on items as a rhino horn transport method:* For the first time since 2013, multiple seizures in 2017 involved either rhino horn pieces that had been taped underneath a passenger's clothes, or rhino horn pieces that had been hidden inside another object and placed in carry-on bags.

This change could be reflective of the potential diversification of rhino horn trafficking methods as rhino horn trafficking activity has increased in the past year, or it could be representative of customs and enforcement officials' increasing awareness of and ability to detect rhino horn, even in cases where the horn has been broken down into shards.

In *Flying Under the Radar*, C4ADS mentioned that rhino horn traffickers may have been successfully moving small pieces of rhino horn or rhino horn powder through airports without getting caught. The above seizures and a recent finding by TRAFFIC seem to have proven this theory correct. In an interview with TRAFFIC for their report, *Pendants, Powder and Pathways*, Major General (Retd.) Johan Jooste, Head of Special Projects for South African National Parks (SANParks), explained:

It is a growing problem. The syndicates no longer want to export whole horns. They have begun cutting them up into what they call 'disks' and large beads in line with demand on the market side and in order to avoid detection here. The methods have changed. Initially, horns were being concealed in wine boxes, or between sweets and clothes, or inside statues and pottery; things like that. Now they've learnt from arrests that have disrupted their activities that it works out better for them to work the horn here and then take it out of the country. It makes it much easier to avoid detection.⁶²



Image 8. 1.8 kg of suspected rhino horn pieces discovered by Hong Kong Customs in the backpack of a male passenger arriving from Mozambique via South Africa Source: Hong Kong Customs

Passenger seizures of rhino horn can therefore be expected to increase in the future, as rhino horn traffickers increasingly take advantage of this new smuggling method.

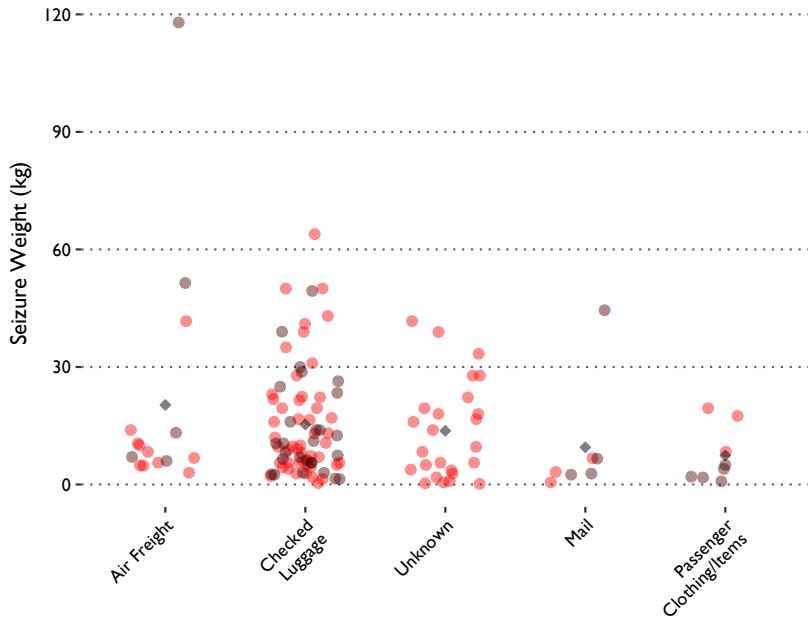
The trafficking methods utilized by rhino horn traffickers in 2017 included:

- Tin foil and other aluminum cases as obfuscation method
- Hidden inside and amongst food
- Missing, incomplete, or fraudulent documentation
- Shipped by mail
- Abandoned luggage
- Moving small pieces of horn, or powder
- Taped to passenger's bodies

In the past year, rhino horn was trafficked along with:

- Ivory
- Lion claws and teeth

Figure 36 presents the information included in Figure 35 slightly differently to showcase the volume of rhino horn moved by each transport method. *Checked luggage* appears as by far the most prominent trafficking method for rhino horn, both in terms of number of seizures and in terms of total weight (see Table 5). Overall, *checked luggage* shipments represented 60% of all rhino horn moved through the air transport sector



Note: Only seizures with known weights are displayed in the graph above

Figure 36. Rhino horn trafficking instances split by transport method and displayed by weight (2009–2017)

Each dot represents one seizure, and each diamond represents the mean weight of seizures for that category. Darker colored dots represent 2017 seizures.

by weight since 2009. Air freight followed, with 16% of trafficked rhino horn by weight. In contrast, although ivory air freight seizures were similarly few in number, they represented 74% of ivory trafficked by air in terms of weight.

Mail seizures are likely underrepresented in Figure 36 since mail seizures are relatively infrequent, and often go unreported.

Transport Method	Seizures	Mean Weight	Total Weight (kg)
Air Freight	15	20.3	305
Checked Luggage	76	15.3	1,147.9
Unknown	27	13.7	341.8
Mail	7	9.5	66.8
Passenger Clothing/Items	8	7.4	58.9

Table 5. Rhino horn transport methods by number and weight (2009–2017)

Rhino Horn Pieces

Although *checked luggage* remains the most common transport method for rhino horn, an increasing number of rhino horns are being smuggled in carry-on bags and in small pieces taped to the bodies of traffickers.



Image 9. 0.8 kg of processed rhino horn taped to waist and ankles of a male trafficker arriving from Xiamen Source: Hong Kong Customs



Image 10. 5 kg of seized ivory horn, found concealed in carry-on luggage in Tan Son Nhat Airport Source: VIETNAMNET

For example, in April 2017, seven pieces of rhino horn were discovered in carry-on luggage by a customs official in Tan Son Nhat Airport.⁶³ The rhino horn pieces had been hidden in the bags of two traffickers, amongst household appliances and speakers.⁶⁴

In a second instance on October 17, 2017, Hong Kong Customs discovered 43 kg of worked ivory in the carry-on luggage of two young women flying from Harare, Zimbabwe through Dubai in the UAE to Hong Kong.⁶⁵ A third woman who was traveling with the suspects was found to have 2 kg of rhino horn strapped to her legs and abdomen, marking the first known instance in 2017 in which rhino horn had been affixed to the body of a trafficker. The route the women had used – from Harare, to Dubai, to Hong Kong – is a particularly common smuggling route for worked ivory, suggesting that this instance may be linked to a prominent ivory trafficking network operating out of Harare.

On November 12, 2017, Hong Kong Customs seized two additional rhino horn trafficking instances, both involving processed rhino horn hidden in *passenger clothing/items*. In the first seizure, officials stopped a 31-year-old male passenger arriving in Hong Kong from Beira, Mozambique via Johannesburg, South Africa.⁶⁶ He was carrying 1.8 kg of rhino horn pieces wrapped in tape and hidden in his backpack. In the second seizure, Hong Kong Customs officers discovered 0.8 kg of rhino horn pieces wrapped in tape and secured to a 35-year-old male passenger's waist and ankles. The passenger had just arrived in Hong Kong from Xiamen.⁶⁷

The similarities in trafficking methods used in each seizure suggest that one trafficking network may be behind the increase in the smuggling of small rhino horn pieces by passengers. However, the widely varying transit routes used in each instance seem to indicate that multiple networks are aware of the utility of this trafficking method, and therefore the increase in rhino horn seizures moved by *passenger clothing/items* may be an indication of increasing enforcement capabilities.

Evading Good Enforcement

The August 2017 arrest of a Vietnamese national with 23 kg of rhino horn at Uganda's Entebbe Airport highlighted wildlife traffickers' use of alternate, and often circuitous, routes to move their illicit goods in an attempt to evade detection.

Thai Xuan Tuan, a Vietnamese citizen, was detained on August 18, 2017, at Entebbe Airport after Uganda Wildlife Authority (UWA) sniffer dogs detected rhino horn in his luggage.⁶⁸ Upon opening Tuan's bag, Ugandan officials discovered 12 rhino horns weighing a total of 23.83 kg.⁶⁹



Image 11. Rhino horn found in Tuan's bag. Source: The Observer

The UWA said Tuan had driven from Kenya to Uganda—which is home to only around 23 rhinos⁷⁰—and intended to fly to Hanoi via Doha on Qatar Airways.⁷¹

That Tuan made the effort to drive from Kenya to Uganda likely indicates an attempt to avoid Nairobi's Jomo Kenyatta Airport, a traditional transit point for wildlife trafficking⁷² that, in recent years, has become fairly adept at detecting and stopping wildlife trafficking attempts. This success has in part been due to the deployment of trained sniffer dogs.⁷³

A potential additional incentive may have been that Uganda's Entebbe Airport has chronically suffered from lax security and corrupt officials that have been known to facilitate the smuggling of contraband through the airport.⁷⁴

However, similar to Jomo Kenyatta Airport, Ugandan President Yoweri Museveni recently ordered sniffer dogs to check all travelers' luggage at Entebbe Airport to prevent its continued use as a transit route by wildlife traffickers.⁷⁵

"The directive is to ensure that Uganda's international airport is not used as a transit route for smugglers," said Ephraim Kamuntu, Uganda's Minister of Tourism, Wildlife and Antiquities. "There are guys that smuggle from outside Uganda and use Entebbe as a transit route; we are stopping it."⁷⁶

Tuan's arrest, while perhaps not yet indicative of a widespread trend, does offer further evidence of a suggestion put forward in *Flying Under the Radar*: traffickers are moving rhino horn from source countries to airports they deem more advantageous before flying the horns to demand markets.

Corruption & Rhino Horn Trafficking

Corruption often facilitates wildlife trafficking. Recent instances of official complicity at key transit points along illicit rhino horn supply chains raise concerns about the scale of wildlife trafficking going undetected due to corruption.

In March 2017, Thai customs officials at Bangkok's Suvarnabhumi Airport seized 21 rhino horns sent from Ethiopia.⁷⁷ At the time of their seizure, the horns were being transported in suitcases by two Thai women—identified as Thitirat Ara-I and Kannsinee Anutranusart—who arrived in Bangkok from Vietnam and Cambodia. Security camera footage shows the women were being escorted through customs by two police officers.⁷⁸ Nonetheless, customs officials stopped the women and placed their bags through a scanner, discovering the rhino horns hidden within.

The police officers were placed under investigation for their possible role in the trafficking scheme. Their supervisor, however, claimed they were unaware of the contents of the luggage and were simply there to “provide convenience” to the two women.⁷⁹ Still, it is apparently common for well-connected travelers to request official escorts through Suvarnabhumi customs to avoid being selected for customs screening, suggesting the women had influence with a high-ranking government official.



Image 12. Several of the rhino horns seized by Thai customs officials. Source: Thai News Channel 8



Image 13. Security footage of the women going through customs. Source: Thai New Channel 8

Similarly, in December 2017, Thai officials detained three suspects for allegedly conspiring to traffic 14 rhino horns into Thailand from South Africa.⁸⁰ Among those arrested was Nikorn Wongprachan, a Thai National Parks and Wildlife Conservation official, who was caught as he attempted to smuggle rhino horn from the quarantine section at Suvarnabhumi Airport to a nearby apartment.⁸¹

A month later, on January 19, 2018, Thai police arrested Boonchai Bach in connection with the case. Bach was the alleged financier and leader of the rhino horn smuggling network, which Thai police described as “a major smuggling syndicate.”⁸² Indeed, following his arrest, Freeland, a counter-wildlife trafficking NGO and ROUTES Partner, described the Bach family as having “long run the international supply chain of illicit wildlife from Asia and Africa to major dealers in Laos, Vietnam, and China.”⁸³



Image 14. Nikorn Wongprachan, an employee at Suvarnabhumi Airport, was caught attempting to smuggle 14 rhino horns. Source: TravelWireNews



Image 15. Boonchai Bach, arrested in January 2018, is a Vietnamese national with Thai citizenship. Source: EPA-EFE

Both cases demonstrate the role of corruption in enabling trafficking networks to take root and endure. The case involving Boonchai Bach is especially emblematic of how expansive, transnational smuggling networks typically require a degree of official collusion to protect and promote their trade.

Reptilesⁱ

Overall, the C4ADS Air Seizure Database counted 335 reptile seizures between 2009 and 2017, or 131,564 seized reptiles. Reptile seizures have been on an overall upward trend since 2009, peaking in 2015 with 62 seizures. Although seizure numbers appeared to decrease in 2016, the drop did not continue, and in 2017 the C4ADS Database identified 55 reptile seizures in airports, for a total of 10,770 seized reptiles.

- *Small- and medium-scale seizures feature prominently:* Unlike overall ivory and rhino horn seizure numbers, which were determined largely by the prevalence of small-scale seizures alone, the overall reptile seizure count seems to depend on both small- and medium-scale seizures (particularly visible in 2015). The increase in seizure numbers in 2017, however, was primarily determined by an even larger increase in small-scale seizures, which offset a decline in medium- and large-scale seizures.

Despite the spike in small-scale reptile seizures in 2017, the number of reptiles seized each year has continued to decline since an overall peak in 2013. At the same time, the average size of reptile seizures has dropped to about 215 reptiles per seizure, and is now at its lowest point in five years. This is consistent with this year's fall in medium- and large-scale seizures and accompanying rise in small-scale seizures, which average only 30 reptiles per seizure.

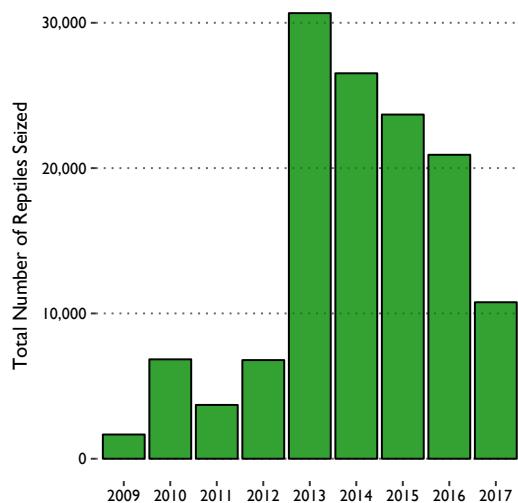


Figure 37. Number of reptiles seized per year (2009–2017)

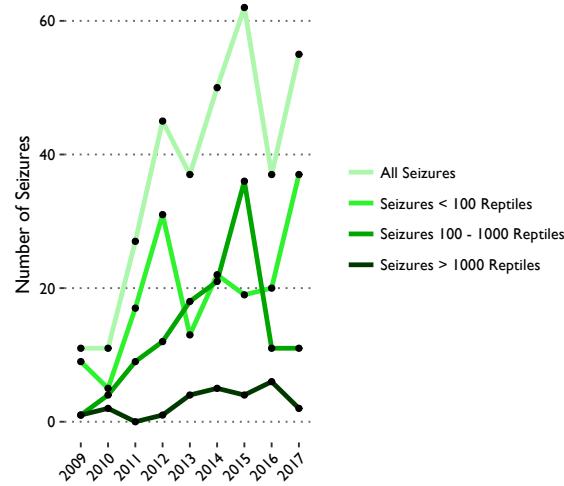


Figure 36. Number of reptile seizures made in airports by year (2009–2017)

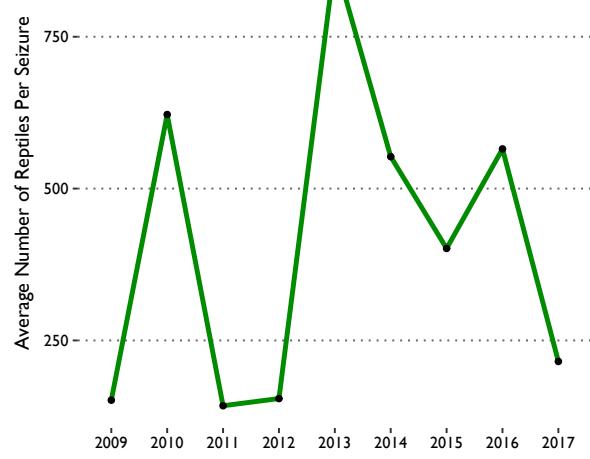


Figure 38. Average number of reptiles seized per year (2009–2017)

ⁱ Seizures in the “Reptiles” category are generally of live animals or animals that have died in transit, but can also include reptile parts (e.g. tortoise shells, crocodile skins). No reptile products, such as alligator skin boots, are included in this category.

Country-by-Country Analysis

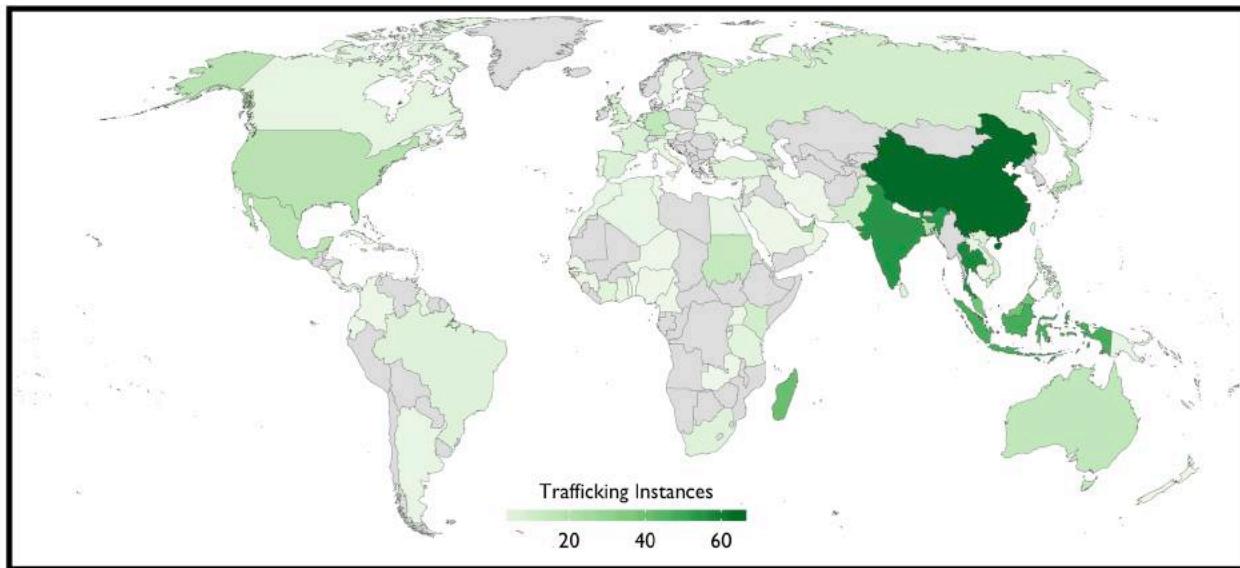


Figure 39. Global heat map for reptile trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

The heat map for reptile trafficking activity between January 2009 and December 2017 (Figure 39) displays a far more global trade than either the ivory or rhino horn trafficking heat maps, reaching out from its epicenter in South and Southeast Asia to Africa, Europe, the Americas, and Australia.

- Growing prominence of China and Indonesia:* Although the reptile heat map remains largely the same as it has in past years, one major change is visible: the past year's reptile trafficking instances have increased China's prominence on the heat map by about 31%. Since December 2016, China has experienced 16 more reptile air trafficking instances, or 266% more instances than China averaged in each of the previous eight years (between 2009 and 2016).

The only other country which experienced a similarly substantial change in significance was Indonesia, which saw a 30% increase in total trafficking instances in 2017 (from 37 identified instances between 2009 and 2016 to 48 total instances between 2009 and 2017). Like China, Indonesia's trafficking instance count in 2017 amounted to a 220% growth in average annual trafficking instances compared to Indonesia's previous yearly average.

- Significance of South and Southeast Asia:* Asian countries remain at the core of the illicit reptile trade, with the top five countries in terms of total reptile air trafficking instances (China, Thailand, India, Indonesia, and Malaysia) all located in South, East, or Southeast Asia.

The main driver of Southeast Asian prominence in the illegal reptile trade is the inter-Asian trade of black pond turtles (CITES Appendix I) and Indian star tortoises (CITES Appendix II). Both species are protected, found in India, and are in high demand as pets in countries like China, Thailand, and Malaysia.

Country	Trafficking Instances
China	65
Thailand	58
India	55
Indonesia	48
Madagascar	41
Malaysia	39
UAE	27
Bangladesh	18
USA	18
Mexico	17

Table 6. Top ten countries by number of reptile trafficking instances (2009–2017)

- *Madagascar remains significant:* While the majority of Africa appears to be of middling consequence in the reptiles heat map, Madagascar stands out. As in Southeast Asia, Madagascar's significance is almost exclusively due to demand for two tortoise species endemic to the island: the ploughshare tortoise (also known as the angonoka tortoise or Madagascar angulated tortoise) (CITES Appendix I), and the radiated tortoise (CITES Appendix I).

Six of the eight reported reptile seizures that originated in Madagascar in 2017 involved either a ploughshare or radiated tortoise—three involved both species.ⁱⁱ In each Malagasy seizure of ploughshare tortoises, anywhere from two to five of the animals were confiscated. Although these numbers seem low, a seizure of five represents 2.5% of the entire wild population of ploughshare tortoises, which is currently estimated at 200 remaining individuals.⁸⁴

- *The illicit reptile trade's global scope (Germany, the UAE, and the US):* Compared to ivory and rhino horn trafficking, illicit reptile supply chains have a truly global reach. Outside of Asia and Africa, other prominent countries for the illicit reptile trade include the UAE, the US, and Germany.

The UAE's frequent appearance in the data is this time not primarily due to its frequent transit hub status, but to reptile demand markets both within the UAE and elsewhere in the Middle East. Its significance in the C4ADS Database is bolstered by a particularly good—and publicly available—CITES seizure report prepared by Emirati authorities in regards to their 2011 and 2012 seizures.⁸⁵ Since the release of the CITES report, the UAE has only been publicly linked to a handful of reptile seizures, and none in 2017. This highlights the clear impact good reporting has on analyses of seizure trends, and the associated detrimental impacts caused by poor or infrequent reporting.

The US and Germany both appear prominent in the reptile heat map as a result of thriving reptile demand within each country. Germany in particular is known within Europe for hosting a number of reptile trade fairs each year, including a particularly large annual fair in Hamm. Multiple traders at the Hamm fair have been accused of reptile trafficking in the past (see **Lizards & Germany** in *Flying Under the Radar* for a more in-depth discussion of some of these allegations).

- *Mexico's domestic reptile trade:* Since 2009, Mexican airports have made at least ten reptile seizures, involving everything from tortoises, to crocodiles, iguanas, geckos, and boa constrictors. Of those ten seizures, at least half were destined for other Mexican cities and were generally packaged in air freight, suggesting the animals had been smuggled into Mexico's domestic reptile trade.ⁱⁱⁱ

ii The species of the turtles involved in the other three seizures were not reported.

iii Note that it is possible that some of these shipments were legal, but were seized because they did not have the proper permits, etc. Few seizure reports detail the specific reason for seizures, however, so which seizures might fall in this category often cannot be determined.

Figures 40–44 below include 2017 data only.

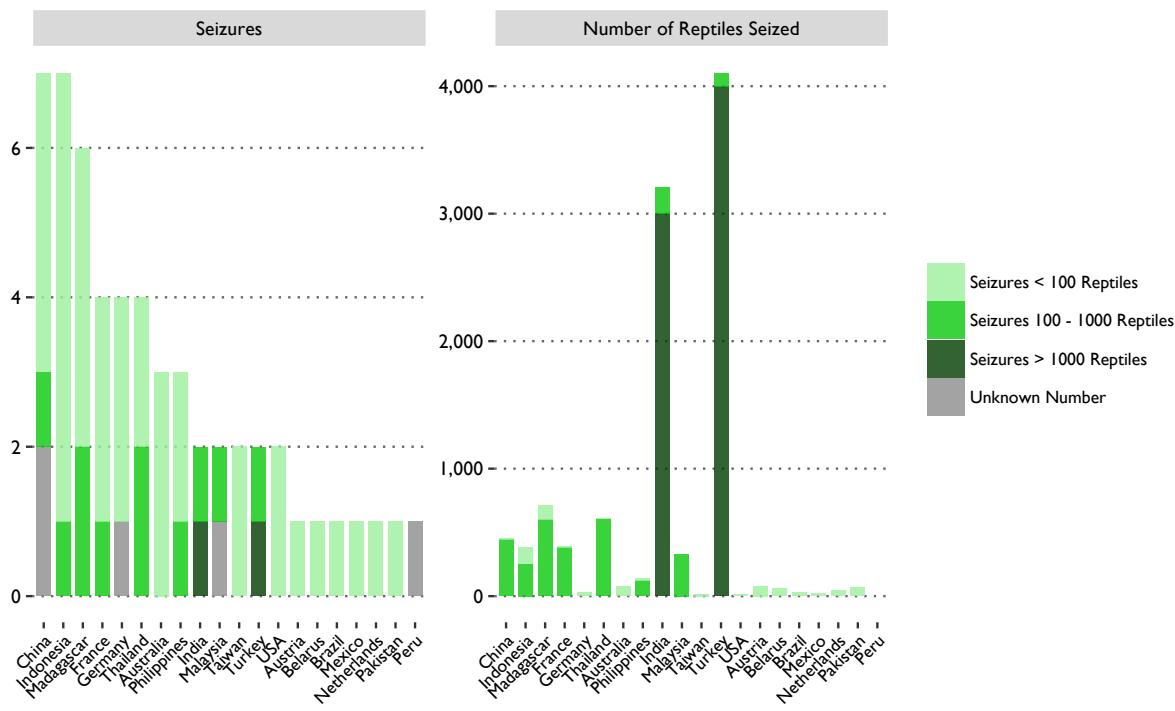


Figure 40. The total seizure count and total number of reptiles seized by country for reptile seizures made in airports in 2017

Reptile trafficking's diverse geographic spread is visible in the wide array of countries that made reptile seizures in the past year. Other discernible trends include:

- *Widely distributed supply chains:* While Figure 40 depicts a slight majority of reptile seizures in Asian countries, including China (seven), Indonesia (seven), Thailand (four), the Philippines (three), and India, Malaysia, and Taiwan (each with two), almost 50% of reptile seizures in 2017 occurred elsewhere. Non-Asian countries Madagascar (six), France (four), and Germany (four), all place in the top six by seizure count, while Australia (three), Turkey (two), and the US (two) rank among the top 13. The remaining countries with reptile seizures in the past year were spread across Europe, the Americas, and Asia.
- *Low numbers of trafficking instances, high seizure numbers:* Although European countries do not appear to experience as much reptile trafficking activity as countries in Asia, both France and Germany made an unusually high number of seizures in the past year, matching or surpassing such prominent countries as Indonesia, Thailand, and India.

France and Germany's success could be a result of particularly effective enforcement, consistent seizure reporting, or simply the fact that both countries are prominent destinations for reptiles, giving customs and enforcement officials a greater chance to interdict illicit shipments.

The vast majority of the reptiles and reptile parts confiscated in 2017 were seized in only two instances. In the first, 4,000 red-eared sliders were discovered at Ataturk Airport, Turkey in three different suitcases arriving from Lebanon.⁸⁶ The second took place the same day, February 15, in Chennai Airport, when 3,000 red-eared sliders were discovered in a passenger's bags after he exited the "green" customs channel and hurried towards the exit.⁸⁷ A few medium-scale seizures in prominent reptile trafficking countries China, Madagascar, Indonesia, Thailand, and Malaysia made up a significant percentage of the rest.

Overall, reptile trafficking appears to be mostly concentrated in East, South, and Southeast Asia in terms of volume, although prominent regions by seizure count are more varied.

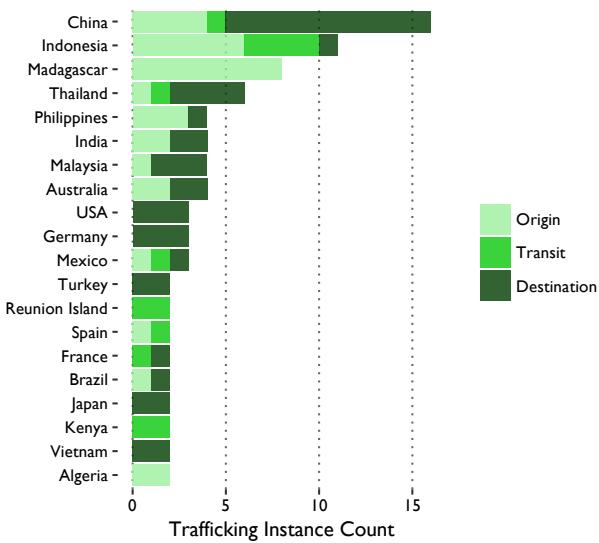


Figure 41. Country-level flight route information for countries with two or more trafficking instances in 2017

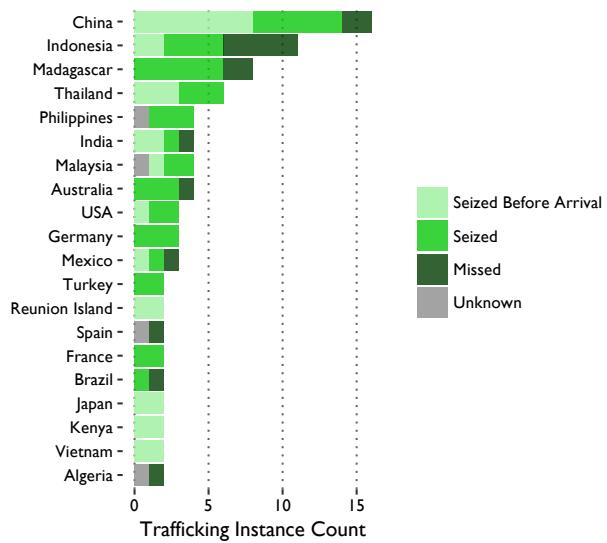


Figure 42. Point of seizure within the supply chain by country for 2017

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

Figures 41 and 42 display the top reptile trafficking countries by their positions along reptile supply chains, and measure each country's ability to stop the trafficking instances moving through their airports.

- *Following usual supply routes:* In the past year, trafficked reptiles seemed to move around the world as expected, following known supply chains. China, Thailand, and Malaysia were all major destinations. Most Asian countries in Figure 41 acted as origin points as well, probably driven by each country's significant reptile populations and the associated prevalence of the intra-Asian reptile trade. American and European countries' placement along reptile supply chains varied depending on their native reptile species (e.g. Mexico and Brazil), as well as on the size of their domestic reptile trades (e.g. the US and Germany).
- *Fewer transit countries:* Relatively few countries featured in Figure 41 acted as a transit point for reptile trafficking instances. Unlike ivory and rhino horn traffickers, reptile and other live animal traffickers are faced with the challenge of keeping as much of their contraband alive as possible before arrival at their destination. For this reason, live animal traffickers are more likely to move their cargo by direct flights, rather than by circuitous transit routes, to reduce the amount of time the animals spend in transit. The prevalence of intra-regional reptile trafficking further reduces the chances that traffickers will need to rely on multi-stop flights to reach their destination.

Still, a few countries emerge as prominent transit points for reptiles. In the past year, Kenya was used to move tortoises from Madagascar to countries in Southeast Asia. Indonesia also featured as a major transit point, generally because of reptile trafficking instances that originated in Indonesia and then transited through Indonesia's main international airport in Jakarta prior to arrival elsewhere in Asia.

- *Transit countries and domestic flights:* China, Thailand, Indonesia, and Mexico were the only countries in the C4ADS Air Seizure Database to act as origin, transit, and destination for reptile trafficking instances during the past year. With the exception of Thailand, each of the countries appeared at every stage along the supply chain because of domestic flights. In Mexico, for example, a shipment

of 20 crocodile skins was discovered in Veracruz Airport on its way from Tabasco, Mexico (likely through Villahermosa Airport) to León, Mexico (likely Del Bajío Airport).

Figure 42 reveals which countries seized reptiles moving through their airports in the past year, which missed them, and which never had the opportunity to stop reptiles that had been discovered earlier in their route.

- *Effects of domestic trafficking:* In ivory and rhino horn trafficking, destination countries tend to make the most seizures. In reptile trafficking, this distinction fades. The prevalence of the intra-Asian and domestic reptile trades means that countries often have multiple chances to stop reptile trafficking instances. While trafficking attempts are generally more difficult to identify on departure, common origin countries for reptile trafficking are also often destination countries, and so benefit from the comparative ease of seizing trafficking instances on arrival. So while an airport in China might miss a shipment of reptiles on departure, another airport in China will have a chance to seize that same shipment during customs clearance upon its arrival. This holds true in the 2017 data: the countries that made the most reptile seizures were both origin and destination points.
- *Seizures on departure:* Prominent origin and transit countries Madagascar and Indonesia made an unusual number of reptile seizures on departure or in transit in 2017, perhaps due to heightened awareness of reptile trafficking in each country.

In general, reptile trafficking by air in 2017 followed established reptile trafficking routes around the world.

Airport-by-Airport Analysis (2017)

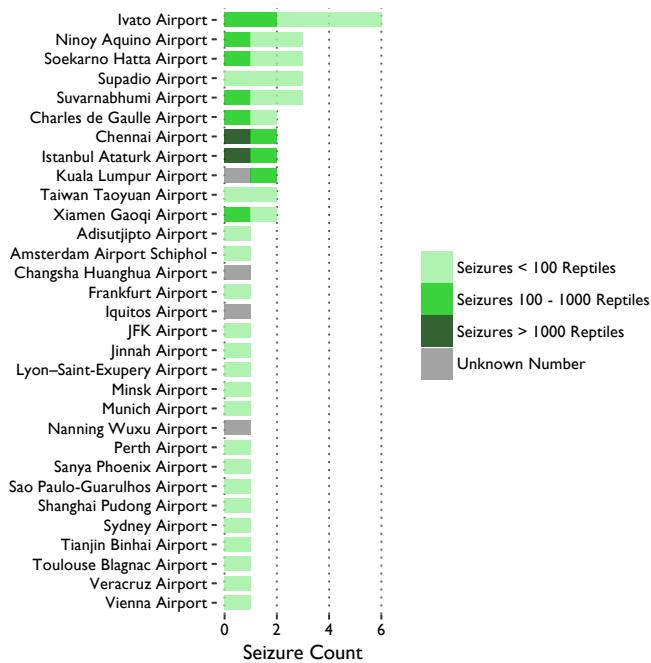


Figure 43. Seizure count for airports with one or more seizures in 2017

Figure 43 charts each airport with reptile seizures in 2017 by number of seizures. The following trends are visible:

- *Geographically diverse:* Few airports made multiple reptile seizures in 2017. The top airport, Ivato, made only six seizures, and only ten other airports made more than one reported seizure the whole year. A further 20 airports made only one seizure each, accounting for 36% of all reptile seizures made in the past year.

Reptile trafficking was not only widely dispersed amongst countries, but within them as well. For example, although China made the most reptile seizures in 2017, only one Chinese airport, Xiamen Gaoqi Airport, stopped multiple reptile trafficking instances. Seizures in five other Chinese airports (Changsha Huanghua, Nanning Wuxu, Sanya Phoenix, Shanghai Pudong, and Tianjin Binhai) helped lead to China's high seizure count. This suggests both that the Chinese reptile trade is not limited to one specific region of the country, and that customs and enforcement around China are aware of and able to stop illicit reptile trafficking instances (although how many instances they miss is, of course, generally unknowable).

- *Prominence of Ivato Airport:* Madagascar ranks second behind China and Indonesia in terms of total seizures made in 2017 (see Figure 40), and as the country's only major international airport, it follows that Ivato Airport would feature prominently in the reptile seizure count by airport. Every other airport in the past year's reptile seizure data was either from a less significant reptile trafficking country (e.g. Charles de Gaulle in France), or was one of multiple international airports within a prominent country (e.g. Chennai Airport in India).

Circle Flow Analysis (2017)

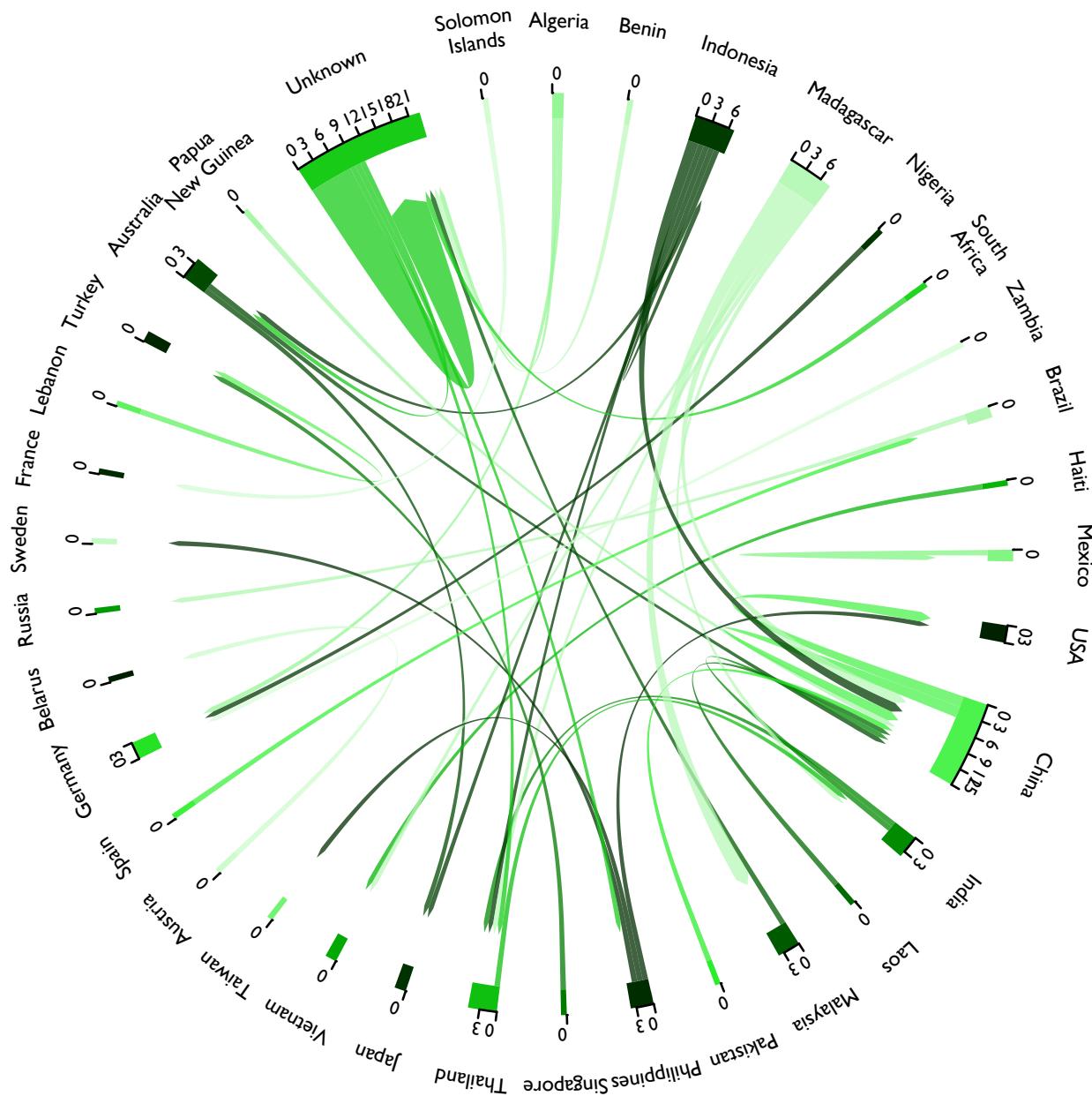


Figure 44. Circle flow map of reptile movements from origin to destination in the air transport sector in 2017

Figure 44 charts the flow of seized reptiles between origin and destination countries (excluding transit) in 2017. A few key takeaways from the above circle flow map are as follows:

- *Decentralized trafficking activity:* Once again, the decentralization of reptile trafficking activity is clear, with no specific movement (e.g. Africa to Asia) dominating illicit reptile movements around the world.
- *Shifting drivers of the illicit reptile trade:* Historically significant countries like India (the largest origin for trafficked reptiles in previous years), Thailand (the largest destination for trafficked reptiles in previous years), and Malaysia fell into a second tier in 2017, behind China, Indonesia, and Madagascar.

The Philippines joined this second group of countries, despite not featuring particularly prominently in past years' reptile air seizure data.

The diminishing significance of the countries primarily involved in black pond turtle and Indian star tortoise trafficking may indicate a slight downturn in the frequency of the trade of those species. There do not appear to have been any publicly reported black pond turtle seizures in airports in 2017, and it seems that there were only two seizures of Indian star tortoises in the same timeframe. By comparison, in 2015, there were at least 16 seizures of black pond turtles and 11 seizures of Indian star tortoises. Alternative explanations include a decrease in public seizure reporting, or a shift in reptile smuggling techniques.

- *Slowly increasing prominence of Australia:* Although Australia has likely been involved in reptile trafficking for some time, given its high number of endemic reptile species, the country did not appear prominently in the reptile seizure data until 2017. In fact, Australia made just under half as many publicly reported reptile seizures (three) in the air transport sector in 2017 as it had in the entire eight-year period between 2009 and 2016 (during which time Australian officials stopped seven reptile trafficking instances). This spike in seizures could be reflective of a new focus on countering wildlife crime within Australian customs and enforcement agencies, or it could be a result of improved seizure reporting.
- *High percentage of unknowns:* A fairly large portion of reptile origins and destinations (27%) were unknown or unreported in the past year, compared to 10% for rhino horn. This may be indicative of differences in reporting between the two categories; rhino horn reporters may focus a bit more on trafficking routes when covering seizures, whereas live animal reporters tend to focus on trafficking methods.

Trafficking Routes Analysis (2017)

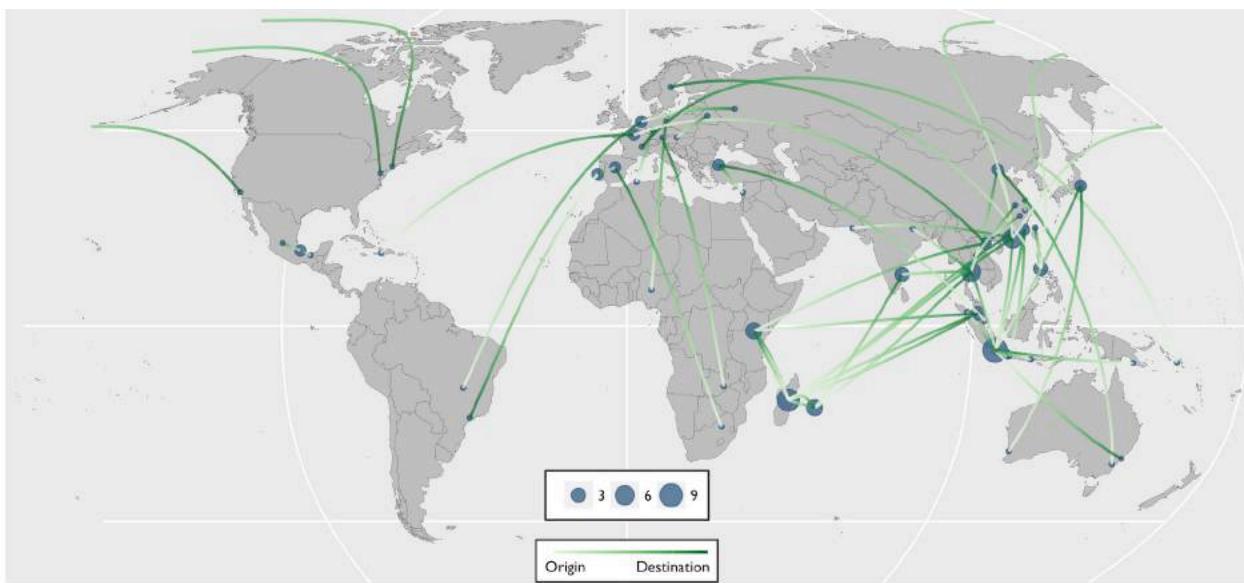


Figure 45. Reptile trafficking routes by air in 2017

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

In addition to underpinning the geographic diversity of reptile trafficking seen previously, the routes map also highlights the limited number of repeat or transit flights used by reptile traffickers, and more easily identifies changes in smuggling trends over time. A number of the trends visible in Figure 45 are as follows:

- *Domestic flights:* Jakarta, Indonesia experienced the most reptile trafficking activity in the past year with ten trafficking instances. In at least four of these instances, the reptiles originated from smaller airports in Indonesia, and were funneled through Soekarno Hatta Airport in Jakarta—Indonesia’s largest airport, with the highest number of connecting flights—before traveling on towards their intended destination. Domestic flights such as these are most common in large countries with in-demand native species and few international airports.^{iv}
- *Emergence of transit points:* Although the use of transit points is generally infrequent in live animal trafficking, a few transit airports emerge in the reptile routes map. For example, Nairobi, Kenya and Reunion Island, France were both intended to be used as transit points in at least two trafficking instances each between Madagascar and Asia. As mentioned above, Indonesia also counted more transit instances than any other country with four, entirely as a result of domestic flights channeling through Jakarta prior to departure for other Asian countries.^v Overall, 25% of known reptile trafficking instances in 2017 moved through—or would have moved through—at least one transit airport.
- *Few repeat routes:* Only three flight routes (Madagascar → Nairobi, Kenya; Madagascar → Reunion Island, France; and Madagascar → Kuala Lumpur, Malaysia) appeared more than once in the 2017

^{iv} This method has also been used by bird traffickers in Brazil and Russia, who acquire birds in remote regions of both countries. The birds are then flown through large hub airports in São Paulo and Moscow en route to their destinations.

^v One trafficking instance that transited through Jakarta was destined for another Indonesian airport, rather than a foreign city.

reptile data. Each route likely originated in Madagascar due to the limited number of flights out of the country.^{vi}

Overall, the reptile routes map highlights the diffuse nature of reptile trafficking by air, as well as reptile traffickers' preference for direct flights.

vi Many flights out of Antananarivo Airport seem to transit through Bole Airport in Addis Ababa or OR Tambo Airport in Johannesburg prior to arrival in Asia, but there is only one mention of OR Tambo as a transit airport for reptiles in the C4ADS Database. It seems then that reptile trafficking instances moving through those airports are either not caught or not reported, or Malagasy reptile traffickers are purposefully avoiding flight routes transiting through those airports.

Trafficking Methods Analysis

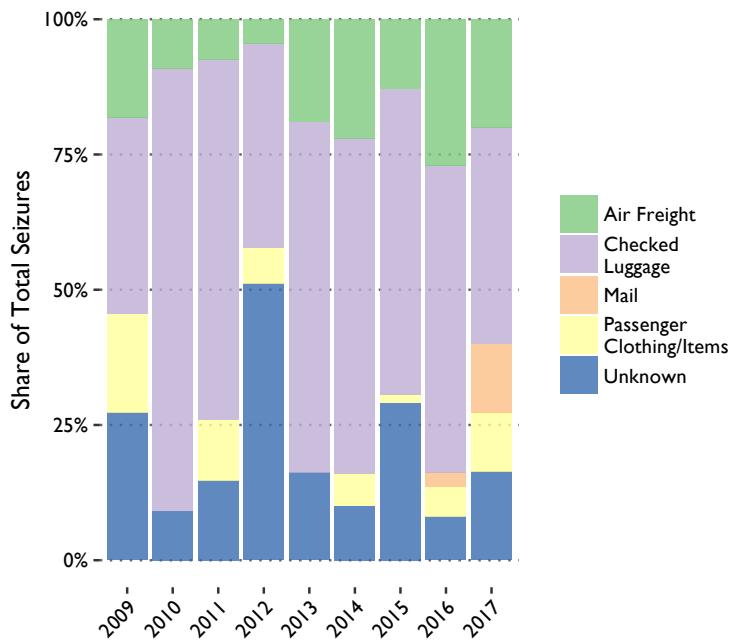


Figure 46. Transport methods for reptile trafficking instances in the air transport sector by year (2009–2017)

Figure 46 splits the reptile trafficking instances within the C4ADS Air Seizure Database by trafficking method. Similar to ivory trafficking, reptile air trafficking instances were most commonly moved in *checked luggage*, although *air freight* shipments carried the highest numbers of reptiles and reptile products overall (see Table 7 below for a more specific breakdown).

- *Few unknowns:* Relatively few reports of reptile seizures do not include transport method information; every year other than 2012 had transport method information for 70% or more of that year's reptile seizures.

Trafficking method information tends to be reported slightly more often for live animals than for animal products, perhaps due to the strange trafficking methods sometimes used by live animal traffickers, or perhaps due to public concern for the welfare of the animals.

- *Diminishing number of checked luggage seizures:* Although *checked luggage* remains the primary transport method for trafficked reptiles, the percentage of *checked luggage* seizures have diminished over the past few years as known *air freight*, *passenger*, and *mail* seizures have increased.

Mail and *passenger* seizures increased more than any other transport method category, each more than doubling from 2016 to 2017. There are no clear trends linking the past year's seizures from either category – they moved through different countries and regions, and the traffickers involved in each used a wide array of common smuggling techniques to hide and move everything from tortoises and frogs to lizards and snakes. The increase in seizures from both categories may therefore be a result of improving enforcement capabilities or increased public seizure reporting around the world, perhaps driven by perceived public interest.

