

SEPTEMBER 2016

# OBSERVATIONS OF THE ILLEGAL PANGOLIN TRADE IN LAO PDR

*Lalita Gomez, Boyd T.C. Leupen and Sarah Heinrich*





## TRAFFIC REPORT

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Published by TRAFFIC.  
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ISBN no: 978-983-3393-54-1  
UK Registered Charity No. 1076722.

Suggested citation: Gomez, L., Leupen, B T.C., Heinrich, S. (2016). *Observations of the illegal pangolin trade in Lao PDR*. TRAFFIC, Southeast Asia Regional Office, Petaling Jaya, Selangor, Malaysia.

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**Sunda Pangolin**



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## ABBREVIATIONS AND ACRONYMS

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNY	Chinese Yuan
EIA	Environmental Investigation Agency
IUCN	International Union for Conservation of Nature
LAK	Lao Kip
Lao PDR	Lao People's Democratic Republic
NGO	Non-Governmental Organization
SEZ	Special Economic Zone
TCM	Traditional Chinese Medicine
USD	US Dollar

## ACKNOWLEDGEMENTS

The authors would like to thank their TRAFFIC colleagues in Southeast Asia, especially Or Oi Ching, Kanitha Krishnasamy, Elizabeth John and Jamie Bouhuys for their valuable participation in this study's market surveys, and Xiao Yu for his contribution of seizure data. From the University of Adelaide (UoA), many thanks are due to Talia A. Wittmann for providing us with useful comments and help with the seizure analysis and Thomas A. A. Prowse for helping with the development of the trafficking network structure. Chris R. Shepherd (TRAFFIC) is thanked for his support and invaluable feedback throughout the writing process. We also thank, Mary Rowen (USAID), Phillip Cassey (UoA) and our TRAFFIC colleagues Nick Ahlers, James Compton, Xiao Yu and Xu Ling for kindly reviewing this report.

Particular thanks are given to the United States Agency for International Development for providing the resources to complete this assessment as part of the global Wildlife Trafficking, Response, Assessment and Priority Setting (Wildlife-TRAPS) Project. Australia Zoo and Australia Zoo Wildlife Warriors are also thanked for generously funding and supporting our work in the SEA region.

# EXECUTIVE SUMMARY

Pangolins are the most heavily trafficked mammal in the world. All eight extant pangolin species are currently listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), prohibiting any uncertified international trade. In addition, a zero quota for CITES exports of all four Asian species was established in 2000. Despite these measures, pangolins continue to be threatened by increasing levels of illegal wildlife trade.

Lao People's Democratic Republic (Lao PDR) is known to play an important role in the international wildlife trade and is a range country for two pangolin species, Sunda Pangolin *Manis javanica*, and Chinese Pangolin *M. pentadactyla*. Its wildlife laws currently fail to protect non-native pangolin species and do not meet the requirements for the effective implementation of CITES. In addition to having weak legislation, Lao PDR is strategically located next to China, Myanmar, Thailand and Viet Nam and forms an important transit hub for these countries, which all have an active wildlife trade profile for aspects of supply, transit and end-use demand.

This report explores Lao PDR's role in the illegal pangolin trade and discusses the findings of two market surveys, conducted in several locations as well as the outcomes of an analysis of pangolin seizures that involved Lao PDR as either an origin, transit, seizure or destination country between 2010 and 2015.

Opportunistic market surveys were conducted between April 2016 and July 2016 within seven cities in the northern regions of Lao PDR. An estimated total of 2734 pangolin scales were found in 13 shops at these different locations. The largest quantity of scales was observed in Luang Prabang, with an estimated 1200 scales found in two shops. Prices for pangolin scales ranged from USD1/ (small) piece to USD1/gram, with large scales sometimes weighing as much as 20 grams. Lao PDR's pangolin trade appeared to be mainly focused on a Chinese clientele in the areas surveyed. Shop owners and employees were predominantly of Chinese ethnicity and prices were often given in Chinese Yuan (CNY). In Luang Prabang and Vientiane, pangolin products were mostly found in popular tourist spots, alongside other illegal wildlife products such as elephant ivory and rhino horn.

Forty-three reported pangolin seizures involving Lao PDR were recorded between 2010 and 2015, involving an estimated 5678 pangolins. Most of these seizures involved shipments being smuggled into the country from Thailand and out to China and/or Viet Nam. In five incidents shipments were confirmed to originate from Africa, confirming the increasing occurrence of African-sourced pangolin trade which complements and substitutes supply from the four declining Asian species.

The large discrepancy between observed local trade and the seizure records confirms Lao PDR's role as a transit country in the international pangolin trade. Improved control of Lao PDR's pangolin trade will be an essential step in reducing the global pangolin trade. In order to achieve this, TRAFFIC recommends the following:

## CITES and national legislation

- Proposals to list all eight pangolin species in Appendix I of CITES should be supported at CoP17 (i.e. Proposals 8 and 12) as this places an overall higher degree of international protection, and will enhance efforts to safeguard pangolins and support regulatory control mechanisms by non-range States.
- National legislation requires urgent improvement to enable effective law enforcement, which is currently ineffectual due to weaknesses in the law that prevent arrests, prosecutions and convictions. Currently considered a Category 3 country by the CITES National Legislation



- Project, meaning that its *"legislation (...) is believed generally not to meet the requirements for the implementation of CITES"*, Lao PDR needs to amend its national wildlife laws to incorporate CITES implementing legislation, including legislation protecting all species of pangolins not native to the country and providing for stricter deterrents / penalties for serious wildlife-related offences, especially when perpetrated through organized groups, transnationally and repetitively.

## Law Enforcement

- Law enforcement capacity should be enhanced to improve proactive investigation into international wildlife crime in general and the pangolin trade in particular. Multi-agency collaboration, both at national and international levels, should be enhanced to tackle the international and organized criminal networks involved in smuggling pangolins across Lao PDR's borders. This should include members of Lao PDR Wildlife Enforcement Network (WEN), notably the environmental police, Customs, the Department of Forest Inspections (DOFI), prosecutors and judges, to investigate mid-high profile cases that involve organized and transboundary activities.
- Increased surveillance of trade in Special Economic Zones (SEZ) and in the other trade "hotspots" identified in this report is also needed.
- Increased prosecution rates including more severe penalties should be realized in order to deter potential wildlife criminals.
- Lao PDR should aim to improve its reporting to the CITES Secretariat as per the new annual illegal trade reporting requirements i.e. CITES Notification 007 that was issued in February 2016. Seizure reports, including comprehensive accounts of actions and outcomes, specifics of seizure and prosecution details are imperative to the analysis of the country's wildlife trade levels and trends, and, eventually, a better understanding of the international illegal wildlife trade.
- Better co-operation and co-ordination between the Customs agencies of Lao PDR and Thailand is required in order to increase detection rates along the Lao-Thai border (which has proven to be a crucial transit point in the international pangolin trade).
- Better co-operation and co-ordination is also needed between Lao PDR and China and Viet Nam, which should include extra vigilance concerning exports from Lao PDR to these two countries.
- In the case of Chinese citizens caught smuggling wildlife products from Lao PDR into China, or involved in illegal purchase, sale or transport of protected species in Lao PDR, moving seizures and apprehension of suspects to prosecution (in both Lao PDR and China) would help increase deterrents to illegal wildlife trade.

## Future Research

- Continued research into Lao PDR's role in the international illegal wildlife trade in general, and the pangolin trade in particular, is needed in order to obtain a current and improved understanding of the trade levels and dynamics in this crucial transit hub. Such research should include seizure analyses and market monitoring, especially in SEZs.
- Beyond Lao PDR, additional research into the global pangolin trade will help guide law enforcement efforts, with the goal of improving the effectiveness of interventions. Such research should include: 1) continued research into the Asian pangolin trade, including seizure and trade route analyses, and drivers of demand; 2) increased research into the trade of African pangolin species to Asia, including seizure and trade route analyses, and drivers of demand.



## INTRODUCTION

Pangolins Manidae spp. are currently the most heavily trafficked mammals in the world. Largely desired for their meat and scales, these small-bodied insectivorous mammals are highly sought after in China (Shepherd, 2008; Challender, 2011; Harrison *et al.*, 2015; Nijman *et al.*, 2016) and also Viet Nam (Challender and Hywood, 2012). Estimates show that more than one million pangolins have been illegally traded since the year 2000 (Challender *et al.*, 2014a). This illegal trade poses a direct threat to all eight pangolin species. Two of the four Asian species, the Chinese Pangolin *Manis pentadactyla* and the Sunda Pangolin *M. javanica* are currently classified as Critically Endangered by the International Union for Conservation of Nature (IUCN) Red List (Challender *et al.*, 2014b, Challender *et al.*, 2014c), while the other two Asian species, the Indian Pangolin *M. crassicaudata* and the Philippine Pangolin *M. culionensis* are classified as Endangered. All four African species are classified as Vulnerable. With the decline of the Asian pangolin species, the illegal trade in Asia now increasingly involves African species, which are shipped to and through a variety of Asian countries to supply the local markets (Challender and Hywood, 2012; Gomez *et al.*, 2016; Shepherd *et al.*, 2016).

It is widely agreed that immediate action is needed in order to save pangolins from extinction, which has spurred increased efforts, including the drafting of a conservation action plan (Challender *et al.*, 2014a). With the depletion of pangolin populations in China, the country's pangolin market now relies heavily on supply flows from neighbouring countries (Challender, *et al.*, 2016; Nijman *et al.*, 2016). A recent study into the pangolin trade in Myanmar's Mong La district found large quantities of pangolin products to be openly available, most of which was destined for the Chinese market (Nijman *et al.*, 2016). Similarly, supply is increasingly moving through Lao People's Democratic Republic (Lao PDR).