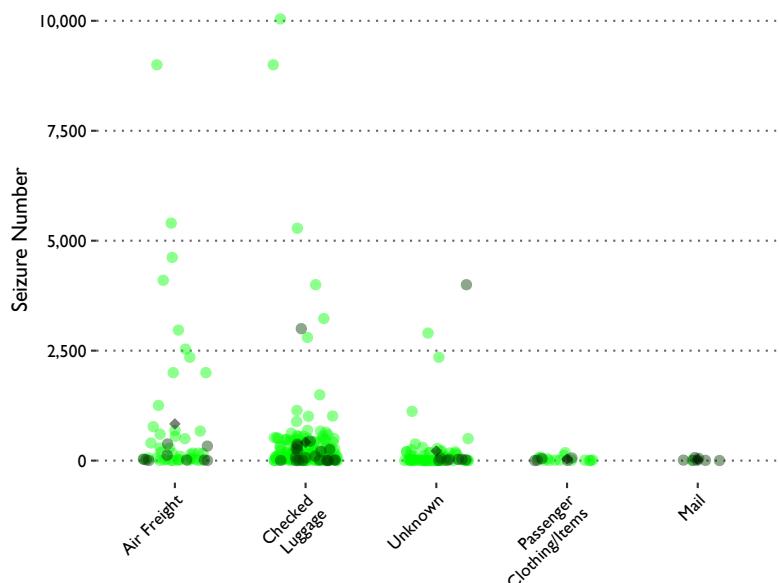
The trafficking methods used by reptile traffickers in 2017 included:

- Missing or incorrect documentation (e.g. declared as “stones”)
- Wrapped in diapers (turtle-specific)

- Unusual number of suitcases
- Shipped by mail
- Abandoned luggage
- Hidden in plastic boxes (with and without air holes) in suitcases or in carry-on bags

In the past year, reptiles were trafficked along with:

- Insects (e.g. cockroaches, insect larvae)
- Arachnids (e.g. spiders, tarantulas, scorpions)
- Meerkats
- Bear products
- Fish
- Eels



Note: Only seizures with known values are displayed in the graph above

Figure 47. Reptile trafficking instances split by transport method and displayed by number of reptiles seized (2009–2017)

Each dot represents one seizure, and each diamond represents the mean weight of seizures for that category. Darker colored dots represent 2017 seizures.

Figure 47 displays the data included in Figure 46 by volume, as well as by category. A few massive reptile shipments dwarf the majority, and likely lead to inflated mean seizure numbers (Table 7). Over the past nine years, *checked luggage* seizures have accounted for 55% of all reptiles seized in the air transport sector. Over the same period, *air freight* shipments have accounted for 33%, despite the lower number of *air freight* trafficking instances, given the larger average size of each individual *air freight* shipment.

- Large checked luggage seizures: Although *air freight* reptile seizures tend to contain the most reptiles or reptile products, *checked luggage* reptile seizures are not only

Transport Method	Seizures	Mean Number	Total Number
Air Freight	54	835	43,414
Checked Luggage	181	417	72,192
Unknown	72	219	15,130
Passenger Clothing/Items	20	35	668
Mail	8	20	160

Table 7. Reptile transport methods by number of seizures and by number of reptiles seized (2009–2017)

the most numerous, but can also be just as large, if not larger, than most *air freight* shipments. For instance, over the past year, the largest reptile trafficking instances (as measured by number of seized reptiles and/or reptile products) were moved by *checked luggage*, with the exception of one significant seizure that lacked transport method information.

Passenger reptile seizures have remained both relatively infrequent and small in size, as expected. *Mail* seizures have also been limited in number and in size, although this is likely at least in part because *mail* shipments generally undergo less customs screening, and because mail seizures often go unreported.

Dangerous Reptiles

Several trafficking instances involving venomous reptiles in 2017 demonstrated the potentially life-threatening, and often under-appreciated, hazards posed by wildlife trafficking to airline and airport personnel.



Image 16. The 11 snakes after being euthanized by Australian officials. Source: Australian Department of Agriculture and Water Resources



Image 17. Two of the tarantulas after being euthanized by Australian officials. Source: Australian Department of Agriculture and Water Resources

In the first instance in mid-March 2017, the Australian Border Force put a box through an X-ray scanner on arrival. The box was labeled “two pair shoes,” and had arrived in Melbourne from Europe. Instead of shoes, the officials discovered 11 snakes, nine tarantulas (including one species famous for eating birds), and four scorpions. Six of the snakes were Wagler’s pit vipers, a venomous species native to South-East Asia.⁸⁸ Several of the tarantulas had died in transit, and Australia’s Department of Agriculture and Water Resources euthanized the remaining animals.

In a second March seizure, US Customs and Border Patrol (CBP) officers discovered a package containing three live king cobra snakes, each hidden inside a potato chip canister, and three turtles.⁸⁹ The cobras—whose neurotoxin venom can kill a human—were all around two feet long, although the species can grow up to 18 feet.⁹⁰



Image 18. One of the king cobra snakes and its potato chip container. Source: Reuters

The package had been sent from Hong Kong to the Los Angeles, California home of Rodrigo Franco. Upon searching Franco’s house, federal agents discovered a live baby Morelet’s crocodile, alligator snapping turtles, a common snapping turtle, and five diamond back terrapins—all of which are protected under US law.⁹¹ Franco told US Fish and Wildlife Service agents he had previously received 20 king cobras in two other shipments, but that they had all died in transit.

In another instance on April 23, 2017, officials in Brussel’s Zaventem Airport seized 112 chameleons, 72 snakes, and 100 frogs en route from Burundi to the Czech Republic.⁹² Three of the snakes were venomous and had to be euthanized, as Belgium did not have the requisite anti-venom available.

Two months later, CBP officers at New York’s John F. Kennedy International Mail Facility discovered another shipment of king cobras via X-ray—this time five juveniles in a package labeled “plastic tray” from Hong Kong.⁹³



Image 19. The king cobra snakes at the JFK International Mail Facility. Source: US Customs and Border Protection

To varying degrees, the above seizures demonstrate a number of common themes seen throughout wildlife trafficking by air: the frequency with which live animals do not survive being trafficked, and the prevalence of repeat traffickers.

All four cases also illustrate the real dangers air sector personnel and passengers face as a result of wildlife trafficking. The large seizure at Brussels' Zaventem Airport is particularly suggestive of a potential nightmare scenario: that, in the course of performing their job, airport or customs officers could receive a life-threatening bite by a venomous animal with no antidote on hand to save them.

Made-to-Order Wildlife Trafficking

While wildlife trafficking seizure data reveals quite a bit about what, where, and how wildlife traffickers operate, it does not usually divulge why. For instance, do traffickers move animals and animal products in anticipation of future sale, or do they wait to receive specific orders? A recent seizure in Vienna suggests the latter.

On March 14, 2017, a 42-year-old Czech man attempted to smuggle 80 animals, including a deadly black mamba,ⁱ along with a variety of geckos, lizards, turtles, and snakes from South Africa into Austria by way of Madrid.^{94 95} After airport authorities discovered boxes in the man's luggage, a sniffer dog was brought in to check his suitcase. Several packs of meat had been stashed amongst the animals' boxes, presumably to throw off tracking dogs. Once the animals had been confiscated, the trafficker was released.



Image 20. An X-ray of the trafficker's luggage revealed the hidden reptiles. Source: bmf.gov.at

This March 14, 2017 trafficking instance does not appear to have been a crime of opportunity, but rather a carefully planned and precise action. As stated in local media reporting about the seizure, the professional packaging, large number of animals and variety of species, and the knowledge of the Czech smuggler indicated a sophisticated smuggling operation.⁹⁶



Image 21. One of the turtles seized Austria in March 2017.
Source: Austrian Federal Ministry of Finance



Image 22. The black mamba seized in Austria in March 2017.
Source: Christian Schulter

ⁱ Prior to the development of a potent anti-venom for black mamba bites, the snakes' venom killed almost 100% of their victims in less than 24 hours.

Source: "Black Mamba." National Geographic. National Geographic Partners, LLC. www.nationalgeographic.com/animals/reptiles/b/black-mamba/

While it has long been theorized that wildlife trafficking networks occasionally fill specific orders for their black market clientele, there are few publicly available seizures that can support this theory. The diverse array of specific species involved in this seizure, however, led Austrian authorities to suspect that the Czech trafficker was doing just that: fulfilling an order. Should this finding be extended to all reptile seizures with those characteristics—large numbers of animals of many different species, seemingly professional packaging—this could alter the standard notion that supply of illicit wildlife and wildlife products often precedes demand.

Birdsⁱ

In total, the C4ADS Air Seizure Database counted 195 bird seizures between 2009 and 2017, or 13,131 seized birds. Bird seizures in airports since 2009 have generally remained around 20 seizures per year, although seizure numbers vary substantially year-to-year. For example, although bird seizure numbers increased steadily until peaking in 2012 with 36 seizures, the following year had the fewest known bird seizures to date, down to 12 seizures—a 67% fall. By 2017, known bird seizures had risen again, and the C4ADS Database counted 27 bird seizures, or a total of 2,566 birds seized.

While widely varying small- and medium-scale bird seizure numbers confound any attempt to detect consistent patterns over time, both seizure categories generally move together, and appear to be the primary determinants of each year's overall seizure numbers.

Large-scale bird seizures in the air sector are comparatively infrequent, perhaps due to the difficulty inherent in moving fragile birds in large quantities, and have been particularly rare in recent years, following an upturn in 2010 and 2011. Large-scale seizures increased slightly in the past year, climbing to three total seizures in 2017. One of the three consisted of 500 birds from Senegal, tightly packed in boxes within four suitcases, that were being smuggled from Léopold Sédar Senghor Airport in Dakar to Madrid by two Spaniards. Only 200 of the birds survived—the rest suffocated.⁹⁷ The second seizure involved 168 hawfinches, black-headed grosbeaks, and painted buntings (protected under Mexican law) moving from Cancún Airport in Mexico to Germany in the possession of one Spanish national.⁹⁸ Sixteen of the animals were found dead due to asphyxiation or crushing. The third, and by far the largest, of the seizures was stopped at Orio al Serio Airport in Italy in October; Italian officials discovered 1,119 dead birds packed with ice packs in the suitcases of eight different hunters returning from an illegal hunting trip in Romania.⁹⁹

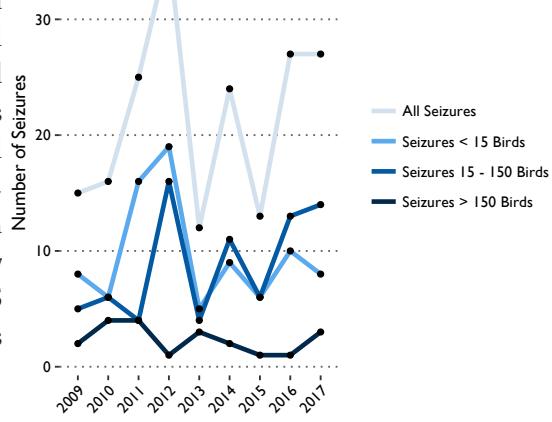


Figure 48. Number of bird seizures made in airports by year (2009–2017)

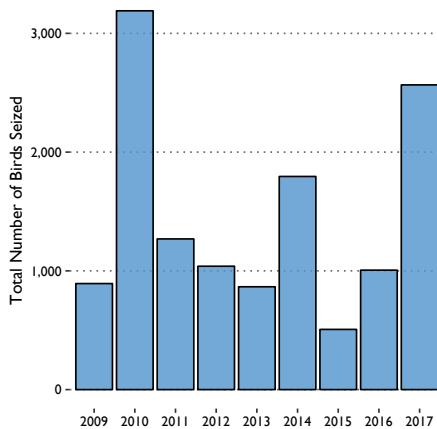


Figure 49. Number of birds seized per year (2009–2017)

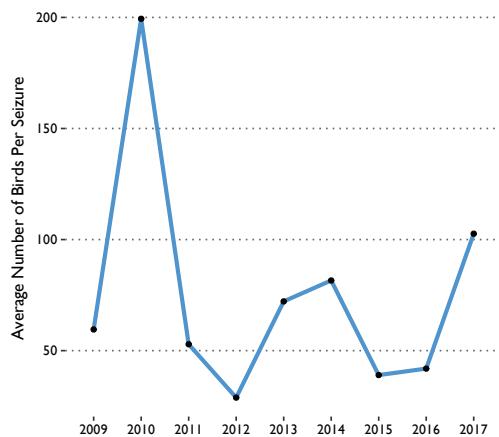


Figure 50. Average number of birds seized per year (2009–2017)

ⁱ Seizures in the “Birds” category are generally of live animals or animals that have died in transit, but can also include eggs or bird parts (e.g. feathers), although these seizures are rare in the C4ADS Database.

Most of the year-to-year differences in total birds seized are driven by a few large-scale seizures; for instance, this past year's seizure of 1,119 birds pushed 2017's total up almost 77%, to 2,566 birds seized. Both 2010 and 2014 were similar, with just one or two seizures of about 1,000 birds each massively impacting the total number of birds seized. 2015 fell short of the other years due to an unusually low number of publicly reported seizures consisting of relatively few birds (the largest seizure in 2015 involved only 200 birds).¹⁰⁰

Country-by-Country Analysis

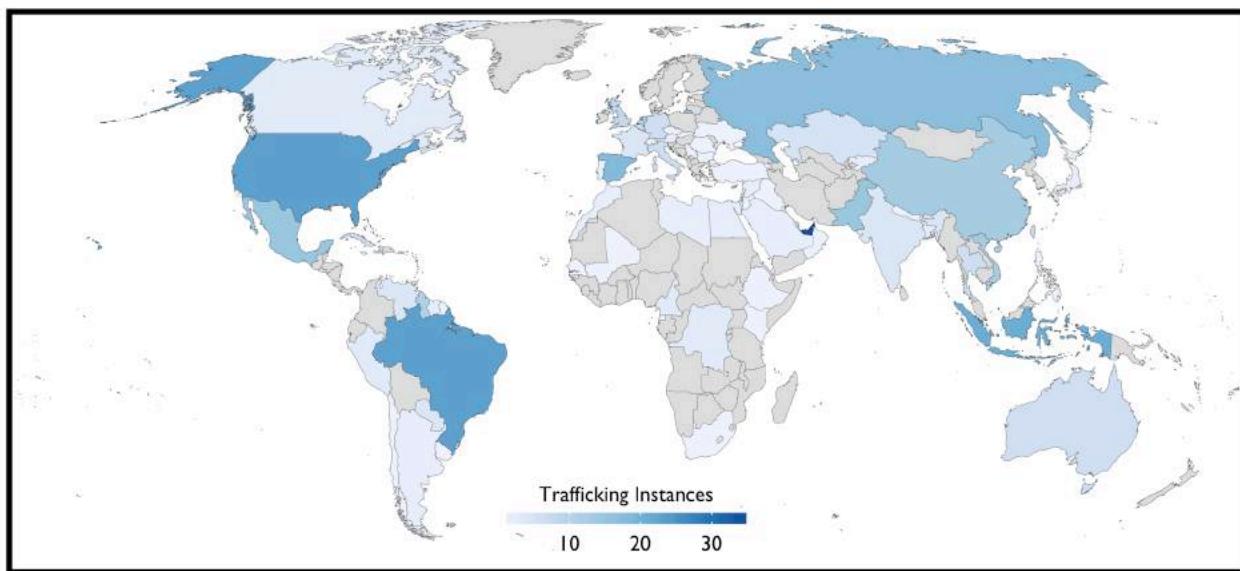


Figure 51. Global heat map for bird trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

Like the reptile heat map, the bird heat map (Figure 51) reflects a truly global trade, with countries affected by bird trafficking on almost every continent.

- *Dominance of the UAE:* The UAE has been the most prominent country for known bird trafficking by air in the world since 2009, partially due to the UAE's importance as a transit hub, but primarily due to significant Emirati demand for protected falcons and other bird species (often grey parrots or love birds).

Although still significantly ahead of the rest of the world in terms of bird trafficking instances, the UAE has experienced fewer bird instances (one) in the past year than before, particularly during 2011 and 2012, when the country saw 23 instances total. This apparent drop in trafficking activity, while potentially indicative of a real change in bird trafficking patterns, is likely driven by seizure reporting; a public Emirati seizure report to CITES in 2013 details seizures in 2011 and 2012,¹⁰¹ most likely skewing the UAE's seizure numbers to show unusually high trafficking activity in those years.

- *Significance of the Americas:* Of the four categories covered thus far (ivory, rhino horn, reptiles, and birds), bird trafficking is the only one that seems to rely heavily on the Americas, which count three of the top ten bird trafficking countries as measured by trafficking instances. Asia is tied with the Americas in terms of regional prominence, while Europe and the Middle East trail slightly with two each.

The Americas feature prominently in the bird heat map for three reasons. First, as in Southeast Asian countries like Indonesia, biodiversity is high in Central and South America, particularly in the Amazon Basin of Brazil. As a result, Central and South American countries often act as both source and origin countries for in-demand finch, macaw, and other parrot species (finches in

Country	Trafficking Instances
UAE	35
Brazil	23
USA	23
Indonesia	21
Spain	18
Russia	17
Mexico	15
Pakistan	15
China	13
Vietnam	13

Table 8. Top ten countries by number of bird trafficking instances (2009–2017)

particular account for 16 out of 40 known bird trafficking instances originating in South America). Second, domestic travel is common in the illegal bird trade, particularly in large countries like Brazil, where exotic birds caught deep in the Amazon are often trafficked by air to larger cities with both international airports and large demand markets of their own. Third, the US is one of the most significant demand countries for birds in the world, falling only behind Spain in 2017. The US also receives most of the finches smuggled out of South America (see **Hair Curlers from Guyana** in *Flying Under the Radar*).

Figures 52–56 below include only 2017 data.

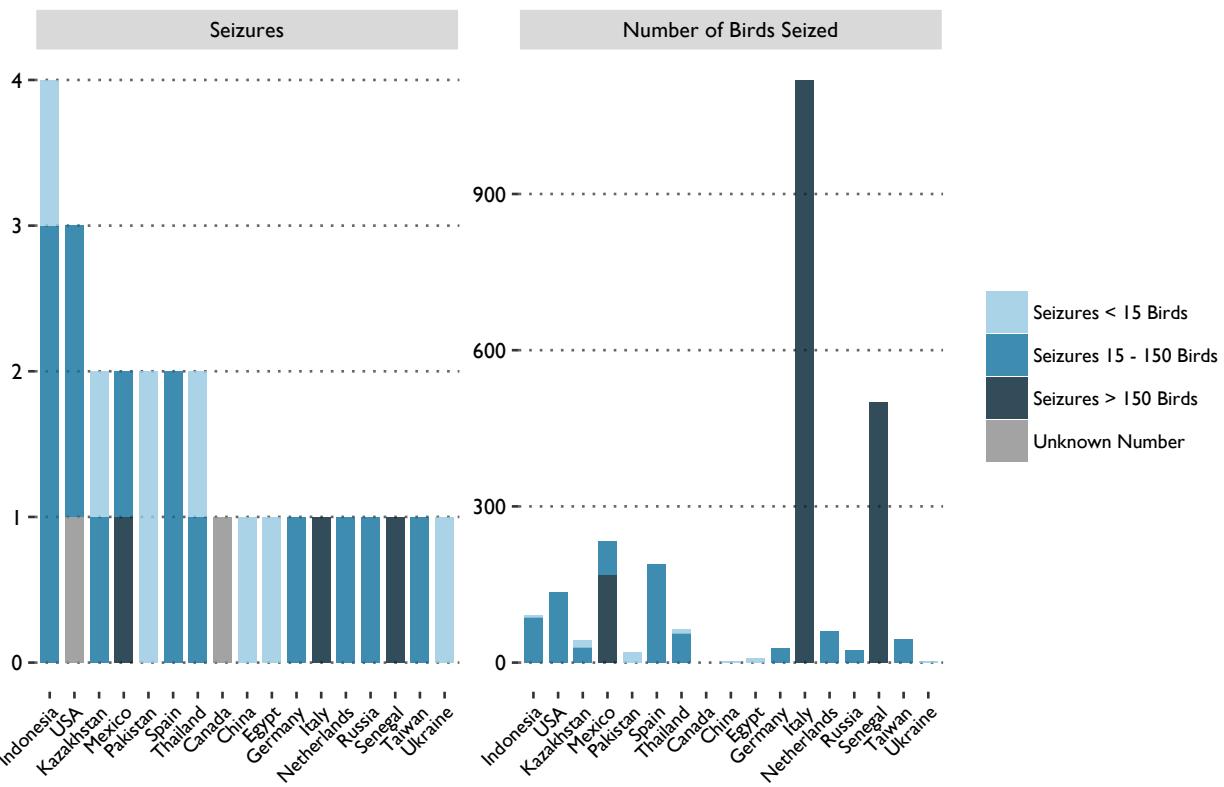


Figure 52. The total seizure count and total seizure weight by country for bird seizures made in airports in 2017

The geographically diverse nature of bird trafficking is visible in Figure 52, with bird seizures spread across the world.

- *Geographic spread of bird seizures:* Out of 27 reported bird seizures in the air transport sector in 2017 specifically, 41% occurred in Asia, with Indonesia counting more seizures than any other country. The Americas followed with 22%, primarily due to seizures in the US and Mexico. European seizures accounted for 26% of the total, while Africa and the Middle East made two (7%) and one seizures (4%) respectively.
- *Few, but impactful, large-scale seizures:* Large-scale bird seizures are rare, but have a large impact on the number of birds seized each year. For example, 2017's three large-scale seizures alone contained almost 70% of all the known birds seized in the air transport sector in 2017; the remaining 24 seizures contained 779 out of 2,566 total birds seized in 2017, averaging about 32 birds per seizure.
- *Prevalence of medium-scale seizures:* Medium-scale seizures were the most common seizures in 2017, occurring in at least ten out of the 17 countries with bird seizures. The most medium-scale seizures were made in Indonesia (three), followed by the US and Spain (two each). The seizures had primarily originated in the Americas (eight) and Asia (six).

Of the eight medium-scale seizures that left from the Americas, one was destined either for Newark or JFK Airport in the US and involved Guyanese finches smuggled in hair curlers, a common trafficking route and trafficking method (see **Hair Curlers from Guyana** in Flying Under the Radar).¹⁰² The other seven left from Mexico (four seizures), Paraguay (two), Guyana, Cuba, and Uruguay, and were

destined for Spain (three seizures), Germany (two), China, Thailand, Taiwan, and one unknown location. Most of the birds were hidden in boxes or cages inside suitcases. Mexico to Spain was the most common route, perhaps driven by a large and sophisticated international bird trafficking network operating out of Spain (see **Spain & Bird Trafficking**).¹⁰³

In general, few cohesive trends are revealed by Figure 52, given the widely varying supply chains and trafficking routes utilized by bird traffickers.

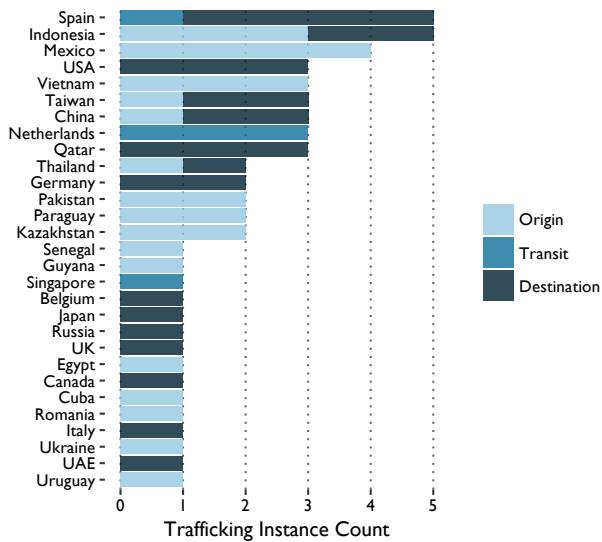


Figure 53. Country-level flight route information for countries with two or more trafficking instances in 2017

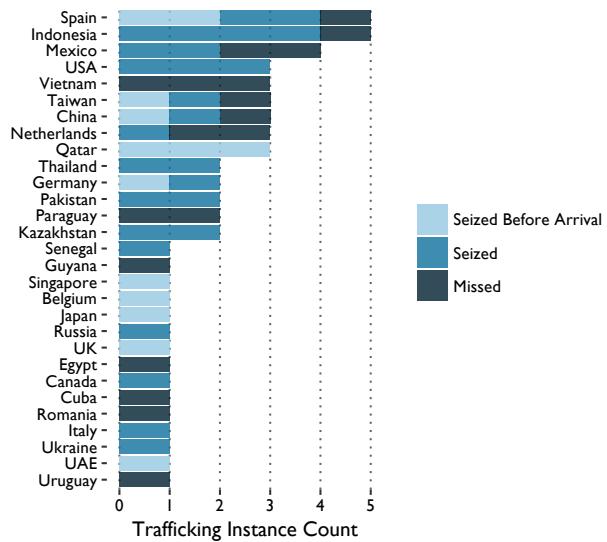


Figure 54. Point of seizure within the supply chain by country for 2017

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

Figures 53 and 54 split the trafficking instances associated with each country by point along the supply chain and by ability to stop each instance. Both graphs reveal some similarities between bird and reptile trafficking, while at the same time showcasing clear differences from ivory and rhino horn trafficking.

- *Origin and destination countries are about equally numerous:* In both ivory and rhino horn trafficking, origin countries tend to be far more numerous than destination countries, as both supply chains begin broad at their base and narrow as they approach relatively few major demand countries. Bird trafficking, however, follows no one supply chain, and seems to have about as many as origin countries as destinations. For example, in 2017, there were 16 origin countries and 15 destination countries for bird trafficking.
- *Seizures at origin:* In general, customs and enforcement agencies seem to make more wildlife seizures on arrival than on departure (for example, see Figures 18 and 19 under **Ivory**). Bird seizures, however, appear to only loosely follow this pattern—quite a few seizures in 2017 occurred prior to departure. Indonesia and Mexico were particularly successful in stopping bird trafficking leaving their countries, each seizing every known instance that moved through their borders except one. Other origin countries (Thailand, Senegal, Pakistan, Ukraine, and Kazakhstan) made at least one seizure on departure. Still, a few origin countries, like Vietnam and Paraguay, missed every known bird instance leaving from their airports.

The comparative ability of customs and enforcement agencies to stop birds, but not wildlife products like ivory and rhino horn, on departure may be related to differences in different traffickers' modus

operandi. For instance, most ivory and rhino horn trafficking instances are moved either in *checked luggage* or *air freight* shipments, but birds are frequently hidden in traffickers' carry-on luggage, or somewhere on their bodies. The screening process for passengers prior to departure may therefore play a role in the higher number of bird seizures seen at origin points for the illicit bird trade.

- *Prominence of Spain:* The most prominent countries by trafficking instance count in 2017 were Indonesia and Spain, both with at least five known instances. Indonesia is home to a wide array of tropical bird species, and is therefore an unsurprisingly prominent origin country. Spain, however, is not known for possessing a large number of in-demand bird species, and until recently, was not known as a significant demand country for trafficked birds either. Other than a couple intermittent seizures, Spain is largely absent from the C4ADS Database for bird seizures until 2016, when it appears that a new air smuggling route opened up between Mexico City and Madrid. In each instance, around 50 to 150 birds (often grosbeaks or cardinals) were hidden in checked suitcases, generally within crowded cages, by Spaniards on their way back to Madrid (see **Spain & Bird Trafficking**). The similarities shared by these seizures is likely indicative of a sophisticated bird trafficking network operating between Mexico and Spain.
- *Few transit countries:* Similar to reptile trafficking, bird traffickers appeared to use few transit countries in 2017, with only three countries used as transit points the whole year. Spain's single known transit instance involved 70 birds stashed in homemade containers and hidden in suitcases on their way from Uruguay to Pamplona, Spain. On the way to Pamplona, the birds moved through Spain's larger international airport in Madrid, Adolfo Suárez Madrid Barajas Airport, likely on Iberia, which offers the only one-stop flight route between Montevideo and Pamplona (all other known flight routes between these two locations take three to 20 hours longer than the Iberia route, and make two to three stops). Singapore was also only used once as a transit stop for a medium-scale seizure of birds moving from Indonesia to Belgium.

Amsterdam in the Netherlands, however, was used as a transit point three times by traffickers moving birds from the Americas (Cuba and Paraguay) to a variety of Asian destinations (China, Thailand, and Taiwan). There were no clear connections or similarities between the three instances that moved through Amsterdam, suggesting that Amsterdam's prominence as a bird transit location is due to its significance as a European transit hub.

Bird traffickers' reliance on direct flight routes in 2017 is consistent with past trafficking patterns, which suggest that live animal traffickers, particularly bird traffickers, try to reduce the time that their animals remain in transit as much as possible. Particularly in cramped, unhealthy conditions, shorter travel times help to lower rates of death amongst trafficked live animals, thereby raising traffickers' profits.

Overall, Figures 53 and 54 reveal bird trafficking to be a global, decentralized trade displaying few of the characteristics commonly associated with ivory and rhino horn trafficking.

Airport-by-Airport Analysis (2017)

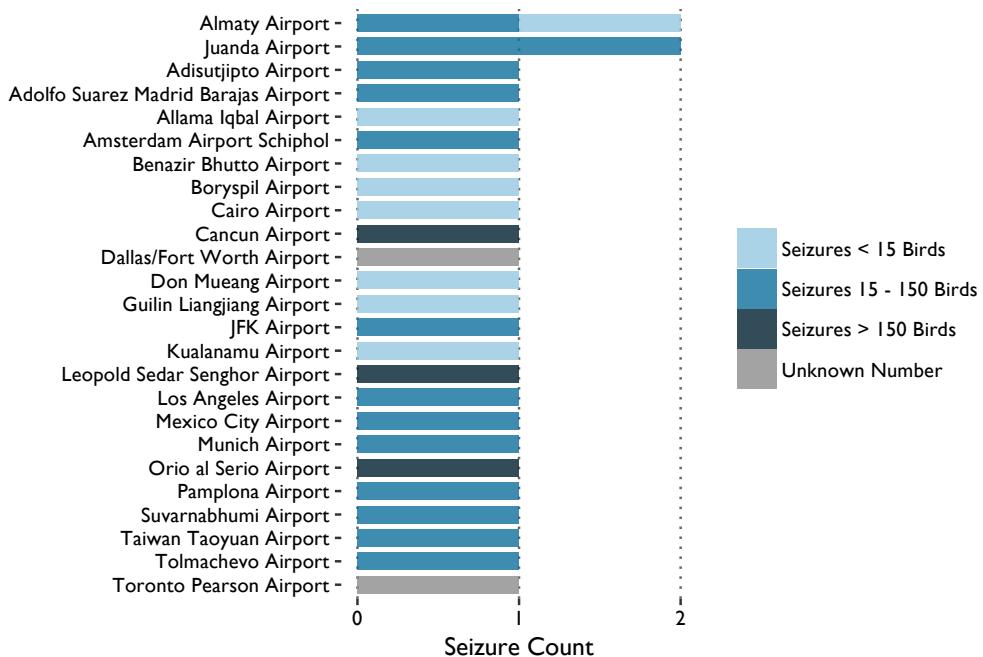


Figure 55. Seizure count for airports with one or more seizures in 2017

Every known airport that made a bird seizure in 2017 is included in Figure 55 above. In keeping with the pattern of geographic diversity seen previously, no airport made more than two seizures all year, and only two airports out of 25 made two seizures.

- *Geographic diversity:* The 25 total airports that made at least one known seizure were widely distributed around the world, with at least one seizure occurring in every region except for Oceania. The two top airports by seizure numbers, Almaty Airport and Juanda Airport, are located in Kazakhstan and Indonesia.
- *Involvement of Central Asia and the Middle East:* Within Asia, East and Southeast Asia accounted for seven seizures, while Central Asian nations Kazakhstan and Pakistan counted four total. Trafficking instances leaving Central Asia primarily involved falcons destined for Qatar, although one instance involved partridges moving to Birmingham in the UK.ⁱⁱ

Every other known bird air seizure linked to the Middle East in 2017 involved falcons. For instance, one falcon trafficking instance originated in Kiev, Ukraine and was destined for Dubai in the UAE. In this instance, three falcons were given sleeping pills, bound with tape, and hidden in a specially modified suitcase with ice packs.¹⁰⁴



Image 23. Three sedated falcons bound and hidden in a suitcase destined for Dubai. Source: NewsOne.UA

The involvement of Central Asia and the Middle East in bird trafficking therefore seems to be primarily driven by significant demand for raptor species, particularly for the endangered Saker falcon. In fact, the legal raptor trade in the region is sufficiently common to warrant the inclusion

ii All known bird seizures originating in Central Asia were detected and stopped prior to departure.

of falcons and other birds alongside guide dogs in certain airline regulations regarding in-cabin animals. Prominent Middle Eastern airlines Qatar Airways, Etihad, and Emirates, for instance, all allow falcons in the main cabins of their aircraft.¹⁰⁵ Emirates in particular makes a distinction based on regional cultural norms: “Animals are not permitted in the cabin of Emirates flights, with the exception of falcons between Dubai and certain destinations in Pakistan, and Guide Dogs for the Blind.”¹⁰⁶ In an effort to avoid the exploitation of these regulations by falcon traffickers and ensure the health of other passengers, Etihad states that all falcons seated in the main cabin must come with all the necessary documentation,¹⁰⁷ likely including each bird’s own passport. Gulf News reported that between 2002 and 2013, more than 28,000 falcons were issued passports to combat the illicit falcon trade.¹⁰⁸ ⁱⁱⁱ

ⁱⁱⁱ In early 2017, a photo of 80 likely Saker falcons seated in the main cabin of an unidentified aircraft garnered a fair amount of attention from news outlets around the world. The photo is available here: www.telegraph.co.uk/travel/news/saudi-prince-buys-plane-tickets-for-80-hawks/.

Circle Flow Analysis (2017)

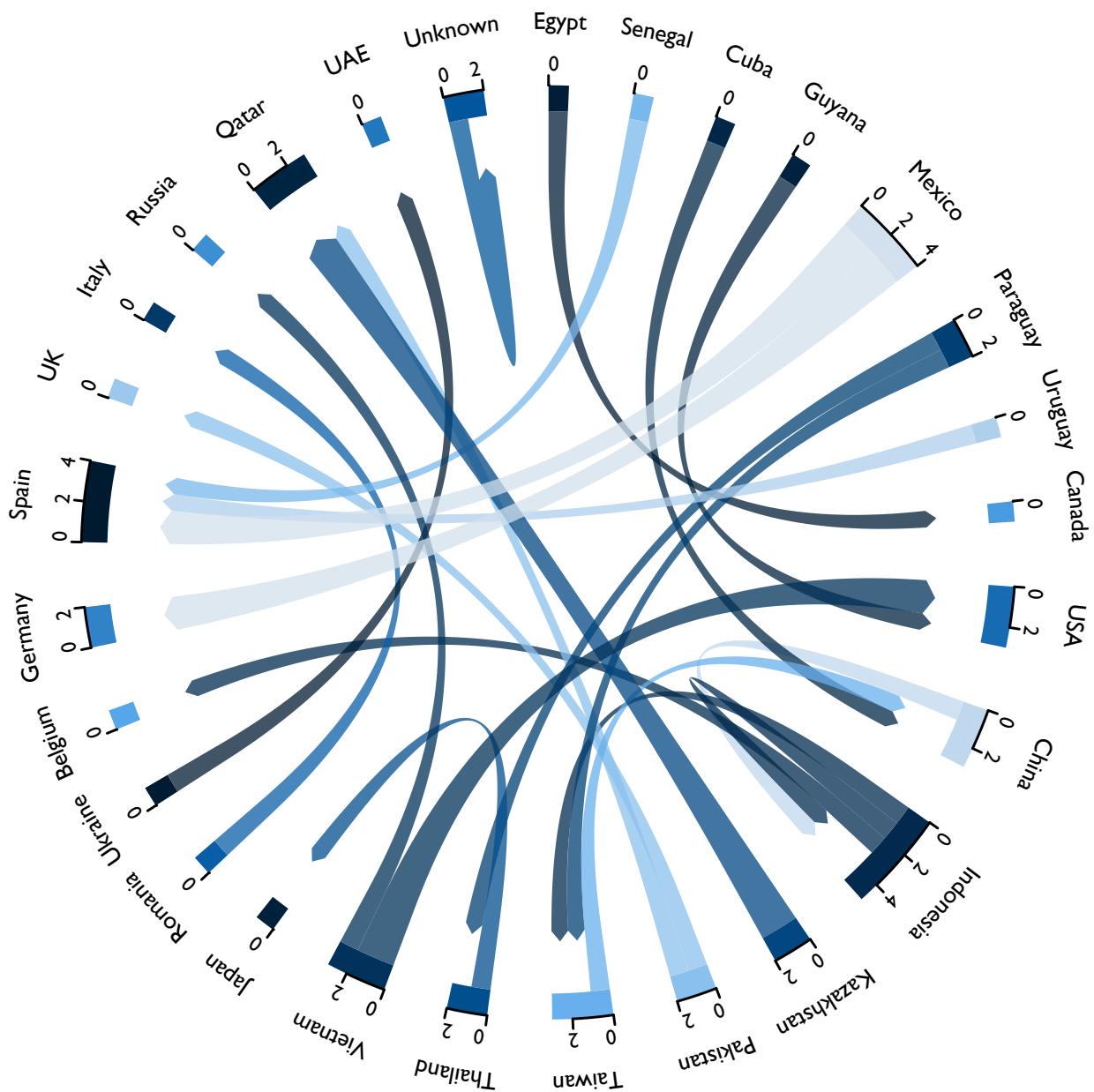


Figure 56. Circle flow map of bird movements from origin to destination in the air transport sector in 2017

Figure 56 maps the flow of seized birds between origin and destination countries (excluding transit) in 2017. A few key takeaways from the above circle flow map are as follows:

- *Decentralized trafficking activity:* Like the reptile circle flow graph, the bird circle flow graph highlights the decentralization of bird trafficking activity, with no specific movement (e.g. Africa to Asia) dominating illicit bird movements around the world.
- *Europe as destination:* Europe emerged as the most prominent destination point for birds in the past year, with 37% of all known bird trafficking instances with available destination information intended for European countries. Asia followed with 30%.

Europe's prominence as a destination region was largely driven by Spain's role as the most significant destination country for the illicit bird trade in 2017. The country was the destination for at least 15% of all known bird trafficking instances in the air transport sector in the past year (see **Spain & Bird Trafficking**). Of the remaining European destination countries (Germany, Belgium, Russia, and the UK), only Germany was the intended destination for more than one instance, representing 7% of all known instances. Every other country was linked to only one seizure each (4% each).

- *Infrequent repeat routes:* The bird circle flow map uncovered only two repeat routes within the bird air seizure data for 2017. Each repeat origin-destination route only appears twice (in comparison, rhino horn routes may be used 10 or more times in one year). Both routes follow a clear path from biodiverse countries with relatively minimal domestic demand for pet birds to countries with thriving pet trades. For example, in addition to exposing movement from Mexico to Spain, Figure 56 also highlights a significant flow of birds from Vietnam to the US (including the critically endangered, Appendix I-listed Bali mynah, a species that counts fewer than 100 wild individuals remaining, and only lives in Bali, Indonesia).
- *Emergence of Paraguay:* Paraguay appeared as an origin for smuggled birds in the C4ADS Database for the first time in 2016, and has since been the origin point for at least four seizures of tropical parrots destined for China, Thailand, and Taiwan. Each seizure involved parrot eggs, an individual trafficker (usually Chinese), and generally some kind of incubator device to keep the eggs safe and warm.^{iv} The similarities between the four seizures, as well as the quick succession of trafficking instances emerging from a new origin point, suggest that they may be associated with one trafficking network operating out of Paraguay. It is also possible, however, that separate networks are simply relying on similar tactics to move birds an unusually long distance (air travel from Paraguay to Asia seems to take an average of around 30 hours)—eggs may therefore be safer to move than adult birds.

iv In one instance, eggs were discovered alongside recently hatched chicks.

Source: www.elmundo.es/madrid/2016/09/08/57d1334922601da85a8b4672.html

Trafficking Routes Analysis (2017)

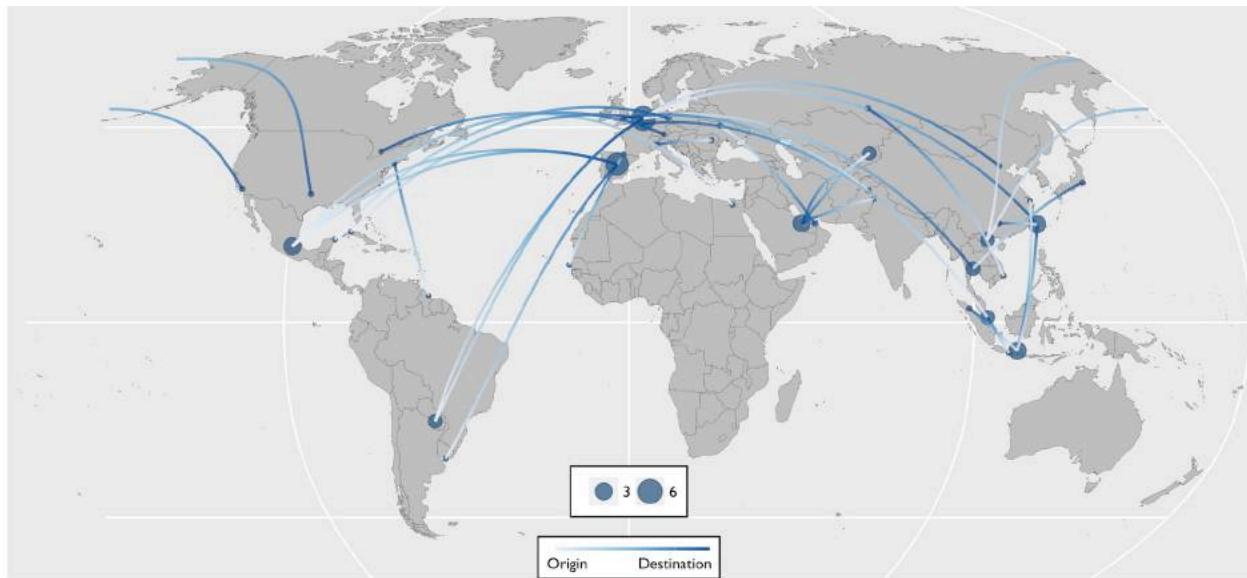


Figure 57. Bird trafficking routes by air in 2017

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

Figure 57 maps the known flight routes used by bird traffickers in 2017. In addition to further demonstrating the broad geographic spread seen in the bird circle flow map, the routes map highlights the limited number of transit flights used by bird traffickers, and can be used to more easily identify changes in smuggling trends over time. A number of the trends visible in Figure 57 are as follows:

- *Repeat routes:* In general, bird and reptile seizure data illustrate how infrequently bird and reptile traffickers re-use the same routes; for example, in 2017, the most common bird trafficking routes were only used twice. Between 2016 and 2017, however, one route defied this trend; although the Mexico to Spain route was only used twice in 2017, the route was used five times in only seven months between August 2016 and February 2017. In comparison, from January 2009 to December 2017, the most common known flight route was Georgetown, Guyana to New York City, USA with somewhere between five and ten seizures^v in nine years.
- *Shifting transit and destination points:* In past years, the Middle East featured prominently in bird trafficking, with the UAE in particular acting as both the largest transit and destination country for bird trafficking instances. But identified bird trafficking activity appears to have shifted away from the Middle East towards Europe in the recent past. The most prominent bird trafficking airport by far in past years, Dubai Airport, appeared only once in 2017, as the destination for a shipment of falcons from Kyrgyzstan. As stated above, Madrid became the most prominent destination, and Amsterdam Airport Schiphol seemed to emerge as the only significant transit airport, with three trafficking instances transiting through the airport.^{vi}

v Five seizures originated in Guyana but had no reported destination.

vi The flight routes for the three bird trafficking instances involving Amsterdam Airport Schiphol were:

- Cuba → Amsterdam, Netherlands → China
- Paraguay → Amsterdam, Netherlands → Bangkok, Thailand
- Paraguay → Amsterdam, Netherlands → Taipei, Taiwan

Overall, in the past year, Spain and Indonesia (five trafficking instances), emerged as the most significant countries for identified bird trafficking activity in the world, followed by Mexico (four), the Netherlands, Vietnam, the US, China, Taiwan, and Qatar (three each).^{vii} Similar to past years, Africa remained largely irrelevant to bird trafficking through the air transport sector, except for one instance from Senegal to Madrid.

vii Note that these numbers are based on identified trafficking activity. There may therefore be more prominent countries that have thus far escaped detection.

Trafficking Methods Analysis

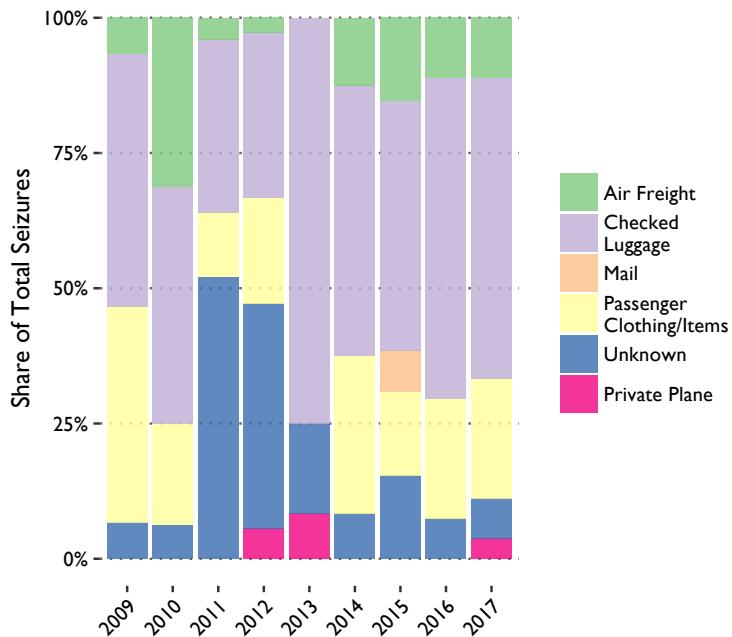


Figure 58. Transport methods for bird trafficking instances in the air transport sector by year (2009–2017)

Figure 58 displays the different transport methods used by bird traffickers according to the C4ADS Air Seizure Database. Similar to reports of reptile seizures, transport methods utilized by bird traffickers are generally publicly reported by government officials or the press, with the majority of bird seizure reports in every year except for 2011 including transport method information. Unlike ivory and rhino horn trafficking networks, which often seem to rely on similar trafficking methods (e.g. tin foil), bird traffickers as a group do not seem to share methods; instead, separate trafficking networks appear to rely primarily on their own trafficking methods consistently (e.g. the continued use of hair curlers to smuggle finches between Guyana and New York). As a result, few consistent trends are visible in Figure 58, and no coherent pattern emerges in relation to the use of *air freight*. Still, the following trends are apparent:

- *Prevalence of luggage seizures:* *Checked luggage* seizures have remained the primary means by which traffickers move birds since 2009, even in 2011 and 2012, when *unknown* seizures accounted for around 50% of all seizures. This trend continued in 2017, with 56% of bird trafficking instances discovered in *checked luggage*.
- *Reliance on passenger clothing/items:* Although most trafficked birds are moved by *checked luggage* or *air freight*, *passenger clothing/items* is still an unusually significant transport method for bird traffickers. In the past year, 22% of known bird trafficking instances were moved by passenger, compared to 12% for rhino horn and 11% for reptiles. Only ivory seizures surpassed birds, with 27% of ivory seizures (likely primarily worked ivory seizures) moved in *passenger clothing/items* in 2017. In past years, the difference was more extreme; between 2009 and 2016, the *passenger* transport method accounted for 20%, 6%, 3%, and 3% of known bird, ivory, rhino horn, and reptile seizures respectively.

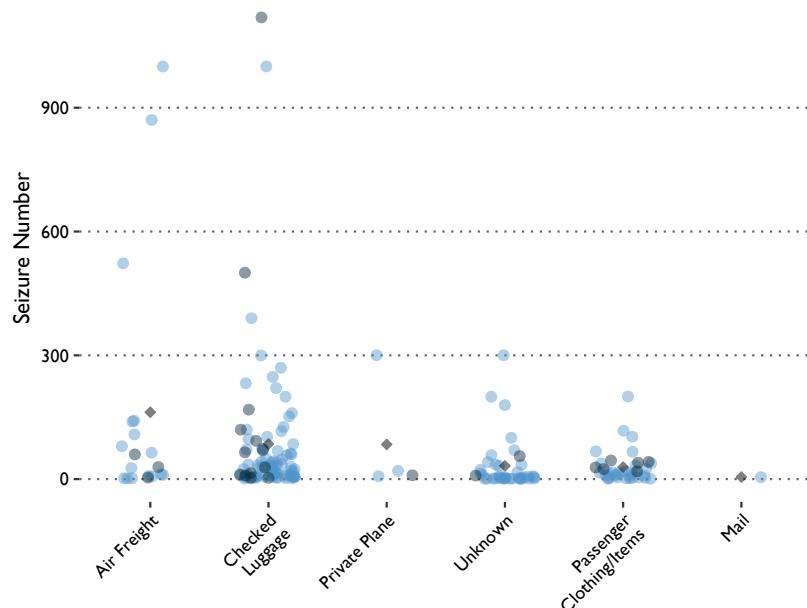
The trafficking methods used by bird traffickers in 2017 included:

- Cages or boxes inside checked suitcases
- Hidden in Pringles cans and mixed with chips

- Stuffed in hair curlers
- Missing or incomplete customs or health documentation
- Use of sedatives

In the past year, birds were trafficked along with:

- Otters



Note: Only seizures with known values are displayed in the graph above

Figure 59. Bird trafficking instances split by transport method and displayed by weight (2009–2017)

Each dot represents one seizure, and each diamond represents the mean weight of seizures for that category. Darker colored dots represent 2017 seizures.

The above graph (Figure 59) displays every known bird seizure in the past nine years by both transport method and by weight. Although the average *air freight* shipment of birds or bird products was significantly larger than the average of any other category, trafficking instances moved by *checked luggage* were far more numerous than any other category, and contained 56% of all birds trafficked by air since 2009 according to the C4ADS Database. *Air freight* seizures moved 24%, while *passenger* seizures accounted for only 8% of birds trafficked by air since 2009.

Similar to reptile seizures, a few exceptionally large bird or bird product seizures are likely pulling the average number of birds seized in *air freight* or *checked luggage* upwards. For example, without the largest *air freight* seizures (seizures of more than 150 birds), the average number of birds discovered in *air freight* shipments drops from 162 to 43, a 73% decrease.

Only one *mail* seizure appears in Figure 59. Although *mail* shipments are generally subject to less customs screening and *mail* seizures are often unreported, the extremely low number of identified bird trafficking instances moved by *mail* may suggest that bird traffickers prefer not to rely on this transport method, perhaps due to the fragility of most bird species.

Transport Method	Seizures	Mean Number	Total Number
Air Freight	19	162	3,087
Checked Luggage	91	85	7,395
Private Plane	4	84	336
Unknown	40	32	1,237
Passenger Clothing/Items	40	29	1,071
Mail	1	5	5

Table 9. Bird transport methods by number and weight (2009–2017)

Spain & Bird Trafficking

Between 2016 and 2017, Spain became one of the most prominent countries involved in bird trafficking. Most bird seizures involving Spain seemed to utilize similar trafficking methods, but originated in a wide array of countries.



Image 24. Birds confiscated in the January 2017 seizure.

Source: WARA Conservation Project



Image 25. Suitcase used in the January 2017 seizure. Source:

WARA Conservation Project

For example, on January 22, authorities in Léopold Sédar Senghor Airport in Dakar, Senegal arrested two Spaniards on their way to Madrid with four suitcases packed full of boxes.¹⁰⁹ Taken together, the boxes held 500 birds of 14 species, some of which appeared to have been protected species. Over half of the birds (60%) had already suffocated. Senegalese authorities noted the birds were “very professionally concealed,” suggesting the traffickers had prior experience.

A bird seizure in Cancún, Mexico also involved a Spanish trafficker; on March 26, PROFEPA officials arrested a trafficker carrying 73 black-headed grosbeaks and cardinals, as well as 95 painted buntings (which are protected under Mexican law) in suitcases during the baggage clearance process.¹¹⁰ Of the 168 birds seized, 16 had already died due to asphyxiation or crushing, and the rest were experiencing high levels of stress. The trafficker claimed he was traveling to Germany.



Image 26. Birds asphyxiated or crushed during the March 26, 2017 seizure. Source: PROFEPA

Both seizures proved to be deadly for a large number of the birds being trafficked. Considering both the Dakar and Cancún seizures occurred at their points of origin, it is extremely likely that more birds would have died before the traffickers reached their final destination.

Another two seizures in 2017 followed the pattern established by the Dakar and Cancún seizures; both also involved Spanish traffickers, contained large numbers of birds packed within crates in suitcases, and had a high mortality rate.

On February 12, two individuals arriving from Mexico were stopped in Madrid Barajas Airport with 120 birds of protected species in cages within suitcases.¹¹¹ Spanish authorities had identified the traffickers as high-risk, because both suspects had traveled repeatedly between Mexico and Spain in the past. At the time of the seizure, 52 birds had already died from asphyxiation.



Image 27. The birds found in the February 2017 seizure. Source: Guardia Civil

Finally, on November 20, 2017, a Spanish citizen attempted to smuggle 70 birds into Spain from Uruguay.¹¹² A customs inspection discovered the birds in 15 homemade cages inside of her luggage. Of the 70 birds, 32 had already died and the remaining 38 died later in a recovery center.¹¹³



Image 28. The 70 birds discovered in cages in November 2017. Source: Guardia Civil



Image 29. The November 2017 seizure resulted in the death of 70 birds. Source: Guardia Civil

Between 2016 and 2017, ten total seizure instances involved Spain, eight of which were destined for Spain. Six of the trafficking attempts were carried out by one to two Spanish nationals or residents. Of the ten seizures involving Spain, 60% originated in Mexico. In nine of the ten seizures, birds were trafficked in suitcases; in at least seven of the ten seizures, cages were used within suitcases to transport the birds. The abrupt appearance of the Mexico to Spain route in the bird seizure data, as well as the similar trafficking methods used not only between Mexico and Spain, but by Spanish traffickers more generally, suggested that one trafficking network was behind these seizures.

In December 2017, Spanish news outlets reported that the Spanish Civil Guard (Guardia Civil) had been coordinating with 18 countries in Africa and Latin America—Mexico in particular—on a bird trafficking case.¹¹⁴ Over the course of the investigation, at least 29 individuals in Spain and elsewhere were arrested

and more than 2,000 animals were seized. According to reports, the network's leader would send trafficking mules to different countries to procure in-demand bird species for Spanish and European markets.¹¹⁵ Upon arrival, network members would either obtain the birds themselves or join forces with local traffickers, who would supply the Spanish mules with suitcases full of birds. Notably, they were careful to fly into a variety of Spanish airports on their return to create the appearance of decentralization.

This network's *modus operandi* appears to fit the above seizures; most involved large numbers of birds of a variety of species, varied origin points, Spanish mules, were moved in boxes and cages in checked luggage, and were destined for various airports in Spain. If Spanish enforcement was successful in identifying and dismantling this network, no trafficking instances utilizing this specific trafficking method will be stopped in 2018. If the trafficking method continues, however, it will be a clear indication that either Spanish enforcement did not stop the entire network, or that multiple Spanish networks are employing the same methodology. Time will tell.

Kurtis Law

One March 2017 bird seizure in Los Angeles Airport highlighted the organized, business-like nature of wildlife trafficking networks.

On March 24, Kurtis Law, an American and Vietnamese dual citizen, attempted to bring 93 birds into the US aboard China Airways Flight No. 6 from Vietnam, which stops in Taiwan before arriving in Los Angeles.¹¹⁶ ¹¹⁷ Only eight birds survived.



Image 30. Some of the birds seized in March 2017 in Los Angeles. Source: US Attorney's Office



Image 31. Birds discovered in Kurtis Law's possession in March 2017. Source: US Court Documents

Among the 93 birds seized were a number of CITES-protected species, including roughly 26 silver-eared mesia, nine Chinese hwamei, eight red-billed leiothrix, and at least two Bali myna (CITES Appendix I). The Bali myna is particularly endangered; there are believed to be only 100 still in the wild, and trading in even captive bred individuals is strictly regulated.

When Law's bags were inspected at the airport, officials found air waybills for additional birds sent to John Wayne Airport and \$10,000 in cash.¹¹⁸ Law told officials that "he had been given instructions that, when he exited the airport upon arrival, someone who had a photo of Law would pick the birds up from [him]."¹¹⁹

Documents found during the March 24 seizure repeatedly included the name "Rex." Analysis of Law's phones and computer indicated that he used the name "Rex" when communicating using the email "asiansongbirds@yahoo.com." According to court documents, one agent stated, "[Law] appears to be one of the largest traffickers of wildlife that I have encountered."¹²⁰

Emails released in court documents revealed that Law used the name "Rex" when referencing conversion and breeding centers, suggesting that Law and his associates were both capturing wild birds and "converting" them, as well as breeding new generations of birds for sale. This is somewhat substantiated by some of Law's emails, in which he differentiated between captive-bred and captive-raised birds, at one point describing captive-raised as "from the wild," and indicating that birds from the wild are more desirable as they are more aggressive.¹²¹

In other emails, "Rex" repeatedly stated that they were "based in Asia with sourcing posts in seven Asian countries; and currently ship our birds to North America, Europe and the Middle East." While corresponding with one customer, "Rex" told him that the birds he was interested in "came from Thailand and Myanmar."¹²² "Rex" indicated at various points that the birds travel a long way before arrival in the

US, that “they sometimes use third or fourth transit countries,” and at one point mentioning that the birds sometimes pass through the Philippines, Singapore, and the Middle East.¹²³

The emails contained in the court documents make frequent references to a third party that imported and exported the birds. One buyer asked “Rex” to send him a copy of a United States Department of Agriculture (USDA) and United States Fish and Wildlife Service (USFWS) release in order to proceed with the purchase, to which “Rex” replied that he was not sure if the “3rd party service provider” he used for logistics “even bother[s] with it.”¹²⁴ In another email, “Rex” replied to a question about the legality of shipping birds into the United States by saying, “Like you said, we don’t care how you do it, just make sure we get our birds.”¹²⁵

While using “Rex” as his pseudonym, Law also:

- Repeatedly suggested to potential customers from Canada that, while airlines would not ship the birds to Canada, they could “ship to a friend of theirs in a US state close to Canada; and then ... come over to pick it up.”¹²⁶
- Answered one inquiry about whether his company had a website by saying that his company did not have its own website, but was a subsidiary of Birdsime, and that the customer should look at that website. This reference is substantiated by records of a Paypal deposit made by a customer to an account for Birdsime with the email address of asiansongbirds@yahoo.com.¹²⁷ i
- Made several references to certain birds only being available by “special order” (see **Made-to-Order Wildlife Trafficking**). At one point, he explained that the special order birds are only available to “long term customers who have who are [sic] comfortable with how we do things.”¹²⁸

During his trial, Law claimed to be “Jane Goodall to the Asian bird world,” and stated that his “main interest was in protecting the birds and giving them new homes.”¹²⁹ This second defense in particular fell flat, given his trafficking methods and the extremely high mortality rate of birds smuggled in his care; prosecutors argued that the “birds were individually wrapped and placed in Law’s suitcases under ‘horrific conditions’ in a way ‘that allowed each bird little or no movement.’”¹³⁰

Kurtis Law eventually pleaded guilty and was sentenced to six months’ house arrest and 12 months in prison. No other individuals associated with the network appear to have been arrested.

i The now-defunct website indicated that Birdsime was located in Vietnam.

Pangolins

The C4ADS Air Seizure Database recorded 102 pangolin seizures in the air transport sector between 2009 and 2017, with a combined weight of 22,612 kg.ⁱ The number of pangolin seizures (Figure 60) increased sharply after 2011, experienced a brief drop in 2014, and has been increasing most years since. This increase is likely attributable to both a steady acceleration in pangolin trafficking activity in the past few years, as well as an associated increase in reporting on pangolin seizures.

Known medium- and small-scale pangolin trafficking instances have been, on average, increasing since 2011. Both categories, however, experienced a dip in identified trafficking activity between about 2012 and 2016. The number of medium- and small-scale seizures made in 2017 abruptly reversed that trend, climbing to the highest number of known seizures (10 each) in each category since 2009.

Large-scale pangolin seizures differ substantially, increasing between 2014 and 2016 before dropping sharply to only one large-scale seizure in 2017. In 2016, there were three pangolin seizures of more than 500 kg, for a total of 3,570 kg of pangolin scales seized (representing about 2,479 pangolins).ⁱⁱ In 2017, large-scale seizure numbers dropped to one (totaling 1,066 kg of pangolin scales, or about 740 pangolins) and were eclipsed by a surge in medium-scale seizures that totaled 3,210 kg of pangolin scales (or about 2,229 pangolins) across ten seizures.

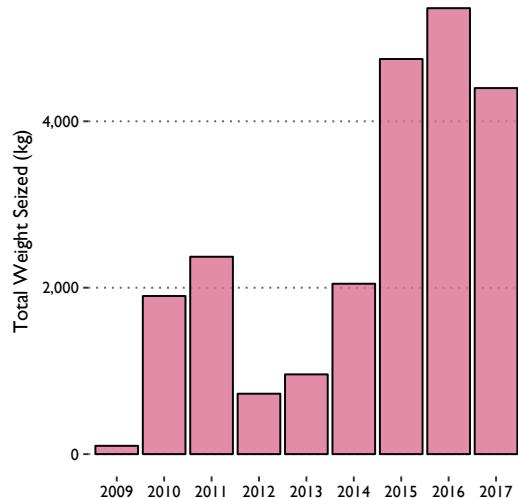


Figure 61. Weight of pangolin scales seized per year (2009–2017)

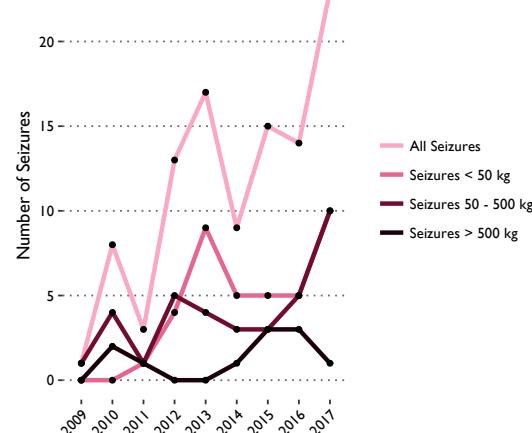


Figure 60. Number of pangolin seizures made in airports by year (2009–2017)

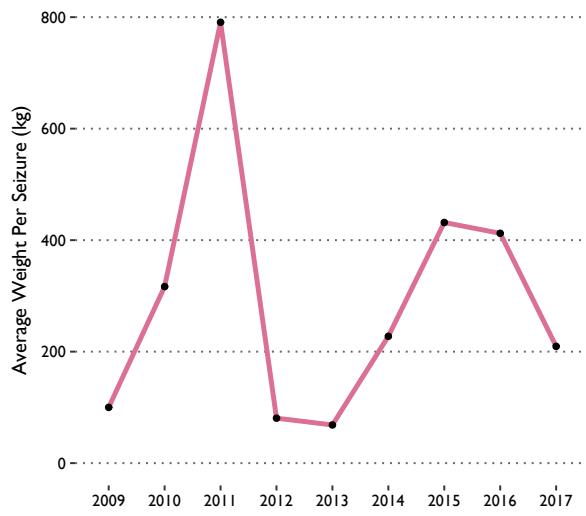


Figure 62. Average weight of pangolin scales seized per year (2009–2017)

i Pangolin seizures generally involve pangolin scales, but may also include pangolin meat or entire pangolins. In these cases, each seizure is assigned an approximate weight.

ii Using an estimate of 1.44 kg of dry scales per pangolin.

Source: Petition to List Seven Pangolin Species as Endangered Pursuant to the U.S. Endangered Species Act. Born Free USA, et. al.. 15 July 2015. www.biologicaldiversity.org/species/mammals/pangolin/pdfs/ESAPangolinPetition_07-2015.pdf.

The high number of large-scale seizures made in 2015 and 2016 is clearly visible in Figure 61. The significant drop in large-scale pangolin seizures in 2017, however, is not. In the past year, medium- and small-scale seizures have been sufficiently numerous to make up for the absence of large-scale seizures, almost matching the total weight seized in both 2015 and 2016, and far surpassing the total weight seized in 2014, another year when only one large-scale seizure was made. This is particularly significant in light of the average weight of pangolin seizures in 2017 (Figure 62), which was actually less than the average weight of seizures in 2014 – in other words, seizure numbers had to increase substantially in 2017 to accumulate such a high total weight.

- *An apparent anomaly:* One particularly unusual year appears in both Figures 60 and 62. In 2011, only three total seizures were made, but the average weight per seizure reached almost 800 kg. A review of the pangolin air seizure data for that year reveals that this abnormally high average seizure weight was driven entirely by a 2,112 kg seizure of pangolin scales and meat—without it, the average for the year falls to 130 kg.

Country-by-Country Analysis

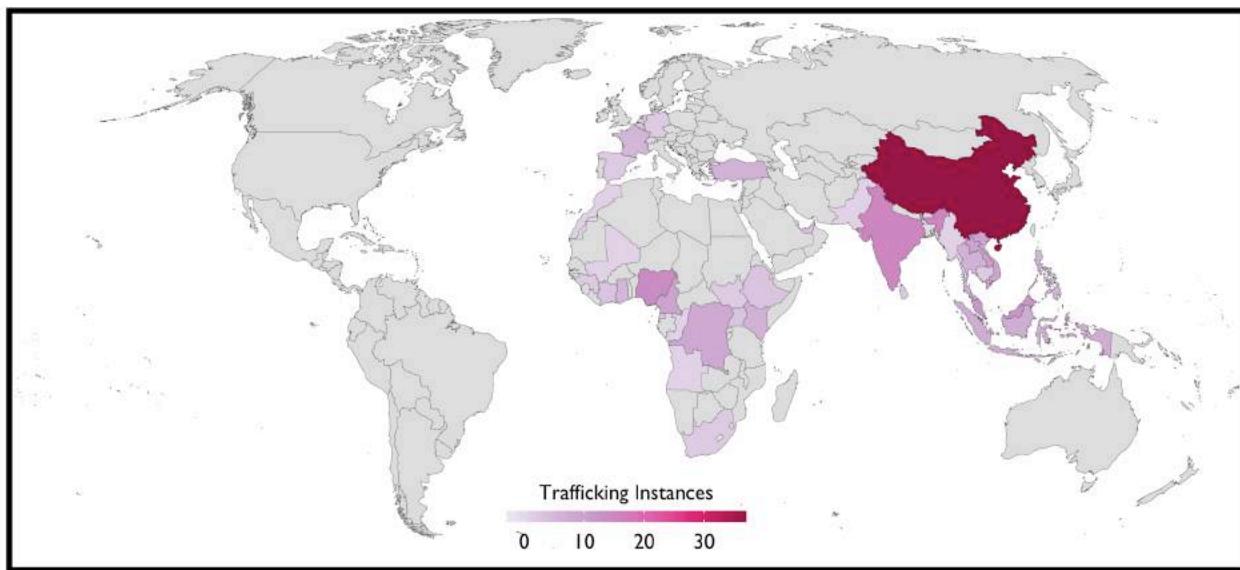


Figure 63. Global heat map for pangolin trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

The global heat map for pangolins (Figure 63) seems most similar to the heat maps for wildlife products ivory and rhino horn. The species behind all three products live in the same broad areas—Africa and Asia—while demand for these products exists primarily in Asia.

- *Transit regions:* As in the ivory and rhino horn heat maps, Europe appears in Figure 63 as a transit region for pangolin products moving from West Africa (the Ivory Coast, Cameroon, Nigeria, and Equatorial Guinea) to Asia (China, Laos, and Vietnam). East African countries Kenya, Ethiopia, and South Sudan also feature as transit points for pangolin products originating in West Africa (Cameroon, Nigeria, etc.) and Central Africa (primarily the DRC) and destined for China and Southeast Asia.
- *Significance of West Africa and India:* Although the pangolin heat map reveals a trade in many ways similar to ivory and rhino horn trafficking, significant regions within the African continent have shifted away from East and Southern Africa to Central and West Africa. This change is in part due to differences in the species' habitats; three pangolin species, the tree pangolin, long-tailed pangolin, and giant pangolin, all live in the forests of West and Central Africa. However, the final African pangolin species, the ground pangolin, lives in Southern and East Africa. Its habitat even extends as far north as Chad and Sudan, but it remains primarily within the grasslands and semiarid regions of Africa. The appearance of countries like South Africa, Sudan, and South Sudan in Figure 63 may therefore be a result of the trafficking of this pangolin species.

India and Central Asia, prominent in reptile trafficking but of little consequence to ivory and rhino horn traffickers utilizing the air transport sector, appear as significant areas for pangolin trafficking

Country	Trafficking Instances
China	37
India	15
Nigeria	14
Malaysia	12
Cameroon	9
Vietnam	9
Laos	9
DRC	8
Indonesia	7
Kenya	6

Table 10. Top ten countries by number of pangolin trafficking instances (2009–2017)

for much the same reason as West Africa. The Indian pangolin lives throughout India, and can also be found in Bangladesh, Sri Lanka, Nepal, and Bhutan. Other Asian pangolin species, such as the Chinese pangolin, Sunda pangolin, and Philippine pangolin, are partially responsible for the prominence of China, Indonesia, and other Southeast Asian countries in the pangolin heat map. China's importance is further bolstered by the country's thriving demand market for pangolin scales and meat, making China the most prominent demand country for pangolin products in the world.

- *Prominence of Nigeria:* Nigeria emerges as a prominent origin point for pangolin scales and other products moving to East Asia. Nigeria's significance is likely due to a combination of the following factors: the existence of at least two pangolin species within its borders, the presence of multiple international airports in a region with few, and relatively limited enforcement capability.

In general, pangolin trafficking activity appears to mirror ivory and rhino horn, with some regional differences.

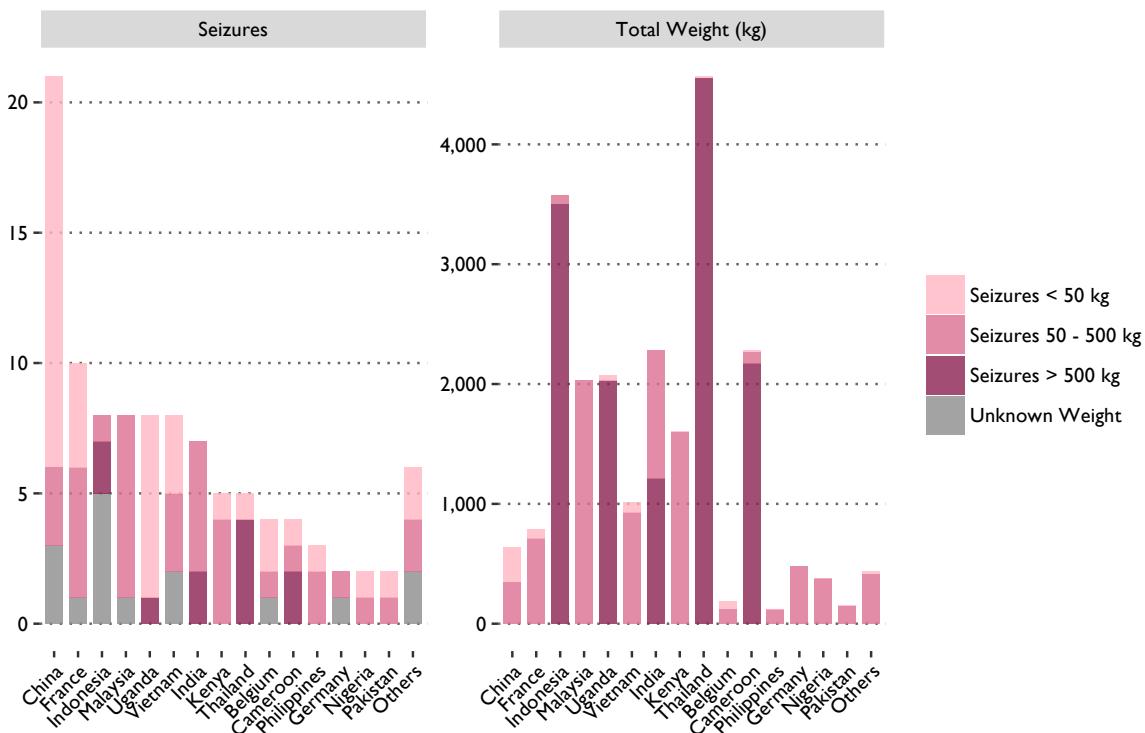


Figure 64. The total seizure count and total seizure weight by country for pangolin seizures made in airports (2009–2017)

China's dominance in the illicit pangolin trade is clearly visible in Figure 64, which displays the number and weight of pangolin seizures made in airports by country. Pangolin seizures were otherwise fairly well distributed along the pangolin supply chain throughout Europe, Africa, and Asia, with no other countries displaying clear prominence in the C4ADS Air Seizure Database.

- *Chinese and Thai dominance:* By seizure count, China has made more than double the number of seizures (21) as the second highest-ranking country, France (10). China's dominance in the C4ADS Database is primarily due to its role as the largest demand country for pangolin products,ⁱⁱⁱ but is also likely due to the country's comparatively effective customs and enforcement capabilities, as well as fairly good seizure reporting.

ⁱⁱⁱ China also receives massive maritime shipments of pangolins, including one 3,100 kg shipment of scales (representing an estimated 7,500 pangolins) discovered in Shanghai in December 2016. The absence of large-scale air shipments seized in the country suggests that traffickers may rely primarily on the maritime transport industry to move large pangolin shipments.

By weight, China falls precipitously from the top spot, substantially behind the leading countries, Thailand and Indonesia. If pangolin seizure weight is measured by scales alone (in other words, excluding meat and entire, frozen pangolins), Indonesia also falls, leaving Thailand as the primary country for trafficked pangolin scales by volume in the world. Thailand's extremely high weight count is driven by two large seizures in Suvarnabhumi Airport in December 2016 that together totaled 3,000 kg of pangolin scales.¹³¹ Both shipments had left Kinshasa, DRC and traveled through Istanbul, Turkey on Turkish Airlines before arrival in Bangkok, and were ultimately destined for Vientiane, Laos.

- *Seizure numbers are not representative of seizure weight:* Overall, the number of pangolin seizures made in a country was not indicative of the weight of pangolin scales that country seized. For example, China accounted for 20% of known pangolin seizures, but only 3% of the total weight of pangolin scales seized, meaning it averaged 30.5 kg per seizure. By contrast, Thailand made only 5% of known pangolin seizures in airports, but amassed 20% of the total weight of pangolin scales seized, averaging 913.6 kg per seizure.
- *Prominence of France:* France ranked second by seizure number, with ten seizures made in the air transport sector since 2009. France dropped to ninth place, however, in terms of volume seized, even though the country has confiscated at least 789.5 kg of pangolin scales and bushmeat in nine years. The weight of France's seizures is essentially dwarfed by the many medium- and large-scale pangolin seizures that have been made in Asia and Africa since 2009. Still, according to publicly available air seizure data, France is by far the most prominent European country involved in the illicit pangolin trade, likely because of Charles de Gaulle's role as a significant transit hub for flights between West Africa and Asia and because of Africa diaspora communities living in Paris.
- *Small seizures are common, but insignificant by weight:* Figure 64 reveals that although small-scale seizures were fairly common (accounting for 39 out of 87 pangolin seizures with known weights, or about 45%), they were almost entirely insignificant in terms of seizure weight. The frequency of larger seizures in almost every prominent pangolin trafficking country meant that small-scale seizures made up only 3% of total pangolin products seized.
- *No discernible pattern in terms of seizure location for different seizure sizes:* Different size pangolin seizures were fairly well-distributed across countries in Figure 64, with no clear pattern emerging. For instance, medium- and small-scale seizures were made in Africa, Asia, and Europe, and large-scale seizures occurred in almost equal parts in both Africa and Asia. Seizures of unknown size, while particularly numerous in pangolin seizure data (likely due to differences in reporting on seizures of pangolin scales versus pangolin meat, skins, and bodies), were similarly scattered across European and Asian airports.

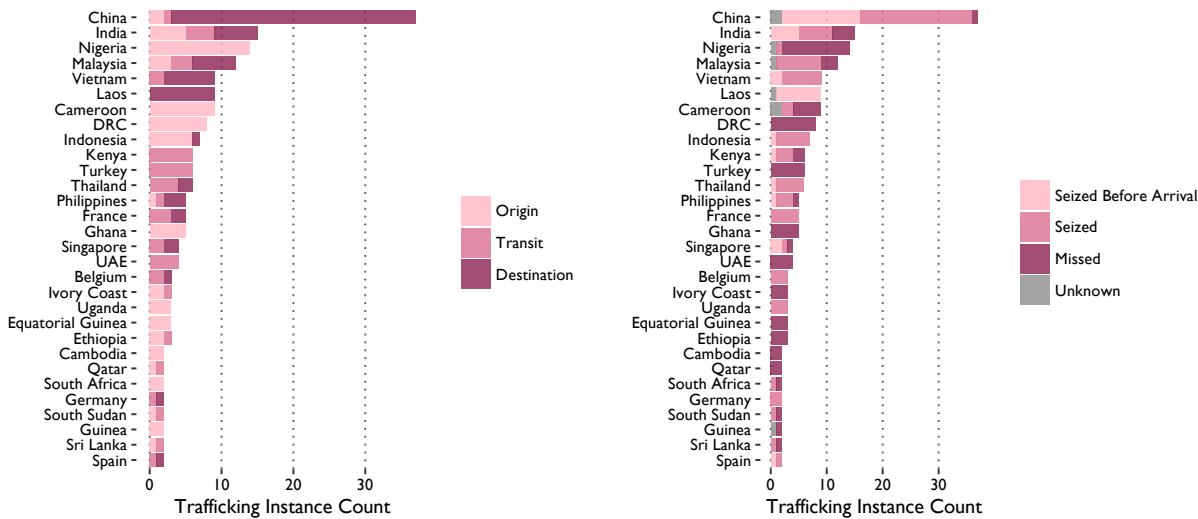


Figure 65. Country-level flight route information for countries with two or more trafficking instances (2009–2017)

Figure 66. Point of seizure within the supply chain, by country (2009–2017)

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

Figures 65 and 66 map countries by their position along the pangolin supply chain, as well as by their ability to seize pangolin derivatives traveling through their airports. China grows in prominence when measured by trafficking instances, with 37 known trafficking instances involving Chinese airports since 2009, 22 more than India, which ranks second in Figure 65. The following trends are also visible in Figures 65 and 66:

- *Asian origin points:* A few Asian destination countries for pangolin products—China, India, Malaysia, Vietnam, and the Philippines—appear as origin points as well. Pangolin populations living in Asia, particularly in India, Malaysia, Thailand, Indonesia, and the Philippines, create the opportunity for an intra-regional trade in pangolins, which is largely prevented in the illicit ivory and rhino horn trades due to low remaining numbers of Asian elephants and rhinos.

Although intra-Asian trade in pangolins still exists, it is worth noting that pangolin trafficking routes have changed substantially over the past decade or so, as poachers and traffickers within certain Asian countries have decimated local pangolin populations.¹³² The loss of once-prominent populations has forced pangolin supply chains to shift to new source regions, first to other Asian countries such as Malaysia and Indonesia, and then to Africa.¹³³ This change is visible in Figure 65 in particular, which reveals that the three most prominent origin countries for pangolin trafficking instances are African (Nigeria, Cameroon, and the DRC).

A number of reports on the illegal pangolin trade suggest that this shift began in earnest around 2009,¹³⁴ and so the true extent of the change is only partially visible in the C4ADS Air Seizure Database. Still, the C4ADS Database has tracked a clear shift in pangolin origin countries between 2009 and 2017. For example, in 2010, the most prominent origin countries for pangolin derivatives were India (four trafficking instances), China (one instance), and Cambodia (one instance). In 2017, the most prominent origin countries were primarily African: the DRC (five trafficking instances), Ghana (four), Ethiopia (two), and Malaysia (also two).

- *Many transit countries:* As in ivory and rhino horn trafficking, pangolin traffickers smuggle pangolin derivatives through countries in Europe, East Africa, and the Middle East on their way to Asian destination markets. In total, out of 37 countries linked to pangolin trafficking by air since 2009, 20 appeared at least once as an intended transit point for pangolin trafficking. Only three of those countries—Kenya, Turkey, and the UAE—were used exclusively as transit points (all three countries

are also well-known transit countries for ivory and rhino horn).

Unlike ivory or rhino horn trafficking, the majority of pangolin transit countries were located in Asia (eight countries), followed by Europe and Africa (four each), and the Middle East (three). Asia's prominence was largely driven by the intra-Asian trade in pangolins.

- *Thailand and Singapore as transit points:* Thailand and Singapore are the only two Asian countries in Figure 65 that are not predominantly destination points for trafficked pangolin derivatives; instead, both countries primarily act as transit points for pangolin scales traveling from Nigeria and the DRC to Laos. Singapore is well-known as a transit country for illicit wildlife products destined for elsewhere in Asia, while Thailand has been a frequent destination point for ivory and reptiles, as well as a lesser transit country for rhino horn moving to China and Vietnam. Thailand's appearance in Figure 65 as one of the second most frequent transit points^{iv} for trafficked pangolins is particularly noteworthy given that Thai officials successfully seized every publicly known instance of pangolin trafficking that reached Thai airports. With the exception of France, no other pangolin trafficking country matched Thailand's ability to stop pangolin trafficking in transit between 2009 and 2017.
- *Prominence of Laos as a destination:* After China, Laos was the most prominent destination point for pangolin trafficking by air between 2009 and 2017. Every known pangolin trafficking instance destined for Laos was seized prior to arrival, suggesting that any pangolin air shipments that made it to Laos's airports were not seized. The main alternative—that every single pangolin instance destined for Laos was stopped en route—is simply not feasible given the low estimated rate of enforcement success around the world (it is generally estimated that only 10% of illicit products are identified and seized by law enforcement). It is, however, possible that Laotian authorities have made pangolin seizures in the air transport sector in the past few years, but have neglected to publicly report them.
- *Unexpected destinations:* A number of countries appear as unusual destinations in Figure 65. France, Belgium, Spain, and Germany were all listed as destination points for trafficked pangolin products at least once since 2010, but none are known to have significant demand markets for pangolin scales. Closer examination of the seizures involving each country reveal that every known pangolin trafficking instance destined for Europe involved pangolin meat, and on at least two occasions, meat from an assortment of other species as well. The meat confiscated in each instance was likely destined for African marketplaces within the countries (see **Europe & the Bushmeat Trade**).¹³⁵
- *Few seizures made on departure:* Although other categories of illicit wildlife products trafficked by air seem to be discovered on both arrival and departure, common pangolin origin countries stopped few, if any, of the pangolin trafficking instances leaving their airports. Only one origin country, Indonesia, appeared to seize a significant number of the trafficking instances originating from within its borders. Indonesia has also demonstrated an aptitude for making bird seizures on departure (see Figure 66).

Customs and enforcement officials in Nigeria, the DRC, and Ghana were particularly unsuccessful in stopping pangolin trafficking instances originating in their countries, stopping only one known trafficking instance between the three. Although the countries rank third, eighth, and fifteenth respectively by trafficking instance count, only Nigeria appears at all in Figure 64 (which ranks countries by seizure count), coming in at twelfth place with only two seizures, despite being the most prominent origin point for known pangolin seizures in the air transport sector.

^{iv} Thailand, India, and the UAE all counted four pangolin transit instances, while Kenya and Turkey counted six.

Airport-by-Airport Analysis

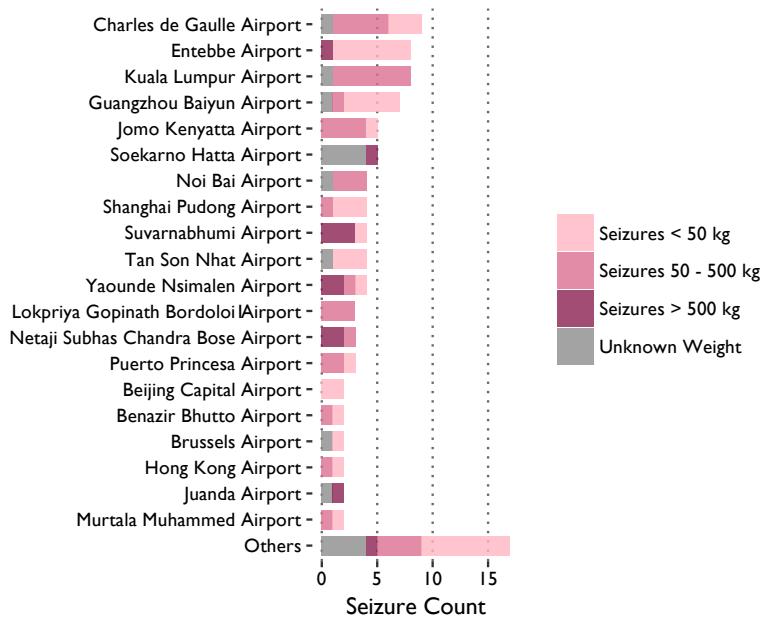


Figure 67. Seizure count for airports with two or more seizures (2009–2017)

Pangolin seizures in airports between 2009 and 2017 were fairly widely distributed across Asia and Africa, with a diverse array of airports (37 total) making at least one pangolin seizure since 2009 (Figure 67).

- *Decentralized seizures:* Pangolin seizures by airport were fairly thinly distributed, with no airports making more than ten known seizures. For example, although China counted more seizures than any other country, those seizures did not seem to concentrate in any specific airport. Instead, China's many large, international airports, combined with widespread demand for pangolin products throughout China, meant China's 20 pangolin seizures were spread across nine different airports.
- *Asian dominance:* Of the 37 airports that made pangolin seizures between 2009 and 2017, 24 are in Asia, seven are in Africa, and six are in Europe. This is likely due at least in part to both the intra-Asian trade in pangolins, as well as the limited number of pangolin air seizures made or reported in origin countries since 2009.
- *Prominence of Charles de Gaulle, Entebbe, Kuala Lumpur, and Guangzhou Baiyun:* Charles de Gaulle, Entebbe, Kuala Lumpur, and Guangzhou Baiyun Airports emerged as the most prominent airports by pangolin seizure count between 2009 and 2017. Although France and Uganda were not among the top countries for pangolin trafficking by air (France and Uganda ranked ninth and eleventh by trafficking instance count respectively), seizures in both countries were concentrated in only one or two airports. This is unlike more prominent countries, in which seizures were more widely dispersed. For example, all of Uganda's seizures were made in Entebbe, while China's 21 seizures were split between nine different airports. As a result, Charles de Gaulle and Entebbe's concentrated seizure count was sufficient to outrank most airports in more significant countries.

Kuala Lumpur Airport ties for second in Figure 67 for a similar reason; although Malaysia has multiple international airports, Kuala Lumpur is by far the busiest and the majority of Malaysia's international passenger and cargo traffic funnels through it. In fact, Kuala Lumpur was the only Malaysian airport with known pangolin seizures in the C4ADS Database. Certain similarities between the seizures—

including route information, seizure size, and trafficking methods (e.g. multiple shipments declared as “oyster shells”)—suggest that two to three distinct networks may be responsible for them.

Guangzhou Baiyun Airport differs from the other three. Its significance could be due to particularly high demand for pangolin products around Guangzhou, or it could be a result of particularly good enforcement or seizure reporting standards.

Circle Flow Analysis

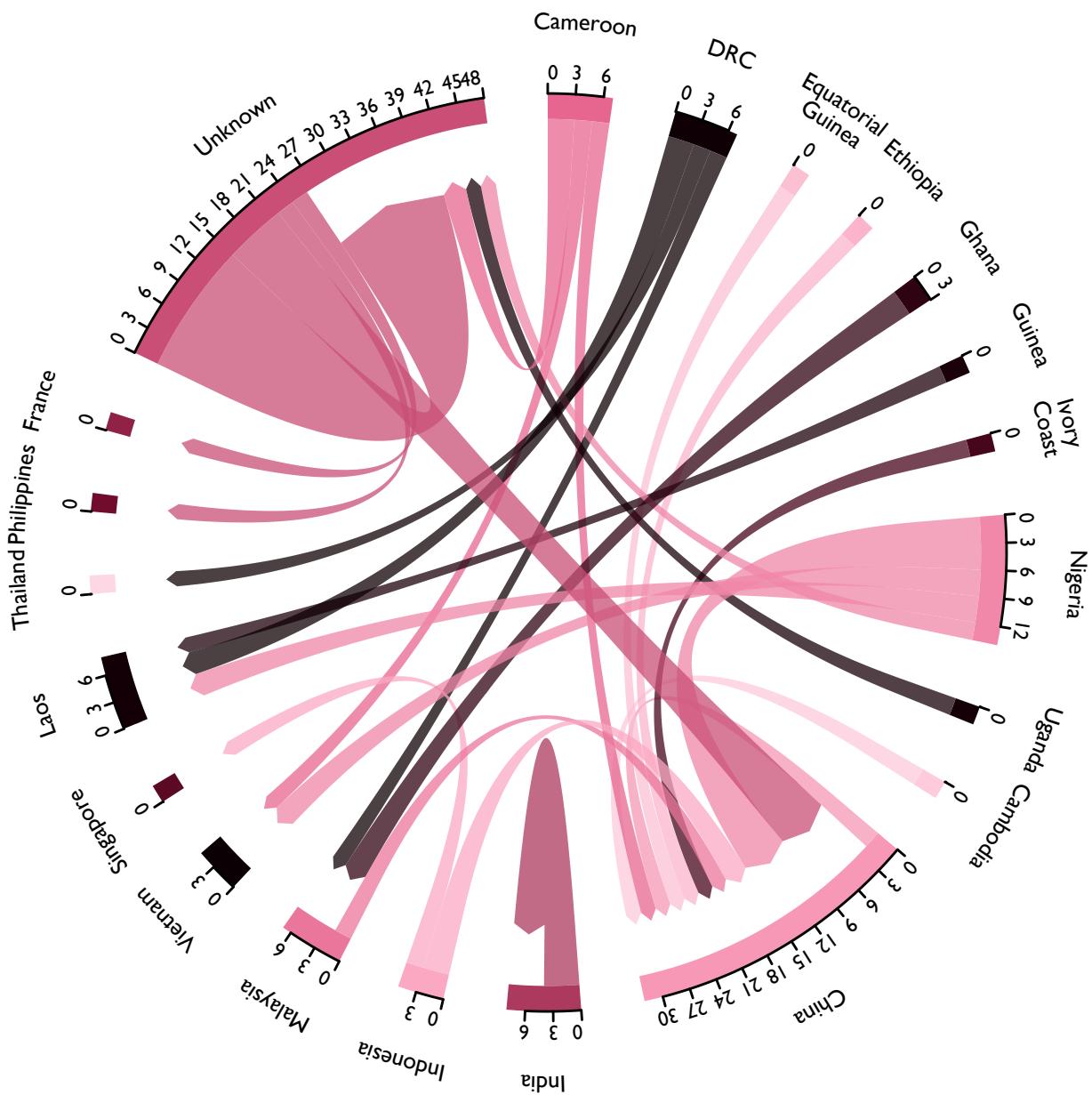


Figure 68. Circle flow map of pangolin movements from origin to destination in the air transport sector (2009–2017)

Only routes that were used more than once are included.

Figure 68 maps the flow of seized pangolin products from origin to destination countries (excluding transit) between 2009 and 2017. Note that Figure 68 includes only those routes that were used more than once. A few key takeaways from the above circle flow map are as follows:

- *West and Central Africa to East and Southeast Asia:* There was a clear flow of pangolin products from West and Central African countries to East and Southeast Asia between 2009 and 2017. For example, 40 of the 56 pangolin trafficking instances that originated in Africa were destined for East and Southeast Asian countries, primarily China (18 instances with African origins), Laos (eight instances), and Vietnam (seven instances).
- *Shifting origins:* In 2016, the most prominent African origin country for pangolins was Nigeria (four

origin instances), followed by the DRC (three). In 2017, pangolin trafficking instances leaving Africa shifted both east and west of Nigeria, with the DRC acting as an origin point for five instances, and Ghana as the origin for four. Together, both countries accounted for 56% of African origin points for trafficked pangolins in 2017. The remaining 44% was distributed across West Africa (four instances total in Nigeria, Guinea, Cameroon, and Equatorial Guinea), East Africa (Ethiopia with two instances), and Southern Africa (Angola with one instance).

- *Intra-Asian trade:* The circle flow map reveals a few instances of intra-Asian pangolin trafficking routes (note that Figure 68 includes only those routes that have been used more than once). For example, Indonesia appears as the origin for a number of trafficking instances destined for Singapore and China, all of which were seized in Indonesia. Both seizures destined for Singapore were large (weighing well over 1,000 kg), were shipped via air freight, and seemed to be of scales and meat.¹³⁶ Although each seizure originated in separate Indonesian airports in different years, both were shipped as “frozen fish,” suggesting both shipments could be associated with the same or affiliated Sunda pangolin^v trafficking networks.

In contrast, the three Indonesian seizures that were destined for China did not seem to share many characteristics. Although little information is available on two of the seizures, what was reported suggests that each instance was destined for a different Chinese airport and utilized a different smuggling method. Combined with the fact that each seizure was made in a different year, it seems likely that they were unassociated.

In 2017, the intra-Asian pangolin trade was primarily driven by a couple of medium-scale seizures of pangolin scales that were sent via mail from Sabah and Sarawak in Malaysia to Hong Kong in November (see **Pangolins & Malaysia**). These two Malaysian seizures were the only known pangolin trafficking instances that originated in Asia in 2017, reflecting the probable downturn in the intra-Asian pangolin trade since 2009.^{vi}

- *Domestic trade:* Although domestic wildlife trafficking seems to be more characteristic of the live animal trade, a few instances of the domestic trade in pangolins are visible in Figure 68.

For example, at least three pangolin trafficking instances originated in India and were destined for Imphal, India, a northeast Indian city near the border with Myanmar.^{137 vii} Two of the three instances were seized in Lokpriya Gopinath Bordoloi Airport in Guwahati within about a week in June 2010. Together, these two seizures contained about 272 kg of pangolin scales, as well as 19 kg of tiger skulls and bones. All three were thought to be ultimately destined for China; officials believed that the shipments would be driven to Moreh, India, on the border with Myanmar, before crossing through Myanmar to China.

A later shipment in December 2010 led to the uncovering of a network of Tamil refugees from Myanmar who had emigrated to Imphal and elsewhere in India.¹³⁸ The network was moving large quantities of pangolin scales, and probably other illicit wildlife and wildlife products, to Imphal, and then most likely over the border into Myanmar, where it was discovered. Since then, there appear to have been no other similar seizures of pangolin scales along this route.

v The predominant species of pangolin in Indonesia.

vi In comparison, 2010 counted at least six pangolin trafficking instances originating in Asian countries (primarily India). Although little is known about pangolin population numbers, poaching and habitat loss in Asia has likely reduced Asian pangolin numbers to such an extent that it has become easier and more profitable to source pangolins from farther-away habitats in Africa.

vii Indian media reports about these seizures are extremely unclear and contradictory, particularly in regards to the specific number of seizures made and their contents. The seizure details described here depict the most likely version of events.

Trafficking Routes Analysis

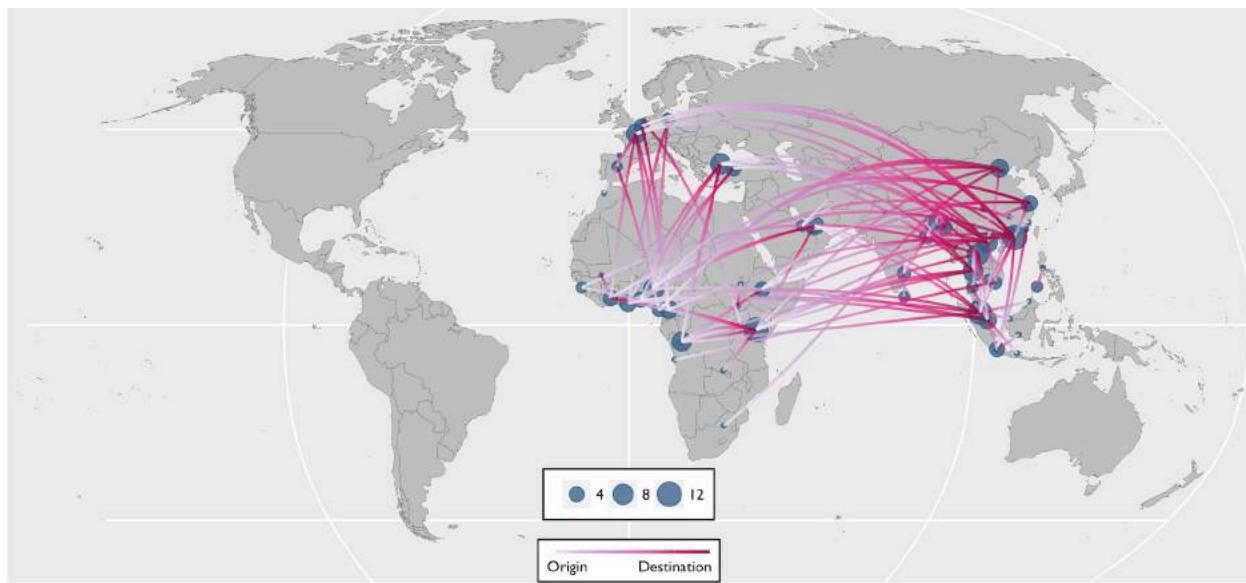


Figure 69. Pangolin trafficking routes by air (2009–2017)

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

Figure 69 depicts the known flight routes used by pangolin traffickers between January 2009 and December 2017. In addition to further demonstrating the overall West and Central Africa to Asia movement visible in the circle flow map, the routes map also highlights pangolin traffickers' reliance on transit hubs in Europe, the Middle East, and East Africa.