Lao PDR is a landlocked country, bordering China, Viet Nam, Cambodia, Thailand and Myanmar. Its total land mass measures 236 800 km<sup>2</sup>. The country was once a haven for thousands of species of flowering plants and hundreds of species of birds and mammals (Nooren and Claridge, 2001). Unfortunately, wild populations of Laotian flora and fauna have declined due to continuing pressure from habitat conversion and unsustainable harvest and trade of wildlife (Phanthavong, 2008). Its geographical location, weak environmental laws, poor enforcement and high corruption levels have made the country a persistent hub of increasing global significance for illegal wildlife trade (Duckworth *et al.*, 1999; Anon., 2015a; Anon., 2015b). Previous research suggested that Lao PDR plays an important role as both a source and transit country for wildlife trafficking (Phanthavong, 2008). In recent years, the country has been implicated in numerous criminal incidents involving rhino horn, elephant ivory, Tiger *Panthera tigris* parts, turtles and pangolins (Anon., 2015b).

Lao PDR's involvement in the international pangolin trade goes back at least several decades, with pangolins being among the most heavily traded animals in the 1980s and 1990s (Duckworth *et al.*, 1999). During this time, the majority of all wildlife confiscations in Lao PDR involved pangolins (Nooren and Claridge, 2001). Both the Sunda Pangolin and the Chinese Pangolin are native to Lao PDR. These two species are protected under the country's Wildlife and Aquatic Act 2007, in which they are classified in the first Prohibition category. Animals listed in this category are considered "rare, near extinct, (of) high value and (...) of special importance in the development of social-economic, environmental, educational, scientific research". The Act prohibits the unlicensed extraction and/or possession of pangolins or their parts. Any violation of the Act that involves "damage to the species" of 200 000 Lao Kip (LAK) (approximately US Dollar (USD) 24) and over, will result in a fine worth double the damage (triple the damage in case of a repeated offence) and/or a prison sentence of three months to five years. No further explanation is given as to what is meant by the rather vague notion of "damage to the species", nor is it made clear how the monetary value

of such damage is determined. Lao PDR has been Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since May 2004. All pangolin species are currently listed in Appendix II of CITES, prohibiting any uncertified international trade. In the year 2000 a zero annual CITES export quota was established for all four wild caught Asian pangolin species traded for primarily commercial purposes (Anon., 2000).



**Sunda Pangolin**

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## METHODS

### Seizure data

Pangolin seizure data for the period 2010–2015 were extracted from a variety of sources, including TRAFFIC publications, open source media, Customs, police, CITES reports, grey literature and several non-governmental organizations (NGOs). Only seizure records that involved Lao PDR as a seizure, origin, transit or destination country were included in the analysis. A “seizure country” was defined as the country where the seizure took place, an “origin country” was defined as the first known point of a trade route, a “transit country” was defined as a country which had functioned as both an importing and a re-exporting country in the trade route, and a “destination country” was defined as the last known point of a trade route. It should be noted that the reported seizures are likely only to represent a fraction of the illegal trade (see Nijman 2015), and will therefore underrepresent its true extent.

The acquired seizure data were analysed for summary statistics, general trends relating to the commodity types being traded, and the countries involved during the research period. All analyses were conducted in the R software (version 3.3.1) environment for graphical computing and statistics (R Core Team, 2015). In order to visualise the geographical network of pangolin trade around Lao PDR through time, the previous country in the trade chain (“exporter”) and the following country in the trade chain (“importer”) were identified regardless of the countries’ role (i.e. seizure, origin, transit, or destination country). The R package “igraph” (Csardi and Nepusz, 2006) was used to construct a network diagram representing the trade flow between these countries.

In order to quantify the number of pangolins implicated in the trade, those that were not reported as entire animals were converted into “whole pangolins”. The average weight of each pangolin species was assumed following Gaubert (2011). In cases where the species of the seized individuals was unknown the average weight across pangolin species (the weight of the heaviest pangolin species (Giant Ground Pangolin *Manis gigantea*) plus the weight of the lightest pangolin species (White-bellied Pangolin *M. tricuspis*) divided by two) was used for the analysis. In these cases, the scale weight per pangolin was assumed, according to Zhao-Min *et al.* (2012) and Heath (1992a, 1992b). For one incident where White-bellied Pangolin and Giant Ground Pangolin were reported, the known scale weights for Sunda Pangolin and Temminck’s Ground Pangolin *M. temminckii* respectively were taken into account (Heath 1992a; Zhao-Min *et al.*, 2012) as they are similar. In one case where the scale quantity was unknown, one individual was assumed to be required for the shipment. For one incident with 16 reported scales, it was assumed that a minimum of one and a maximum of 16 pangolins were required, and the average (whole number) was used in subsequent analysis. For another incident where 40 “medicinals” were reported, at least one pangolin and a maximum of 40 pangolins were assumed to be involved, and again the average whole number of pangolins was used. The same was done for five reported skin pieces. In another incident, pangolins along with other animals were reported as weighing 150 kg. It was assumed that half of the reported weight was made up by pangolins and again the average weight of the heaviest and the lightest pangolin species was used for subsequent analysis.