- *Importance of transit hubs:* The use of transit hubs in France, Turkey, Kenya, and the UAE is particularly visible in the pangolin routes map. Out of the 39 pangolin seizures in the C4ADS Database that are known to have relied on a transit airport, 44% transited through at least one of these four countries. Adding in other common transit countries Qatar, Singapore, and Ethiopia pushes this percentage up to 54%.

The use of transit hubs is likely necessary, given the distance between pangolins' main source countries in West Africa and destination markets in East and Southeast Asia. Paris, for instance, seized pangolin products moving from Nigeria, the Ivory Coast, and Cameroon to Laos, China, and Vietnam. But transit points may also provide pangolin smugglers with an opportunity to obfuscate the true origins of their illicit cargo by arriving at their destination points from comparatively less risky countries, like Belgium and Germany.

- *Intra-Asian trade:* The intra-Asian pangolin trade is particularly visible in the pangolin routes map, with many trafficking instances clearly originating in India, Malaysia, and Indonesia destined primarily for China and India. Out of at least 71 pangolin air trafficking seizures destined for Asia since 2009, 20 (28%) are known to have originated in Asia (56% originated in Africa). As mentioned previously, this intra-regional trade in pangolins appears to have been decreasing over the past few years.
- *Unusual routes:* A couple of unusual flight routes are visible in the pangolin routes map that did not appear in the circle flow map. For example, South Africa appears as the origin point for at least two trafficking instances destined for Asia. Although this appears extremely unusual on the routes map—Southern African countries rarely appear in the C4ADS Air Seizure Database in relation to

pangolin trafficking—it probably should not. Ground pangolins are native to a large swath of East and Southern Africa, and have been smuggled increasingly since 2010.¹³⁹ Few seizures in the C4ADS Database, however, could involve ground pangolins; only nine seizures originate from within the species' extensive range. The reasons behind this absence are unclear, but it is possible that wildlife trafficking networks operating in East and Southern Africa tend to rely primarily on maritime shipments to move their contraband, which could include ground pangolins, ivory, rhino horn, big cat products, etc.

In addition, although Figure 69 clearly illustrates that European airports are semi-frequent transit points for pangolin trafficking instances moving from West Africa to Asia, at least one instance is visible that appears to stop in Spain. In April 2017, Spanish customs officials in Madrid-Barajas Airport discovered the carcasses of at least two pangolins and a monkey in the suitcase of a traveler who was en route to Bilbao, Spain from Equatorial Guinea.¹⁴⁰ Although the intended destination of the animals was not disclosed in articles about the seizure, past trafficking instances of pangolin bushmeat to European cities have generally been destined for sale in African markets within these European cities (see **Europe & the Bushmeat Trade**).

Overall, pangolin trafficking routes by air appear most similar to ivory routes, with both supply chains in general moving from Africa to Asia through prominent transit hubs in Europe, the Middle East, and East Africa.

Trafficking Methods Analysis

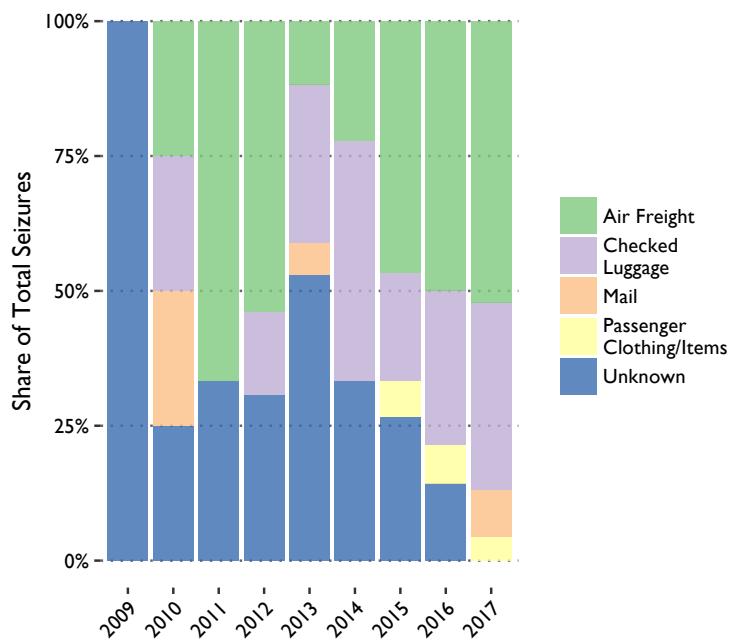


Figure 70. Transport methods for pangolin trafficking instances in the air transport sector by year (2009–2017)

Figure 70 displays the transport methods used by pangolin traffickers since 2009. Pangolin products seem to be primarily trafficked by *air freight*, followed by *checked luggage*. Pangolin trafficking instances are infrequently moved by *passengers*.

- *Reliance on air freight and checked luggage:* In every year except 2010, 2013, and 2014, *air freight* shipments made up the majority of known pangolin seizures with transport method information, accounting for anywhere from 47% (2015) to 67% (2011). *Checked luggage* seizures followed, making up anywhere from 15% (2012) to 44% (2014) of seizures with transport method information.

The prevalence of *air freight* seizures of pangolin products since 2009 is at least in part because of pangolin traffickers' tendency to send only medium- and large-scale shipments of pangolin scales, perhaps due to the low value of individual scales (i.e. pangolin scale shipments must be big enough to warrant the expense of air travel). In addition, since many pangolin seizures involve pangolin carcasses or meat, pangolin traffickers may be forced to rely on *air freight* and *checked luggage* to move their contraband, given both the size of the smuggled products and their probable odor.

- *Infrequent passenger seizures:* Pangolin products have only been moved by passengers (on their persons or in their carry-on bags) in three out of 77 known pangolin seizures with transport method information, most likely for the same reasons that pangolins are typically moved by *air freight* or *luggage* (i.e. size, quantity, and odor). In each of these instances, pangolin scales were moved alongside small quantities of worked ivory, suggesting that ivory is expensive enough to warrant smuggling pangolin scales by air in small amounts.
- *High percentage of unknown transport methods:* Pangolin trafficking often appears similar to ivory and rhino horn trafficking, in part due to the similar nature of their supply chains (originating in Africa, transiting through Europe, the Middle East, or East Africa, and arriving in Asia), and in part because pangolin is generally trafficked as a product, rather than as a live animal. This secondary reason is likely behind the high percentage of *unknown* pangolin seizures visible in Figure 70; media outlets

tend to report transport methods for live animals, like reptiles and birds, more frequently than they report transport methods used for illicit wildlife products. The fall in *unknown* seizures in 2017 may reflect growing international attention to the issue of pangolin trafficking, as pangolins in Africa and Asia have become more endangered due to rampant poaching.^{viii}

The trafficking methods used by pangolin traffickers have included:

- Missing, incomplete, or fraudulent documentation
- Declared as fish (e.g. “frozen fish,” “dried seahorses,” “live crabs”)
- Declared as wigs, feathers, oyster shells, etc.
- Hidden underneath meat, fish, or other animals (e.g. turtles)
- Destined for fake addresses
- Shipped together with fish, fruit, and vegetables
- Wrapped in tin foil and hidden inside fish

Pangolins have been trafficked along with:

- Ivory
- Rhino horn
- Bear paws
- Hornbill beaks
- Hippopotamus teeth
- Insects (butterflies)
- Big cats (tiger skulls and bones, lion claws)
- Reptiles (hawksbill turtles, green turtles, geckos)
- Bushmeat of various species (crocodile, antelope, monkey, rodent, agouti)



Image 32. Worked ivory and pangolin scales discovered wrapped in tin foil and hidden inside frozen fish Source: Thanh Nien

^{viii} All eight pangolin species were up-listed to CITES Appendix I at the most recent CITES meeting in 2016, which likely helped draw international attention to their plight.

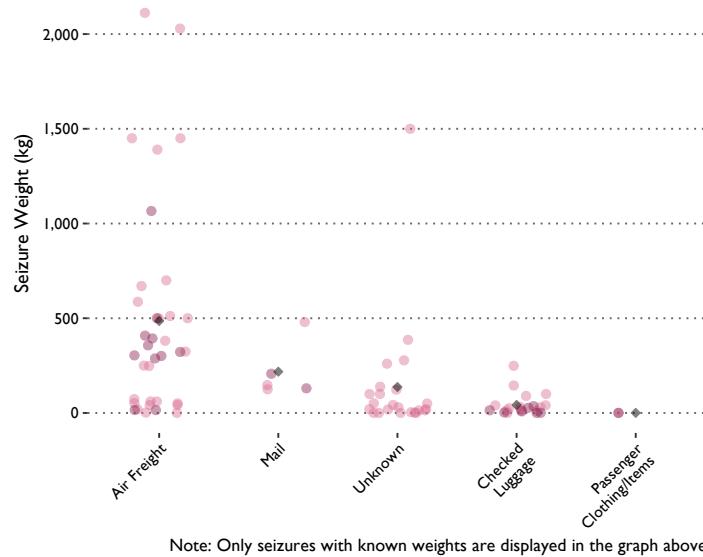


Figure 71. Pangolin trafficking instances split by transport method and displayed by weight (2009–2017)

Each dot represents one seizure, and each diamond represents the mean weight of seizures for that category. Darker colored dots represent 2017 seizures.

The dominance of the *air freight* category in pangolin trafficking is clear in both Figure 71 and Table 11; *air freight* seizures accounted for 40% of all pangolin seizures by number between 2009 and 2017, and an impressive 77% by weight.

The only other major transport method for pangolin products in terms of weight was the *unknown* category, which made up 14% of pangolin seizures by weight. The distribution of *unknown* seizure weights visible in Figure 71 suggests that many of these seizures were likely moved by *air freight* or *checked luggage*.

Although only five *mail* seizures were identified, they were large enough to surpass *checked luggage* by weight, averaging 217.8 kg versus 42.6 kg per seizure. This suggests *mail* may be a significant transport method for pangolin products trafficked by air.

The *checked luggage* and *passenger* categories were minuscule by comparison to the other categories; even though *checked luggage* seizures represented 27% of known pangolin seizures, they made up only 4% by weight. Similarly, *passenger* seizures accounted for a measly 3% of all known pangolin seizures (0.0003% of total weight seized).

Transport Method	Seizures	Total Weight (kg)	Mean Weight
Air Freight	41	17,476	485.4
Checked Luggage	28	894.1	42.6
Unknown	26	3,152.2	137.1
Mail	5	1,089	217.8
Passenger Clothing/Items	3	0.7	0.3

Table 11. Pangolin transport methods by number and weight (2009–2017)

Pangolins & Malaysia

A suite of pangolin scale seizures in Kuala Lumpur Airport between May and November 2017 showcased a number of common red flags for trafficking instances moved by air freight: multiple trafficking instances using similar trafficking methods were shipped in close succession, documentation for each was falsified, all were destined for nonexistent addresses, and each had followed similar routes before arriving in Kuala Lumpur.

In early May 2017, customs officials at Kuala Lumpur airport discovered 18 sacks in two separate shipments in the airport's cargo warehouse containing 712 kg of pangolin scales.¹⁴¹ According to the Director General of the Royal Malaysian Customs Department, the stockpile of pangolin scales were the combination of two shipments from Africa: eight sacks seized on May 2 were from Accra, Ghana by way of Dubai,¹⁴² and ten sacks seized on May 4 were from Kinshasa, Congo by way of Nairobi and Dubai.¹⁴³ Both shipments were consigned with false documentation, claiming contents of "general product and dry herbs."¹⁴⁴



Image 33. Customs officers standing next to pangolin scales seized in May 2017. Source: Vincent Thian/AP Photo



Image 34. Customs officers display pangolin scales seized in May 2017. Source: TRAFFIC

A little over a month later, two other pangolin seizures in Kuala Lumpur appeared to follow a similar pattern. On June 9, 2017, the Royal Malaysian Customs Department seized 12 boxes labeled "oyster shells" but contained 288 kg of pangolin scales.¹⁴⁵ ¹⁴⁶ The origin of this shipment was also Accra, Ghana, and the final destination was a fake address.¹⁴⁷ A second shipment of 393.5 kg of pangolin was seized on June 15, and it was also labeled "oyster shells" and shipped from Ghana.¹⁴⁸ ¹⁴⁹

Two weeks later, on June 30, 2017, customs officials in Malaysia seized another 300.9 kg of pangolin scales.¹⁵⁰ The shipment had arrived from the DRC¹⁵¹ via Ethiopian Airlines and was destined for a fake address.¹⁵²

Finally, on November 16 and 17, 2017, 13 boxes containing pangolin scales were seized at Kuala Lumpur Airport's Mail and Courier Centre while en route to Hong Kong.¹⁵³ These boxes were part of four separate shipments originating from different addresses in Malaysia, but all being sent to the same Hong Kong address.¹⁵⁴ All four shipments were labeled as "samples."¹⁵⁵

While these seizures may not all have been linked to one trafficking network, it seems highly likely that no more than four wildlife criminal groups were behind the seizures, highlighting the importance of tackling established trafficking networks in order to dismantle the illegal wildlife trade.

Europe & the Bushmeat Trade

Over the last decade, the majority of known pangolin trafficking instances destined for Europe have involved the smuggling of pangolin meat. The main drivers of this trade are African diaspora communities in European cities, where bushmeat is in demand for either household consumption or as a delicacy for traditional dishes in restaurants.

For instance, a 2010 study published in the journal *Conservation Letters* estimated that five tons of African bushmeat per week are smuggled into France through Charles de Gaulle Airport.¹⁵⁶ In all of 2012, French customs officers seized over 30 tons of bush meat of African or Asian origin.¹⁵⁷

The meat of a variety of African animals—such as primates, crocodiles, and snakes—is smuggled into European cities. On at least two occasions, pangolin meat was seized along with meat from an assortment of other species. In October 2012, for instance, several hundred pounds of antelope, monkey, crocodile, and pangolin meat were seized from the suitcases of passengers arriving at Charles de Gaulle Airport from Africa. The meat was allegedly destined for the Château-Rouge district of Paris, where bush meat is known to be illegally sold by vendors at an African market.¹⁵⁸ In another instance, in June 2013, French officials at Paris Orly Airport seized 14 kg of bushmeat, including monkey, agouti,ⁱ and pangolin, arriving from sub-Saharan Africa after a stopover in Morocco.¹⁵⁹ The meat was allegedly intended to be served in Paris-area restaurants.



Image 35. A smoked pangolin that was smuggled into France.

Source: AP



Image 36. A skinned pangolin seized at the Madrid Airport.

Source: Guardia Civil

The smuggling of pangolin meat, however, is not limited to France. In April 2012, customs officials at the Brussels Airport seized eight dead pangolins arriving from Cameroon, where pangolin meat is commonly eaten.¹⁶⁰ German officials at the Munich Airport made a similar seizure in March 2015, when they confiscated pieces of smoked pangolin from the suitcase of a traveler arriving from Ghana, who declared the meat as “refined” traditional bush food.¹⁶¹ Spanish customs officials at the Madrid Airport also made an April 2017 seizure of a dead monkey and two skinned pangolins from a man traveling to Bilbao from Equatorial Guinea.¹⁶²

Despite its delicacy status, the smuggling of bushmeat into Europe poses considerable public health risks; for example, the consumption of bushmeat in Africa was linked to the 2014 Ebola outbreak.¹⁶³ Furthermore, bush meat illegally smuggled into Europe is not subject to hygiene checks, raising concerns over the spread of pathogens.¹⁶⁴

ⁱ Agoutis are an American rodent species. How agouti meat ended up in a trafficking attempt between Sub-Saharan Africa and Europe is unclear, although it is possible that “agouti” in this case refers to the greater cane rat, which is both considered a delicacy and is given the nickname “agouti” in Western Africa.

Marine Productsⁱ

There were at least 82 seizures of marine products in the air transport sector between January 2009 and December 2017, according to the C4ADS Air Seizure Database. Similar to the ivory, rhino horn, reptile, and pangolin categories, marine products seizures in airports have experienced a clear increase since 2009. The extent to which the low seizure numbers visible in Figure 72 between 2009 and 2012 are reflective of limited seizure reporting, rather than of actual trafficking or enforcement activity, is unknown. Regardless, marine product seizures increased by more than 120% between 2014 and 2015, and have remained high, at 20 seizures per year each year since 2015.

The seizure data in Figure 72 is not broken down by small-, medium-, and large-scale seizures due to the wide variety of marine species that are included in this category. Determining a seizure scale that could accurately reflect the nuances of different types of marine product trafficking is virtually impossible. An average large-scale seizure of seahorses, for instance, would likely include many thousands of animals, while a large-scale seizure of fish swim bladders probably would not exceed a few hundred specimens.

Similarly, while the number of marine products seizures can be displayed by year (Figure 72) and by country (Figure 75), the combined weights of various marine product seizures could not be accurately compared, particularly since some types of marine seizures are reported by number, while others are reported by weight. Many marine products seizure reports lack both weight and number information entirely, and C4ADS does not possess sufficient data on every illegally traded marine species to be able to approximate weights for seizures of species that are reported only in terms of number, or vice versa. Again, using seahorses as an example, seizures of seahorses can involve as many as 20,000 individual fish, and the average weight of one seahorse is rarely reported. So if a seizure of 20,000 seahorses does not include a reported weight, how can the weight of one seahorse be approximated? This question is complicated when the fact that most seizures are of dried seahorses is taken into account. Only one seahorse seizure in the C4ADS Database, a 2015 shipment of seahorses stopped in Madagascar, included both weight and number; the seizure involved 1,000 seahorses weighing a combined total of 3 kg, or 0.003 kg per seahorse. This one data point is hardly sufficient to support a broader approximation of seahorse seizure numbers or weights, and furthermore, it does not aid in the attempt to compare marine seizures across species.

In lieu of an assessment of the total weight of marine products seized, Figure 73 presents a breakdown of the most common categories of marine species seized in the air transport sector. Of all the marine products confiscated, seahorses were interdicted most often, accounting for 24.4% of total marine products seizures. Eel seizures accounted for 15.6%, while fish, mollusks (generally abalone or conches), and coral seizures accounted for 13.3% each. Together, these five categories accounted for 80% of all marine products seized in airports since 2009.

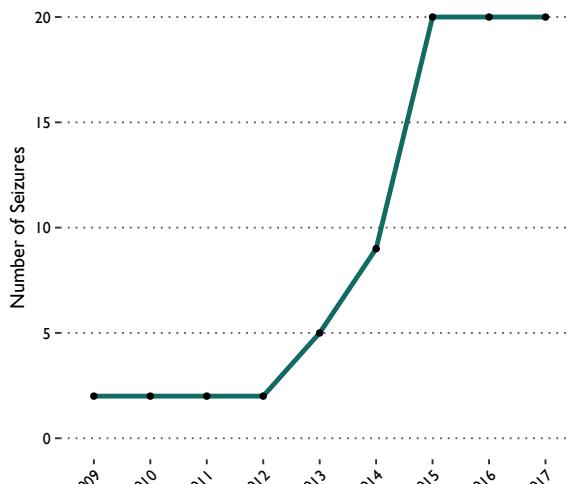


Figure 72. Number of marine seizures made in airports by year (2009–2017)

ⁱ “Marine products” refers to any marine species or marine species derivative that is trafficked by air (primarily seahorses, coral, fish bladders, etc., although marine mammals qualify as well). This category includes European eels as well.

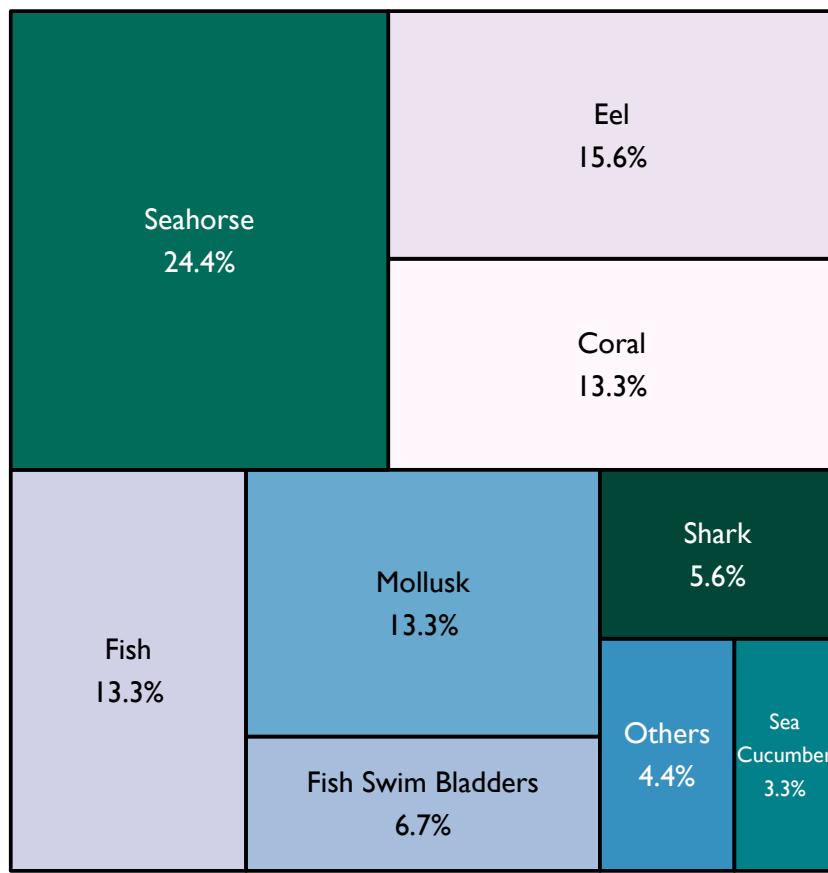


Figure 73. Percentage breakdown of seized marine products by type (2009–2017)

Note that the breakdown of marine products seizures by type is in part determined by species differences and the associated dissimilarities in how each species is trafficked. Seizures of seahorses and eels, the most commonly seized marine products, can often involve thousands of individual specimens (one shipment discovered at Charles de Gaulle Airport in Paris contained 18,700 seahorses; officials in Sofia Airport in Bulgaria found 2,000,000 European eels en route to China in 2015). This could be a reflection of the comparative ease of finding and collecting seahorses and eels, or indicative of the low value of individual specimens—the Charles de Gaulle seizure was estimated to be worth only \$225,000, or about \$12 per seahorse.¹⁶⁵ With such low value species, traffickers must amass large quantities to warrant the expense of shipping them to destination markets. By contrast, fish swim bladders are both relatively difficult to obtain and high-value (a July 2017 seizure of 375 totoaba swim bladders in Tijuana Airport in Mexico could have been worth more than \$2 million). Partially because of this, swim bladder shipments number at most in the low hundreds, and seizures tend to be infrequent.

Country-by-Country Analysis

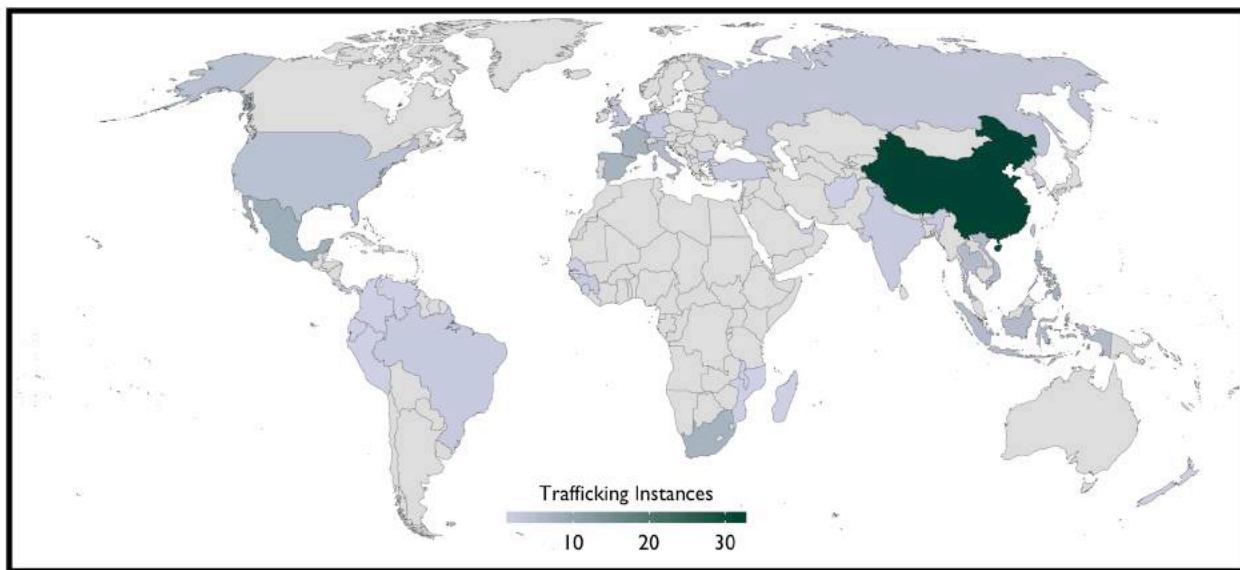


Figure 74. Global heat map for marine products trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

The marine products heat map (Figure 74) showcases the geographic range of marine products trafficking, highlighting the countries most affected by it. The many varied supply chains that make up marine product trafficking defy clear categorizations, and prevent many clear trends from appearing in the heat map.

- *Geographic diversity:* Marine products seizures in the air transport sector were generally thinly spread across a wide array of countries in the Americas, Europe, Africa, Middle East, and Asia. The only commonality these countries seemed to share was access to water; few landlocked countries appeared to be affected by marine product trafficking by air.

Unlike ivory, rhino horn, or pangolin supply chains, which are limited at their origins by access to elephant, rhino, and pangolin habitats, marine product supply chains encompass a wide variety of marine species that can be sourced from oceans, rivers, and lakes around the world.

- *Dominance of China:* China's dominance in the marine heat map vastly outweighs the prominence of any other country affected by marine products trafficking. Table 12 reveals that China counts over four times as many marine trafficking instances as Mexico, the second most prominent country.

Country	Trafficking Instances
China	32
Mexico	8
France	7
Philippines	7
South Africa	7
Spain	7
Indonesia	5
Thailand	5
Vietnam	5
Italy	5

Table 12. Top ten countries by number of marine product trafficking instances (2009–2017)

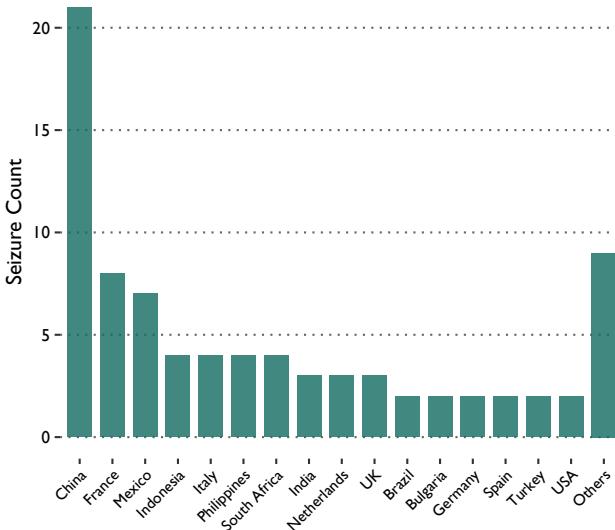


Figure 75. Number of marine product seizures by country (2009–2017)

Although marine product seizures are generally incomparable by weight or number, the above graph helps to identify which countries marine product trafficking affects, and how frequently. Figure 75 reveals that although China made the most marine products seizures (21), seven of the top 16 countries by seizure count were European. Still, with almost three times as many seizures as the next most prominent country by seizure count, China's significant lead means that Asian countries led in terms of seizures between 2009 and 2017, with 33 out of 82 total seizures (40%).

- *Geographic diversity:* Marine products seizures were not just limited to Asia and Europe, which together counted 59 seizures (72% of seizures); the Americas followed with 15 marine seizures (18%), followed by Africa (five, 6%), the Middle East (two, 2.4%) and Oceania (one, 1.2%). The fact that every region of the world has made at least one marine products air seizure since 2009 highlights the wide geographic reach of marine product trafficking.

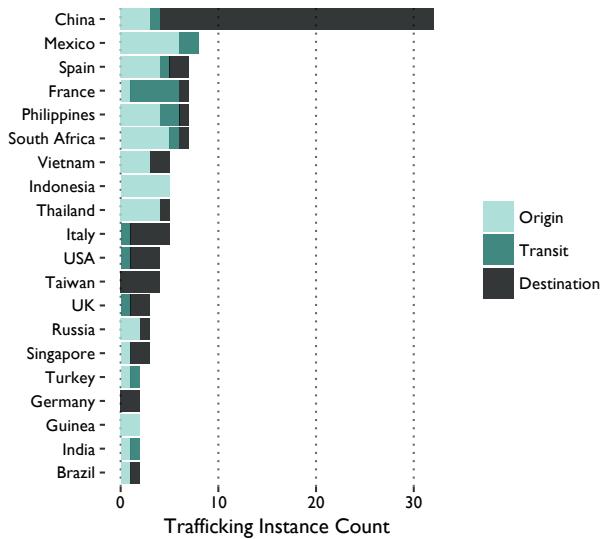


Figure 76. Country-level flight route information for countries with two or more trafficking instances (2009–2017)

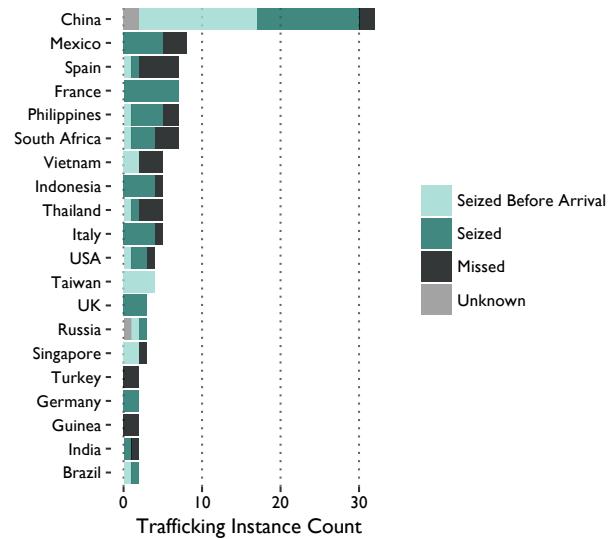


Figure 77. Point of seizure within the supply chain by country (2009–2017)

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

Figures 76 and 77 (above) depict every country with two or more marine products trafficking instances between 2009 and 2017. China continues to appear prominently, with four times the number of trafficking instances as second-ranked Mexico. The majority of the other countries that experienced two or more marine product trafficking instances were widely distributed across the world; eight of the countries in Figures 76 and 77 are Asian, six are European, three are American, two are African, and one is Middle Eastern.

- *China as destination:* China is by far the world's most prominent importer of illicit marine products, according to the C4ADS Database. Of China's 32 identified marine products trafficking instances, 28 were destined for China. China's prominence as a destination point for marine products appears to have been fairly consistent since 2009, with no clear waxing or waning trends visible in the data.

Marine products destined for Chinese airports have originated from all over the world, including Mexico, Spain, South Africa, Madagascar, and Thailand, but seem to be primarily destined for just one Chinese airport—Hong Kong. Of the 22 marine air trafficking instances destined for China with destination city-level information, 15 were en route to Hong Kong, or in Hong Kong, when they were seized.ⁱⁱ The marine species destined for Hong Kong Airport varied, from eels (four instances), to shark fins (also four instances), totoaba bladders (two), seahorses (two), abalone (two), sea cucumbers (one), and rays (one).

Such a high number of marine trafficking instances may have been destined for Hong Kong Airport for two reasons. First, Hong Kong is known for having thriving demand markets, both legal and illegal, for marine products, including shark fins, sea cucumbers, abalone, and fish bladders (certain species behind all three of these products are highly protected by national and international laws). A fairly large affluent business community in Hong Kong has meant that even the most expensive marine species can be sold in high-end fish markets and restaurants; some high-end restaurants even offer special, under-the-table menus for valued patrons including expensive, in-demand endangered species.

Second, until recently, Hong Kong customs and enforcement officials were considered to be fairly lax in regards to enforcing anti-wildlife trafficking legislation.¹⁶⁶ This likely led many marine products traffickers, and likely traffickers of other species, to import their contraband by air or by sea into Hong Kong, with the intention of smuggling it over the border into mainland China to bypass perceived stricter enforcement in cities like Beijing and Shanghai.¹⁶⁷ Hong Kong has recently taken steps to address this issue by publicly stating support for anti-wildlife trafficking laws and regulations, even requiring some seafood retailers to post signs informing customers of the illegality of the totoaba trade clearly in their shops.¹⁶⁸ Hong Kong authorities have also been conducting periodic examinations of seafood retailers in the city to ensure that no illicit seafood products are on sale; however, these examinations are generally preceded by at least a few days' notice to retailers that enforcement officials will be reviewing their stores, and are therefore questionably effective.¹⁶⁸

- *Prominent origin points:* No country stood out in Figure 76 as the most prominent origin point for illicit marine product trafficking; instead, marine product origins were dispersed across at least 28 different countries, concentrating slightly in Mexico, South Africa, and Indonesia, each with at least five origin instances.

Mexico counted six marine origin instances. Four of the six involved totoaba bladders or fillets,^{iv} while the other two involved sea cucumbers and coral. The totoaba fish lives only in the Upper Gulf

ii Other Chinese destination cities included Beijing, Nanjing, Shanghai, and Xiamen.

iii The recent ivory ban is a good example of this. While President Xi vowed to ban ivory sales in 2015 (China's ban went into effect December 31, 2017), Hong Kong resisted, finally voting to ban the ivory trade in January 2018. Hong Kong's ban will come into effect gradually, and will only be fully implemented in 2021.

iv One totoaba bladder seizure also included seahorses.

of California in Mexico, and is highly valued in China for its swim bladder, which is both used to make fish maw soup and given as an expensive gift. Totoaba's high value has attracted the attention of some organized crime groups in Mexico, who seem to have expanded into the totoaba trade.¹⁶⁹

South Africa's five origin instances were primarily abalone and seahorse seizures. South Africa is well-known as one of the world's main origin points for abalone, which is both legally and illegally harvested off the coast, then brought back to shore and likely taken to some sort of processing center before being exported to abalone demand markets in Asia.^v

Indonesia also counted five origin instances. The marine products departing from Indonesian airports varied substantially, from manta rays, to whitetip shark fins, lobster, and various species of coral, mollusks, and tropical fish. Indonesia's appearance as an origin point for marine products is hardly surprising, given that the country is a tropical island nation with plentiful access to coral reefs. Indonesian customs and enforcement again were unusually capable of stopping trafficking instances on departure, seizing almost every marine product trafficking instance leaving from Indonesian airports.

- *Europe as transit region:* At least 15 countries acted as transit points for illicit marine products shipments moving around the world. Most countries were the intended transit point for a maximum of one to two seizures; the geographically diverse nature of the illicit marine products trade ensured that few routes were used more than once. France, however, emerged as the only primarily transit country in Figure 76, with a total of five marine instances intended to transit through Paris's Charles de Gaulle Airport. The instances followed no clear pattern, originating in Spain, China, Madagascar, and Guinea and destined for China, Spain, and Vietnam. The only major unifying factor between the majority of the seizures was their contents; four of the five contained seahorses.

Despite the difficulty inherent in stopping wildlife trafficking in transit, French authorities seized all five known instances traveling through Charles de Gaulle, as well as three other marine product trafficking instances that originated in or were destined for Paris or Lyon between 2009 and 2017.

- *Europe as destination region:* Although Asian nations counted by far the most trafficking instances (almost entirely due to Hong Kong Airport), almost as many European nations (six) appeared as destination points for marine products as Asian countries (seven).^{vi}

Europe's prominence as a destination region for trafficked marine products was largely driven by Italy, which seized at least four different trafficking instances destined for the country. Each seizure involved coral, with one two-ton seizure involving not only coral, but also shrimp and 25,000 tropical fish intended for a wholesaler on the outskirts of Rome.

Other European destination countries France, Germany, Spain, Russia, and the UK received a wide array of marine species from predominantly Southeast Asian countries (Thailand, Vietnam, the Philippines, etc.). The majority of seizures appeared to be of coral, conches, and seahorses, suggesting that marine products destined for Europe are used as decorations in aquariums and homes, and, to a lesser extent, as food; one traveler from Senegal was arrested after she tried to bring seahorses back with her to cook.¹⁷⁰

v An abalone poaching operation was recently caught on camera by two South African citizens with a drone. Footage of the process of poaching the abalone, hiding the abalone on shore, retrieving the abalone, and transporting it for processing is available at the following link: www.facebook.com/warren.witte.5/videos/10155250332925841/.

vi The seventh Asian country, South Korea, only counted one trafficking instance, and so is not included in Figures 76 or 77.

Airport-by-Airport Analysis

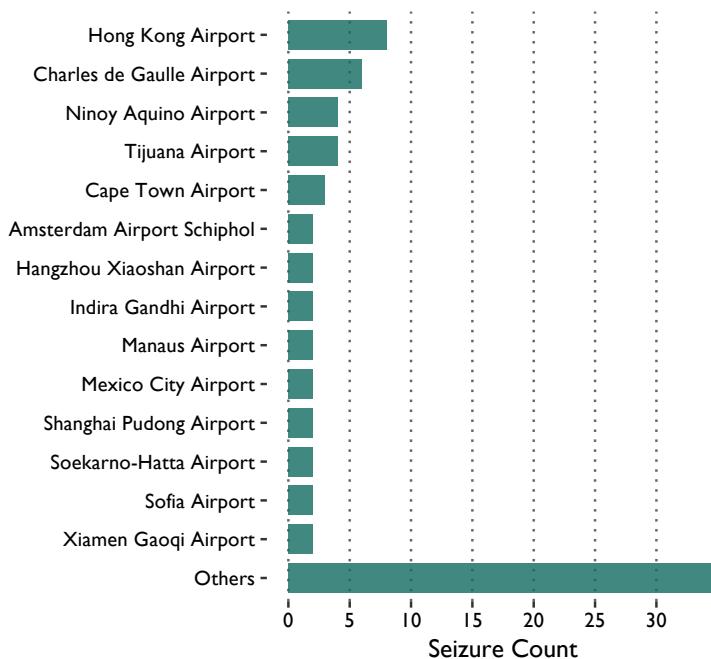


Figure 78. Seizure count for airports with two or more seizures (2009–2017)

Figure 78 displays all the airports with two or more publicly reported marine products seizures since 2009. Relatively infrequent seizures (only an average of nine or so per year, compared to 41 for ivory trafficking) paired with extremely diverse marine supply chains meant that only 14 airports made two or more known seizures in the past nine years.

- *Seizures widely dispersed:* Every airport made fewer than 10 seizures—the only two airports with more than five were Hong Kong, probably the world’s leading demand city for marine products, and Charles de Gaulle. The other 12 airports with two or more marine product seizures since 2009 were dispersed throughout Asia, Europe, the Americas, and Africa.
- *Asia and Europe again dominate:* Although marine product trafficking is extremely decentralized and impacts most regions of the world to some extent, Figure 78 again reflected a concentration of marine seizures in Asian and European countries.

Of the 49 airports that have made known marine products seizures since 2009, 17 are located in Asia. Chinese importance in regards to marine product trafficking is so pronounced that a total of ten Chinese airports counted at least one seizure, numbering one more airport than the entire American region. With Hong Kong leading the way, 17 Asian airports made at least 33 seizures between 2009 and 2017, followed by Europe with 26 seizures in 18 airports. In comparison, only three African airports made marine product seizures, for a total of five seizures across the continent.

- *Absence of Oceania:* No Oceanic airports appear in Figure 78. In fact, only one Oceanic marine products seizure appears in the C4ADS Database—a 2015 seizure of ornamental fish in Adelaide Airport, Australia.¹⁷¹ This lack of Oceanic seizures is surprising, given the plentiful marine ecosystems of many Oceanic countries, and suggests that customs and enforcement officials in Oceania are either not making seizures, or not reporting them.

Although it is possible that Oceanic countries are simply missing marine products trafficking instances

leaving their airports, Oceania also rarely appears as an origin, transit, or destination region for other known marine products seizures; the only other Oceania-related seizure in the C4ADS Database is a Chinese seizure of a “batch of [mail] shipments” containing deer antlers, deer tongue, dried sea cucumber, and fish gelatin originating in New Zealand and destined for Tianjin in June 2017.¹⁷² Perhaps traffickers find Oceania too remote to source from, and instead prefer to obtain marine species from countries in more easily accessible regions, like Southeast Asia.

Overall, the airports with the most marine products seizures largely reflected seizure rankings by country (Figure 75), although some differences arose based on the number and distribution of international airports within a country. For example, Italy ranked fourth by seizure count in Figure 75, but no Italian airports made enough seizures to warrant inclusion in the above graph. This is explained by a look at the marine products seizure data in the C4ADS Air Seizure Database, which reveals that each Italian seizure was made in a different Italian airport (Falcone Borsellino Airport, Olbia Costa Smeralda Airport, Reggio Calabria Airport, and Rome Fiumicino Airport).

The tendency for marine products seizures to scatter throughout countries highlights just how significant China must be to the illicit marine product trade, not only because of how many different Chinese airports made marine seizures, but also because of how many seizures each of those airports made.

Circle Flow Analysis

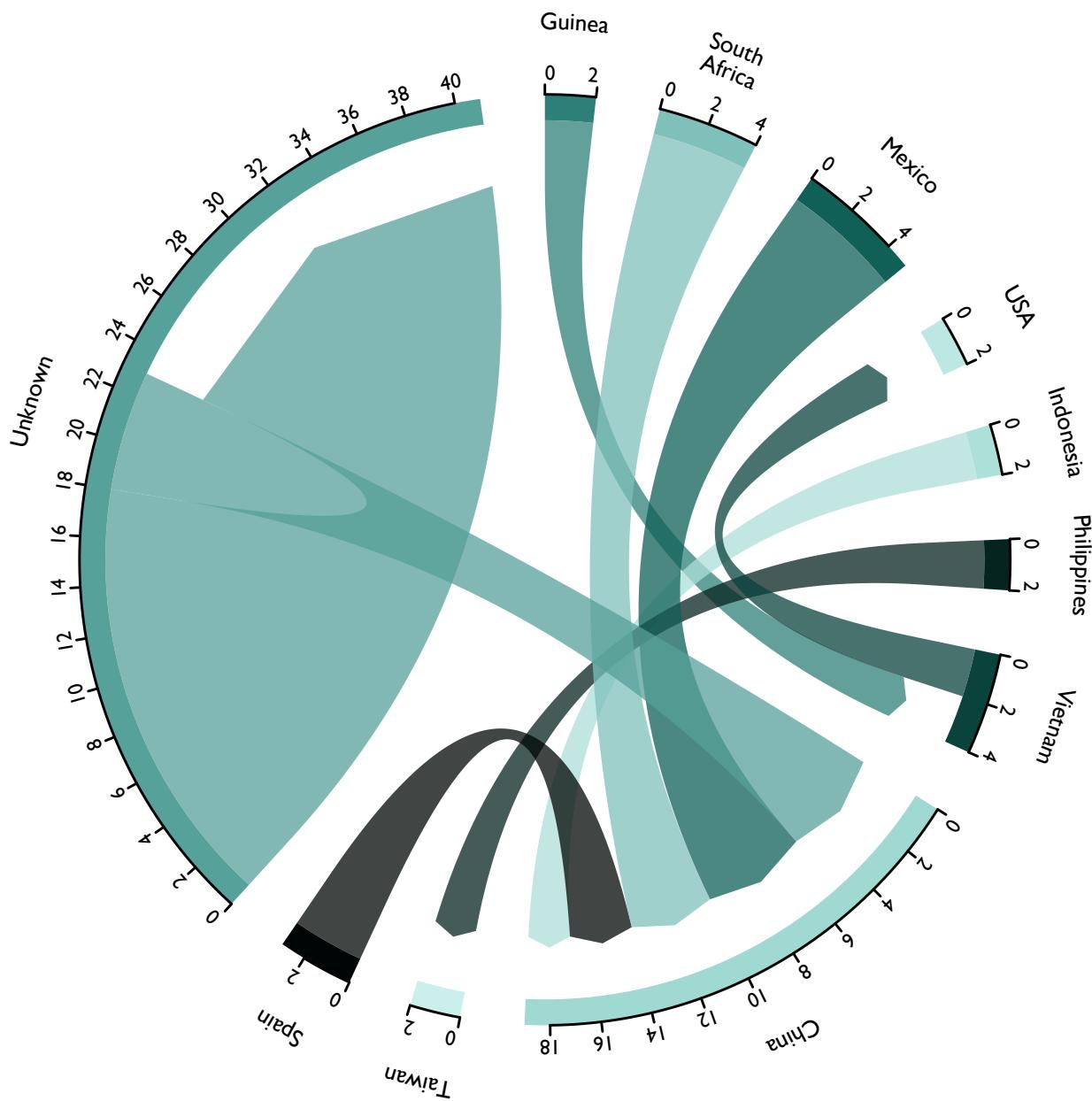


Figure 79. Circle flow map of marine product movements from origin to destination in the air transport sector (2009–2017)

Only routes that were used more than once are included.

Figure 79 maps the movements of seized marine products between origin and destination countries (excluding transit) from 2009 to 2017. Marine product trafficking varies too much by species to draw many generally applicable conclusions from the marine circle flow map, or to identify many overarching trends. Furthermore, it is important to note that Figure 79 includes only those routes that were used more than once, which limited the scope of the map to nine separate, identifiable routes. The C4ADS Database contains 48 total routes from origin to destination, meaning 39 routes were only used once. Still, a few key takeaways from the above circle flow map are as follows:

- *Diverse origins, concentrated destinations:* As in Figure 76, the marine products circle flow map showcases the diverse origins of trafficked marine products, with countries in Asia (Indonesia, the Philippines, Vietnam), Africa (Guinea, South Africa), Europe (Spain), and the Americas (Mexico) all acting as the origin points for at least two instances of marine product trafficking. Despite the widely dispersed origins of the marine products supply chain, destination countries seemed to concentrate in Asia; with the exception of two instances that were destined for the USA, every known repeat marine products air trafficking route was destined for Asia (China, Vietnam, and Taiwan).

One country in particular illustrated the tendency of the marine products supply chain to narrow substantially towards its end. By far the most significant destination for marine products (representing 76% of known instances with destination information displayed in Figure 79), China was the intended destination of marine products originating in Mexico (totoaba swim bladders and sea cucumber), South Africa (seahorses and abalone), Spain (European eels), Indonesia (manta rays and shark fins), and a number of unknown countries (European eels, shark fins, abalone, and seahorses). China's reach expands further if routes that were only used once are considered as well; in total, between 2009 and 2017, China received marine products from at least 13 different countries in the Americas (Mexico, Costa Rica, Venezuela), in Africa (Malawi, South Africa, Madagascar, Mozambique, Sierra Leone), in Asia (Indonesia, Thailand, the Philippines); in Europe (Spain), and in Oceania (New Zealand).

- *High number of unknowns:* Roughly 40% of all marine products trafficking instances from 2009 to 2017 (including those not shown in Figure 79) did not include either origin or destination information, compared to 27.5%, 33%, and 27% for reptile, ivory, and rhino horn trafficking respectively. This may reflect the news media's relatively minor focus on marine product trafficking compared to other types of wildlife trafficking.

Trafficking Routes Analysis



Figure 80. Marine product trafficking routes by air (2009–2017)

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

Figure 80 graphs the known flight routes used by marine products traffickers between 2009 and 2017. The marine products routes map reveals once again the wide geographic spread of marine product trafficking, showing instances extending to every continent except Antarctica, with concentrations in Asia and Europe.

- *Asia as a destination region:* The marine products routes map again highlights the importance of Asia to the marine products trade, with Asian countries (China, Taiwan, Thailand, Vietnam, Singapore, and the Philippines) listed as the destinations for 67% of marine products air trafficking instances with known destinations.
- *Involvement of Africa:* Although the involvement of Africa in marine products trafficking is relatively minimal, the known marine product trafficking instances originating in Africa share a number of traits that, when examined, help to explain Africa's role in marine species trafficking more generally.

For instance, all but three of the marine products trafficking instances originating in Africa were destined for China and Vietnam. Many of these instances transited through Europe, particularly when they had originated in West Africa (75% of West African instances transited through either France or Belgium).

Although the majority of identified African trafficking instances fit an expected pattern (most involved the export of seahorses or abalone from known seahorse and abalone source countries), one trafficking instance in particular seemed odd. In July 2013, 164 seahorses were discovered in the luggage of a person arriving in Hangzhou Xiaoshan Airport from Malawi,¹⁷³ an odd origin point for seahorses, given that it has no access to the ocean. The country is, however, home to the giant Lake Malawi, which holds hundreds of endemic tropical fish species that are highly sought after in the tropical fish trade. But the Lake does not appear to contain seahorses. It seems then that either the seahorses originated elsewhere, or that traffickers have identified a seahorse species within Lake Malawi that is largely unknown.

Overall, African countries seem to be significant origin points for both seahorse and abalone supply chains, which often transit through Europe on the way to Asian demand markets.

- *Involvement of the Americas:* American countries were involved in at least 17 marine products trafficking instances in the air transport sector between 2009 and 2017. Five of those seizures involved swim bladders, an organ present in certain croaker fish species to regulate their buoyancy. The majority of the American swim bladder instances originated in Mexico, and involved bladders taken from the beleaguered totoaba fish species.^{vii} All of the swim bladder instances with known destinations were ultimately destined for Hong Kong or Shanghai, and generally transited through Mexico or the US on the way.¹⁷⁴
- *Appearance of Afghanistan:* The appearance of Afghanistan in the marine products routes map is unusual, given that Afghanistan is land-locked, with relatively low numbers of even rivers and lakes. But Afghanistan acted as the origin of one strange trafficking instance: in February 2017, one Afghan national was arrested in Indira Gandhi Airport in Delhi after arriving from Kabul with 114 kg of red organ pipe corals in his luggage.¹⁷⁵ Officials quoted in press reports about the instance seemed to express confusion, stating “We are probing whom he was supposed to deliver these to, as these corals are found largely in the West Pacific region to the south of Japan and near [the] eastern coast of Africa.”¹⁷⁶ Red organ pipe corals have even been found off the coast of India, the passenger’s intended destination, only adding to the confusion surrounding this unusual incident.^{viii}

vii Other swim bladder trafficking instances originated in Venezuela and Costa Rica.

viii No other marine products trafficking instances originating in Afghanistan have been identified.

Trafficking Methods Analysis

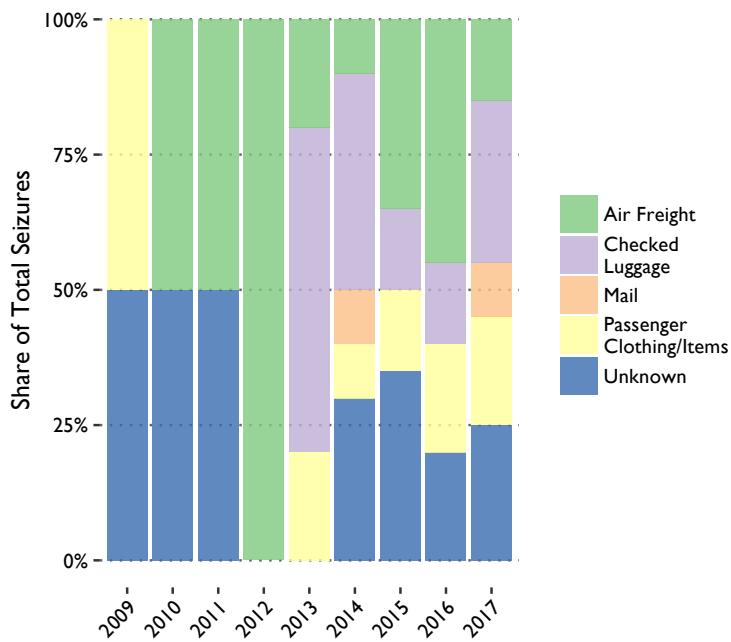


Figure 81. Transport methods for marine products trafficking instances in the air transport sector by year (2009–2017)

The transport methods used to traffic marine products vary significantly year to year. The broad assortment of marine species included under the “marine products” label prevents the identification of many clear patterns within marine products trafficking. As a result, variations within Figure 81 may be more likely to reflect surges or drops in seizures of different marine species (i.e. seahorse trafficking surges as totoaba bladder trafficking falls), rather than subtle changes in the way that certain species are being smuggled. Still, a number of the broader trends visible in Figure 81 are as follows:

- *Prominence of air freight and checked luggage:* Marine products were slightly more likely to be smuggled via *air freight* than via any other transport method, with *air freight* counting 25 seizures (41.7% of all marine products seizures with known transport method information). *Checked luggage* followed with 18 seizures (30%). Both categories together represented 71.7% of marine products seizures with known transport method information.

Most commonly air trafficked marine species were almost equally split between *air freight* and *checked luggage*. Known totoaba seizures, for example, only counted one more *air freight* seizure than *luggage* seizure, despite the fact that only one totoaba seizure numbered fewer than 100 totoaba swim bladders (in other words, transport methods used for totoaba did not seem to vary by weight or number).^{ix}

It is possible that with more complete, consistent seizure data, more specific transport method trends could be visible at the species level for marine products. It is also possible that customs and enforcement screening of certain transport methods (in this case, *air freight* and *checked luggage*) is more effective, leading to an overrepresentation of those categories.

^{ix} With one exception, totoaba seizures in the air transport sector numbered between 100 and 400 bladders, and weighed between about 14 kg and 52 kg. Totoaba trafficking instances discovered on land have been significantly smaller, numbering only a few totoaba bladders at a time. This suggests totoaba bladders are stockpiled prior to export.

The trafficking methods used by marine products traffickers have included:

- Missing, incomplete, or fraudulent documentation
- Mixed with other fish or fish products
- Hidden in coolers

Marine products have been trafficked along with:

- Multiple turtle species
- Worked ivory
- Rhino horn
- Deer antlers

Coral seems particularly likely to be trafficked along with other illicit wildlife, particularly other marine species. Of the publicly reported coral seizures in the air transport sector, 42% were moved with another species. Accompanying species varied, but tended to include giant clams, anemones, shrimp, tropical fish, crabs, and conches. Most were destined for Europe, although one seizure of coral and ivory was destined for Texas in the US.

Wildlife Trafficking, Passport Fraud, & Criminal Convergence

Wildlife traffickers must frequently rely on the same methods and routes used by other traffickers to move protected wildlife species and products. As a result, some wildlife traffickers are engaged in multiple types of crime. One marine products seizure in 2016 illustrated this phenomenon.

On October 31, 2016, a Chinese man was arrested by South African officials after boarding a flight at OR Tambo Airport for Hong Kong.¹⁷⁷ The passenger was travelling with a fraudulent passport, and was only discovered by Hawks officials when his brother attempted to bribe a South African Home Affairs official to process and authorize his passport. The trafficker's brother had previously been arrested for the production of counterfeit passports.

When Hawks officials searched the Chinese trafficker's luggage, they found ivory, 10 kg of wet abalone, dry abalone, polished diamonds, and a bag of prescription medication.¹⁷⁸ If not for the trafficker's brother's failed attempt at bribery and the subsequent quick action of South African officials, the Chinese passenger would have successfully smuggled multiple illegal wildlife products, jewels, and medication through OR Tambo.

The October 2016 seizure highlighted convergence between various crime types, as well as the frequent involvement of repeat offenders in wildlife trafficking and other crimes. In wildlife trafficking in particular, suspects are often released with a warning or a small fine, hardly sufficient punishment to prevent the suspects' future involvement in the illegal wildlife trade.

New Flight Routes, Organized Crime, & Totoaba

Over the last decade, the opening of a direct Mexico to China flight route has altered the methods used by totoaba bladder smugglers to move bladders from Mexico to China.

Traditionally, totoaba bladders destined for Asia were smuggled over the US border and then flown out through the international airports of larger American cities, such as San Diego and Los Angeles. However, in April 2008, Mexican airline Aeroméxico launched a Tijuana-Shanghai flight, making it the first and only direct connection between Latin America and China.¹⁷⁹

The opening of a direct flight to China has diminished traffickers' need to face US customs officials at the US-Mexico border; as a result, totoaba currently appears to be primarily smuggled directly to Asia onboard this flight. Indeed, Tijuana Airport made the third most known seizures of marine products in the world from 2009 to 2017. A former official with Mexico's Environmental Protection Agency (PROFEPA) claimed the late-night flights leaving Tijuana were the preferred method given lax security, saying, "The key is the flights that leave at two in the morning for Shanghai. They aren't reviewed."¹⁸⁰



Image 37. In July 2017, 375 totoaba bladders destined for Shanghai were seized in Tijuana Airport. Source: *El Universal*



Image 38. In December 2017, officials at Tijuana Airport seized 60 kg of totoaba fillets. Source: *Frontera*

For example, in one instance in July 2017, a flight from Tijuana to Shanghai was canceled, meaning all of the flight's already loaded checked baggage had to be unloaded and returned to their owners.¹⁸¹ When six suitcases remained unclaimed, Mexican Federal Police opened the bags to find 375 totoaba bladders weighing 24.464 kg. The bags' owners did not seem to face any consequences for their trafficking attempt.

Although totoaba traffickers have identified a strategy to bypass more effective enforcement efforts in the US, the Americas–Asia portion of the totoaba supply chain remains the most vulnerable to enforcement action. Totoaba traffickers' reliance on commercial transportation systems and relatively few exit points, including the Tijuana-Shanghai flight, force them to interact with customs and enforcement officials, if not in the US, then at least in Mexico and China.¹⁸²

Totoaba traffickers' exploitation of a more advantageous flight route in response to increasing enforcement pressure at the US-Mexico border is clear evidence that wildlife traffickers pay attention to and take advantage of changing dynamics in enforcement and the air transport sector (see also **Shifting Transit Routes, Narcotics, and Reptiles** in *Flying Under the Radar*).

Mammalsⁱ

The C4ADS Air Seizure Database recorded 127 seizures of mammals and mammal products in the air transport sector between 2009 and 2017. As with almost every other category of wildlife trafficking covered in this report (ivory, rhino horn, reptiles, pangolins, and marine products), mammal trafficking by air seems to have steadily increased, particularly after 2011. The speed with which mammal trafficking has grown also seems to be steadily increasing. For example, in the past year, the number of mammal seizures made in airports around the world has more than doubled, from 15 in 2016 to 34 in 2017.

The seizure data in Figure 82 is not divided by seizure size due to the wide variety of mammal species that are included within this category. Comparing a seizure of 4,000 camel teeth, for example, to a seizure of one baby chimpanzee would mischaracterize mammal trafficking trends by equating fundamentally different illegal trades.

Instead, a treemap (Figure 83) was created to visualize which mammal species are seized most frequently, in order to determine the comparative prominence of different types of mammal trafficking.

To do this, mammal species were first binned by broader type. Categorizing the mammals in the C4ADS Database by species would have resulted in many extremely specific groups, e.g. marmosets, slow lorises, etc., with only a handful of seizures each. Mammal species were instead sorted into *big cats* (lions, tigers, leopards), *primates* (orangutans, chimpanzees, gorillas), *bears* (sloth bears, sun bears), *large mammals* (hippos, giraffes, elephant, rhino), *small mammals* (otters, fennec foxes, warthogs, cats, goats, marsupials), *antelope* (duikers, saiga antelopes), and *canine* (wolves).

Of all mammals seized, *big cats* or big cat products (e.g. teeth, claws) were seized most often, accounting for 31% of all mammal seizures. *Primates* were next with 20%, followed by *large mammals* with 15%, *small mammals* with 14%, *bears* with 9%, and *antelope* with 6.5%. The *deer* and *canine* categories trailed the rest of the group with 3.2% and 1.9% respectively.

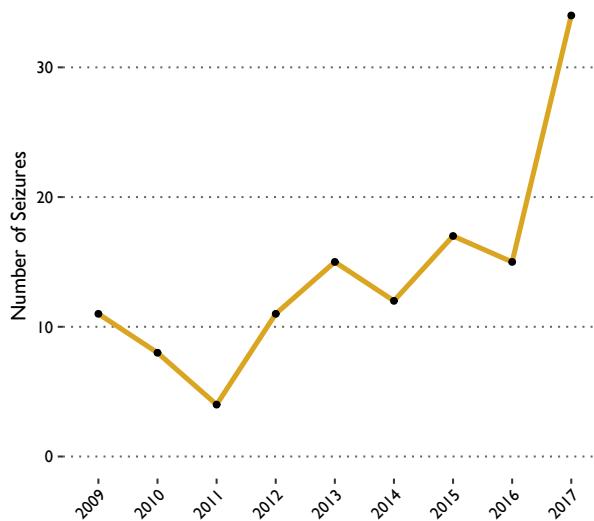


Figure 82. Number of mammal seizures made in airports by year (2009–2017)

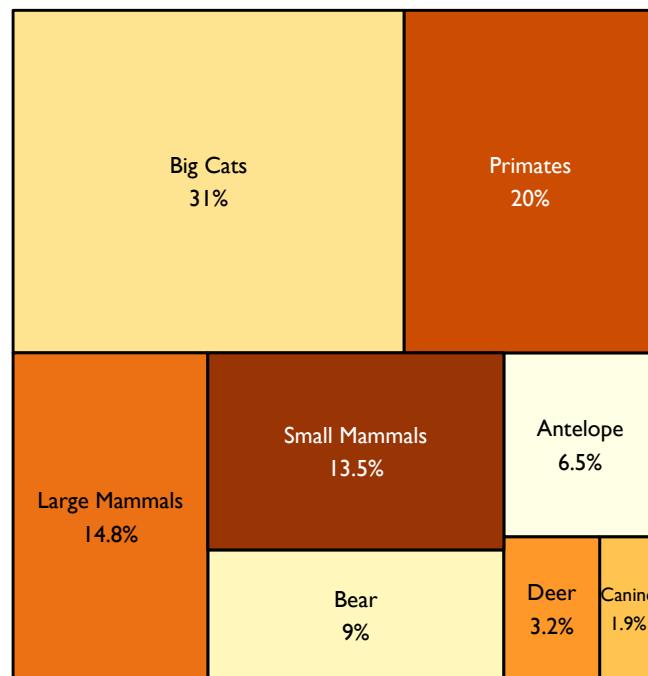


Figure 83. Percentage breakdown of seized mammals by type (2009–2017)

ⁱ “Mammals” refers to any mammal species or mammal species derivative—other than elephant ivory, rhino horn, or pangolin products—that is trafficked by air (primarily big cats, primates, deer, etc.). Marine mammals are not included.

Country-by-Country Analysis

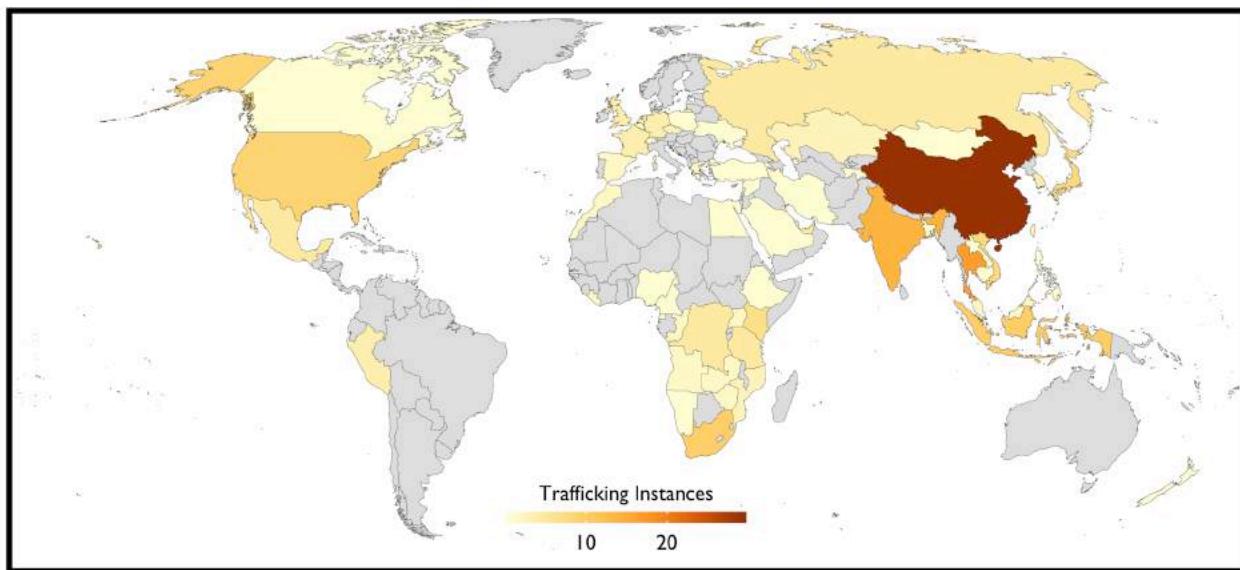


Figure 84. Global heat map for mammal trafficking instances in the air transport sector between January 2009 and December 2017

The heat map represents the total number of times that a successful or planned trafficking instance was recorded for each country. The map includes instances where the product did not actually enter a country because it was seized earlier in the route.

Similar to reptile, bird, and marine products trafficking, Figure 84 reveals that mammal trafficking is very diverse geographically, affecting at least 62 different countries around the world. Still, the mammals heat map (Figure 84) shows that mammal trafficking is most concentrated in Asia, despite prominent countries for mammal trafficking by air also appearing in the Americas, Africa, and Europe.

- Geographic diversity:** Mammal trafficking shares key features of both the illicit wildlife products trade (ivory, rhino horn, and pangolins) and the illicit live animal trade (reptiles, birds, and marine products).

First, mammal traffickers, like reptile, bird, and marine species traffickers, can source their contraband from all over the world; they are not restricted, as ivory traffickers are, to operating only within one or two geographic regions. As a result, like most live animal trades, mammal trafficking by air impacts every world region, with the exception of Antarctica.

At the same time, the mammal products trade—primarily consisting of lion teeth and claws, elephant tails, hippo teeth, etc.—relies on animals living within the same areas as most elephant, rhino, and pangolin populations. The traffickers of these products are therefore forced to rely on much the same supply chains as traffickers of ivory, rhino horn, and pangolin products. As a result, East, Central, and Southern Africa, of only passing relevance to most live animal trades, are important source regions for the mammal products trade, resulting in their appearance in the mammals heat map (Figure 84).

Country	Trafficking Instances
China	29
Thailand	17
India	14
Indonesia	10
South Africa	10
USA	9
Japan	8
Vietnam	8
Kenya	7

Table 13. Top nine countries by number of mammal trafficking instances (2009–2017)

- *Significance of Asia:* Despite mammal trafficking's global reach, six of the top nine countries (Table 13)ⁱⁱ for mammal trafficking were Asian (China, India, Thailand, Vietnam, Indonesia, and Japan), together accounting for 38% of all mammal trafficking instances in the air transport sector between 2009 and 2017.

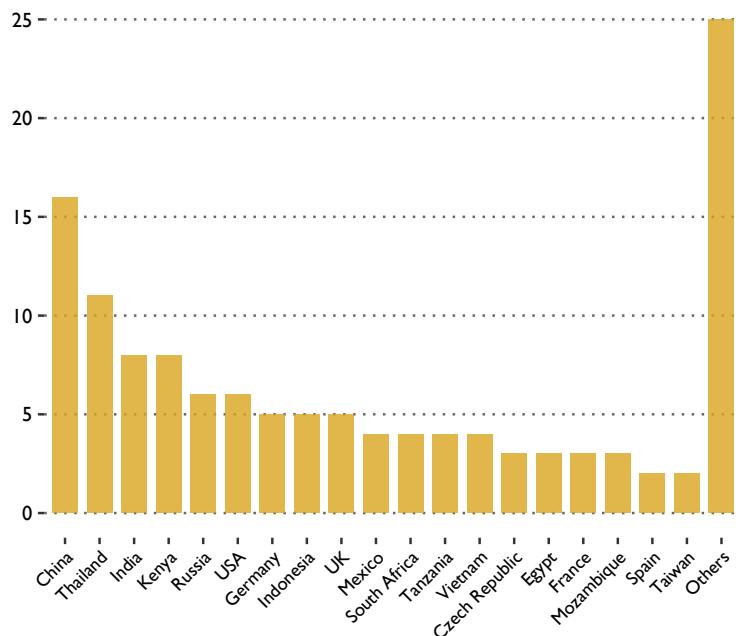


Figure 85. Number of mammal seizures by country (2009–2017)

Unlike the mammals heat map, which measures a country's prominence based on its associated number of mammal trafficking instances, Figure 85 displays countries based on the number of mammal seizures made within their airports.

- *Geographic diversity:* Figure 85 reflects the geographic diversity seen in the mammals heat map; almost 20% of known mammal seizures are grouped under the other countries category, having been made in countries with fewer than two seizures. Of all the countries that made mammal seizures, 13 were African, 12 were European, 11 were Asian, five were American, three were Middle Eastern, and one was in Oceania. Asian countries made the most seizures with 51, compared to 30 in Europe and 29 in Africa.ⁱⁱⁱ

As in the ivory, rhino horn, reptile, pangolin, and marine products categories, China counted more mammal seizures in the air transport sector in the past nine years than any other country. The large gap between China and the country with the second most seizures shrunk in the mammals data, however, to a difference of only five seizures between China and second-ranking Thailand.

ⁱⁱ Five countries are tied for tenth: the DRC, Mexico, Russia, Tanzania, and the UAE, all with five instances.
ⁱⁱⁱ The Americas, Middle East, and Oceania counted 13, three, and one seizures respectively.

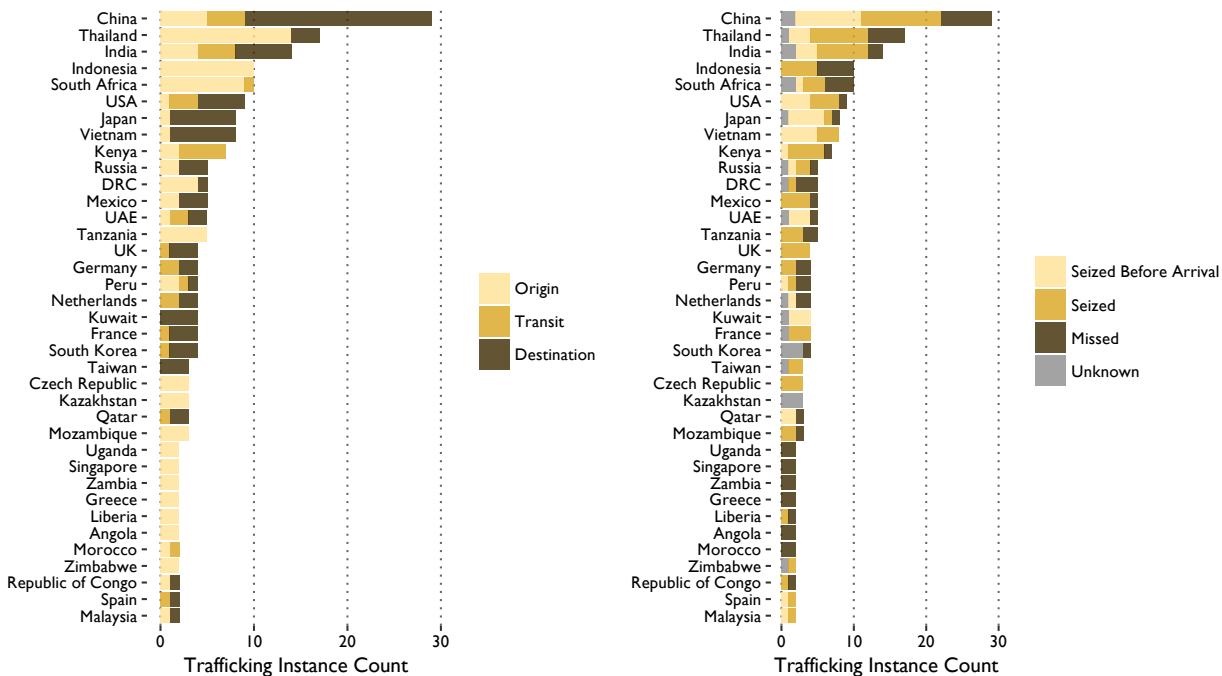


Figure 86. Country-level flight route information for countries with two or more trafficking instances (2009–2017)

Figure 87. Point of seizure within the supply chain, by country (2009–2017)

Only trafficking instances for which flight route information exists were included. The data is split by country, rather than airport, to account for transit information reported at the country level.

The widespread nature of mammal trafficking is again visible in Figures 86 and 87, with 37 total countries involved in two or more trafficking instances of mammals or mammal products since 2009. By comparison, the similarly diverse marine products trade only counted 20 countries with two or more trafficking instances. Other trends visible in the above graphs are as follows:

- **Chinese dominance:** China once again emerges as the most significant country for mammal trafficking in terms of trafficking instance count. Although China was also the most prominent country as measured by seizure count, the country's dominance in the illicit mammals trade increases substantially when considered in terms of trafficking instances, counting 29 total instances compared to Thailand's 17.

Unsurprisingly, China was primarily a destination for mammal trafficking instances, with 20 instances destined for Chinese airports. Those 20 instances were destined for Chinese cities throughout the country, including Hong Kong, Hangzhou, Beijing, Xiamen, Qingdao, etc. The animals involved in those instances varied widely as well, variously including mammals like hedgehogs, sugar gliders, slow lorises, as well as mammal products such as bear paws and gall bladders, lion teeth and claws, and big cat and wolf skins. The wide array of mammal trafficking instances destined for China largely prevents the identification of any overarching trends associated with the country, although a slight majority of instances appeared to originate in Africa.

In one instance involving Hangzhou, the most prominent Chinese destination city for mammal trafficking, a shipment of 11 hyenas was stopped at Robert Gabriel Mugabe Airport in Zimbabwe after officials discovered that the hyenas were not being transported according to CITES and IATA's Live Animals Regulations.¹⁸³ The animals had been captured in Hwange National Park, and were injured on the journey from Hwange to the airport—one hyena even managed to escape en route.

All 11 animals were destined for Hangzhou Safari Park.^{iv} The other trafficking instances destined for Hangzhou all involved mammal products, including frozen bear paws and frozen pangolins. Still, officials at the airport in Hangzhou, Hangzhou Xiaoshan Airport, appear to have made no publicly reported mammal seizures since 2009.

- *Africa as an origin point:* African countries acted almost exclusively as origin points for the illicit mammal trade between 2009 and 2017. The African nations included in Figure 86 were the origin points for mammal trafficking instances destined for Asia, Europe, the Americas, and the Middle East.

Mammal trafficking instances departing from Africa primarily involved big cats (23 seizures), primates (seven seizures), and antelope (five seizures). Other trafficked species included giraffes, hippos, and rats. Trafficking instances of different species and products did not appear to follow any one particular flight route, perhaps reflective of a more opportunistic trade than ivory, rhino horn, or pangolin trafficking.

Although Kenya acted as an origin point for mammals in at least two instances, it retained its role as a prominent transit country for wildlife and wildlife products, counting more mammal transit instances than any other country in the C4ADS Air Seizure Database. In total, 41 mammal instances originated in Africa, compared to only nine African transit instances (five of which flew through Kenya), and three African destination instances.

- *Broad supply chains and diverse destinations:* Unlike the other categories included in this report, which tend to have relatively few destination countries, the illicit mammals supply chain remains broad from beginning to end, counting 36 total origin countries and 34 total destination countries across Asia, Africa, Europe, the Middle East, the Americas, and Oceania. Of all the mammal trafficking instances with origin information in the C4ADS Database, most originated in either African (40%) or Asian (33%) countries, with a few instances originating in Europe (11%), the Americas (11%), and the Middle East (5.6%).

Destination countries, although slightly less numerous than mammal origin countries, were more widely distributed, appearing in Asia (32%), Europe (24%), the Middle East (21%), the Americas (12%), Africa (8.8%), and Oceania (2.9%).

The diversity of the many varied supply chains making up the illicit mammal trade is to some extent unsurprising, given that mammal traffickers can operate in any region of the world, depending on their specific species of interest. Perhaps more unexpected is the wide variety of destinations for mammal trafficking outside of Asia, given the oft-cited belief that Asian countries are the main drivers behind the illicit wildlife trade. Furthermore, there is no one clearly discernable trend associated with most mammal air trafficking incidents destined for regions outside of Asia—European and American demand for trafficked mammals and mammal products appears just as varied, if not as substantial, as Asian demand. In this way, mammal trafficking, more so than ivory, rhino horn, reptile, pangolin, or marine products trafficking, is a problem with truly global implications.

- *Unusual transit locations:* Similar to other live animal trades, there were comparatively few transit points involved in the illicit mammal trade, with only 27% of identified mammal seizures relying on indirect flights. Of the 20 transit countries that did appear in the mammal data, only five (Kenya, Ethiopia, the UAE, Qatar, and the Netherlands) are generally considered common transit points for the illicit wildlife trade. The remaining 15 countries spanned Asia, Europe, the Americas, Africa,

^{iv} Hangzhou Safari Park has been at the center of some controversy in the past over shipments of young elephants from Hwange National Park in Zimbabwe to the Park. Although the shipments have complied with CITES regulations, critics have argued that animals should remain in their natural habitat, and are poorly maintained in the Park.

and the Middle East, and were generally used as a transit location only once.^v

- *Unusual origins and re-exports:* A number of the origin countries visible in Figure 86—including the Czech Republic, Greece, Ukraine, and Singapore—stand out, as they are not home to many in-demand mammal species. While some unusual origin countries, like Singapore, are known to have demand markets for certain mammal species, countries like Greece and Ukraine are not well-known for their involvement in any aspect of the illicit mammals trade.

The Czech Republic in particular was an unexpected origin point, with at least three trafficking instances involving tiger skeletons, teeth, and claws, as well as rhino hides, rhino horns, and bear gall bladders, all departing from Prague for Vietnam in 2013. According to reports, the seizures were all associated with a network of Vietnamese ex-patriots living in Prague and working at the SAPA marketplace (a Vietnamese market). To acquire rhino horn and other wildlife products, the network leaders would hire Czech citizens to go on hunting safaris in South Africa and bring back hunting trophies, which would then be exported via air from Prague to Vietnam (see **Prague, Vietnam, and Wildlife Trafficking Networks** for more information).

Other unusual seizures originating in Greece (hippo teeth, wolf skins), Ukraine (Siberian tigers), and Singapore (tiger products) may also have been re-exported from their original source countries, although media reports on at least two of the seizures offer alternative explanations. For example, 645 the wolf skins seized on arrival in Beijing from Greece may have been taken from Greece's indigenous wolf species.¹⁸⁴ If true, the 645 skins seized in Beijing would have represented essentially the entire species, which has a remaining population of 500 to 700 individuals. In the seizure originating in Ukraine, three Siberian tiger cubs were seized in Beirut, Lebanon on their way from Ukraine to Damascus, Syria in March 2017.¹⁸⁵ The cubs were en route from a Ukrainian zoo to a Syrian zoo, but were shipped in inhumane conditions against both CITES and IATA's Live Animals Regulations, leading to their seizure.

There was no clear pattern as to where mammal trafficking instances were stopped; origin, transit, and destination countries appeared to make seizures in equal measure. Instead, the number of seizures made in each country seems largely dependent on the amount of mammal trafficking instances moving through the country.

^v Four countries appeared as transit points more than once: India and China (four instances each), the US (three), and Germany (two).

Airport-by-Airport Analysis

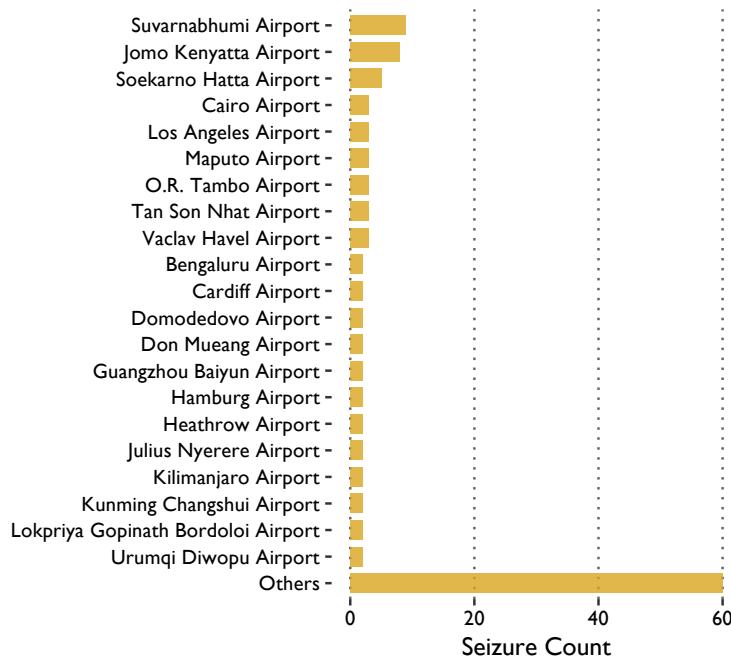


Figure 88. Seizure count for airports with two or more seizures (2009–2017)

Figure 88 displays the airports with two or more mammal seizures between 2009 and 2017. The widespread nature of mammal trafficking is visible in the limited number of seizures made, even in Suvarnabhumi Airport (nine), which counts more known mammal seizures than any other airport. Most airports (60) made only one mammal seizure between 2009 and 2017.

- *Geographic diversity:* Over the past nine years, mammal seizures were made in Asia, Europe, Africa, the Middle East, the Americas, and Oceania. Asian airports counted the most seizures, with 40.2% of the total, followed by European airports with 23.6%, and then African (22.8%), American (10.2%), Middle Eastern (2.4%), and Oceanic (0.8%) airports.
- *Appearance of Suvarnabhumi Airport:* Suvarnabhumi Airport in Bangkok made more publicly reported mammal seizures than any airport between 2009 and 2017. The majority of mammal seizures made in Suvarnabhumi originated in Bangkok, were destined for either the Middle East (Iran, Kuwait, and the UAE) or Asia, and involved live animals. The species seized varied widely, from baby tigers, to groundhogs, otters, and marmosets. Some of the species seized were from Thailand (slow lorises, smooth otters, etc.), while some were not. Fennec foxes, for instance, are native to North Africa, and marmosets are found primarily in the Brazilian Amazon.

Suvarnabhumi Airport, however, is not the only Bangkok airport featured in Figure 88. Don Mueang Airport appears as well, although it counts only two identified mammal seizures (both involving otters). Taken together, Figure 88 reveals that Bangkok airports made at least 11 mammal seizures within the past nine years.

The prominence of Thai airports in Figure 88 is likely due to high biodiversity in Thailand, as well as perhaps Bangkok's importance as a transit hub—it is possible that, as seen elsewhere in the illicit wildlife trade, trafficking networks converge on Bangkok, bringing with them animals from all over the world, later exporting them to their ultimate destinations. Either way, the importance of Bangkok

as an origin point for such a wide array of mammal species seems to point to a thriving black market for mammals in Thailand.

Several sources support this theory; one reptile trader in Jakarta, for example, told TRAFFIC investigators that “he had previously travelled a few times to Bangkok in order to buy unspecified species...to smuggle back to Indonesia,” saying that “prices were much cheaper in Thailand, so he could make a good profit by selling the animals in Indonesia.”¹⁸⁶ Furthermore, Thai legislation only seems to protect a small portion of species from trade. As of 2016, most non-native and CITES-protected species were not covered by Thailand’s primary wildlife law.¹⁸⁷ Thai officials also cannot ask people in possession of wild animals for proof of legal import—the onus is on the officials to prove that the animals were illegally imported.

- *Seizures in transit:* Jomo Kenyatta Airport in Nairobi ranked second for the highest number of mammal seizures between 2009 and 2017 with eight. At least 50% of these seizures involved mammal trafficking instances stopped in transit between other African countries and Asian demand markets. Every single seizure involved big cat products, primarily lion teeth, and often included other mammal products, including warthog teeth and leopard claws.

Jomo Kenyatta Airport’s high number of mammal seizures likely reflects, in part, the Kenyan authorities’ prowess in interdicting illicit wildlife movements, even in transit. The airport’s high seizure numbers may also be affected by unusually high volumes of illicit wildlife and wildlife products moving through the airport at any given time. Given the inherently clandestine nature of wildlife trafficking, it is unclear which factor—effective enforcement or high wildlife trafficking activity—has a larger impact on seizures within Jomo Kenyatta.

Circle Flow Analysis

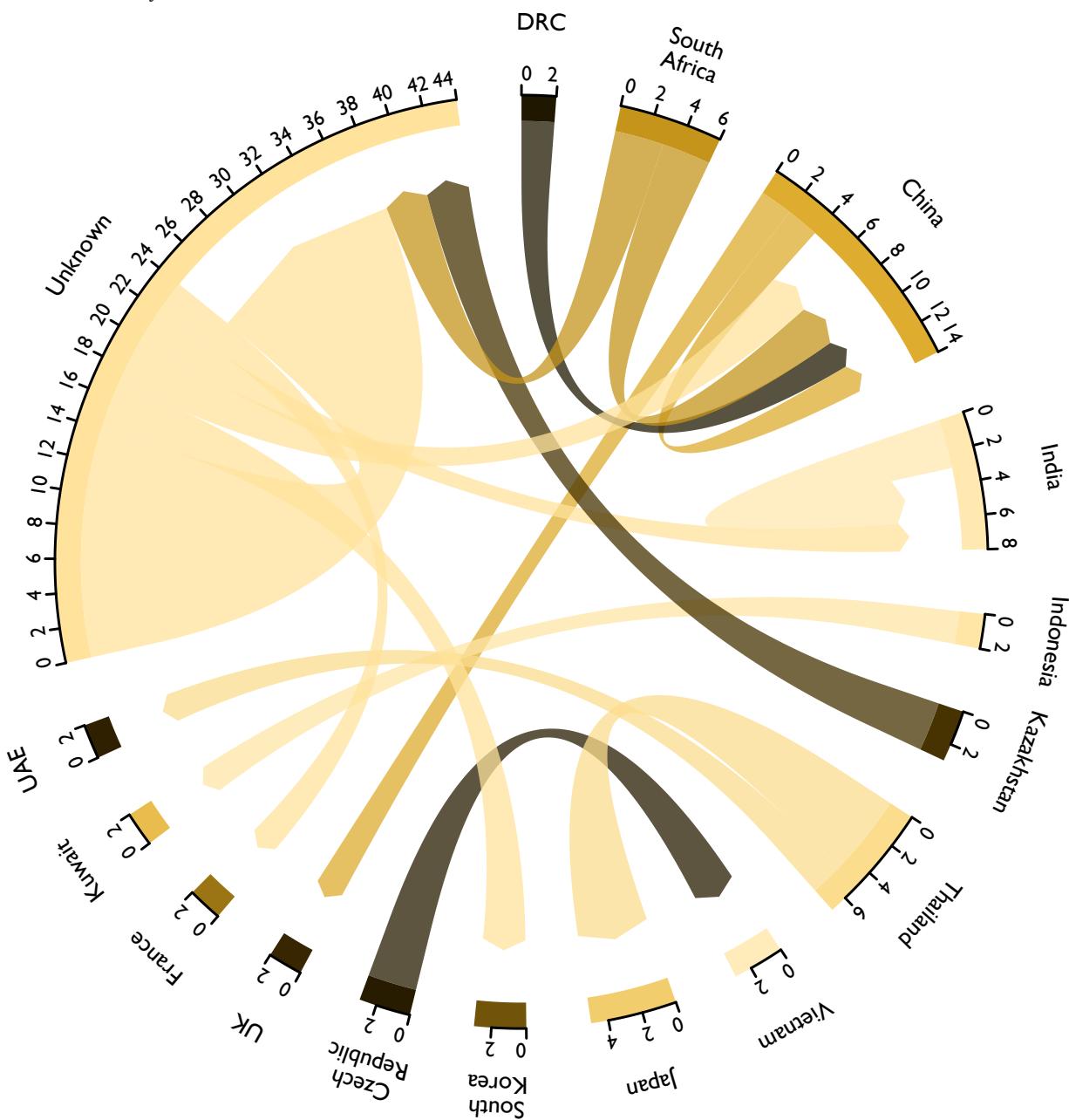


Figure 89. Circle flow map of mammal movements from origin to destination in the air transport sector (2009–2017)

Only routes that were used more than once are included.

Figure 89 maps the flow of seized mammals from origin to destination countries (excluding transit) between 2009 and 2017. Note that Figure 89 includes only those routes that were used more than once. Mammal trafficking varies too much by species to identify many overarching trends in the circle flow map. However, a few broad conclusions can still be drawn:

- *Repeat routes:* The most prominent repeat route was between Thailand and Japan, which counted five total mammal trafficking instances, three in 2017 alone. Each instance in 2017 was intended to leave from Bangkok (through either Suvarnabhumi or Don Mueang Airports) for Japan, and involved

an assortment of live small mammals (otters, fennec foxes, and jerboas) hidden in checked luggage. Different Japanese traffickers were arrested in each instance.

The instances did not appear to be clearly linked, raising the question of how so many similar seizures could take place in under a year within such a diverse trade.

- *Unusual origins and re-exports:* There were a number of unusual origin points for trafficked mammals and mammal products between 2009 and 2017, some of which were only used once, and thus do not appear in Figure 89. In one instance, a sugar glider was found on a Cayman Airways flight from Miami Airport to Owen Roberts Airport in the Cayman Islands after it escaped from a passenger's hand luggage.¹⁸⁸ In a second instance, cheetah and leopard teeth, as well as lion claws, were seized on arrival in Tan Son Nhat Airport, Vietnam from Dubai Airport in the UAE.¹⁸⁹ In 2013, three shipments of various mammal products (tiger skeletons, claws, and teeth, as well as rhino skin, rhino horns, and bear gall bladders) were seized in Prague on their way to Vietnam.¹⁹⁰ Finally, two seizures in China between 2015 and 2016 originated in Kazakhstan and were destined for the same Chinese airport near the Kazakh and Mongolian borders.¹⁹¹ The instances contained two different mammals and mammal products (bear paws and a live serval).

None of the species involved in these seizures are native to the US, the UAE, or the Czech Republic. However, sugar gliders are popular pets in the US, as are certain big cat species in the UAE.^{vi} The Czech seizures were later linked to a Vietnamese network operating out of Prague that sourced their wildlife products from South Africa (see **Prague, Vietnam, & Wildlife Trafficking Networks**), and the Kazakhstan seizures were likely both destined for China's booming wildlife trade. All eight instances are therefore likely examples of re-exportation of animals or animal products originally from elsewhere.

- *Unusual destinations:* At least two mammal trafficking instances originated in China and were destined for the UK between 2009 and 2017. Both instances involved mammal products intended for medicinal use, and may have been ultimately destined for sale in Asian marketplaces in the UK, such as London's Chinatown.¹⁹²

In one instance in July 2012, a passenger, Sun Liu, was stopped by Border Force officers in Cardiff Airport.¹⁹³ Officials found "traditional Chinese medicines" in her suitcase, including three boxes of ground rhinoceros horn, one box of medicine containing bear bile, and two boxes of a CITES-protected plant extract. She was ultimately arrested at "Dr China" in Pontypridd, which appears to be an acupuncture and traditional medicine business, although the store has no online reviews and seems to have little online presence.

- *High percentage of unknowns:* A large percentage of mammal origins and destinations were unknown, with 38.6% of the trafficking instances lacking origin and/or destination information. Of the 49 instances with unknown origin or destination information, 28.6% lacked information for both.

vi Although owning a cheetah, lion, or leopard has been seen as a status symbol in the UAE for years, Emirati authorities recently outlawed the practice of keeping big cats as pets. Despite the fact that big cat owners now face a fine or jail time if they are caught, the practice continues.

Trafficking Routes Analysis



Figure 90. Mammal trafficking routes by air (2009–2017)

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city. Capital cities are used when specific airports are unavailable.

Figure 90 maps the known flight routes used by mammal traffickers between 2009 and 2017. As in Figure 84, the routes map highlights the geographic diversity of the illicit mammal trade, as well as the prominence of African nations as origin points, European countries as destinations, and Asian nations as both origins and destinations.

- *Indonesia as an origin point:* Indonesia appears prominently in the mammals routes map, counting the second most origin instances in Asia after Thailand. The geographic diversity inherent in mammal trafficking is apparent in the trafficking instances leaving from Indonesia; each identified instance was destined for a different country in Asia, Europe, the Americas, or the Middle East. The instances primarily involved primates (slow lorises, orangutans, lemurs, gibbons, etc.) and big cats (leopard cubs, as well as big cat teeth and claws) being moved in checked baggage. None of the instances were clearly linked.
- *Infrequent repeat routes:* According to the C4ADS Database, there were only ten routes used more than once by mammal traffickers, and of those, only three routes were used more than twice. The majority of the repeat routes seemed to be associated with a few distinct, small-scale trafficking networks specializing in certain mammals and mammal products and operating between two different countries.

The most prominent route was Thailand to Japan, which numbered five repeat instances between 2013 and 2017. Another frequent route existed between Prague and Vietnam, prior to the dismantling of a network of Vietnamese ex-patriots operating out of a Prague-based Vietnamese marketplace (see **Prague, Vietnam, & Wildlife Trafficking Networks**).

One of the few other repeat routes was a domestic route between Dimapur, Guwahati, and Imphal, India that was used multiple times by the same network in 2010 to move tiger bones and pangolin scales from Indian nature reserves to the Malaysian border. After the arrests of the network's members, the route went dark—no other known mammal seizures have been made along those same flight routes since.

The scarcity of repeat routes in mammal trafficking is at least in part due to the widespread nature of mammal trafficking, with origins and destinations located all over the world, but it also may be because mammal traffickers do not need to rely on certain routes to avoid hyper-aware customs and enforcement officials, as ivory traffickers likely do. Similarly, the low number of repeat mammal routes may be reflective of the disorganized nature of mammal trafficking, which does not seem to require the same level of network development that ivory, rhino horn, and pangolin traffickers need. Mammal trafficking routes are also likely affected by the fact that there does not seem to be sizable, consistent demand in any one area for most mammal species (i.e. the demand market for cheetahs in the Middle East, for instance, is probably not so substantial and constantly under-supplied as to make continuous cheetah deliveries profitable). It is therefore likely not worthwhile to set up long-standing supply chains to feed widely varying demand in one specific region.

- *The Middle East and the live animal trade:* In most of the wildlife trafficking categories covered by this report, the Middle East either does not feature at all, or is primarily a transit region for wildlife and wildlife products moving from Africa to Asia.^{vii} In the mammal routes map, that changes—the Middle East emerges as a clear destination region for mammal trafficking instances originating in both Africa and Asia.

Between 2009 and 2017, the majority of mammal instances destined for the Middle East originated in Thailand, Indonesia, Tanzania, and Mozambique, and were destined for Iran, Kuwait, Qatar, and the UAE. At least 75% of these instances contained live animals (tiger cubs, slow lorises, pythons, orangutans, Javan gibbons, etc.) moved in luggage and destined for the region's thriving exotic pet trade.

Notably, only three of these instances were stopped in the Middle East, and one of those three was a particularly unusual seizure involving malnourished Siberian tiger cubs stranded at Rafic Hariri Airport in Lebanon. The dearth of live animal seizures in the region, despite the well-known practice in certain Middle Eastern countries of keeping exotic pets as status symbols, may suggest one of the following: that Middle Eastern air seizures of mammals are not publicly released or getting much publicity, that most Middle Eastern customs and enforcement agencies are turning a blind eye to illegal live animal imports, or that many mammal species that are protected elsewhere and banned from trade do not receive the same level of protection in the Middle East.

Regardless, the high number of mammal seizures made en route to the Middle East, paired with the low number of seizures on arrival in the region, suggests that most mammal air trafficking into the Middle East goes undetected.

Overall, mammal trafficking networks appear to be more fluid than networks moving goods like ivory, rhino horn, or pangolin scales, which seem to require a certain amount of infrastructure to be able to operate effectively. Mammal traffickers may be more opportunistic, given the realities of their trade. Live mammal trafficking is fairly risky—live animals like tiger cubs or baby chimpanzees may awaken in transit, drawing attention to themselves, or die, meaning all the resources expended to keep them alive were wasted—and mammal products, while less risky to move, are of lower value, and not always worth the effort needed to amass large quantities of any one product (e.g. lion teeth and claws).

vii Bird trafficking routes are, of course, the exception to this generalization.