A generalized linear multivariate regression model was fitted to test for the relative change in the number of whole seized pangolins (log10 transformed), in relation to: 1) the number of incidents; and 2) time.



## Market survey

Opportunistic market surveys were conducted between 18 and 28 April 2016 and between 19 and 21 July 2016. During this period, seven cities in the northern regions of Lao PDR were visited: Vientiane (the country's capital), Luang Prabang (one of the country's main tourist spots), Luang Namtha, Muang Sing, Boten (all near the border with China), the Golden Triangle Special Economic Zone (SEZ) (in Bokeo Province) and Houayxay (on the border with Thailand) (**Figure 1**). Only Vientiane was visited twice (18–21 and 26–28 April), but different parts of the city were covered during each visit. These cities were selected on the basis of previous research into Lao PDR's wildlife trade, which had identified them as important (Chinese) tourist destinations and/or (potential) wildlife trade hubs (Nijman and Shepherd, 2012). It should be noted that because of this, the customer preferences and the demand for pangolin products in these cities is likely to differ from those in other Laotian cities.

Survey locations included public markets, street stalls, public malls, traditional medicine shops, hotel shops, tourist markets and tourist shops. Shops were visited opportunistically, meaning that no predetermined list of shops was used during the survey. Shops were selected based on the type of products that could be observed for sale. Only those shops that were found to have pangolin products for sale were recorded and included in this report. Price information was only acquired in some cases as some vendors were unwilling to share such information with the investigators. Prices were provided in Chinese Yuan (CNY), LAK or USD. In case of the former two, prices were converted at a conversion rate of 1 USD = 6.66 CNY and 1 USD = 7,947.69 LAK, respectively (<https://www.oanda.com/currency/converter/>, accessed on 10 August 2016). Photographic evidence was obtained opportunistically.

Identifying different pangolin species by their scales can be a difficult task; there is considerable overlap in size between all but the largest scales of the different species (Nijman *et al.*, 2016). When scales are sealed in plastic bags and/or displayed out of reach, there is no reliable way of determining the species. Therefore, no distinction is made between the different pangolin species in the survey results. Although it is likely that most pangolin products in Lao PDR belong to any of the three “continental” Asian species (i.e. Sunda Pangolin, Chinese Pangolin and Indian Pangolin), the remaining five species may also be on sale. Especially in stores where pangolin products are found next to (presumably African) ivory, the possibility that the pangolins were also imported from Africa should be considered.