Trafficking Methods Analysis

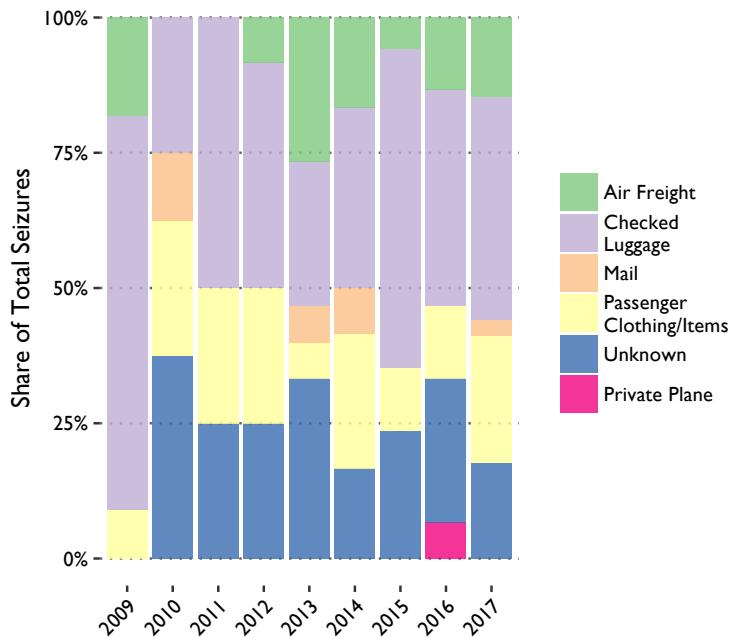


Figure 91. Transport methods for mammal trafficking instances in the air transport sector by year (2009–2017)

The transport methods used to traffic mammals and mammal products between 2009 and 2017 varied widely, given the large number of mammal species and products that were moved through the air transport sector in that timeframe. There seemed to be no clear trends associated with different species, or even any clear differences between live mammals and mammal products—all mammal groups seemed to be primarily moved by checked luggage.

- *Prominence of checked luggage:* Checked luggage seizures dominated in every year except for 2010 and 2013, which were plagued by an unusually high number of seizures without transport method information. Still, in most years, checked luggage was the most common transport method used for both live animal smuggling attempts and for mammal products trafficking.

The prevalence of checked luggage seizures may be in part due to the relatively small size of most mammal trafficking instances, or the lower cost of moving contraband via checked luggage versus air freight (traffickers of high-value products such as ivory and rhino horn may have the funds to rely on air freight more). Live animal traffickers are likely also aware of the dangers of shipping live animals, and the difficulty of hiding live animals for long periods of time in air freight. It may be simpler and safer for traffickers to sedate animals, hide them in a suitcase, and move them over relatively short distances. Similarly, passenger seizures may have been infrequent due to the difficulty of hiding live animals in carry-on baggage or on the trafficker's body. Note that the alternative is also possible; live animals shipped by air freight and mammal products moved by passenger may be unusually successful trafficking methods, leading to low seizure numbers in those categories.



Image 39. A sedated tiger cub hidden amongst stuffed tiger toys in Suvarnabhumi Airport. Source: Wildlife Checkpoint, Suvarnabhumi Airport

- *Appearance of private plane:* Although private planes, often subject to less customs screening and governmental oversight, are likely used relatively frequently to smuggle all types of contraband including ivory and other wildlife products,¹⁹⁴ few *private plane* seizures are reported with sufficient detail to be included in the C4ADS Air Seizure Database. However, one well-reported mammal seizure in 2016 both involved the use of a private plane, and possessed the requisite detail to be included in the C4ADS Database.

In March 2016, Dutch Armenian brothers Artyom and Edward Vartanyan were arrested at Kilimanjaro Airport in Tanzania as they tried to export 450 monkeys and other animals on a private charter plane to Armenia.¹⁹⁵ The animals had allegedly been bought from residents of Arusha, Tanzania who possessed permits to catch them, and were destined for Artyom's Jambo Exotic Park in Dzoraghbyur, Armenia, which had previously been the subject of a criminal case involving an illegally imported bonobo. At the time of their arrest, the brothers were in possession of export permits which had been issued contrary to an export ban issued earlier that month.

The Vartanyan seizure is particularly unusual, not just because it occurred on a private plane, but also because it occurred at all—most private flights and their passengers undergo less rigorous customs screening than normal passenger or cargo flights, and often are protected by diplomatic immunity.^{viii} Wildlife trafficking instances involving private planes are therefore undoubtedly underreported, given the low likelihood that wildlife and wildlife products moved by private jet will be identified.

The trafficking methods used by mammal traffickers have included:

- Missing, incomplete, or fraudulent customs documentation
- Veterinary medications to sedate live animals
- Hidden in electronic equipment
- Disguised as a similar, but legal product (e.g. lion teeth as dog teeth, lion cubs as kittens)
- Tin foil
- Hidden under strong smelling materials (e.g. coffee)

Mammals have been trafficked along with:

- Ivory
- Birds (cockatoos, parakeets, toucans, hawks, etc.)
- Rhino horn
- Pangolin scales, pangolin meat, and frozen pangolins
- Reptiles (pythons, tortoises, lizards, geckos)
- Crocodiles and crocodile meat
- Sea cucumbers
- Caviar

A large number of mammal seizures included multiple different types of mammal products and other animals. In one instance in April 2015, officials in Russia discovered six lemurs, two apes, and one leopard cub

viii A report entitled Beyond Borders by Julian Rademeyer details a few instances of diplomats avoiding penalties for wildlife trafficking due to diplomatic immunity. Diplomatic missions, however, are not exempt from CITES.

Sources: Rademeyer, Julian. Beyond Borders: Crime, conservation and criminal networks in the illicit rhino horn trade. Global Initiative against Transnational Organized Crime, 2016. <https://killingforprofit.com/wp-content/uploads/2018/02/Global-Initiative-Beyond-Borders-Part2-July-2016-1.pdf>.

CITES. Resolution 11.3 (CoP17): Compliance and enforcement. www.cites.org/sites/default/files/document/E-Res-11-03-R17A.pdf.

alongside 55 snakes, 32 lizards, seven turtles, and two baby crocodiles in a suitcase arriving from Indonesia.¹⁹⁶ Multiple seizures involved both mammal products and ivory, rhino horns, or pangolins; big cat products were particularly likely to be trafficked with ivory. For example, one Vietnamese woman was arrested after attempting to smuggle four kg of ivory, nine elephant tails, three sets of leopard skins, and multiple big cat claws into Vietnam.¹⁹⁷

Prague, Vietnam, & Wildlife Trafficking Networks

Beginning in 2010, a series of rhino horn thefts and seizures revealed the Czech Republic to be an important transit point for the illicit rhino horn trade from South Africa to East and Southeast Asia, and also highlighted the importance of Asian diaspora communities to the illegal wildlife trade.

The illicit black market for rhino horn first gained notoriety in the Czech Republic after a string of seven rhino horn thefts from Czech museums and art galleries between 2010 and 2012. While the stolen rhino horns were never found, three individuals allegedly associated with the thefts were eventually arrested.¹⁹⁸ Shortly thereafter, and upon the advice of the Czech Environmental Inspectorate, all rhino horns were removed from museum and gallery exhibits.¹⁹⁹

After several rhino horn shipments sent directly from South Africa to Vietnam in May 2011 were seized in South Africa, rhino horn shipments began routing through the Czech Republic.²⁰⁰ A few months later in November 2011, the Czech Environmental Inspectorate (CEI) acknowledged that the Czech Republic was emerging as a rhino horn transit point, sourced almost entirely from South Africa and destined for Vietnam.²⁰¹

Four months after this announcement, CEI and Czech customs seized ten rhino horns at the Vaclav Havel Airport in Prague in March of 2012, and seized another consignment of eight rhino horns in July at the Bratislava Airport.²⁰² In December 2013, two separate consignments of rhino horn were again seized in the Czech Republic, one in airport customs and the other in the SAPA marketplace, a market with strong ties to the Vietnamese diaspora.²⁰³ The shipments were destined for Vietnam, and their illicit contents had been wrapped in electrical cords and further concealed by resin, plastic wrap, and tar.²⁰⁴

A subsequent investigation into the seizures revealed that Vietnamese nationals had hired Czech citizens to act as intermediaries on their behalf. Specifically, Czech citizens would apply for rhino hunting permits, and their names would be used in forged documents.²⁰⁵ Upon arrival in South Africa, Czech citizens would meet up with a South African organizer who employed professional hunters to assist in tracking and shooting rhinos.²⁰⁶ After the hunt, the Czech citizens would receive a cash prize, sign over the horns to the organizer, and travel back to the Czech Republic.²⁰⁷

After the Czech seizures, the Vietnamese network again changed its tactics, now relying on a professional Czech hunter with the requisite permits already in place.²⁰⁸ To avoid detection, the hunter would import the rhino horns into the Czech Republic himself, concealed within a shipment of speakers. Once in the Czech Republic, the rhino horns were then handed over to the Vietnamese traffickers. In exchange for his services, the hunter would be paid in cash.²⁰⁹ As government investigators began to track the network's evolving methodologies, it was reported that the network began relying on other transit countries with less experience in detecting illicit wildlife products, such as Germany.²¹⁰

Of particular note over the course of CEI's investigations is the fact that the network behind these rhino horn shipments also engaged in the illicit trade of "tiger bones, ivory, and drugs (methamphetamine etc.)."²¹¹ As part of the seizure investigations and in searching identified properties linked to the Vietnamese facilitators, investigators found "unmarked cigarettes, bullets to weapons, counterfeit watches, handbags



Image 40. Rhino horn seized in the Czech Republic in 2012. Source: CITES

and wallets, and the entire forgery workshop with embroidery machines and different patterns of protected brands.”²¹² The network’s involvement in multiple types of crime demonstrates the versatility of wildlife trafficking networks, which rely on a few proven trafficking methods to move illicit products of many types.

The rhino horn thefts and seizures associated with this Vietnamese expat network between 2010 and 2015 not only revealed that wildlife criminals quickly adapt their tactics to avoid detection in response to law enforcement action, but also that these networks do not limit themselves to one type of crime.

Repeat Offenders

On January 23, Wu Xiaohui, a Chinese national, was stopped by airport police in Cape Town Airport.²¹³ He was found on an aircraft destined for China with 150 dried abalone pieces. Wu was released after the abalone he was carrying was confiscated, even though Wu had been previously convicted in March 2010 for abalone smuggling.

Just three days later, on January 26, 2015, Wu was stopped again by police in Cape Town Airport on his way to China.²¹⁴ Officials discovered that he was carrying rhino horn pieces, rhino horn powder, lion claws, and crocodile meat in his luggage (see **Rhino Horn Pieces**). This time, he was sentenced to five years in prison.

Repeat wildlife traffickers are common, in part due to the indifference of most customs and enforcement officials to wildlife trafficking instances, and, perhaps more importantly, the extremely low penalties for wildlife crimes in most countries around the world (see **Repeat Offenders** in *Flying Under the Radar*).

Wu's case is not only an example of the frequent appearance of repeat offenders in wildlife trafficking instances, but also an example of the overlap that can occur between different types of illegal wildlife species, from rhino horn to abalone. Anti-wildlife trafficking legislation must be made substantial enough to deter repeat offenders, who otherwise may see an opportunity to engage in multiple types of wildlife crime at once, confident that they will face no significant consequences, regardless of whether or not they are caught.

Conclusion

Environmental criminal networks have exploited the world's increasingly interconnected systems of trade, finance, and transport to grow their illicit businesses into one of the world's most prevalent criminal trades. In the transport sector, wildlife traffickers take advantage of enforcement loopholes, lack of awareness, lack of concern, limited public and private sector coordination, capacity gaps, and lagging technology and procedures to conduct their operations. As the world grows smaller and international travel becomes increasingly pervasive, wildlife traffickers will find more and more opportunities to hide amongst the throng, undetected in plain sight. Enforcement and the private sector should take immediate steps to curb traffickers' ability to fly under the radar, taking advantage of their emergence from the black market into the legal transportation system. Without a conscious effort to identify, track, and dismantle wildlife networks and their operations, traffickers will continue to find the illegal wildlife trade a profitable, low-risk enterprise, at substantial detriment to ecosystems, economies, and global security.

In *In Plane Sight*, we find the illegal wildlife trade to be truly global in scope, affecting airports in at least 134 countries, and generally growing in prominence.ⁱ Traffickers moving all seven categories of wildlife and wildlife products covered by this report—ivory, rhino horn, reptiles, birds, pangolins, marine products, and mammals—heavily rely on large hub airports, and often exploit the same vulnerabilities within the air transport sector as traffickers of other illicit goods. Although wildlife trafficking seeps into countries on every continent other than Antarctica, China's role in the illegal wildlife trade (likely driven by high demand for wildlife, but also by fairly effective enforcement, good reporting standards, and sheer population size) completely eclipsed the involvement of any other country, placing China first in terms of air trafficking instance count for every category other than bird trafficking. Finally, seizure data suggests that wildlife trafficking can be roughly divided into two groups: wildlife product trafficking (ivory, rhino horn, pangolins and pangolin products), which generally flows from Africa to Asia in a broad supply chain that narrows substantially as it approaches its end; and live animal trafficking (reptiles, birds, marine species and products, and mammals), which tends to rely more on direct flights and is widely dispersed throughout the world, without a clearly definable supply chain.

Few other specific trends can be determined for wildlife trafficking as a whole, given variations in source, destination, and market activity for each wildlife category included in this report. Instead, we provide brief overviews of our main findings for each category below.

Ivory

Trends

Between 2009 and 2013, ivory air seizure numbers appeared to substantially increase, likely affected by an increase in ivory trafficking activity paired with increasing media coverage of the current elephant poaching crisis. The extent to which improvements in enforcement capability or awareness impacted the increase is unclear.

After 2013, ivory trafficking activity in airports appeared to drop slightly, with a decline appearing to begin in earnest between 2016 and 2017. This recent downturn may be a side effect of two newly implemented ivory trade bans in the US and China, as well as the passage of an ivory ban in Hong Kong (the ban stipulates that

ⁱ Although wildlife trafficking seems to be increasingly prevalent, two categories covered in this report defied this trend: bird trafficking appears to have remained more or less consistent since at least 2009, and ivory trafficking has experienced a noticeable downturn since 2016.

the ivory trade will be phased out between 2018 and 2022, as ivory licenses expire in the city).²¹⁵

According to the C4ADS Air Seizure Database, China plays a particularly large role in the illicit ivory trade, with more than double the number of identified ivory trafficking instances as the next most prominent country, Thailand.

Routes

In 2017, ivory trafficking trafficking routes continued to follow the standard Africa to Asia flow, with many instances transiting through the Horn of Africa, Middle East, or Europe on the way to China and Southeast Asia.

The most common ivory trafficking route went from Zimbabwe, through Dubai, to Hong Kong. Seizures made along this route frequently involved the use of handmade vests.

Methods

Although ivory is most frequently moved in *checked luggage*, the vast majority of ivory by weight is moved by *air freight*. In 2017, there appeared to be a surge in ivory trafficking instances moved by *passengers*, either on their persons or in their carry-on baggage. It is so far unclear whether this trend will hold, or whether it simply reflects a momentary change in trafficking activity, reporting, or enforcement efforts.

Rhino Horn

Trends

Like ivory trafficking, rhino horn trafficking has experienced a marked increase beginning in about 2009. As known ivory trafficking activity has declined, however, recorded rhino horn seizures have spiked, counting almost twice as many seizures in 2017 as in 2015. The surge in seizures in 2017 was driven by increases in seizures of every size; small-, medium-, and large-scale rhino horn air seizure numbers all hit new record highs in 2017.

Routes

Rhino horn air trafficking routes largely follow the flow of ivory from Africa to Asia, although rhino horn origins are far more concentrated in Southern Africa. Rhino horn trafficking instances are generally destined for China, Vietnam, and Laos.

The significant increase in rhino horn trafficking activity seen in the Trends section was reflected in a clear increase in rhino horn trafficking instances moving from South Africa to China, often through the Middle East (and, to a lesser extent, Europe) (see **Appendix III: Routes Maps (2015–2017)**).

Methods

Rhino horn trafficking instances are much more likely to move by *checked luggage* than by any other transport method, even *air freight*.

In the recent past, a new rhino horn trafficking method has emerged; trafficking networks are beginning to smuggle small pieces of rhino horn, rather than full horns or larger, more identifiable pieces of horns. This new method is likely an attempt to better evade detection by vigilant customs and enforcement officials along usual rhino horn trafficking routes. This change was evident in the emergence of *passenger clothing/items* in 2017 as a rhino horn transport method for the first time since 2013.

Reptiles

Trends

Reptile seizures in the air transport sector also appear to have increased since 2009, although it is unclear whether an increase in trafficking activity, higher awareness, better enforcement, better reporting, or a combination of these factors is behind this escalation.

The number of reptiles seized each year is often largely dependent on a small number of large-scale seizures, containing as many as a few thousand reptiles or reptile products per seizure. Over the past year, the total number of reptile seizures remained close to the recent average of about 50 seizures per year, but fewer reptiles were seized overall, as the average size of each seizure decreased.

Routes

Unlike ivory or rhino horn trafficking, reptile trafficking rarely moves from Africa to Asia.ⁱⁱ Instead, reptile trafficking routes extend widely across Asia, Europe, the Americas, Africa, and Oceania. Known reptile trafficking instances rarely seem to use the same flight routes more than once in a year.

Southeast Asia appears as the most prominent region in the world for reptile trafficking, largely due to the black pond turtle and Indian star tortoise trades operating between India, Bangladesh, Malaysia, China, and other countries in the region. Europe is the second largest demand region for trafficked reptiles in the world, followed by the Americas.

In 2017, the prominence of certain Southeast Asian countries in the illicit reptile trade appeared to decrease slightly. Their diminishing significance seems to be tied to substantially decreasing seizures of black pond turtles and Indian star tortoises, previously the most frequently trafficked Southeast Asian reptile species.

Methods

Reptiles are far more likely to be trafficked by checked luggage, both in terms of seizure numbers and seizure size. Air freight was the second most frequent transport method for reptiles. Although passenger seizures of reptiles remain fairly infrequent, there was a slight increase in reptiles and reptile products moved by this method in 2017.

Reptile trafficking instances posed a particular danger to passengers, enforcement officials, and airline employees, as at least one 2017 reptile seizure included a black mamba, one of the most venomous species of snakes in the world.

Birds

Trends

The birds category is perhaps the most unusual of all the wildlife categories contained within the C4ADS Air Seizure Database. Although bird seizures have increased somewhat since 2009, they tend to vacillate around an average of 20 seizures per year, preventing the identification of many clear trends in terms of overall bird trafficking activity. If anything, bird air seizure data suggests that bird trafficking is a particularly decentralized enterprise.

ⁱⁱ The primary exception to this is the trade in ploughshare and radiated tortoises between Madagascar and Southeast Asia.

Bird trafficking activity extends across the globe, affecting the Americas, Europe, Asia, the Middle East, Africa, and Oceania. Unlike the other categories covered in this report, bird trafficking appears to be most relevant to the Americas, although non-American countries the UAE, Indonesia, Russia, and Spain are all significant as well.

Routes

There are virtually no known flight routes moving birds from Africa to Asia; instead, trafficked birds most commonly move between the Americas, Europe, Asia, and the Middle East. In 2017, Spain was a particularly common destination for bird trafficking instances originating in the Americas. Although live animal traffickers generally prefer to rely on direct flights, Amsterdam in the Netherlands also featured as a transit point for instances moving from the Americas to Asia.

Methods

Like reptiles and rhino horn, birds are most likely to be smuggled by *checked luggage*. Birds are comparatively more likely than the other categories to be moved in a passenger's clothing or carry-on baggage, even though *passenger clothing/items* only accounted for a small percentage of total birds seized (according to the C4ADS Database, there have been more passenger than *air freight* seizures of birds, but air freight shipments average 183 birds per instance compared to 31 for passenger instances).

In some ways, bird trafficking seemed to be the riskiest of the categories included in this report. Birds are more likely to die in transit than reptiles, mammals, or marine species, and trafficked birds have been found on a number of occasions to be suffering from infections or diseases, including H5N1, that can be passed on to humans.

Pangolins

Trends

Pangolin air seizures also appear to have increased substantially since 2009, largely driven by an increase in small- and medium-scale seizures between 2009 and 2017. After a brief drop in 2013, the number of publicly available pangolin seizures made each year has been on a steep incline, hitting new record highs in 2016 and 2017.

Routes

Pangolin trafficking routes appear similar to both ivory and rhino horn trafficking routes, in general following an Africa to Asia flow. However, pangolin trafficking instances seem to primarily originate in West Africa, transiting through Europe, the Middle East, or East Africa prior to arrival in East or Southeast Asia.

Since four pangolin species are native to Southeast Asia, there are also a few common intra-Asian routes, primarily from Indonesia and Malaysia to China.

Methods

Like ivory, pangolin trafficking instances are generally moved by *air freight*, followed by *checked luggage*. Passenger seizures of pangolin products were rare, and made up a small fraction of the total weight of pangolins seized in the air transport sector.

The prevalence of *air freight* seizures of pangolins (primarily pangolin scales) highlighted pangolin traffickers'

tendency to move pangolin products en masse.

Pangolin products were often trafficked alongside other wildlife and wildlife products, including bushmeat.

Marine Products

Trends

Marine products seizures in the air transport sector have undergone a marked increase since about 2012, appearing to peak in 2015, followed by a slight decline in 2016 and 2017.

The marine products category encompasses such a wide variety of species—from seahorses, to shark fins, to caviar, etc.—that general, overarching trends in marine products trafficking are often difficult to discern. For example, seizure counts were not broken down and analyzed by seizure size, since seizures of different species are often reported differently (e.g. eel seizures are often reported by number, while totoaba bladder seizures can be variously reported by weight or number). Marine products seizures were instead examined by group; seizures of dried seahorses appeared to make up the majority, followed by eels, mollusks (abalone, clams, etc.), and corals.

Routes

Marine product flight routes varied substantially, given the wide array of source regions for commonly trafficked marine species. Marine trafficking instances originated in the Americas, Europe, West and Southern Africa, and Asia. Most instances were destined for China, Taiwan, or Southeast Asia, with a small number of instances destined for Europe or the United States.

Methods

Marine products traffickers did not appear to primarily rely on one transport method to move their contraband; instead, marine products trafficking instances were fairly evenly distributed between *air freight*, *checked luggage*, and *passenger clothing/items*. Transport methods for marine products seizures were not analyzed by seizure size.

Many marine products seizures included more than one species. Coral seizures in particular frequently included other marine species.

Mammals

Trends

Mammal air seizure numbers remained fairly consistent between 2009 and 2014, although seizures began to increase in 2015 and about doubled between 2016 and 2017.

Like the marine products category, the mammals category covers a diverse array of species, from lions to wolves, deer, chimpanzees, groundhogs, otters, and cats. To avoid generalizing across essentially incomparable seizures of different species, mammal seizures were not analyzed by size, and were instead depicted by group. Big cat and primate seizures appeared to represent the majority of mammal seizures, followed by bear, large mammals (hippo teeth, elephant tails, giraffe bones, etc.), small mammals (hedgehogs, sugar gliders, otters, foxes, etc.) and antelope.

Routes

Given mammal species' wide-ranging habitats, mammal flight routes extended across the globe, primarily affecting Africa, Asia, Europe, and the Middle East, as well as the Americas and Oceania.

Common origin countries were generally concentrated in Asia and Africa, while common destinations extended throughout Asia, the Americas, Europe, and the Middle East. Like most live animal traffickers, mammal traffickers seemed to avoid multi-stop flights as much as possible (although transit flights were more common for traffickers of mammal products—e.g. lion teeth, elephant tails—which generally originated in Africa and were destined for Asia).

Methods

Mammal trafficking instances were primarily moved by *checked luggage*. Mammal transport methods were perhaps the most diverse of any wildlife category covered in *In Plane Sight*, and included not only *checked luggage*, *air freight*, and *passenger clothing/items*, but also *mail*, and at least one instance involving a *private plane*.

As in the marine products category, transport methods for mammal seizures were not analyzed by seizure size, given the broad array of trafficked mammal species, as well as inconsistencies in mammal seizure reporting.

A large number of mammal seizures contained more than one species or product; big cat seizures, for instance, frequently involved ivory, primates, pangolins, and bears (both live animals and animal products). Other common mammal trafficking methods included the use of veterinary drugs, including ketamine, to sedate live animals in transit.

Recommendations

As in *Flying Under the Radar*, we have refrained from producing regional recommendations, and have instead chosen to focus our efforts on more broadly applicable recommendations that, if implemented correctly, could help to reduce wildlife trafficking throughout the air transport system as a whole. Most of last year's recommendations are still applicable this year, and primarily involve awareness, training, enforcement procedures, seizure reporting, and prevention efforts. Our recommendations are grouped below by topic, and are meant to be applicable to enforcement, industry, intergovernmental organizations, and nongovernmental organizations. For more specific recommendations regarding a certain species or region, please contact C4ADS or the broader ROUTES Partnership.

To improve future analyses, we again recommend that the appropriate stakeholders make available more detailed seizure reports, and begin to include transport sector information (air, maritime, land) in existing databases. While public reporting processes are perhaps challenging at first to implement, improved seizure data would allow C4ADS and other organizations to provide better and more helpful support to enforcement and industry alike. Furthermore, the air industry needs seizure information in order to take effective voluntary action against wildlife trafficking. Still, we acknowledge that not all seizure information can be made public given security and other concerns, but any increase in the amount of publicly available seizure data would be beneficial.

Many of the trafficking methods identified in both *Flying Under the Radar* and *In Plane Sight* are utilized by traffickers of all types. As a result, implementation of the following recommendations will likely improve enforcement success not just for the illegal wildlife trade, but for other crime types as well.

For agencies and organizations interested in taking a more proactive approach to combatting wildlife trafficking, we have included examples, possible paths forward, and organizations to contact wherever possible. The implementation of many of the recommendations can also be supported by the resources developed under the ROUTES Partnership and work being undertaken by other groups on wildlife trafficking (e.g. United for Wildlife and the US Wildlife Trafficking Alliance).

Over the past year, the ROUTES Partnership has been actively supporting the air industry in an effort to reduce airlines' and airports' vulnerability to exploitation by wildlife traffickers, thereby reducing traffickers' ability to conduct their illicit business. Although the following recommendations generally mirror last year's, the ROUTES partners, in coordination with industry and certain government agencies, have made considerable progress in implementing a number of crucial recommended steps forward. We have updated the recommendations to reflect this progress. We have also added a number of recommendations that were not present in *Flying Under the Radar*. Each of these is marked with an asterisk (*).

Some of our recommendations are geared towards specific stakeholder groups (e.g. enforcement versus industry), while some are applicable to multiple groups. Each recommendation is marked with the following symbols to illustrate its intended audience:

§ – Customs and enforcement agencies

‡ – Private sector

× – Intergovernmental organizations

∅ – Nongovernmental organizations

Regardless of each recommendation's intended audience, we would emphasize that communication and collaboration are needed, at a minimum, between enforcement and industry to ensure that wildlife trafficking through the air transport sector is addressed comprehensively and strategically.

We recommend the following steps be taken to improve enforcement success rates and reduce wildlife trafficking by air.

Awareness

1. Increase awareness among air passengers, aviation staff, freight forwarders, shippers, and enforcement officials. § ‡ × ∅

Increased awareness of the issue of wildlife trafficking through the air transport sector amongst all affected parties will lead to more seizures of illegal wildlife and wildlife products. Informed passengers will be more likely to report suspicious activity to airline and airport personnel, and will be less likely to unwittingly purchase illegal wildlife goods. Air industry staff and enforcement will be more likely to recognize illegal consignments and suspicious behavior.

Common awareness raising efforts involve putting up anti-wildlife trafficking posters or displays in airports (Jomo Kenyatta Airport and Guangzhou Baiyun Airport, for example, both clearly exhibit anti-wildlife trafficking messages and posters) and in-flight messages or materials.

Wildlife trafficking awareness training and materials can be tailored and delivered to customs, enforcement, and appropriate air industry personnel by government agencies such as the US Fish and Wildlife Service (FWS); nongovernmental organizations such as the WWF, TRAFFIC, and Freeland; trade associations like the International Air Transport Association (IATA) and Airports Council International (ACI); and broader partnerships like ROUTES and United for Wildlife. For example, the ROUTES Partnership has created wildlife trafficking awareness materials and toolkits (including infographics, handouts, customizable graphics, etc.) that can be downloaded and used by air transport companies.ⁱ

2. Adopt or create a pamphlet or tool tailored to each country to help customs and enforcement officials, as well as relevant industry personnel, identify restricted species and wildlife products commonly trafficked through their territory.ⁱⁱ § ‡ × ∅

One significant impediment to increased wildlife seizures is the frequent inability of customs and enforcement

ⁱ For more information on available awareness training and materials, contact the ROUTES Partnership at routespartnership.org/contact/ or C4ADS at info@c4ads.org.

ⁱⁱ For support creating a pamphlet tailored to a specific area, contact C4ADS at info@c4ads.org.

officials to determine which wildlife species or products are subject to protections.

A number of nonprofits and intergovernmental organizations have developed methods to address this issue, including:

- CITES produces and publishes identification guides for a wide variety of animal and plant species. The guides are available here: www.cites.org/en/resources/wiki_id.php (note: the search function for “genus” seems to return more results than the “common name” search).
- Freeland, a nonprofit dedicated to tackling wildlife trafficking and human slavery, released a mobile phone application in 2016 to assist law enforcement agencies in the identification and handling of trafficked species.²¹⁶ WildScan can be downloaded for free on Apple and Android devices, and is currently available in English, Khmer, Bahasa Indonesian, Thai, and Vietnamese.
- Tikki Hywood Trust, a Zimbabwean nonprofit dedicated to conservation, education, and legislation, has developed a handbook to assist all relevant enforcement stakeholders in assessing and docketing identified wildlife crimes appropriately.²¹⁷ This approach could be repurposed to include information on the identification of species relevant to particular jurisdictions.
- TRAFFIC, the wildlife trade monitoring network, has produced a number of identification guides for wildlife species commonly traded in Southeast Asia. Each guide has been produced in Mandarin, Japanese, and ten ASEAN languages. The guides can be retrieved at www.traffic.org/identification.ⁱⁱⁱ

3. Ensure public reporting mechanisms are in place and well-known so passengers can report suspected wildlife trafficking instances.* § ‡

Airline passengers are well-positioned to witness and report on potential wildlife trafficking instances. However, at present, there is no known mechanism for passengers to report suspected wildlife trafficking to enforcement or industry personnel. Passengers are also largely unaware of wildlife trafficking red flags that could alert them to potential trafficking instances.

Suspected wildlife trafficking reporting mechanisms should be developed for passengers and publicized within airports (e.g. banners or displays) to raise awareness (see **Recommendation 6** for more detail on two potential reporting mechanisms). Materials developed to promote the mechanism should include not only red flags (“what to watch out for”), but also what types of information should be reported (e.g. flight number). A well-designed reporting mechanism would incorporate a tool to reduce false positives and extract the most promising reports of illegal wildlife trafficking activity. Note that creating a system that allows informants to remain anonymous will likely encourage reporting on suspected trafficking instances.

Training

4. Provide training on red flag indicators associated with wildlife traffickers and shipments. Ensure that follow-up trainings are provided as necessary to support uptake. § ‡ × Ø

Customs, enforcement, and air industry staff would benefit from periodic trainings on the identification of all types of illegal activity. While suspicious behavior exhibited by traffickers can be easy to identify, documentation associated with a shipment is not always obviously fraudulent. Additional training tailored to the detection of high-risk air freight consignments in particular will help customs officials to more accurately

iii Contact the ROUTES Partnership at routespartnership.org/contact/ for additional assistance.

identify illicit shipments.

Common red flags for passenger behavior include anxious behavior and bulging clothing. Common red flags for air waybills include inconsistent weights, shipments of low-value bulk goods, partial or non-existent shipper or consignee information, an unusually low estimated price given the declared products being shipped, inconsistent information (e.g. used tire products being shipped to “ABC Furniture Company”), etc. Because these red flags are not specific to wildlife, additional training on these and other red flag indicators should lead to increased seizures of wildlife, drugs, and other illicit goods. As a result, additional training on these topics could likely be folded into existing trainings on how to identify trafficking activity.

Training programs should be tailored for relevant personnel, and should differentiate between red flags for different customs screening procedures (e.g. passengers, air freight/cargo, mail/post), and different types of customs screening (e.g. document screening, equipment screening, sniffer dogs, etc.). Follow-up trainings should be provided after the initial training to ensure the training program’s effectiveness.

Screening trainings can be provided by organizations like the WCO and its partners, which provides training modules on countering illicit wildlife trafficking through the air cargo segments of the Container Control Programme (CCP) of its Aircop project, which aims to train customs and other law enforcement officers in the air cargo and air passenger domains. Other customs and enforcement agencies like the US Transportation Security Administration (TSA), and US Customs and Border Protection (CBP) have provided similar training programs in the past.^{iv}

5. Incorporate training for airline staff on how to safely handle trafficked live or dead animals after discovery into existing training programs. Create and provide “forensic protection protocols” training to preserve evidence for trial.* § ‡ ×

In *Flying Under the Radar*, we recommended that protocols be developed to help airline employees handle animals immediately after discovery, to both ensure the safety of airline personnel and passengers, as well as the safety of the animals themselves. In particular, we recommended that staff be trained to deal with 1) wildlife that gets loose or is discovered in flight, and 2) dead animals, without creating a health risk for employees or passengers.

In 2017, IATA, as part of the ROUTES Partnership, developed guidance on how to safely handle escaped animals in cabins.^v These guides should be incorporated into existing training programs as appropriate to ensure that air industry personnel are equipped to deal with wildlife safely.

Similarly, training should be developed to ensure customs, enforcement, and air industry personnel know how to preserve forensic evidence associated with seizures of wildlife and wildlife products. This is often crucial for seizures that progress to prosecution.

Enforcement

6. Develop clear escalation procedures^{vi} upon discovery of potential illegal activity. § ‡

^{iv} See www.cbp.gov/travel/travel-industry-personnel/carrier-liaison-prog for information regarding CBP’s Carrier Liaison Program.

^v See www.iata.org/policy/environment/Documents/best-practices-handling-escaped-animals-cabin-crew.pdf for IATA’s “Best Practice on Safe Handling of Escaped Animals in the Cabin.”

^{vi} “Escalation procedures” in this case means established communication channels and processes that move a report of possible illegal activity to enforcement officials with the power to act.

At present, air industry personnel in general do not have an established protocol for alerting enforcement to potential wildlife trafficking instances. Instituting clear and consistent escalation procedures will help to ensure that trafficking activity is promptly reported and addressed. To do this, the air industry will need to be aware of the relevant points of contact within specific customs or enforcement agencies.

However, we note that customs and enforcement may be reluctant to provide specific contact details due to concern about potentially being inundated with false leads, or leads without sufficient detail for follow up. To deal with this issue, wildlife trafficking hotlines (phone- or web-based) could be created that provide specific submission templates. For web-based hotlines, this could be as simple as including a “Suspected Trafficking Incident” reporting form on customs or enforcement websites, with specific boxes to fill in (e.g. “Type of trafficking incident (select one),” “Reason for suspicion,” “Airline & flight number,” “Contact details if follow up is needed (optional)” etc.). A phone-based hotline might be designed to walk informants through a series of prompts to gather requisite information.

Either option will require that a person or computer program quickly filter through submitted tips to identify the most promising leads before the potential trafficker or illicit shipment leaves the airport. If the suspected trafficker or shipment does manage to get on a flight, established communication channels and e-documentation systems (see **Detection** below) can help alert officials at their destination to their presence prior to their arrival.

In the case of human trafficking, a number of organizations have developed pamphlets for airline passengers and airport personnel to assist in the identification of potentially trafficked individuals, complete with risk indicators or “Signs to Look Out For,” first response protocols, and next step protocols. See **Appendix IV** for a *Human Trafficking Assessment Tool for Airlines & Airports* by Human Trafficking Hotline that could be used as a basis for a Wildlife Trafficking Assessment Tool.

7. Engage with the private sector to ensure that aviation personnel are aware of the types of information needed to follow up on reports of wildlife trafficking. Provide feedback to industry and the public on the outcomes of submitted tips.* § ‡

To ensure that submitted tips on potential trafficking instances are useful, customs and enforcement should work with industry to determine specific categories of necessary information that industry personnel can provide in the event that potential trafficking activity is identified. These categories could then be included within reporting mechanism templates (see **Recommendation 6**).

To encourage proper reporting, customs and enforcement should find a way to provide appropriate feedback to industry and the public on the results of submitted tips. Ideally, this would be accomplished by sending direct feedback to informants via email or phone (provided they did not submit information anonymously). Feedback could also be gathered and provided to companies and the public in the form of an annual report or statement, including information on how many submitted tips resulted in seizures. However, taking into account resource constraints and confidentiality concerns, this could also be accomplished by simply posting a press release to customs websites after seizures including whatever information can be made publicly available (see **Recommendation 17**).

8. Develop post-seizure procedures to safely and securely store wildlife products or ensure the proper care of trafficked live animals. Develop procedures to track seized live animals and wildlife products. § ✗

In some locations, customs officials are reluctant to stop illegal wildlife traffickers or shipments due to a lack

of post-seizure procedures or accommodations, such as a secure warehouse to store seized ivory.²¹⁸ In other cases, customs officials may seize illegal wildlife and store it according to existing procedures, only for the product or animals to be trafficked back into the illegal wildlife trade.^{vii viii}

Where post-seizure procedures do not exist, customs should work to build a comprehensive post-seizure process and disseminate it to all relevant officials. Illegal wildlife products should be stored in an existing secure warehouse for confiscated contraband, or within a new secure facility, with multiple checks in place to prevent seized products leaking back into the illegal market. In Kenya, for example, seized ivory is stored in two vaults behind steel doors with multiple locks, defended by armed guards.²¹⁹

For live animals, a suitable wild animal rescue center, veterinary practice, or zoo must be identified which can provide treatment, care, and rehabilitation for large numbers of animals with little warning. Any selected facility must be carefully vetted to ensure the security of the animals in their care. Note that CITES provides guidelines^{ix} to assist countries in identifying the proper course of action (reintroduction to natural habitat, return to the state of export, captivity, or euthanasia) for seized animals, depending on conservation status and health needs.²²⁰

Due to the possibility that seized animals or products might re-enter the illegal wildlife trade, customs agencies should ensure that procedures are in place to track the live animals and wildlife products they have confiscated. Each animal or wildlife product should be catalogued and its whereabouts clearly stated within a specially designated location, perhaps within a seizure database (see **Recommendation 16**), or a separate database specifically designed for that purpose. Regardless, the information should be updated periodically to ensure that the animal or product is still accounted for. If anything is found to be missing (particularly if they are found to be missing in large quantities), an investigation should be initiated to locate them.

9. Dedicate additional resources to combatting the illegal wildlife trade in common hub airports exploited by wildlife traffickers. § ‡

Both *Flying Under the Radar* and *In Plane Sight* have shown that large international hub airports are crucial to the illegal wildlife trade. However, many of the same qualities that make hub airports vulnerable to trafficking—such as their wide selection of available flight routes, location, and size—make them a popular choice for travelers, and can create a capacity problem for customs and enforcement screening. This is particularly true for passengers and shipments transiting through hub airports; tight turnaround times and high volumes of transiting passengers and cargo make transit customs screening difficult at best (see **Recommendation 10**). Still, the vital role many hub airports play in the illegal wildlife trade must be addressed.

vii In one instance in 2015, Vietnamese officials seized “42 live, critically endangered” pangolins and delivered them to forest rangers, presumably for rehabilitation. The forest rangers instead sold all 42 animals to local restaurants, claiming that “the animals were too weak to be rescued anyway.”

Source: Bryce, Emma. “Critically Endangered Pangolins Rescued, Then Sold as Food.” The Guardian. 20 Feb. 2015. www.theguardian.com/environment/world-on-a-plate/2015/feb/20/critically-endangered-pangolins-rescued-then-sold-as-food.

viii Before Spain designated a rescue center to receive rescued wildlife, “some of its seized animals went to a zoo now under investigation for ties to the illegal wildlife trade.” A nonprofit organization, Animal Advocacy and Protection, is now Spain’s designated rescue center. According to Raquel Garcia, head of public policy for the organization, “We bring [the animals] in, rehabilitate them if they’re social animals, and make sure they’re placed in a legitimate location.”

Source: Actman, Jani. “What Happens to Smuggled Animals After They’re Seized?” National Geographic. 30 Sep. 2016. <http://news.nationalgeographic.com/2016/09/wildlife-watch-animals-seized-smugglers/>.

ix See Resolution 17.8 on Disposal of Confiscated Illegally Traded Specimens of CITES-Listed Species at the following link: www.cites.org/sites/default/files/document/E-Res-17-08.pdf.

There are a number of potential options available to improve customs screening and reduce air industry vulnerability to wildlife trafficking without overburdening officials and air industry employees. One way to do this would be to invest more heavily in wildlife sniffer dogs, which are able to screen large numbers of people, luggage, and shipments extremely quickly; for example, in a 2016 Smithsonian documentary about Frankfurt Airport, a sniffer dog checked 40 suitcases for drugs in 100 seconds.²²¹ Another solution would be to shift from paper-based documentation to e-documentation. Once implemented, e-documentation systems could incorporate customs screening technology and equipment designed to automatically identify red flags for trafficking activity, including wildlife trafficking (see **Recommendation 19**). Both options would increase customs and enforcement's ability to screen outbound, transit, and incoming flights relatively quickly.

The ROUTES Partnership has also worked to counter wildlife trafficking in hub airports. Since 2016, the ROUTES Partnership has conducted training in hub airports in Africa, Asia, and the Middle East.^x Some of the materials associated with this training program are available on the ROUTES website for download.^{xi xii}

While training workshops are a step in the right direction, additional resources and attention should still be committed to addressing wildlife trafficking in hub airports, particularly transit airports in Europe, East and Southern Africa, the Middle East, and Asia. Note that as enforcement targets wildlife trafficking through hub airports in these regions, traffickers will naturally shift their operations away from those hubs to hubs in new locations, or to smaller regional airports. As a result, enforcement, industry, or nongovernmental organizations should monitor seizure evidence of shifting trafficking patterns so that counter-wildlife trafficking efforts can shift to match.

10. Develop or enhance customs screening procedures for transit flights. § ‡

Most customs officials currently have limited ability to screen passengers and shipments in transit, putting the burden of detection almost entirely on origin and destination locations. They are also hampered by the short turnaround times for connecting flights, which do not allow enough time to effectively screen passengers, luggage, cargo, and postal mail. If customs screening could be increased in transit, officials would have an additional opportunity to stop illegal wildlife trafficking.

This is, of course, only possible in certain circumstances. For example, when passengers and shipments have extremely short layovers, adding another layer of complication is generally not feasible. In instances where a flight lands to offload some passengers and re-fuel before flying to another destination, many passengers and their luggage will not even exit the plane, and therefore cannot be screened. Note that it is possible that traffickers are aware of this and take advantage of these types of flight schedules when planning their route.²²²

Although customs and enforcement will likely not be able to remove these vulnerabilities entirely, both the deployment of sniffer dog teams and e-documentation systems would help. Sniffer dogs in particular could assist with customs screening during short layovers, perhaps by screening passengers on high-risk flights as they disembark (or, in the cases of checked luggage, air freight, or postal mail, as they are offloaded). Risk screening systems associated with e-documentation could send alerts on high-risk transiting passengers or cargo forward to customs during flights, allowing officials to prepare for the flight's arrival and screen only those people, suitcases, or shipments that have been flagged by the system (see **Recommendation 18**).

^x Airport Council International (ACI) also provided a short training to a number of African airport operators through their Developing Nations Airport (DNA) Assistance Program.

^{xi} See <http://routespartnership.org/industry-resources/training-modules>.

^{xii} Additional training workshops will take place in a number of African and European airports in 2018.

11. Customs and enforcement should be aware of flight routes opening through high-risk areas.* § ‡

Wildlife traffickers have been known to shift their operations on occasion to take advantage of opening flight routes through jurisdictions they consider more advantageous.^{xiii} To anticipate these changes, officials should keep track of opening flight routes to and from high-risk jurisdictions for their particular airport. For example, countries with in-demand reptile species should be wary of opening flight routes to common reptile demand countries in Southeast Asia, Europe, and the Americas (and vice versa).^{xiv}

Similarly, airlines should understand the implications of flight routes between significant source or origin countries and demand countries for in-demand wildlife. If a planned flight route will be at a high-risk for bird smuggling, airport awareness displays or in-flight materials could help to reduce the route's vulnerability, and could increase the chances that bird trafficking instances will be discovered and properly reported by well-informed passengers or staff.

Airlines should also clearly communicate plans for new flight routes to relevant customs and enforcement officials. If the proper communication channels do not already exist, coordination will be necessary to ensure that airlines are reporting to the appropriate authorities.

12. Develop and maintain a comprehensive internal database of entities previously involved in wildlife seizures. §

Our findings highlight the prevalence of repeat offenders involved in wildlife trafficking. To counter this threat more effectively, customs and enforcement should first take note of individuals and companies that have previously been involved in wildlife seizures in their jurisdictions (e.g. entities that have shipped, transported, trafficked, purchased tickets for, or were intended to receive trafficked wildlife or wildlife products). The names and identifiers of these people and companies should then either be stored in a comprehensive database of wildlife offenders, or should be added to existing databases of suspect entities.

A useful database would be computer-based, managed by one designated individual or agency, and continuously updated with detailed information on relevant entities. For an individual, necessary information would include: name, age, a photo (or physical characteristics), passport information, and detailed information on past seizures. For a company, the following categories would be relevant: name, phone numbers, addresses, point of contact, and detailed information on past seizures. The seizure entities database would ideally be either a part of, or linked to, the database used for seizure information (See **Recommendation 17**). In the absence of sophisticated technology like Palantir or i2, a simplistic way to store such information would be in an encrypted Excel file.

13. Develop a system to test counter-wildlife trafficking protocols. §

After the implementation of updated or new counter-wildlife trafficking protocols, such as improved customs screening procedures for wildlife, customs and other enforcement officials should attempt to assess their effectiveness. Covert testing is the most reliable way to determine enforcement success rates, as most other methods attempt to estimate the volume of trafficking activity that was not identified within a certain

^{xiii} See **New Flight Routes, Organized Crime, & Totoaba** in this report and **Shifting Transit Routes, Narcotics, and Reptiles in Flying Under the Radar**.

^{xiv} Note that this will require that officials are familiar with species commonly trafficked through their country, as well as with those species' common origin or destination countries (e.g. Dubai officials should know that worked ivory often leaves from Zimbabwe before passing through Dubai Airport and traveling to Hong Kong. Dubai officials should therefore recognize that flights from Zimbabwe are at a higher risk for ivory trafficking).

timeframe.

Effective testing should be convincing, varied, and occur on multiple occasions to track changes in enforcement success over time. Results and findings should be presented in de-briefs to leadership and relevant officials.

The US TSA conducts covert testing of security systems within the United States and abroad using trained “Red Teams” from the Department of Homeland Security. Red Team members generally carry fake improvised bombs and attempt to successfully pass through airport security.²²³ This strategy could be altered slightly to test airport customs screening protocols for the detection of illegal wildlife.

14. Improve wildlife customs screening requirements for postal mail shipments. Ensure mail seizures are reported to the same degree as passenger, checked luggage, or air freight seizures.* § ‡

Screening for postal mail shipments – or shipments sent via a postal service – is primarily focused on security threats. For example, a poster created by the US Postal Service (USPS) entitled, “Suspicious Mail or Packages,” helps mailroom staff detect packages likely containing explosives or radiological, biological, or chemical threats.^{xv}

Since customs screening is the primary means by which wildlife trafficking instances are discovered, many live animals and wildlife products have likely escaped detection in postal packages. For example, between January and June 2016, the UK ran an operation targeting mail shipments en route to mainland China.²²⁴ During the course of the operation, UK officials made 50 wildlife seizures “involving a total of 153 [ivory] specimens and an additional 39 kg of African Elephant carvings were detected.”²²⁵ In other words, UK officials made an average of 8.3 ivory seizures a month from mail shipments alone. A similar operation in a more significant country for ivory trafficking would likely have found far more.

Although mail seizures seem relatively infrequent, this could partially be an effect of how rarely mail seizures are publicly reported. To counteract the impression that mail shipments undergo little customs screening, and to publicize customs and enforcement successes, national postal services should establish internal and external seizure reporting mechanisms. This will both ensure that seizure analyses based on public data are more accurate, and will broadcast to traffickers that national postal services should not be considered an easy way to move illegal products.

15. Increase cooperation with other customs and enforcement agencies along high-risk supply chains. Inform foreign agencies of seizures on flights that have left or are destined for their countries.* §

Customs and enforcement agencies should work to collaborate with other agencies along high-risk supply chains, both to disseminate seizure information and to monitor wildlife trafficking networks that appear to be operating in multiple jurisdictions.

For example, Zimbabwean, Emirati, and Hong Kong officials should work together to share information on the handmade vest network that continues to move worked ivory through Harare, Dubai, and Hong Kong (see **Handmade Vests in Hong Kong** in *Flying Under the Radar* and **Handmade Vests in Hong Kong—An Update** in this report). Hong Kong and Zimbabwean officials in particular should collaborate to address both the source and destination elements of the network simultaneously, since established trafficking networks are most effectively dismantled if each branch of the network is confronted at once.

^{xv} See https://about.usps.com/publications/pub166/pub166_tech_015.htm for USPS guidelines on how to detect and safely address likely security threats in mail packages. See https://about.usps.com/publications/pub166/images/pub166_tech_015_1.jpg for the “Suspicious Mail or Packages” poster.

Whether or not close collaboration is possible between agencies in different countries, customs should at least disseminate information on seizures that occurred at destination to the country the flight originated from, and should inform countries of seizures that occurred at origin prior to arriving in their airports.

Seizure Reporting

16. Store collected seizure information in one centralized database. §

Consolidated seizure reporting provides customs and enforcement officials with a way to track their own success rates, as well as monitor shifting trafficking patterns and methods over time. Furthermore, maintaining detailed seizure records can help identify future trafficking instances involving repeat offenders or common trafficking methods. Note that this recommendation applies not only to wildlife seizures, but to seizures of other contraband as well. Consolidating information on seizures of all types can help to identify overlap between and within trafficking networks.

In order to collect seizure data for inclusion in a seizure database, customs and enforcement agencies should have standardized reporting procedures, or a seizure reporting mechanism, in place to ensure that officials report seizures systematically. A successful mechanism will be relatively simple and easy to understand, and will be accompanied by training of customs and enforcement officials on reporting protocols. All customs and enforcement officials should be made aware of the reporting protocols relevant to their positions.

In some countries, seizure information is held only by the agency that made the actual seizure, and is not shared across all relevant customs and enforcement agencies.^{xvi} In these and other cases, seizure information is often stored in hard copy, preventing easy dissemination or storage of the seizure data. To avoid these issues, a seizure database should be computer-based, managed by a few designated individuals or one agency, and continuously updated with detailed information on relevant entities. Regardless of the database manager, all relevant enforcement agencies should have access to the database.

In the absence of sophisticated technology like Palantir or i2, a simplistic way to store such information would be in an encrypted Excel file. If linked entity information will be held in a separate database (see **Recommendation 12**), the seizure database should refer or somehow link to the entity database, making sure to connect each entity to specific seizures.

The more detailed seizure information is, the more can be done with it; given time and capability constraints, however, consistently compiling and storing detailed seizure information may not be feasible. See **Appendix V** for a seizure reporting template containing the baseline of information that should be collected and stored after seizures. Routes information (origin, transit, and destination locations) is included to both understand wildlife movements, and fill in some of the knowledge gaps created by relying on seizure information alone. The

^{xvi} A May 2015 report undertaken on behalf of the Department of National Parks and Wildlife of Malawi included Malawi's wildlife seizure data from 1989 to 2014. The report's authors gathered the data from a variety of different Malawian government agencies that had compiled their own internal seizure databases in hard copy. According to the report, "...reviewers found there to be a lack of reliable available data, making it is [sic] almost impossible to identify detailed crime patterns or trends. Several agencies seemed to have not historically recorded or retained wildlife crime data, and those that did often stored it in hard copy only, making it very difficult to access and analyse. In total, 50 wildlife crime cases were analysed by reviewers, the majority of which were ivory offences at airports."

Source: Waterland, Shelley, et. al. Illegal Wildlife Trade Review Malawi. German Federal Ministry for Economic Cooperation and Development (BMZ) through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; German International Cooperation, Lilongwe Wildlife Trust, Born Free Foundation, and the Department of National Parks and Wildlife of Malawi, May 2015. www.lilongewildlife.org/wp-content/uploads/IWT-Review-Malawi.pdf.

ability of customs and enforcement agencies in multiple countries to access this data (see **Recommendation 15**) would be particularly helpful to bridge wildlife trafficking knowledge gaps. Transport method information (passenger, checked luggage, air freight, etc.) should be included to help officials and industry target wildlife trafficking activity more effectively. Note that other organizations like the WCO and CITES have also created seizure reporting templates (see **Appendix V**).

Once a database is designed and put to use, officials should be able to easily organize and partition information for CITES reporting and for other purposes. For example, if an official would like to identify past seizures using a specific type of obfuscation method, they should be able to search for the method in question and quickly compile a list of relevant seizures. One example of an existing database with this capability is the EU TWIX database.

17. Develop a procedure to publicly report seizure information. Update seizure press releases with prosecution results. §

Publishing seizure reporting, either on a website or in periodic public reporting, provides clear evidence that enforcement efforts are effective in preventing trafficking.

Once a reporting mechanism is developed and implemented, seizure information should be released to whatever extent possible, preferably in the form of press releases. Providing public seizure data will allow for the creation of a positive feedback loop between enforcement, industry, and nongovernmental organizations. For example, more seizure data improves the type of analysis done in this report, which in turn informs enforcement about global trafficking trends and patterns. Furthermore, publishing information on seizures can provide positive feedback to individuals and industry personnel who report suspicious activity, encouraging more people to come forward and do the same. Still, we acknowledge the need to keep some information confidential.

Whenever possible, seizure press releases should include—or be updated to include—prosecution results for individuals and companies implicated in wildlife seizures. Publishing this information is a great way to publicize that enforcement is taking wildlife crime seriously, and not releasing traffickers immediately after confiscating their contraband.

The Hong Kong Customs and Excise Department^{xvii} and the South African Revenue Service (SARS),^{xviii} for example, maintain websites for departmental press releases on seizures and other developments. Hong Kong Customs also releases their own statistics on their caseload, seizures, and arrests over time.^{xix} Some customs and enforcement agencies also maintain social media accounts where they post seizure information and other relevant news. These reporting strategies are good models for those seeking to publicize their enforcement successes.

Policy

18. National laws should, at a minimum, enforce CITES regulations and regulate the domestic trade in non-native species. Penalties for wildlife trafficking should be raised until they are sufficiently deterrent.* §

xvii See www.customs.gov.hk/en/publication_press/press/index.html for Hong Kong press releases.

xviii See www.sars.gov.za/Media/MediaReleases/Pages/default.aspx for South African press releases.

xix See www.customs.gov.hk/filemanager/common/pdf/statistics/enforcement_cases_en.pdf for an example.

Wildlife trafficking legislation is often relatively lax; some countries do not even fully enforce CITES regulations. Thailand, for instance, does not regulate the domestic trade in non-native species, nor does it allow Thai officials to ask wildlife traders for proof that their animals were legally imported, creating substantial loopholes that can be exploited by wildlife traffickers.²²⁶ In other countries, wildlife trafficking penalties exist, but account for a small fraction of the value of trafficked species or wildlife products. In still other countries, existing wildlife legislation is sufficient, but is often not enforced by customs and enforcement, who prioritize penalizing other crime types.

Inconsistent wildlife legislation and enforcement create space for wildlife traffickers to continue operating relatively safely in certain countries, and are a large part of the reason that repeat offenders are so prevalent within wildlife crime.

To address these issues, countries should examine their wildlife trafficking legislation to determine whether it is sufficiently strict to create a deterrent effect, and if it is, whether the existing laws are consistently enforced. At a minimum, CITES regulations should be enforced, and the trade in both native and non-native species should be regulated and monitored. Ideally, fines should be raised until they represent a significant portion of the value of the trafficked species or product, and repeat offenders should receive harsher penalties to dissuade their continued involvement in the illegal wildlife trade. Finally, wildlife laws should allow for and encourage seizure follow-up and investigations to identify the individuals ultimately responsible for wildlife trafficking networks' activities.

Detection

19. Pursue shift towards electronic paperwork for air freight and updated technology for customs screening. Expand advanced cargo and passenger information systems to include red flags for the illegal wildlife trade. Incorporate CITES e-permits in e-documentation systems. § ‡ ×

Steadily increasing passenger and cargo volume has put pressure on existing customs screening and enforcement procedures that are straining to deal with the increase.²²⁷ Implementing e-documentation technology can take pressure off overwhelmed customs officials and expedite the passenger and cargo screening processes.

Furthermore, e-documentation systems can incorporate risk management systems designed to identify suspect activity, thereby improving interdiction success rates. E-documentation risk management systems can also alert customs and enforcement of inbound passengers or shipments that display multiple red flags for trafficking activity, based on pre-established risk factors. In addition, the speed with which documentation can move through an e-documentation system could both improve official response times and, through integrated messaging, increase communication between different national customs and enforcement agencies. Finally, the use of CITES e-permits hampers the ability of wildlife traffickers to use and re-use fraudulent CITES permits.

Note that e-documentation systems are most effective when broadly implemented; lagging technology in certain airports will necessitate retaining paper customs and shipping documents to some extent, and will prevent the realization of the full benefits of a technologically enhanced transport system. Dedicating additional resources to updating the technological capabilities of specific airports should therefore have a significant positive impact on the entire air transport sector.

Appendix I: WCO CEN Wildlife Seizure Data (2015–2016)

The World Customs Organization's (WCO) Customs Enforcement Network (CEN) is an application intended to help Customs agencies collect information on trafficking incidents around the world. The application is based on a database containing voluntarily submitted seizures of six different categories of illicit products: cultural heritage; drugs; environment (including wildlife); intellectual property rights (IPR), health, and safety; revenue; and security. The analysis in this section relies on the CEN database's wildlife seizures in airports from January 2015 through December 2016.

In 2017, C4ADS assisted the WCO in preparing the 2016 *Illicit Trade Report* (ITR), an annual report which analyzes trends in CEN seizure data from the previous year. C4ADS provided data cleaning, analytical, and visualization support for all six categories covered by the CEN database.

The voluntary nature of submitting seizure data to the WCO creates a few analytical issues that should be considered. First, the analysis in this section should not be construed as a representation of the entirety of wildlife crime, but rather a reflection of wildlife trafficking in the countries that submitted seizure data to the WCO in 2015 and 2016. Trends spotted in this analysis are therefore influenced by the countries which chose to share data. As a result, any visible changes in trafficking activity between 2015 and 2016 may reflect an actual change in trafficking, or they could reflect a change in the country's seizure data submissions to the WCO. Furthermore, even those countries that do submit their seizure data may not be submitting the data in its entirety, which might lead to incorrect or inaccurate analytical results. It should be noted that the countries that submit the most seizure data to the CEN database are generally European, and thus the CEN database is fairly Euro-centric.

The CEN data C4ADS received was not integrated into the C4ADS Air Seizure Database in part due to the difficulty of detecting and resolving seizure overlap between the C4ADS' and the WCO's seizure information. For instance, since the data in the CEN database is submitted by customs agencies, it does not contain external sourcing information, which could be used to remove duplicates between the databases and ensure that every seizure is unique. The CEN database also records different, albeit similar, types of seizure information, making it difficult to integrate into the C4ADS Database. For these reasons and other reasons, the WCO CEN database is examined separately, and is intended to supplement the analysis of the C4ADS Air Seizure Database.

The data in this analysis represents only 31.3% of the CEN database's total environment data for 2015 and 2016, since flora seizures and seizures occurring outside of the air transport sector were removed from the data and subsequent analysis, as they did not fall within the scope of this report.

The CEN database also distinguishes between "seizures" and "cases." Cases are defined as a unique interdiction of a shipment by customs officers, while seizures are recorded for each unique product seized in a case. Several seizures can arise from one case if there are a variety of wildlife products in the interdicted shipment. In the below analysis of wildlife product movements, we look at the data on a case level to avoid double-counting movement through countries for cases which contained several products. Overall, the data contained 1,407 wildlife cases, or 1,518 wildlife seizures, in airports in 2015 and 2016.

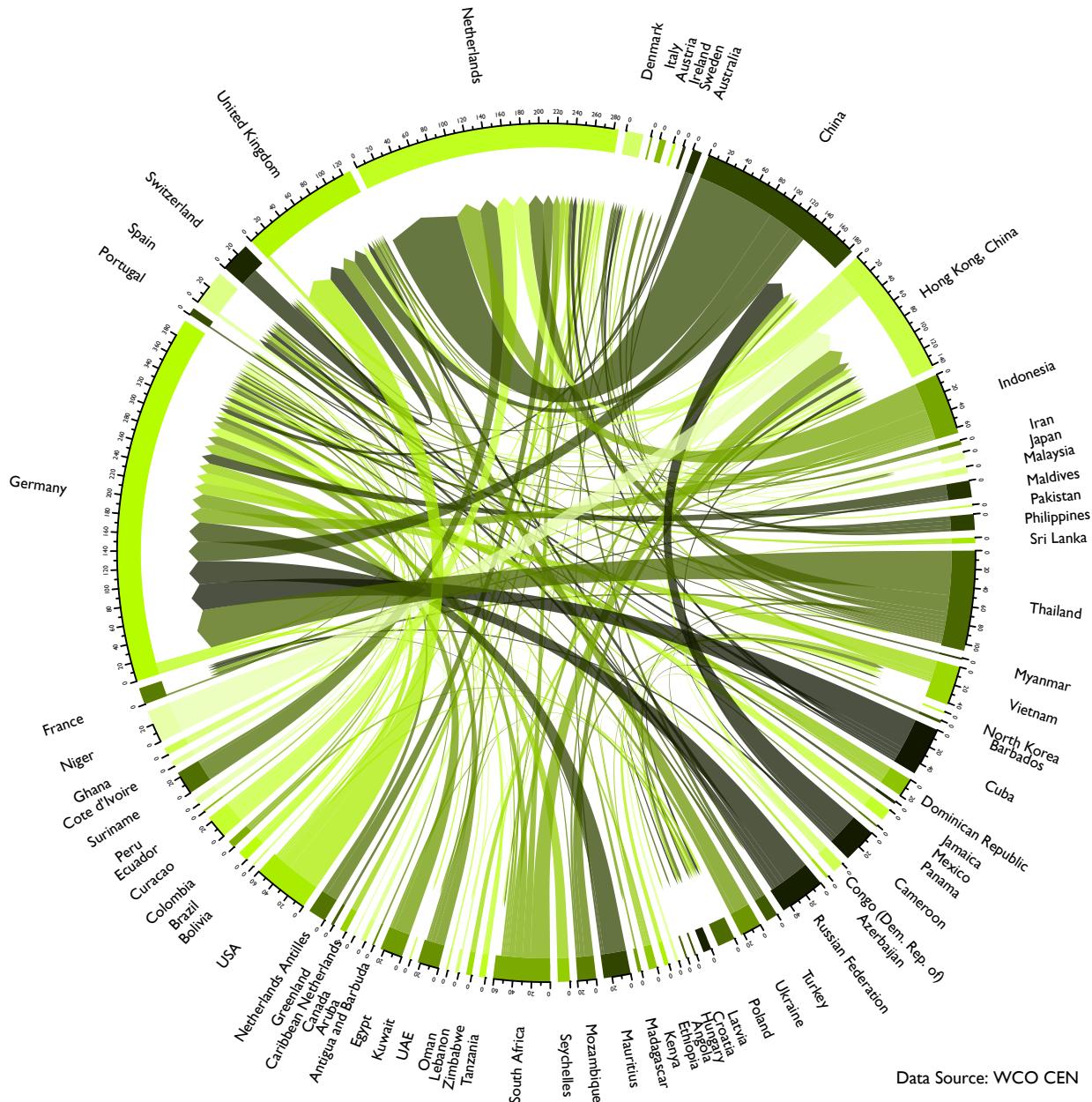


Figure 92. Circle flow map of wildlife movements from origin to destination in the air transport sector (2015–2016)

Only routes that were used more than once are included.

Figure 92 shows the intended movements of wildlife and wildlife products through airports from origin to destination countries for all cases in the 2015 and 2016 CEN data. Germany stands out as the largest destination for seized wildlife in Figure 92, predominantly because Germany submitted significantly more cases to the CEN database than any other country. For example, Germany submitted 523 wildlife cases, or 37% of all relevant cases submitted to the CEN database in 2015 and 2016. Thailand seems to be the primary origin of wildlife flowing into Germany (50 cases), followed by Cuba (34), and Russia (30).

The most significant wildlife movement displayed in Figure 92 was from China to the Netherlands, with 90 cases recorded along this route. Although this finding may appear incongruous with the common assumption that wildlife trafficking generally flows towards China, it is likely driven by the prevalence of European data

in the WCO CEN database. Outside of Europe, Hong Kong was the most prominent destination for wildlife in the CEN database, with 110 cases destined for the city. The most significant origin point for wildlife destined for Hong Kong was Niger, with 31 cases.

China was the most prominent origin country for wildlife cases in 2015 and 2016 (136 cases), followed by Thailand (105), Indonesia (66), and Cuba (52). These four countries did not submit cases to the CEN database in 2015 or 2016—their involvement was revealed through seizure data submitted by other countries.

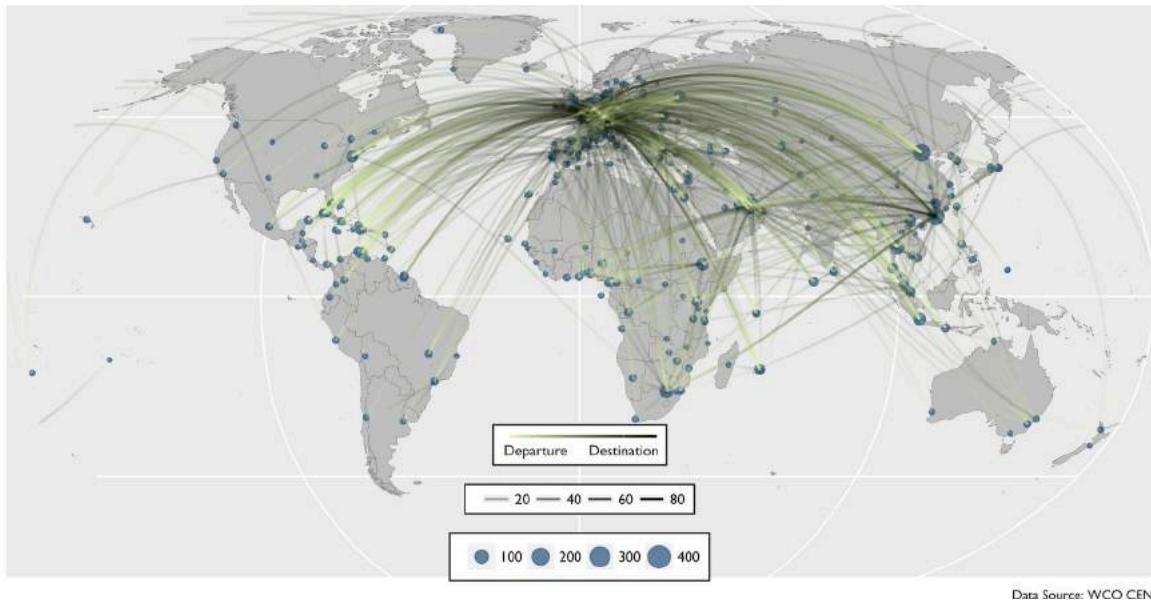


Figure 93. Air trafficking routes for wildlife products seized from January 2015 to December 2016

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city or country. The opacity of the lines represents the number of seizures which occurred along that route. Capital cities are used when specific cities are unavailable.

Figure 93 showcases the flight routes used by wildlife traffickers in 2015 and 2016. The map clearly depicts the Euro-centric focus of the CEN data; the primary trend visible in Figure 93 is the flow of wildlife and wildlife products into and out of Europe. European countries submitted 1,173 of the 1,407 wildlife cases in the air transport industry in 2015 and 2016, representing 83.4% of the case data for those years. Asia is ranked second for case submissions with 129 environment cases, followed by Africa with 101 cases. Countries in other regions submitted far fewer cases to the WCO: the Middle East only counted two cases, and Oceania and the Americas only had one case each.

Amsterdam in the Netherlands plays a major role in Figure 93. Amsterdam was the destination for three of the top four routes in 2015 and 2016: Beijing, China to Amsterdam (88 instances); Willemstad, Curacao to Amsterdam (36); and Jakarta, Indonesia to Amsterdam (35). The only other route in the top four was from Washington, DC to London, UK, with 15 instances.

Unsurprisingly, Amsterdam ranked first in terms of the number of flights carrying illegal wildlife that departed from or arrived in the city, recording 428 total flights, while Frankfurt, Germany ranked second with 377, and Hong Kong, China ranked third with 179. However, there were only 61 unique flight routes destined for Amsterdam, compared to 90 unique flight routes destined for Frankfurt. This may suggest that wildlife trafficking into Amsterdam is more concentrated than trafficking into Frankfurt. It is also possible that Frankfurt is both a significant origin and transit point in Germany, leading to the more diverse array of

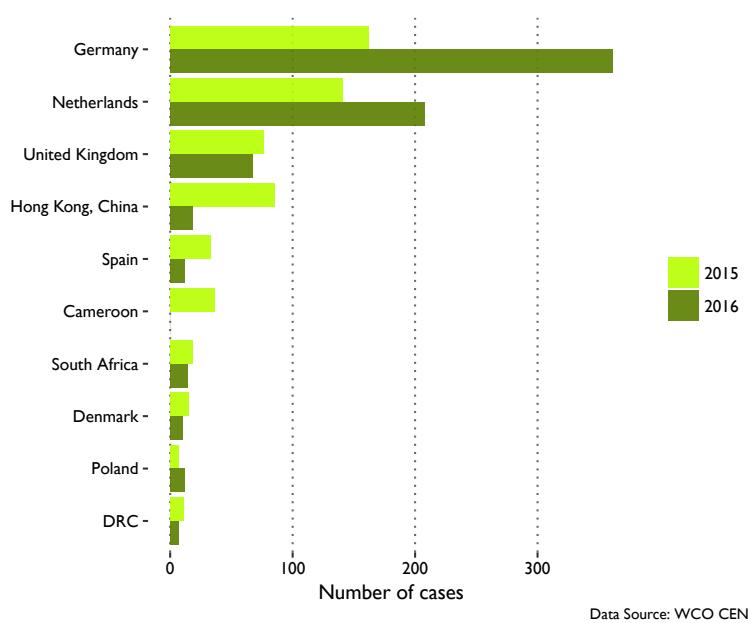


Figure 94. Total case count by country (2015–2016)

airports grew from 141 cases in 2015 to 208 cases in 2016. Poland was the only other country in the top ten to record a growth in cases, increasing from seven in 2015 to 12 in 2016.

The other countries in Figure 94 counted a decline in cases from 2015 to 2016. Hong Kong fell by the largest amount, reporting 85 wildlife cases conveyed by air in 2015 but only 18 in 2016, a decline of nearly 79%. Spain also reported a decline in wildlife cases, submitting 36 cases in 2015 but only 12 in 2016. Finally, Cameroon submitted 36 cases in 2015 but none in 2016, the only country in the top ten to report zero cases in a year.

Figure 95 exhibits the most prominent countries in the CEN database, ranked by trafficking instances (the number of times each country appeared as an origin, transit, or destination point). Each country's trafficking instances are divided by origin, transit, and destination instances. Germany is clearly displayed as the largest destination for wildlife in 2015 and 2016, with 418 instances destined for the country, followed by the Netherlands, which recorded 317 instances. Germany also appeared as a transit point more times than any other country (153 instances). Although the UAE counted fewer total transit instances (115), those instances made up a much larger proportion of the UAE's trafficking instances,

flight routes associated with the city. For example, Frankfurt was the origin for 106 total flights (or 72 unique routes), while Amsterdam was the origin for 60 total flights (or 29 unique routes).

Germany also recorded several domestic flights in the CEN database. Of the 341 unique routes passing through Germany, 28 were domestic, accounting for 47 total domestic flights. The largest domestic flight route was from Frankfurt to Berlin, with eight separate flights.

Figure 94 displays the top ten countries by submitted case count for 2015 and 2016. Germany submitted more than double the number of cases in 2016 (361 cases) than it had the previous year (162 cases). The Netherlands experienced a similar increase; according to data submitted by the country, the number of cases in Dutch

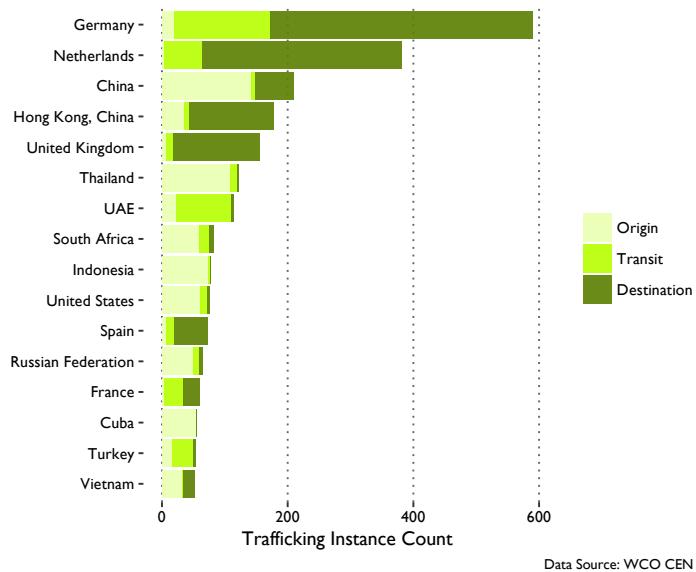


Figure 95. Country-level flight route information for countries with 25 or more trafficking instances in 2017

accounting for 77% of the instances the country reported in 2015 and 2016. This is consistent with the UAE's reputation as a prominent transit hub for wildlife smuggling.

Eight of the top 16 countries shown in Figure 95 did not submit cases to the CEN database in 2015 or 2016: China, Thailand, the UAE, Indonesia, the US, Cuba, Turkey, and Vietnam. Since countries that did submit data to WCO tended to make seizures on import, rather than on export, the majority of trafficking instances associated with these non-reporting countries were origin instances. South Africa and Cameroon were the only primarily origin countries to submit a significant number of cases to the WCO.ⁱ

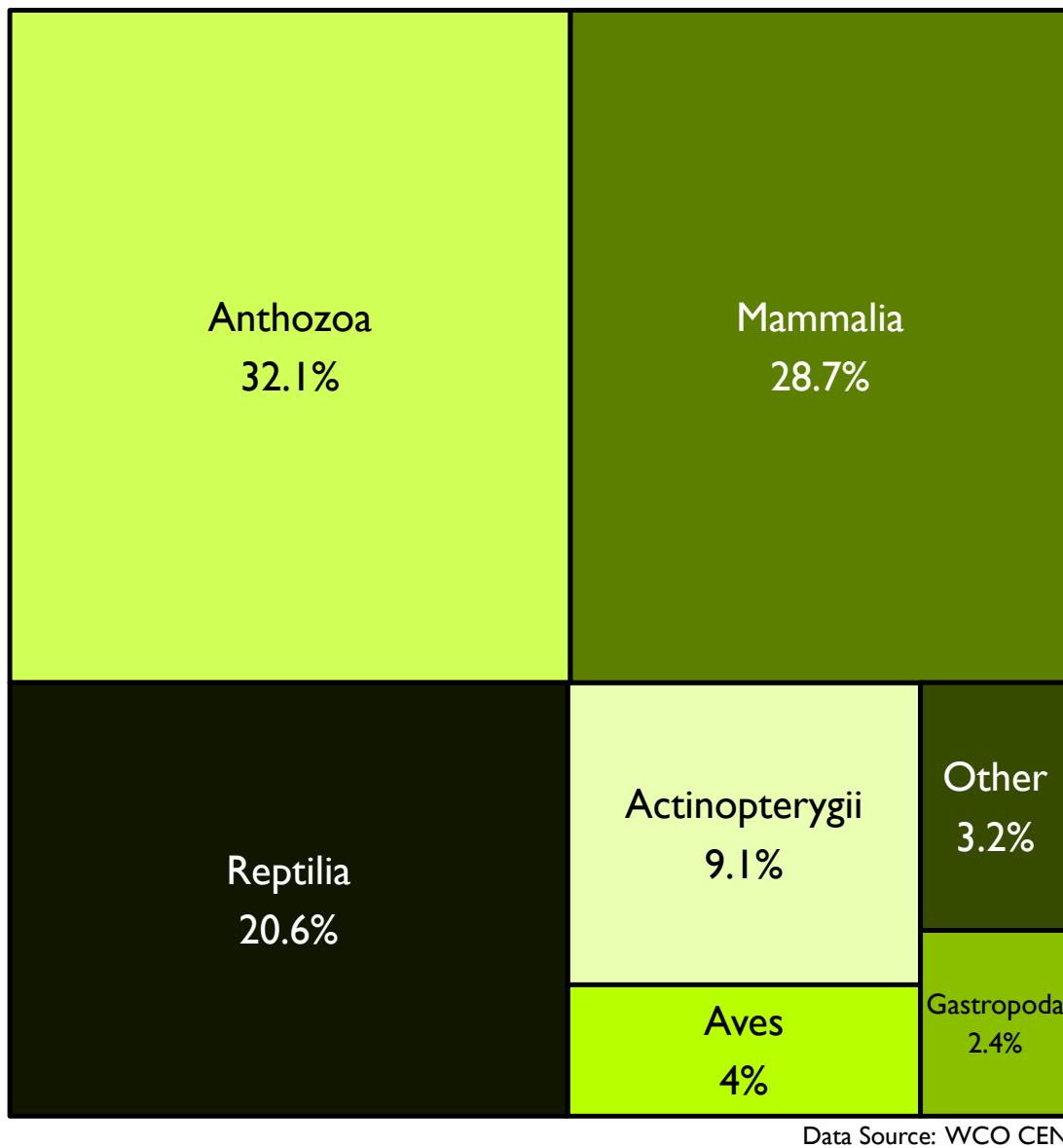


Figure 96. Environment seizures in the air transport industry by class (2015–2016)

The above groups correspond to the following categories in the body of the report: Anthozoa (Marine Products), Mammalia (Mammals), Reptilia (Reptiles), Actinopterygii (Marine Products), Aves (Birds), Other (may correspond to several categories), and Gastropoda (generally not included within the categories).

ⁱ Of South Africa's 82 recorded trafficking instances, 59 originated in the country. Similarly, of Cameroon's 40 recorded instances, 39 originated in Cameroon.

Figure 96 displays the breakdown of wildlife classifications for seizures submitted to the CEN database in 2015 and 2016. Anthozoa, or coral, was seized most frequently (32.1%). Of 488 total anthozoa seizures, 436 were of stony coral. Anthozoa seizures primarily originated in Thailand (78), Indonesia (56), and Cuba (43).

Mammalia seizures accounted for 28.7% of all 2015 and 2016 seizures, totaling 435 seizures. Elephants (and elephant products) were the most frequently seized mammal species, primarily due to the ivory trade: 86% of the 170 elephant seizures were of ivory. Felines (mainly tigers, leopards, and lions) were the next most frequently seized mammal with 58 seizures, followed by musk deer with 48 seizures, and pangolin with 46.

Reptilia (20.6%) ranked third for most commonly seized class in 2015 and 2016 with 313 seizures. Pythons and crocodile accounted for 91 and 90 of the 313 seizures respectively, together making up nearly 58% of reptile seizures.

Actinopterygii—ray-finned fishes like eels, seahorses, and sturgeon—accounted for 9.1% of seizures (138 seizures).

The aves class (birds) recorded 60 seizures (4% of total seizures) of 36 different species of birds. Scarlet macaws and grey parrots were most frequently seized, with seven seizures each.

Finally, gastropoda (queen conch) accounted for 2.4% of total seizures, while the “Other” class (3.2%) encompassed a variety of different species, including sea cucumbers, leeches, clams, butterflies, and scorpions.

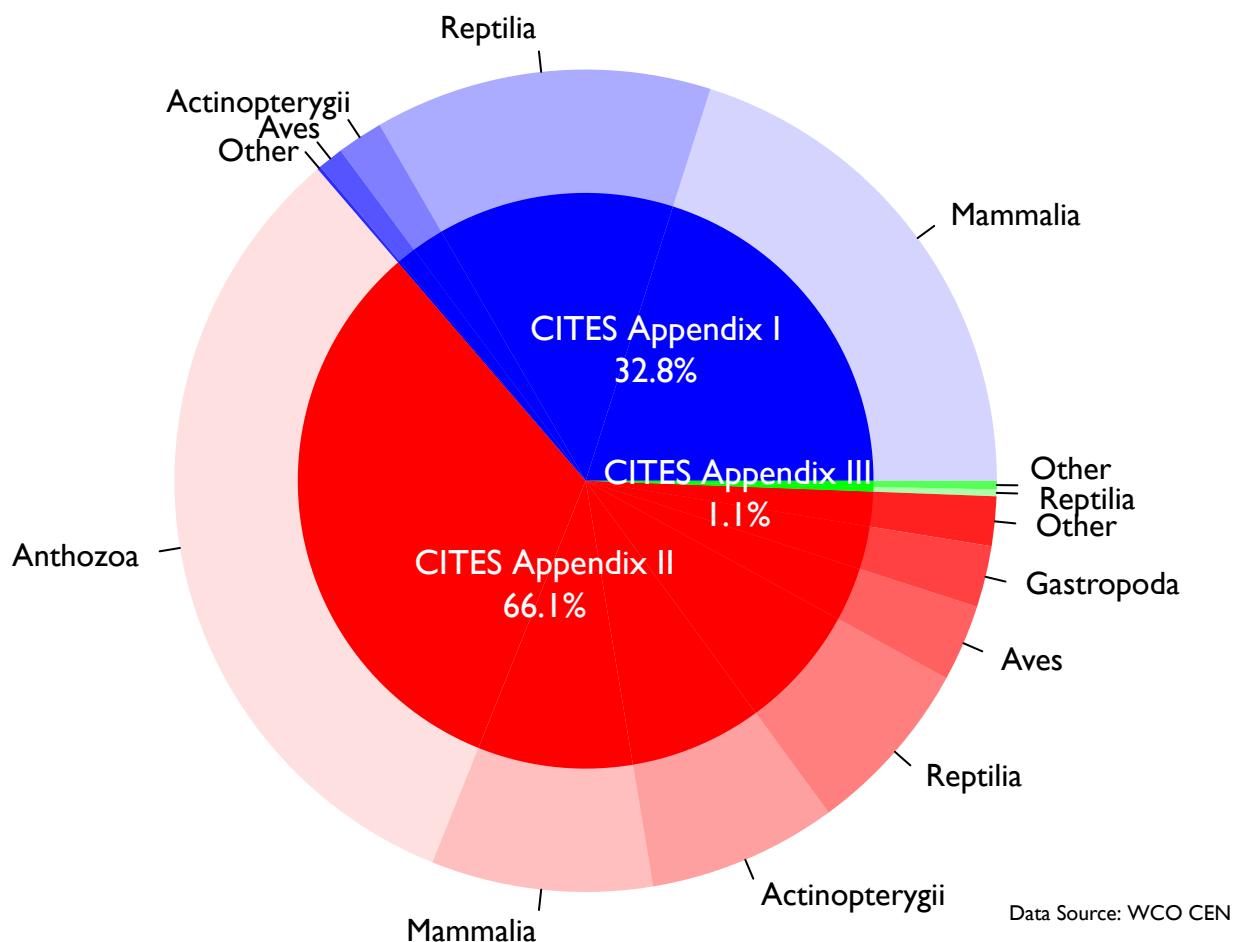


Figure 97. The breakdown of CITES designation by class for seized wildlife in 2015–2016

Figure 97 showcases the percentage breakdown of CITES-listed species that were seized in the air transport sector in 2015 and 2016.ⁱⁱ Seizures of Appendix II-listed species constituted the majority, with 942 of 1,518 total seizures falling in this category. Most of these seizures were of anthozoa, or coral; 487 of the 488 anthozoa seizures in the data involved CITES Appendix II-listed coral species. Without the anthozoa seizures, seizures involving Appendix I-listed animals would take the majority.

Mammalia seizures constituted the majority of CITES Appendix I seizures, counting 300 seizures total. Elephants (including ivory), felines, and musk deer numbered 170, 53, and 48 seizures respectively. The reptilia class followed, with 198 seizures involving Appendix I-listed reptiles. This class is largely made up of pythons, crocodiles, and marine turtles, which together account for 177 (89.4%) of reptilia seizures. Of the 15 aves seizures involving Appendix I species, 12 were seizures of macaws (scarlet, hyacinth, great green, and indigo), two were seizures of falcons (gyrfalcons and barbary falcons), and one was of Caribbean amazons.

ii The CITES Appendices list those species whose international trade is subject to certain restrictions.

- Appendix I: Trade is permitted only in exceptional circumstances
- Appendix II: Trade is controlled
- Appendix III: Trade is controlled in certain countries

Source: CITES. “How CITES works.” www.cites.org/eng/disc/how.php.

Appendix II: FWS LEMIS Seizure Data (2009–2016)

The Law Enforcement Management Information System (LEMIS), managed by the US Fish and Wildlife Service (FWS), tracks the movement of wildlife and wildlife products into and out of the United States. The LEMIS system is used both to track the legal import and export of wildlife, collected through the Declaration for Importation or Exportation of Fish or Wildlife form (Form 3-177), and to collect seizures of illegal wildlife and wildlife products for investigative support.²²⁸ US law enforcement agencies directly submit seizure information to the LEMIS database.

During the data collection phase for *Flying Under the Radar*, C4ADS submitted a Freedom of Information Act (FOIA) request for wildlife seizure data between 2009 and mid-2016. The data we received in response, while detailed, was not sorted by land, air, or sea seizures, and thus could not be included in our analysis. In early 2017, C4ADS submitted a second FOIA request for all wildlife seizures in airports between 2009 and 2016. This section analyzes the LEMIS data we received in response to our second request, and covers the period from January 2009 to December 2016.

C4ADS chose not to incorporate this data within the C4ADS Air Seizure Database in part because of the difficulty in detecting and validating overlap between seizures in both datasets. We were often unable to judge whether a seizure in the LEMIS database was a duplicate of one already recorded without additional information. Without the ability to ensure every seizure is unique, integrating the two databases together would compromise the quality of the data and associated analysis.

In addition to the issue of overlap, the LEMIS database contains far more seizures than the C4ADS Air Seizure Database, which is primarily sourced from CITES reports, government reporting, customs press releases, news media, and other open sources of information. But relying on open source seizure information will inevitably mean that many other seizures—confidential seizures still under investigation, or seizures that were not considered important enough to report—will not be collected. The LEMIS database, in contrast, captures all known seizures of wildlife products on import to or export from the United States, whether or not these seizures receive media attention. Integrating such a comprehensive database of US seizures with the C4ADS Air Seizure Database would lead to an overrepresentation of the United States’ involvement in wildlife trafficking, and would skew any conclusions drawn from the data.

Although the LEMIS data we received contains far more US seizures than the C4ADS Database, some of the information included within the LEMIS dataset lacks detail. For example, trafficking route information is only provided at the city level for the US portion of each route. The international leg of each route (the origin location of imports and the destination location of exports) are only provided at the country level, without city or airport information. The LEMIS seizure data also does not provide the full intended flight routes of recorded seizures, even at the country level. This means that a full transit route analysis through origin, transit, and destination locations is not possible.

We therefore chose to analyze each dataset separately, rather than integrate the LEMIS data into the wider analysis. In this section, the LEMIS seizure data will be used to highlight wildlife trafficking trends through the United States, and to compare those identified trends with trends found through analysis of the C4ADS Air Seizure Database.

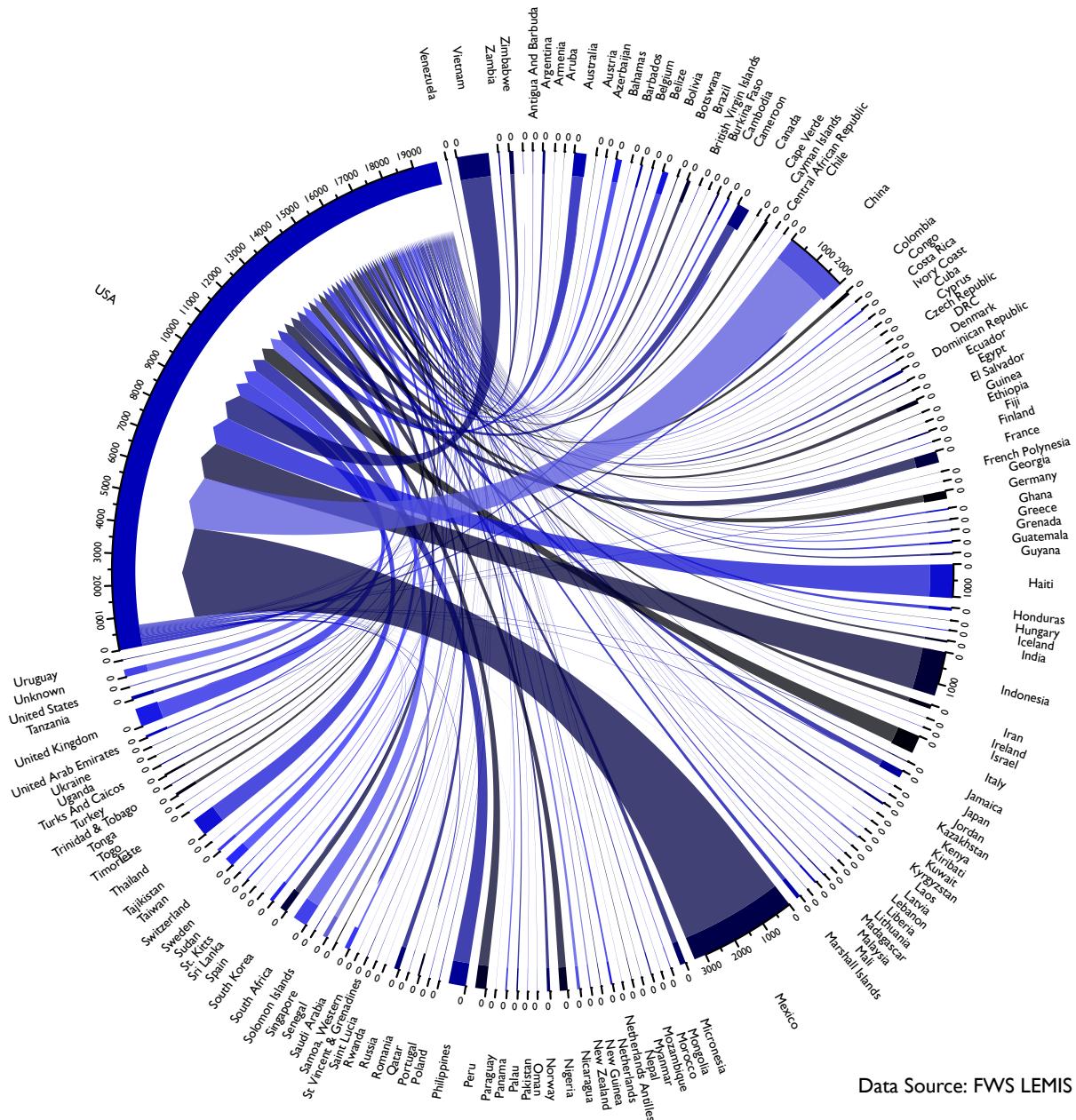


Figure 98. Circle flow map of wildlife movements from origin to destination in the air transport sector (2009–2016)

Only routes that were used more than once are included.

Figure 98 displays the movement of wildlife seizures between origin and destination countries for both import and export seizure data in the LEMIS database from 2009 to 2016. The prevailing trend in Figure 98 is that there are far more seizures made on import into the United States than on export from the US. In total, 19,301 wildlife seizures were made on import while only 777 were made on export between 2009 and 2016, for an average of about seven seizures a day since 2009.

Figure 98 also showcases the diverse origins of wildlife seized in US airports. The LEMIS data contained seizures originating in 186 different countries, while only 65 different countries were recorded as destination points for wildlife seized on export. The much higher number of seizures on import, as well as the diverse

array of identified origin countries for those seizures, points to a large and diverse market for wildlife in the United States, likely driven at least in part by the exotic pet trade.

The majority of seizures on arrival in the LEMIS data were imported for personal purposes (54.8%), followed by commercial purposes (39.2%). The remainder of seizures on arrival were imported as hunting trophies (3.4%), for scientific purposes (2%), and for an assortment of other reasons, including education, circuses, biomedical research, judicial purposes, and zoos (0.6% combined). In contrast, wildlife seized on departure were primarily intended to be exported for primarily commercial purposes (68.3%), followed by personal purposes (28.2%), biomedical research (1.3%), circuses and hunting trophies (0.8% each), and education and scientific purposes (0.5% combined).

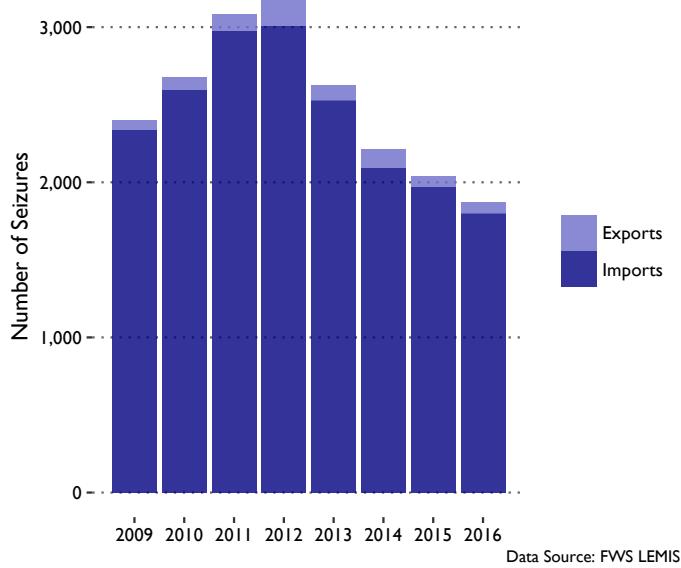


Figure 99. Seizure count by year and direction (2009–2016)

Figure 99 displays the LEMIS seizure data by year, divided by import or export. There was a marked increase in seizures from 2009 to 2012, which recorded a peak of 3,172 seizures. Since 2012, LEMIS data shows a consistent decline in seizures each year, falling to just 1,872 wildlife seizures in 2016, a 41% drop over a five-year period. The rate of decline was greater for exports than for imports; seizures made during export fell by 57% while seizures made on import fell 40% between 2012 and 2016.

This growth and decline trend seems to mirror some of the patterns seen in the C4ADS Air Seizure Database, which focuses far less on seizures made in the US. For instance, bird seizures in the C4ADS Database increased steadily from 2009 to a peak in 2012, followed by a drop the next year (see Figure 48). The trend was most apparent, however, in the ivory

data in the C4ADS Database, which contained a similar peak in seizure numbers in 2013, followed by a fairly consistent decline (see Figure 13). The existence of this trend both in the US-centric LEMIS data, as well as in the more global C4ADS Database, suggests that the cause of this pattern is not limited to just one country, but is instead reflective of an international change in wildlife trafficking.

Imports

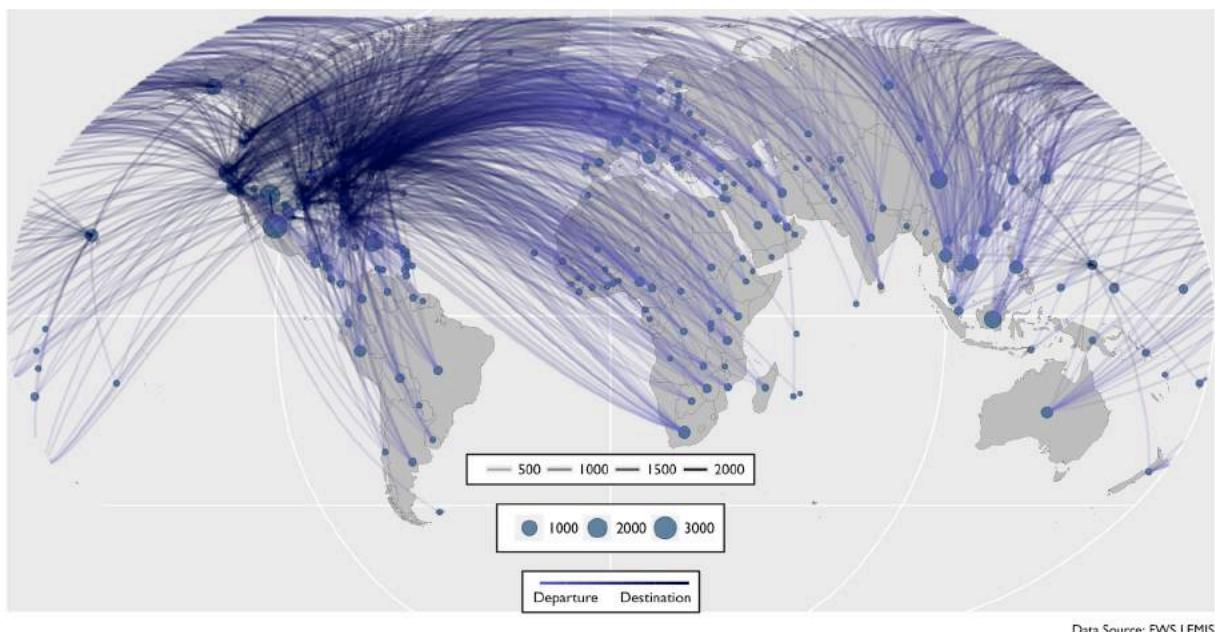


Figure 100. Air trafficking routes for wildlife products seized on import in the United States from 2009 to 2016

Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city or country. The opacity of the lines represents the number of seizures which occurred along that route. For non-US locations, the circle at the center of the country is used to express the number of flights from that country.