Muang Sing market





Luang Namtha Day Market

**Figure 1: Market survey locations within the northern regions of Lao PDR between April and July 2016.**

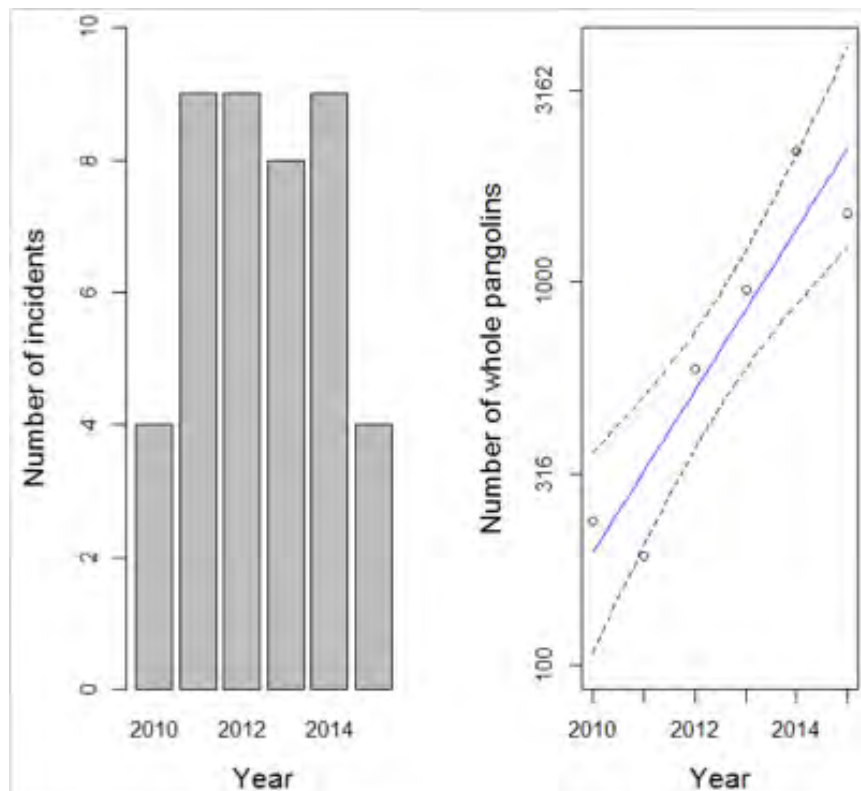


## RESULTS

### Seizure data

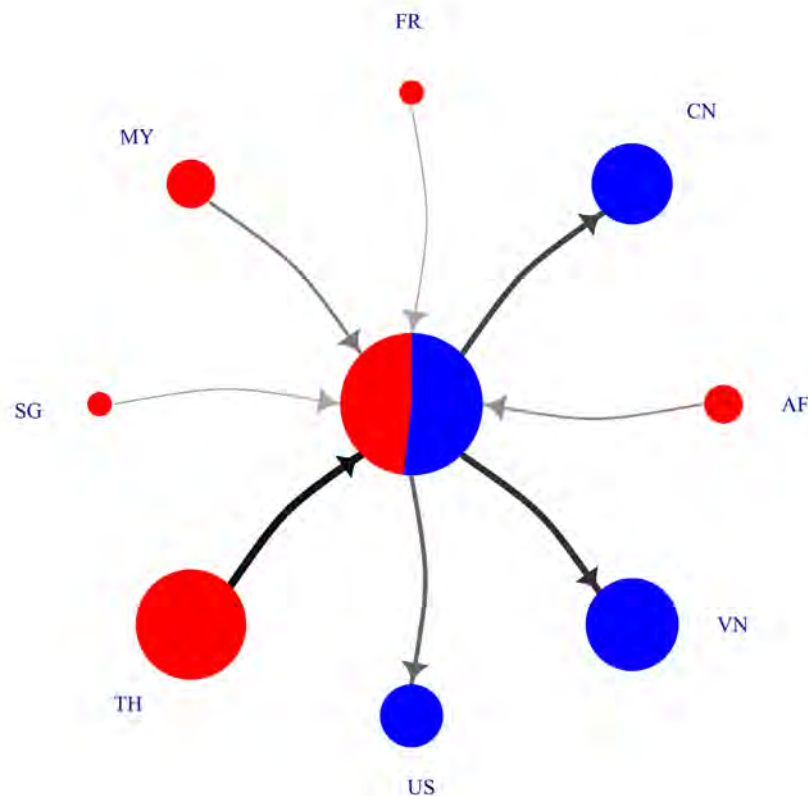
Between 2010 and 2015, Lao PDR was involved in a total of 43 reported trafficking incidents, in which it was either a seizure (2.3 %), origin (32.6 %), transit (44.2 %) or destination country (23.3 %). The total number of all illegally traded commodities during the period of 2010–2015 accounted for an estimated c.5678 whole pangolins. The volumes of estimated whole seized pangolins increased significantly through time during the research period (estimate [log]  $\pm$  SE =  $0.21 \pm 0.05$ ,  $t = 4.32$ ,  $P = 0.02$ ,  $R^2 = 0.77$ ), regardless of the number of incidents (estimate [log]  $\pm$  SE =  $0.01 \pm 0.04$ ,  $t = 0.34$ ,  $P = 0.75$ ) (**Figure 2**).

**Figure 2: (a) The number of incidents and (b) the generalized linear multivariate regression (estimate [log]  $\pm$  SE =  $-0.21 \pm 0.04$ ,  $t = 4.89$ ,  $P = 0.01$ ) between the volumes of pangolins (measured in the number of estimated whole pangolins) in the illegal trade involving Lao PDR through time.**



A total of 29 imports into Lao PDR and a total of 34 exports from Lao PDR were recorded (**Figure 3**). None of the countries that exported pangolins to Lao PDR were also found to import pangolins from Lao PDR at a different time during the research period, and vice versa. Pangolins and their parts were in most cases smuggled from Thailand into Lao PDR (75.9 % of imports), or from Malaysia (10.3 % of imports), Africa (6.9 % of imports), Singapore (3.5 % of imports) or France (3.5 % of imports). Most pangolin exports from Lao PDR were destined for China (47.1 % of exports), Viet Nam (38.2 % of exports), or the United States (14.7 % of exports).

**Figure 3: Network of pangolin trafficking incidents, not showing complete trade routes, but rather shipments directly going in and out of Lao PDR (central circle). Darker lines and larger circles indicate a greater number of links, with the maximum being 22 links between Thailand (TH) and Lao PDR in the period 2010 to 2015. The colour red within the circles represents exports; blue represents imports and the following abbreviations were used: FR = France, CN = China, AF = 'Africa', VN = Viet Nam, US = United States of America, TH = Thailand, SG = Singapore, MY = Malaysia.**



A total of 11 countries were involved in the pangolin trade with Lao PDR (**Table 1**). All seized shipments originating from African countries (n=5) consisted of scales, while all other shipments in or out of Lao PDR (presumably from Asia) were either live animals (n=18), “individuals” (whole animals, but uncertain whether dead or alive) (n=11 incidents), scales (n=2), a mix of live animals and scales (n=3), dead animals (n=1), claws, tails and skin pieces (n=2), and “medicinals” (n=1).