Figure 100 displays the flight routes taken by wildlife trafficking instances seized on import into the United States between 2009 and 2016. The origins of the instances were widely dispersed, with 1,258 unique routes originating in 186 different countries. The wildlife instances in Figure 100 were seized in 59 different American airports. The most prominent destination cities for imported wildlife were Miami, Florida (2,490 seizures); El Paso, Texas (2,268); and San Francisco, California (1,891).

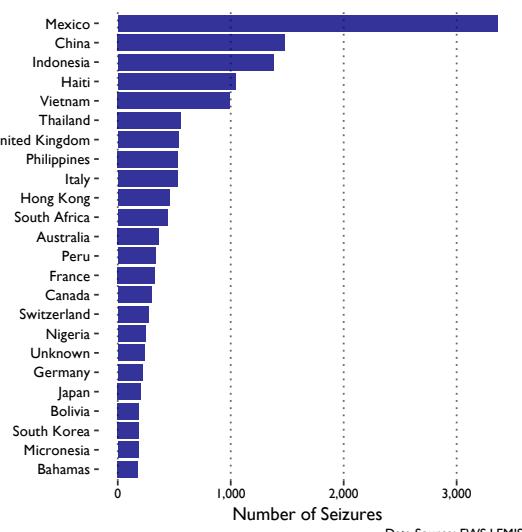


Figure 101. Total seizure count of imported wildlife by origin country (2009–2016)

The most prominent route shown in Figure 100 was from Mexico to El Paso, Texas (2,258 seizures). Rattlesnakes (meat and oil) were frequently trafficked along this route, accounting for nearly 28% of seizures made in El Paso on arrival from Mexico. The next most frequently utilized route displayed in Figure 100 was from Haiti to Miami, Florida (995 seizures). Most of the seizures along this route (95.6%) involved conch meat. The third most significant route by seizure count was from China to San Francisco, California (573 seizures). Most of the seizures made along this route (69.3%) involved the importation of “medical part or product,” suggesting the contents of these seizures were destined for use in traditional Chinese medicine.

Figure 101 displays seizures made on import by origin country. Only countries with 150 or more origin

instances were included. As seen in the routes map, Mexico was the largest origin country for wildlife seized on arrival in the US, with 3,361 seizures (67.2% of the seizures originating in Mexico were seized in El Paso, Texas). China (not including Hong Kong) was the next largest origin, although it had fewer than half the number of seizures originating in Mexico (1,479).

Five of the top nine countries by seizure count in Figure 101 were in Asia. Seizures that originated in Asian countries accounted for 33.2% of all seizures with known origin countries in the LEMIS dataset. Slightly more seizures originated in North and South America (35.7%), while Europe ranked third after Asia with 13.7%, followed by Africa, Oceania, and the Middle East with 8%, 5.1%, and 2.2% respectively. Seizures with unknown origins accounted for the remaining 2.1%.

Two of the other countries in the top nine by seizure count neighbor the United States: Mexico and Haiti. Meat imports play a major role in the prominence of both countries, with significant amounts of rattlesnake meat and conch meat arriving in the US from Mexico and Haiti respectively. These imports are likely destined for the large populations of Mexican and Haitian expats living in the US; shipments from Mexico and Haiti in the LEMIS dataset were primarily for “personal” use, accounting for 88.2% and 91.7% of seizures made on arrival from those countries respectively.

Figure 102 depicts the wildlife seized most frequently in the United States on arrival. The graph only contains wildlife or wildlife products seized more than 200 times. Coral is revealed as the most commonly seized product with 2,097 seizures, primarily on arrival from Indonesia, which accounts for just over 49% of all coral seizures in the LEMIS data.

Of the 20 products in Figure 102, eight are marine products. Reptiles and reptile products follow, accounting for seven of the top 20 products seized.

Elephant products (including ivory), while trafficked substantially internationally, were seized only 687 times on import into the US, behind coral, conch, crocodile, python, and deer products. Ivory made up around 69% of elephant seizures, while the other 31% was made up of elephant bone, meat, leather, and other products. Surprisingly, the top origin countries for elephant products seized in the United States were Mexico and the United Kingdom, with 85 and 64 seizures respectively. Their significance could be because of the worked ivory trade (although Mexico does not have a well-known market for ivory of any type), or because both countries acted as common transit or re-export points for ivory originating elsewhere. More expected origin countries for elephant products followed: Zimbabwe (57), Nigeria (56), and South Africa (54).

Appearing after marine products, mammals, and reptiles, the most frequently seized bird species was ostrich (238 seizures). While not visible in Figure 102, pangolin and rhinoceros trafficking instances were seized 96 and 32 times respectively.

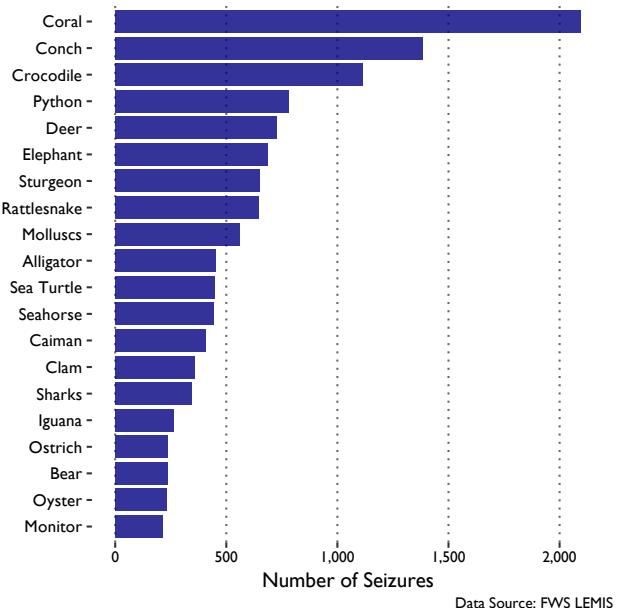
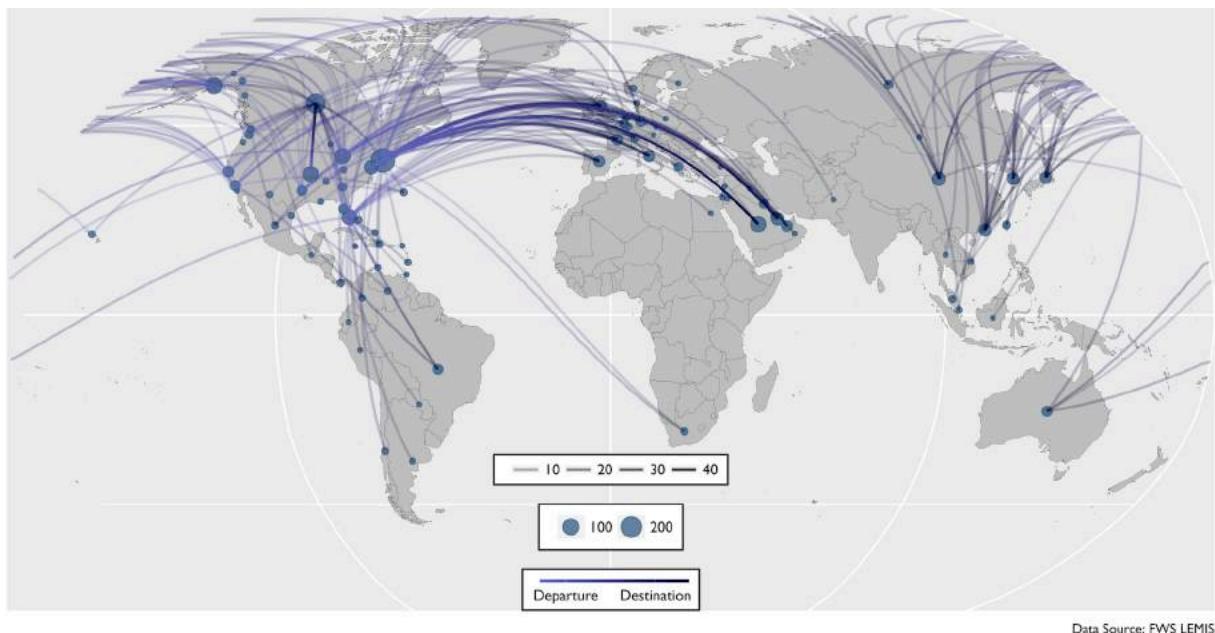


Figure 102. The total seizure count by generic name of products seized on import into the United States (2009–2016)

Exports



Data Source: FWS LEMIS

Figure 103. Air trafficking routes for wildlife products seized on export from the United States (2009–2016)

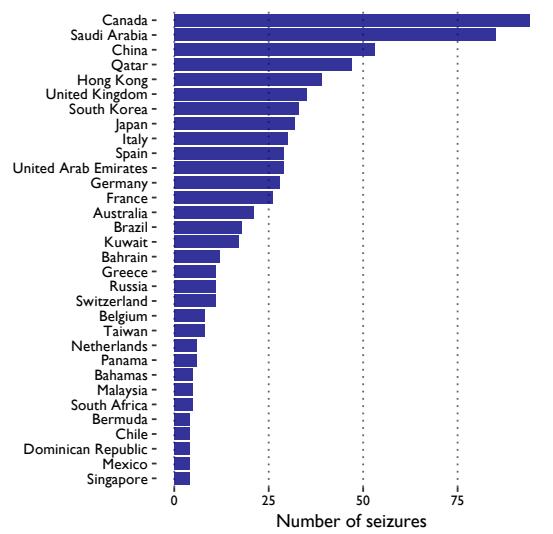
Circle size indicates the number of flights carrying illicit wildlife that departed from or arrived in a particular city or country. The opacity of the lines represents the number of seizures which occurred along that route. For non-US locations, the circle at the center of the country is used to express the number of flights to that country.

Figure 103 displays the intended flight routes for wildlife seized on export out of the United States between 2009 and 2016. The LEMIS export routes map depicts far fewer routes than that of imports, with only 174 unique export routes compared to 1,258 unique routes for imports. The most common origin points in Figure 103 are New York, New York (277 seizures), followed by Anchorage, Alaska (102), Miami, Florida and Chicago, Illinois (81 each). Canada was the most frequently listed destination for illicit wildlife shipments leaving the United States, with 94 seizures in the LEMIS data destined for Canada.

The most commonly used export flight route was Washington, DC to Saudi Arabia (49 seizures). The second and third most commonly used flight routes both involved New York and the Middle East: New York to Qatar and New York to Saudi Arabia (35 seizures).

Figure 104 shows the number of seizures made on export by destination country. Europe features most prominently, with 207 seizures (26.6%) made on export destined for European countries. Of the common European destinations, the United Kingdom ranked highest by seizure count (35 seizures), followed by Italy (30 seizures), and Spain (29 seizures).

Middle Eastern countries made up the second most seizures, with 198 total seizures (25.5%) destined for



Data Source: FWS LEMIS

Figure 104. The total seizure count of exported wildlife by destination country (2009–2016)

the region. Saudi Arabia was by far the largest destination within the Middle East (85 seizures), followed by Qatar (47), and the UAE (29).

Asia ranked third, with 181 seizures (23.3% of export seizures). Four of the top eight countries by seizure count—China, Hong Kong, South Korea, and Japan—account for 157 total seizures, equivalent to 86.7% of all seizures destined for Asia.

Figure 105 displays the top wildlife and wildlife products seized on export. The graph only contains wildlife seized 10 or more times. The wildlife and wildlife products seized on export were far less diverse than wildlife seized on import; 145 different types of wildlife products were seized on export compared to 616 for import. Alligators were the most frequently seized wildlife product on export from the United States, recording 90 seizures.

The second species or wildlife product seized most on export were pythons. Pythons are not native to the United States, but have been brought into the United States and released into the wild by reptile collectors, breeders, and owners, and are now thriving in Florida's tropical wetlands. As a result, the population of non-native snakes in the wild in Florida is now estimated to be between 30,000 and 100,000.²²⁹ Of all seized python exports, 59% were destined for the Middle East, with Qatar ranking as the top Middle Eastern country with 14 seizures.

Elephant products ranked third in Figure 105, with 41 seizures made on export between 2009 and 2016, all of which contained ivory. China and Hong Kong were the intended destinations for nearly 44% of ivory seizures leaving the United States. Ivory seizures on export have been decreasing over time; although a high of 13 ivory seizures were made in 2014, that number has fallen dramatically, with only one elephant seizure made on export in 2016.

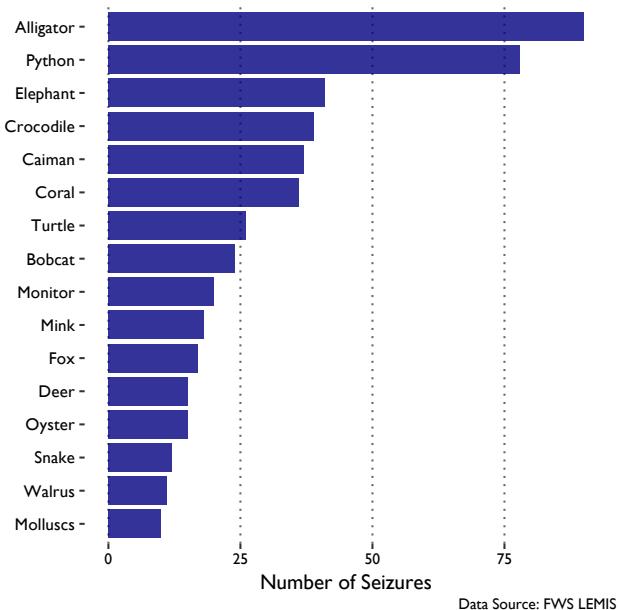
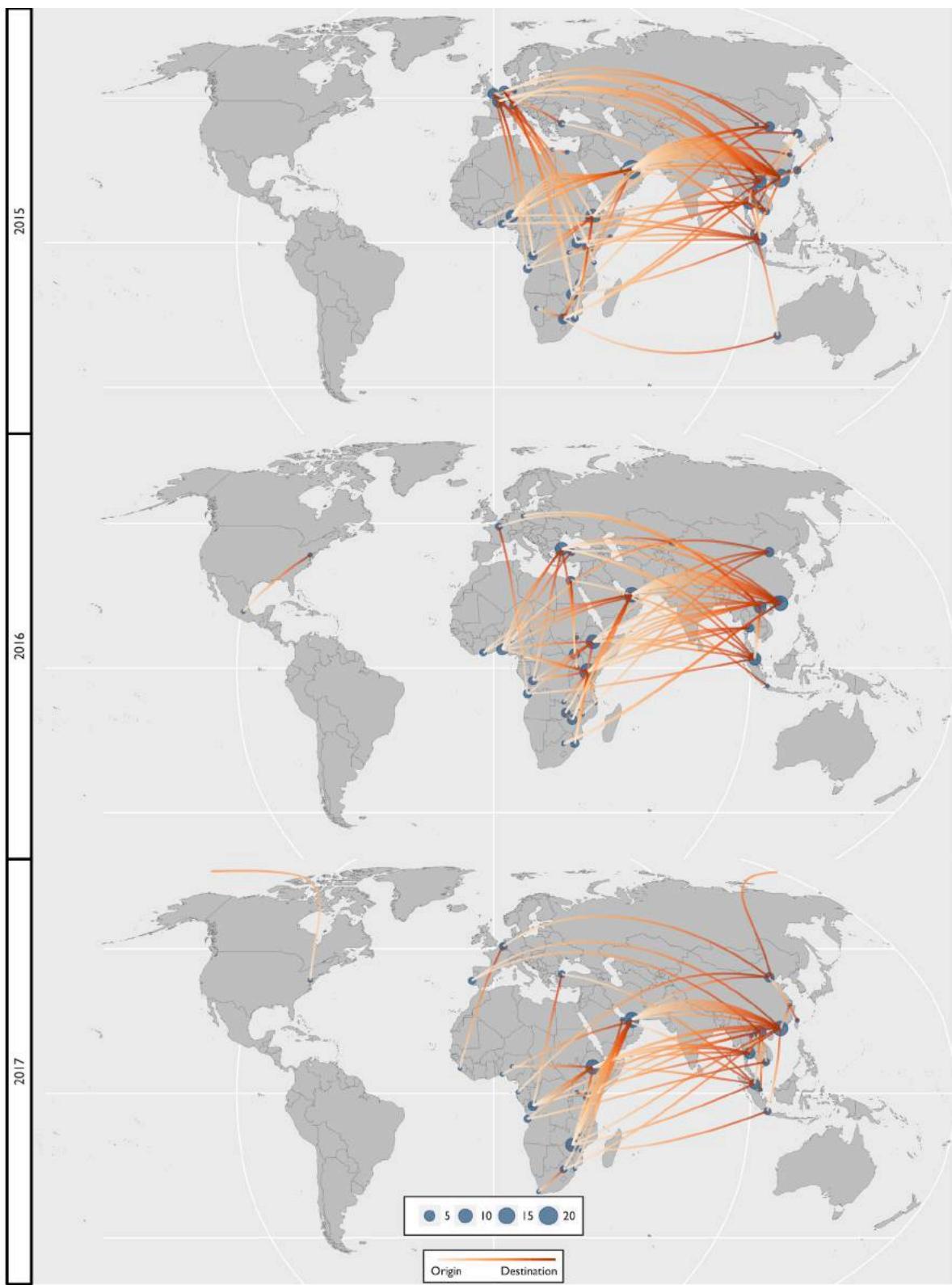


Figure 105. The total seizure count by generic name of products seized on export from the United States (2009–2016)

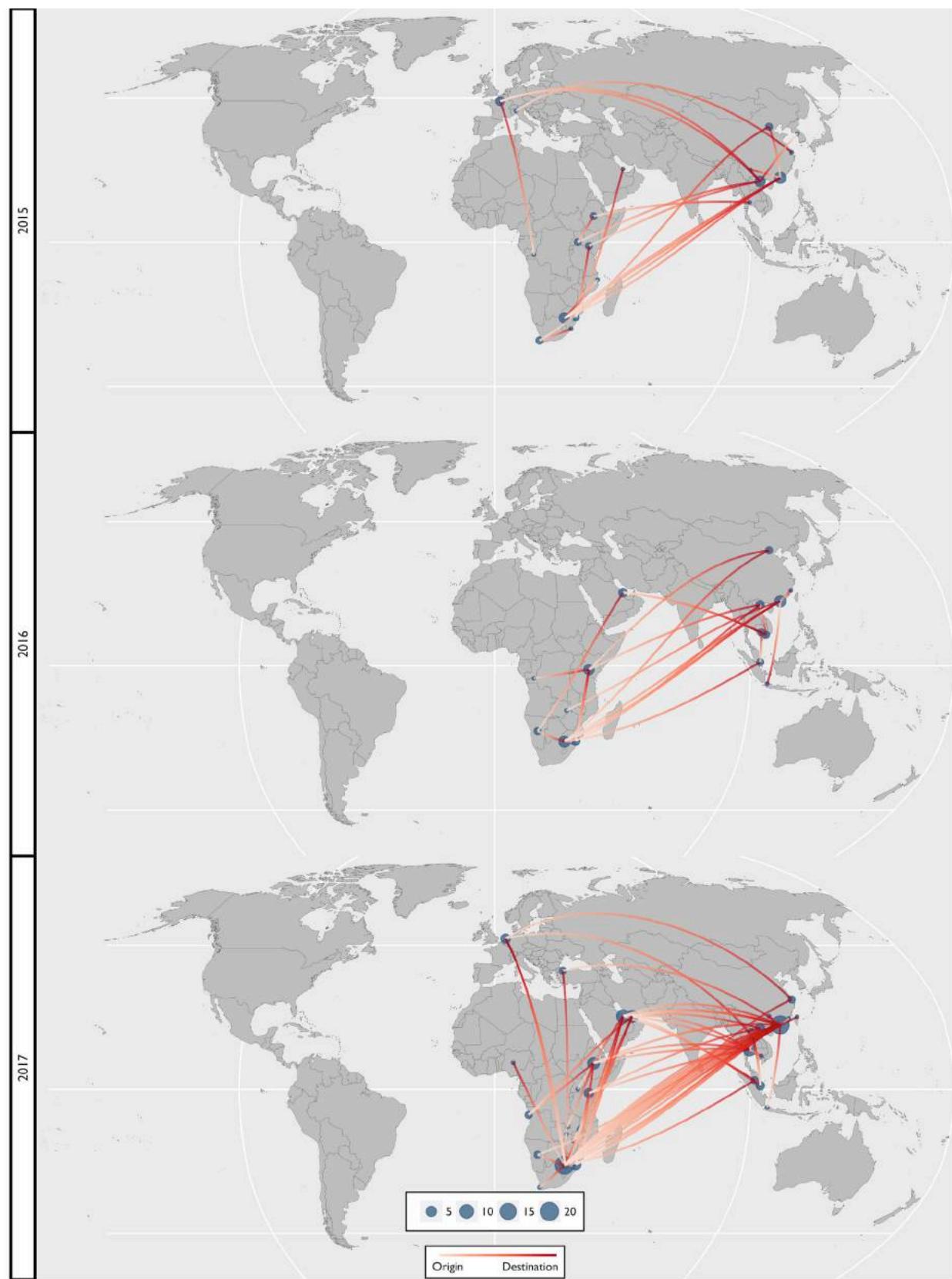
Appendix III: Routes Maps (2015–2017)

Ivory



Ivory trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

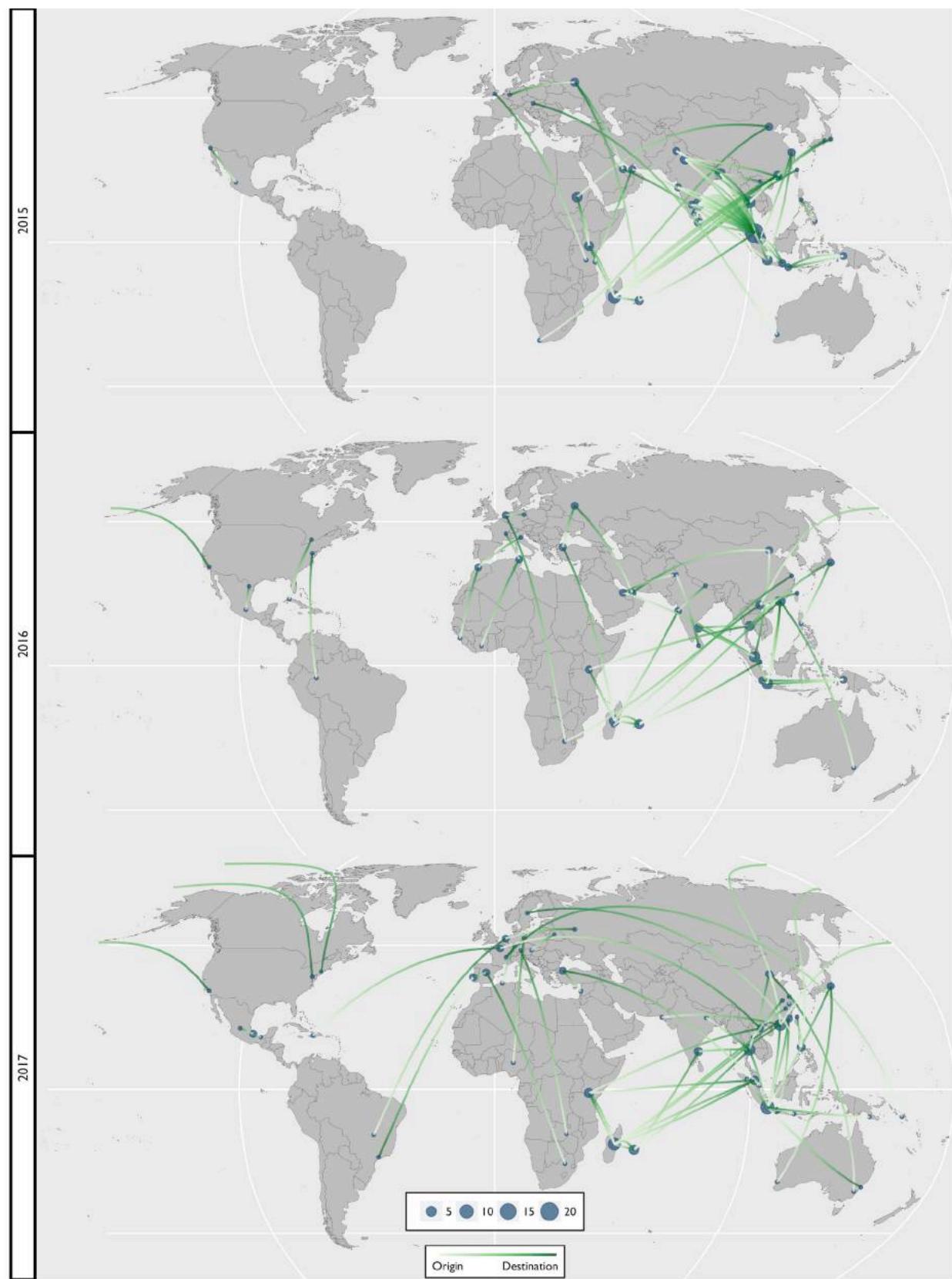
Rhino Horn



Rhino horn trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

In Plane Sight

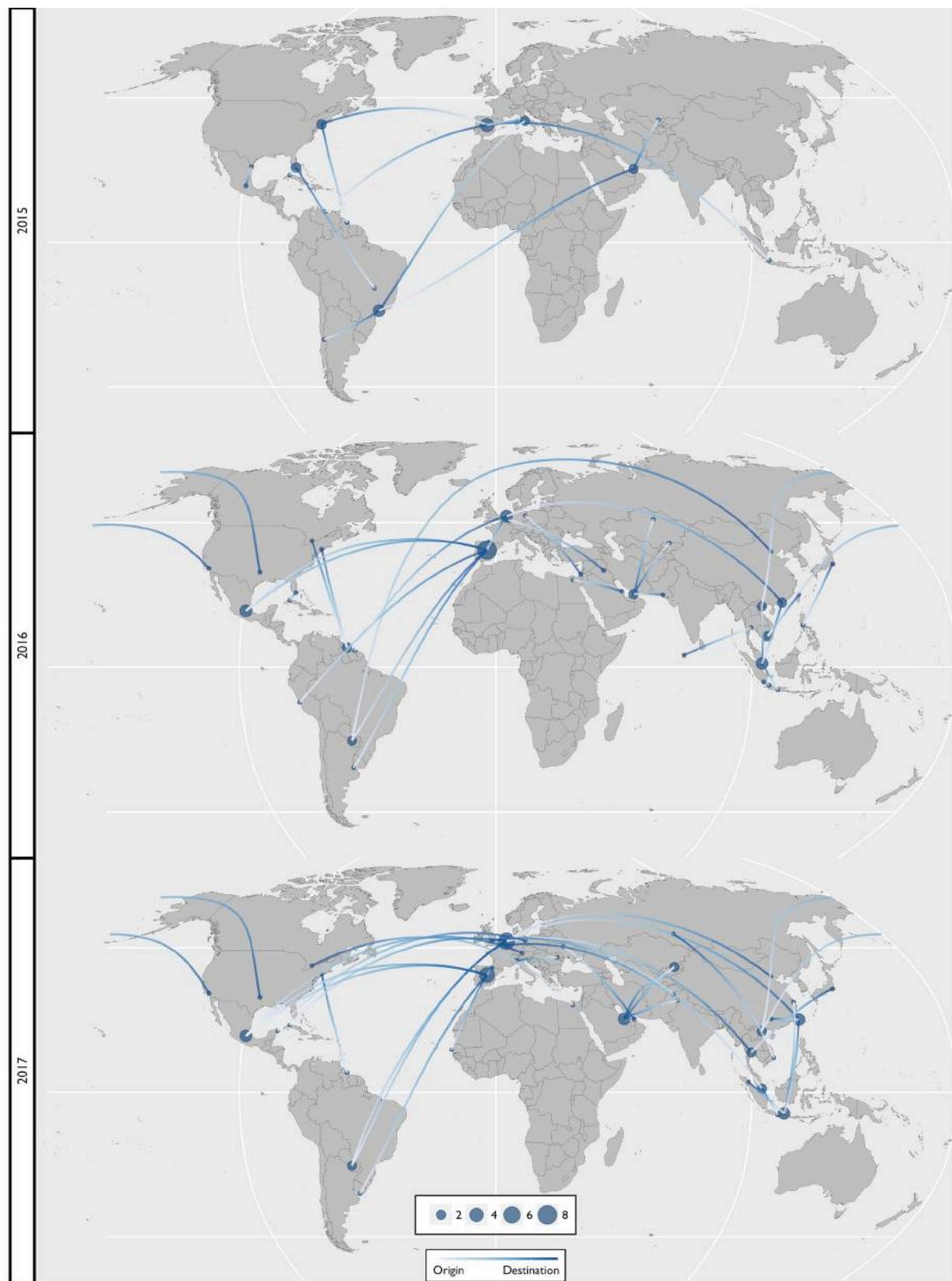
Reptiles



Reptile trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

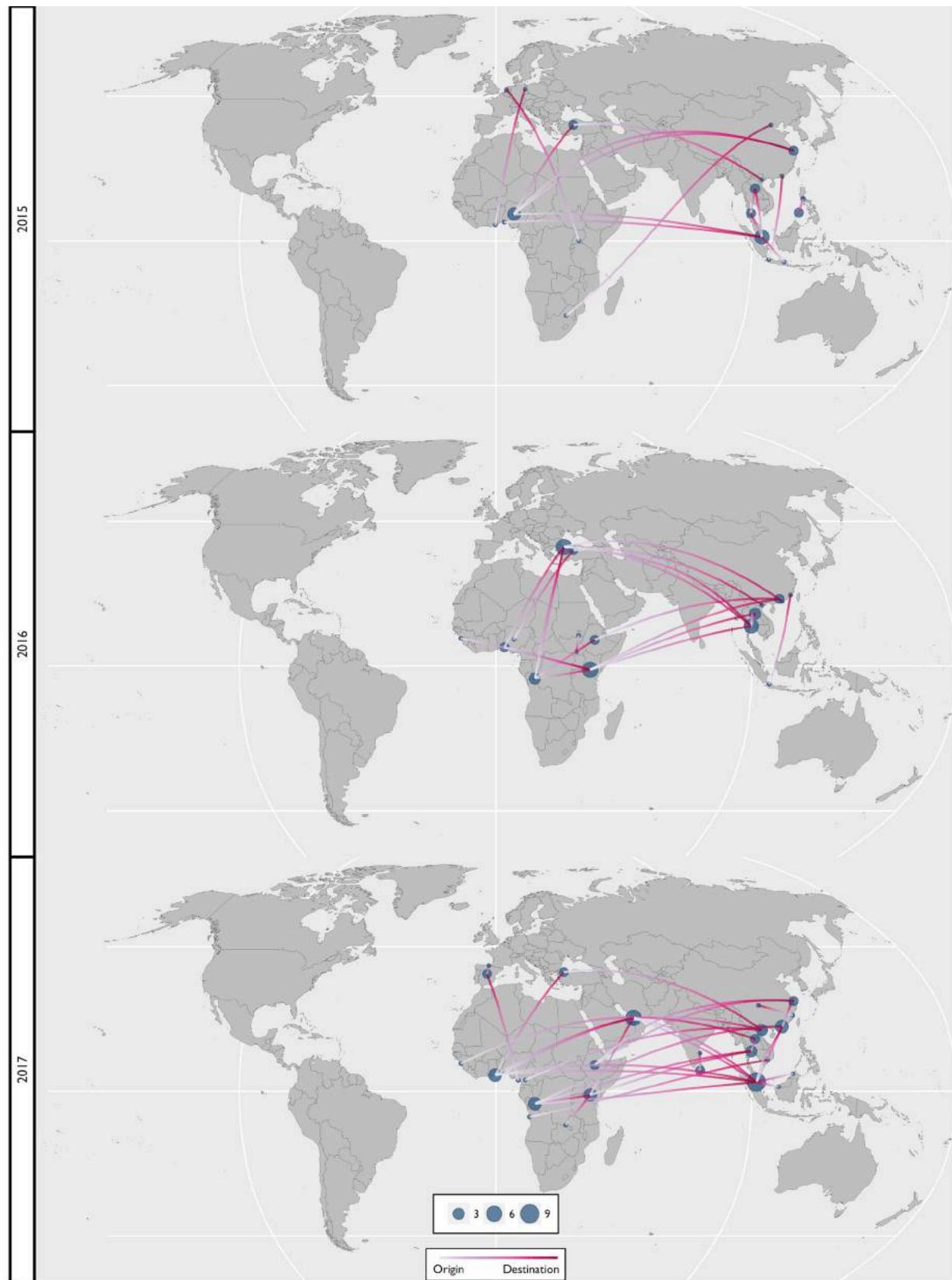
In Plane Sight

Birds



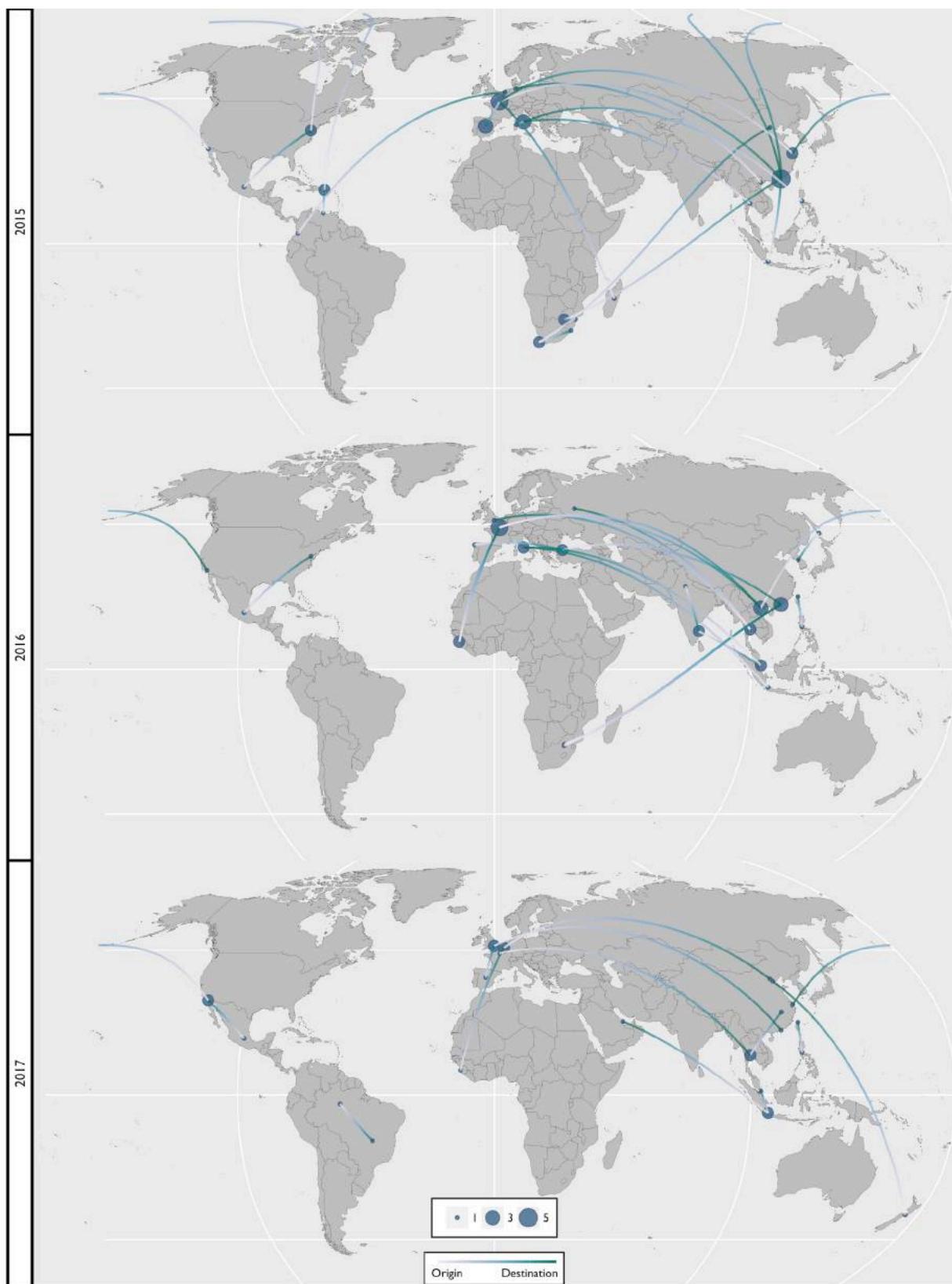
Bird trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

Pangolins



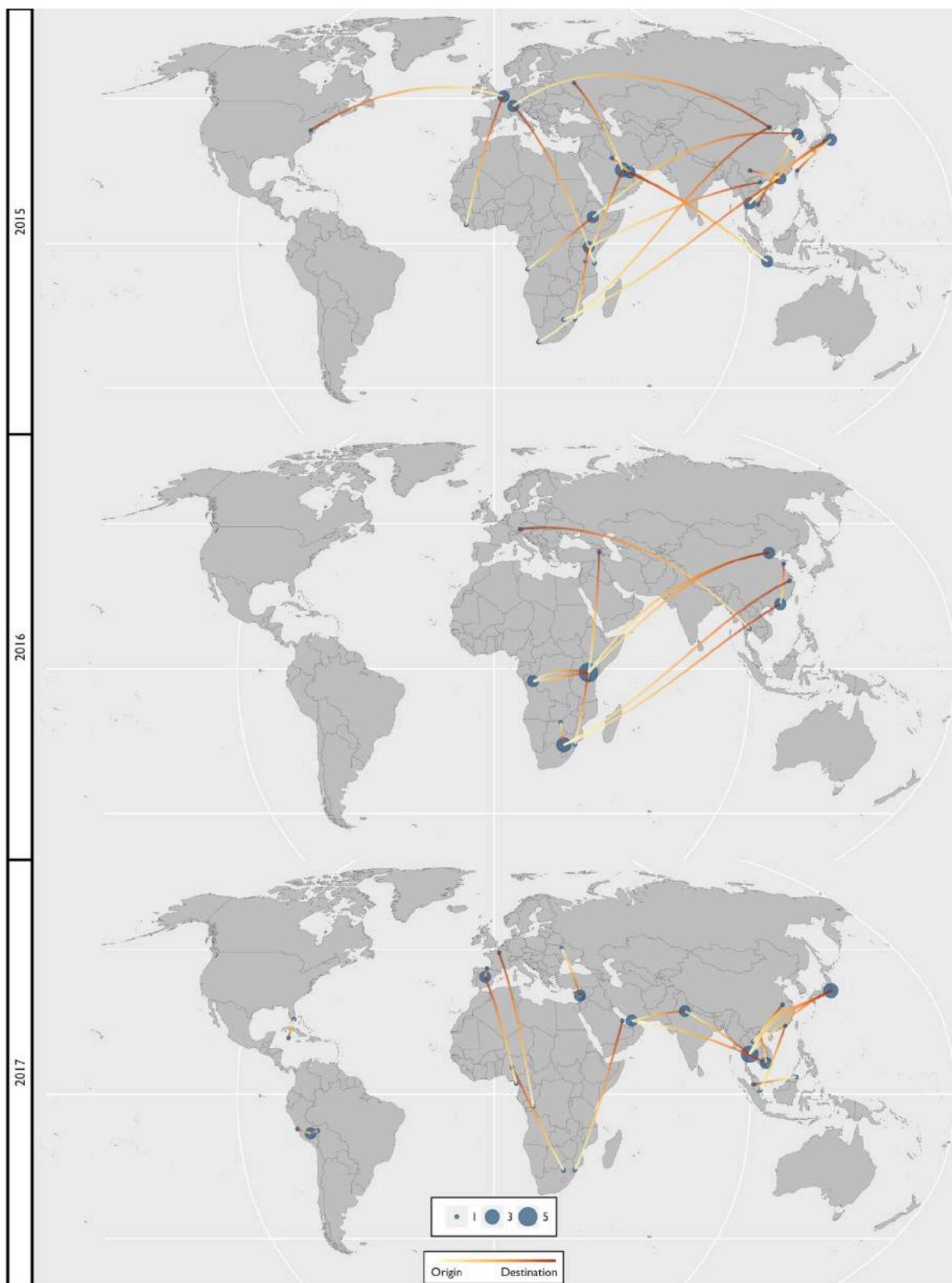
Pangolin trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

Marine Products



Marine product trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

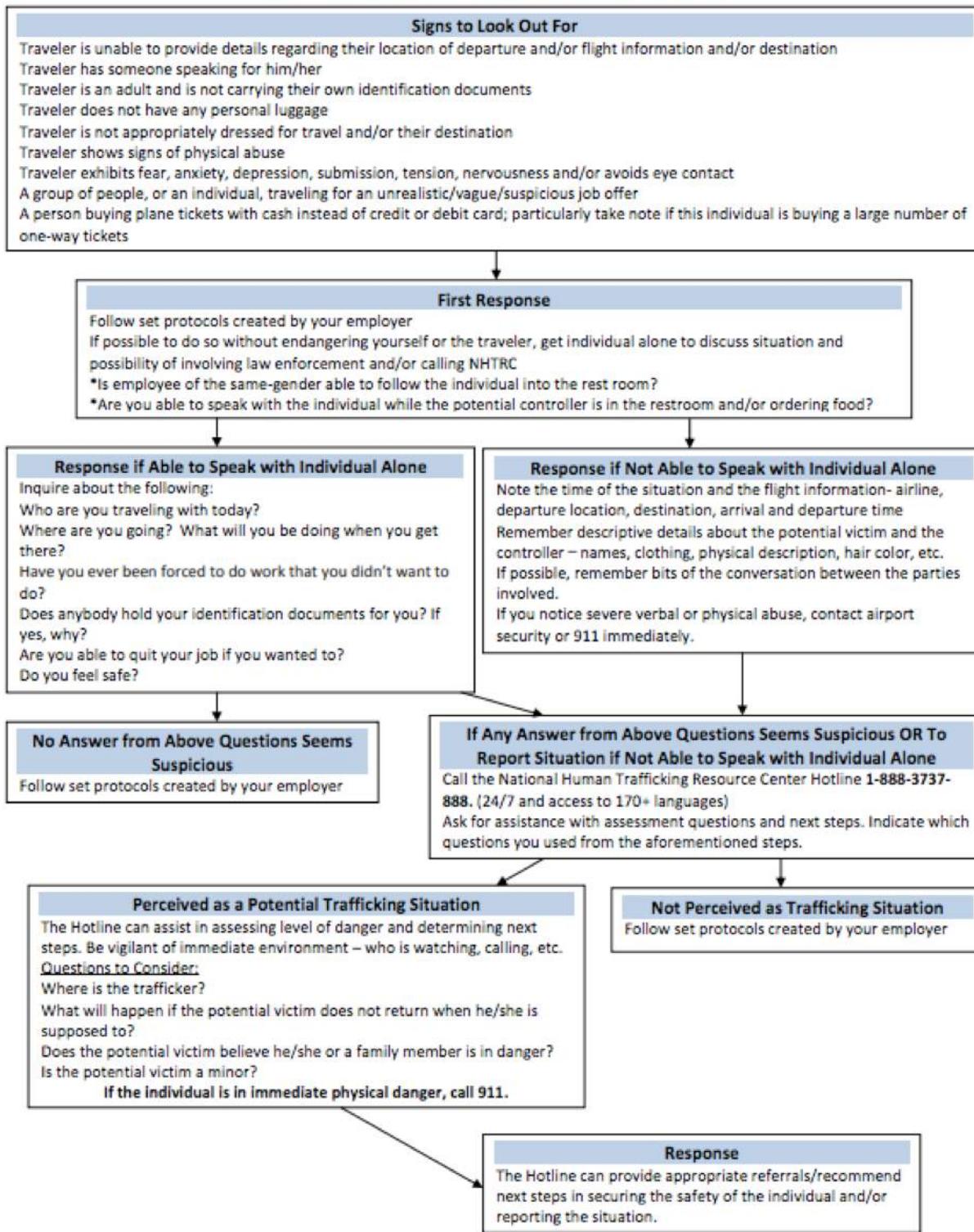
Mammals



Mammal trafficking routes by air recorded in the C4ADS Air Seizure Database (2015–2017)

Appendix IV: Human Trafficking Assessment Tool for Airlines & Airportsⁱ

Human Trafficking Assessment Tool for Airlines & Airports



ⁱ "Human Trafficking Assessment Tool for Airlines & Airports." Human Trafficking Hotline. <https://humantraffickinghotline.org/sites/default/files/Assessment%20Tool%20-%20Airlines%20%26%20Airports.pdf>.

Appendix V: Seizure Reporting Template

In an attempt to reduce the amount of time and effort needed to track seizures, C4ADS designed the below template as a simplistic framework for seizure reporting. A more detailed seizure reporting template is included in WCO's Customs Enforcement Network (CEN) platform.ⁱ

Case Number:			Seizure Date:		
Suspect 1: Name:	Sex:	Age:	Nationality:	Passport:	Repeat Offender: Y/N
Suspect 2: Name:	Sex:	Age:	Nationality:	Passport:	Repeat Offender: Y/N
Contraband Seized 1:			Weight/Number:		
Contraband Seized 2:			Weight/Number:		
Airline:			Flight No.:		
Origin:		Transit Location(s):		Destination:	
Transport Method: (Check one)	Air Freight	Luggage	Passenger Carry-on	Passenger Clothes	Other
Number of Suitcases or Freight Parcels:					
Obfuscation Method / Cover Load (e.g. tin foil, garlic):					
Manner of Detection (e.g. intelligence, risk profiling, X-ray revealed suspicious object):					
Suspect(s) History:					
Additional Details:					
Evidence Held By:			Report Written By (Printed Name, Sign, Date):		

ⁱ For more information on CEN, see www.wcoomd.org/en/topics/enforcement-and-compliance/instruments-and-tools/cen-suite/cen.aspx. For the CITES seizure reporting template, see <https://cites.org/sites/default/files/notif/E-Notif2016-007.pdf>.

Appendix VI: R Packages

The following R packages were used in the creation of this report:

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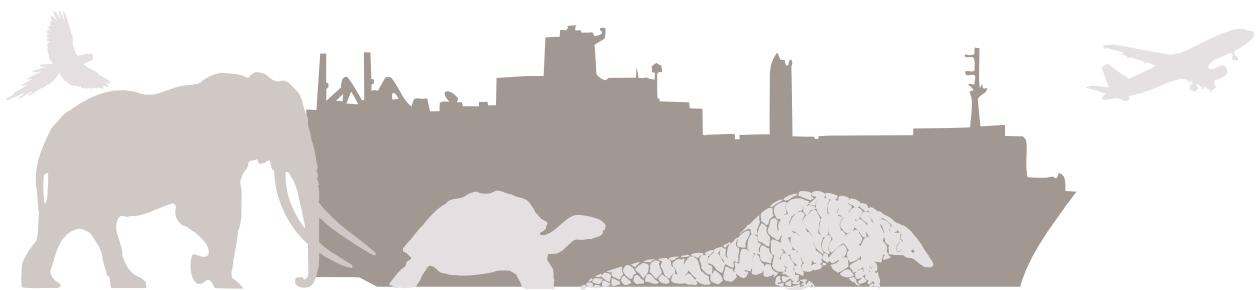
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The USAID Reducing Opportunities for Unlawful Transport of Endangered Species (ROUTES) Partnership brings together transport and logistics companies, government agencies, development groups, law enforcement, conservation organizations, academia and donors to disrupt wildlife trafficking activities, and forms a key element of the concerted international response to addressing wildlife poaching and associated criminal activities worldwide.

The goal of the ROUTES Partnership is to disrupt wildlife trafficking by reducing the use of legal transportation supply chains, and operates under five objectives; (1) Improve the data and analytics on wildlife trafficking within passenger and cargo supply chains for evidence-based, focused action; (2) engage corporate leadership to collaborate to combat wildlife trafficking; (3) improve the ability of transportation personnel to assist law enforcement to combat wildlife trafficking; (4) integrate wildlife trafficking into relevant industry standards and protocols; and (5) increase passenger and client awareness of wildlife trafficking issues.

For more information on the ROUTES Partnership visit www.routespartnership.org.



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