Eleven incidents reportedly involved the Sunda Pangolin, while the Chinese Pangolin, the White-bellied Pangolin, and the Giant Ground Pangolin were all reported in one incident each. All other incidents only reported “pangolins” (*Manis* spp.).

**Table 1: The number of pangolin seizures involving Lao PDR per country during the period 2010–2015.**

Country	Number of Incidents
Lao PDR	43
Thailand	22
Viet Nam	14
China	18
Malaysia	12
United States of America	5
Nigeria	3
Indonesia	2
“Africa”	1
France	1
Kenya	1
Singapore	1

Shipments from Africa constituted 11.6 % of all incidents. The first incident occurred in 2013, when 263 kg scales from two African species (White-bellied Pangolin and Giant Ground Pangolin) were seized from a bus in Viet Nam coming from Vientiane, Lao PDR. A shipment destined for Lao PDR, in 2014, involved 250 kg of pangolin scales originating in Nigeria and transiting via France, where it was seized. In another incident from 2014, 6 bags containing another 263 kg of pangolin scales were seized in Viet Nam. It is uncertain whether the shipment actually originated from Africa, but the bags containing the scales had a Kenyan label stamped on them. In 2015, two more incidents occurred, with one involving 324 kg of pangolin scales and 505 kg of elephant tusks, coming from Nigeria via Singapore (where it was seized) and supposedly on its way to Vientiane, Lao PDR. The second incident occurred on Koh Samui (Thailand) where 587 kg of pangolin scales and 789 kg of elephant ivory were seized from a flight coming from Singapore. The shipment originated in Nigeria and was bound for Lao PDR. Of the total c.2028 kg recorded seized scales, 83.2% were supposedly of African origin (**Table 2**).

Thirty-three incidents (76.7 %) exclusively involved Asian countries (i.e. did not involve African or non-range countries), and accounted for an estimated c.3015 whole pangolins. These consisted of 61 kg live pangolins + 1679 whole live pangolins (n = 21 incidents), c. 75 kg individuals + 534 whole individuals (n = 11 incidents) and c.340 kg of pangolin scales (n = 4 incidents). The five largest of these incidents all involved a smuggling route from Thailand via Lao PDR to either China or Viet Nam. In one incident in 2012 a suspect was transporting 138 live pangolins hidden in plastic baskets from Thailand’s southern Chumphon Province to its northern province of Nong Khai (**Table 2 – No. 17**). From there the shipment was supposed to be transported to Lao PDR where it was to be sold to Chinese customers. In 2013 nearly 200 live pangolins were discovered in Thailand’s province of Udon Thani (**Table 2 – No. 28**). These animals, were believed to be destined for China or Viet Nam, via Lao PDR. In 2014 there were three incidents. The first incident involved a seizure of 169 pangolins in Thailand’s Province of Nakhon Ratchasima, again destined for China or Viet Nam, via Lao PDR (**Table 2 – No. 32**). The second incident involved a seizure of 150 kg of pangolin scales, as well as 100 live pangolins in the Malaysian state of Perak (**Table 2 – No. 37**). The shipment was *en route* from Sumatra, through Malaysia and into Thailand. It was assumed that the animals were then to be transported via Lao PDR to China. The third incident involved 113 live Sunda Pangolins and 180 kg of Sunda Pangolin scales, which were being transported from Malaysia to Thailand, where they were seized in the southern Thai province of Chumphon (**Table 2 – No. 36**).



**Table 2: Recorded pangolin seizures involving Lao PDR during the period 2010–2015.**

No	Date	Year	Seizure	Origin	Destination	Items Seized	Quantity	Source <sup>1</sup>
1	7 Feb	2010	USA	Lao PDR	USA	Tail/Claw/ Unknown	1/1/1	LEMIS
2	28 Jul	2010	Viet Nam	Lao PDR	Viet Nam	Unknown	150kg <sup>2</sup>	Media
3	18 Aug	2010	Thailand	Malaysia	China via Lao PDR	Live	105	TRAFFIC
4	15 Oct	2010	Thailand	-	Lao PDR	Whole <sup>3</sup>	106	Media
5	17 Jan	2011	Viet Nam	Lao PDR	Viet Nam	Whole	1	NGO
6	18 Jan	2011	Viet Nam	Lao PDR	Viet Nam	Whole	2	CITES
7	3 Feb	2011	USA	Lao PDR	USA	'Medicinals'	40	LEMIS
8	24 Mar	2011	Viet Nam	Lao PDR	Viet Nam	Dead	15	CITES
9	8 Jun	2011	USA	Lao PDR	USA	Dead	1	LEMIS
10	22 Nov	2011	Thailand	-	China via Lao PDR	Whole	50	
11	2 Dec	2011	Viet Nam	Lao PDR	China	Whole	50kg	NGO
12	22 Dec	2011	Thailand	-	Lao PDR	Whole	18	
13	26 Dec	2011	Thailand	-	Lao PDR	Live	74	TRAFFIC
14	23 Feb	2012	USA	Lao PDR	USA	Scales	16	LEMIS
15	1 Mar	2012	Malaysia	Malaysia	Lao PDR	Live	50	TRAFFIC
16	23 Apr	2012	Viet Nam	Malaysia	Viet Nam via Lao PDR	Live	71	TRAFFIC
17	May	2012	Thailand	-	Lao PDR	Live	50	TRAFFIC
18	19 Jul	2012	Thailand	-	China OR Viet Nam via Lao PDR	Live	12	Media
19	4 Sep	2012	Viet Nam	Lao PDR		Live	118	TRAFFIC
20	14 Nov	2012	Thailand		Lao PDR	Live	52	TRAFFIC
21	25 Dec	2012	Thailand		Lao PDR	Live	42	Media
22	26 Dec	2012	Viet Nam	Lao PDR	Viet Nam	Live	100	TRAFFIC
23	16 Jan	2013	Viet Nam	Africa <sup>4</sup>	Viet Nam via Lao PDR	Scales	263kg	CITES
24	25 Mar	2013	Thailand	Malaysia/ Thailand	China via Lao PDR	Live	104	TRAFFIC
25	25 Apr	2013	Viet Nam	Lao PDR	Viet Nam	Whole	1	CITES
26	18 May	2013	Thailand	-	China via Lao PDR	Whole	110	TRAFFIC
27	17 Jun	2013	China	Lao PDR	China	Live	2	TRAFFIC
28	16 Sep	2013	Thailand	Thailand	China OR Viet Nam via Lao PDR	Live	200	TRAFFIC
29	26 Oct	2013	USA	Lao PDR	USA	Skin	5 Pieces	LEMIS
30	22 Nov	2013	Thailand	Malaysia	China via Lao PDR	Live	122	TRAFFIC
31	23 Jan	2014	Viet Nam	Kenya	Viet Nam via Lao PDR	Scales	263kg	NGO

32	28 Mar	2014	Thailand	-	China via Lao PDR	Whole	169	NGO
33	16 May	2014	Thailand	-	China via Lao PDR	Live	130	NGO
34	2 Jul	2014	France	Nigeria	Lao PDR	Scales	250kg	TRAFFIC
35	6 Jul	2014	Thailand	Malaysia	China via Lao PDR	Live	34	CITES
36	9 Sep	2014	Thailand	Malaysia	China via Lao PDR	Live/Scales	113/180kg	CITES
37	13 Sep	2014	Malaysia	Indonesia	China via Thailand and Lao PDR	Live/Scales	100/150kg	NGO
38	22 Oct	2014	Thailand	Malaysia	China via Lao PDR	Live/Scales	75/10kg	CITES
39	27 Oct	2014	Viet Nam	Lao PDR	Viet Nam	Live	7	NGO
40	8 Mar	2015	Thailand	Malaysia	China via Lao PDR	Live	61kg	CITES
41	30 Oct	2015	Lao PDR	Indonesia	Lao PDR	Live	81	TRAFFIC
42	10 Dec	2015	Thailand	Nigeria	Lao PDR	Scales	587kg	TRAFFIC
43	12 Dec	2015	Singapore	Nigeria	Lao PDR	Scales	342kg	Media

<sup>1</sup>Sources include, but are not limited to: TRAFFIC: reported in TRAFFIC's seizure database and/or the TRAFFIC Bulletins; CITES: reported by different CITES Management Authorities; NGO: compiled through reports from different NGOs; LEMIS: reported in the Law Enforcement Management Information System of the United States of America; Media: reported through open source media.

<sup>2</sup>Total weight of pangolins including other wildlife

<sup>3</sup>Whole animal, uncertain whether dead or alive

<sup>4</sup>Country not further specified in the report

## Market survey

Scales were found to be the only pangolin commodity type openly available in the surveyed markets and shops. Observed amounts ranged from 20 to 1200 scales per survey site (Table 3).

**Table 3: The open availability of pangolin scales observed during the market surveys in April and July 2016.**

Date	Survey Locations	No Outlets observed with pangolins scales	Quantity of scales (estimated)	Notes
19, 20 & 27 April 2016	Vientiane (capital)	4	520	Price quoted: Range USD2/piece to USD1/gram (some pieces weighing as much as 20 grams). Use described by vendor: traditional medicine to treat “itchiness”; pendants
21 April 2016	Muang Sing	2	750	Supposedly from China Price quoted: KIP80 000/bag (~USD10/bag); Each bag estimates to contain approximately between 60–80 scales Use described by vendor: traditional medicine to treat stomach aches
22 April 2016	Boten	2	190	Sold openly in a container (~150 scales); and packed in several small bags (~10 scales/bag) Price quoted: CNY15/piece (~USD2/piece)
22 & 23 April 2016	Luang Namtha (province capital)	2	52	Sold individually as pieces; and packed in one bag ~ 50 scales
24 April 2016	Luang Namtha (province capital)	2	1202	Two large pieces observed in one shop to be made into pendants One shop with 10 bags containing approximately 150 scales each
20 July 2016	Golden Triangle SEZ (Bokeo)	1	20	One small bag observed openly for sale
21 July 2016	Houayxay	none	-	
<b>Total</b>		<b>13</b>	<b>2734</b>	

The observed scales were either packed into bags which varied in size (i.e. ranging from as little as 10 scales per bag to as much as 150 scales per bag), or were displayed openly as individual pieces or in containers (Figure 4).

**Figure 4: Open availability of pangolin scales in various locations in Lao PDR, showing varied display or packaging methods, observed during the market surveys in April and July 2016.**



**Pangolin scales observed at a shop in Luang Namtha**

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**Pangolin scales observed at Chinese Market in Vientiane**

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**Pangolin scales observed at a jewellery shop in Luang Prabang**

© K. Krishnasamy/TRAFFIC



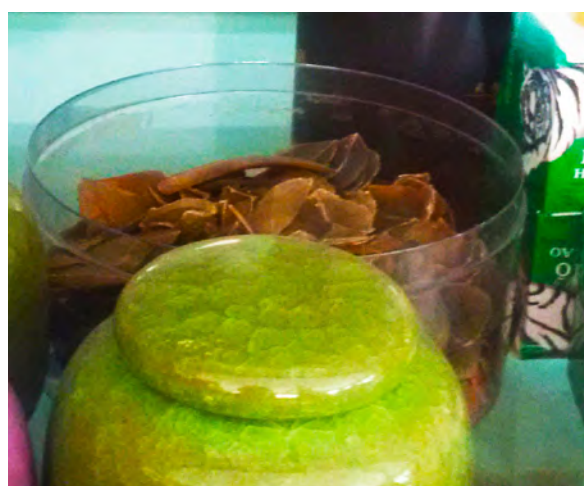
**Pangolin scales observed at the Muang Sing market**

© E. John/TRAFFIC



**Pangolin scales observed at the Muang Sing market**

© L. Gomez/TRAFFIC



**Pangolin scales observed in Boten**

© K. Krishnasamy/TRAFFIC



They were mostly being sold for use as traditional medicine, although two shops (one in Vientiane and one in Luang Namtha) were found selling individual scales as jewellery (to be made into pendants). The largest quantity of scales was observed in Luang Prabang with an estimated 1200 scales from two jewellery shops, while the lowest quantity (20 scales) was found in the Golden Triangle SEZ. The highest recorded price for pangolin scales was USD1/gram, as stated by one vendor at the Chinese Market in Vientiane who also claimed that larger scales can sometimes weigh as much as 20 grams.

In Luang Prabang and Vientiane, pangolin scales were found in popular tourist spots alongside other wildlife contraband such as elephant ivory, shredded rhino horn, Helmeted Hornbill *Rhinoplax vigil* casques, bear claws and Tiger teeth. In Muang Sing, scales were observed at the main market in the traditional medicine section. Wildlife products on sale here for purported medicinal purposes included elephant skin, Tiger bone, serow horn and porcupine stomach. In comparison, much smaller quantities of scales were recorded in Boten, Luang Namtha and in the Golden Triangle SEZ, Bokeo Province.

It should be noted, however, that many of the shops in the Golden Triangle SEZ were either closed or looked abandoned at the time of survey i.e. July 2016. According to one restaurant owner, this was not a peak tourist time (i.e. from China), and tourists were generally expected towards the end of the year. In Boten, pangolin was observed on the menu in one restaurant (although restaurants were not targeted by this survey). Of the seven locations visited, Houayxay was the only place where no pangolins were observed for open sale.



Pangolin scales observed at the Muang Sing market

## DISCUSSION

### Lao PDR as a transit country

The number of recorded seizures associated with Lao PDR between 2010 and 2015 confirms the country's role as an important hub in the international pangolin trade. Within this trade dynamic, Lao PDR appears to function predominantly as a transit country. This is supported by the stark contrast between the relatively low numbers of pangolin scales observed in open trade during the market surveys and the large numbers of specimens (live/dead animals, body parts, products and derivatives) reported in the seizure records. In most of the seizure data, Lao PDR was marked as a transit country (44.2 %). As seizure records are notoriously inconsistent, especially when it comes to the completeness of trade routes, it is possible that even in records where it was indicated as an origin- or a destination country, Lao PDR was likely a transit location in the overall trade chain. In these cases, only one exporter and one importer were identified in the whole incident, and while it is possible that the complete transaction merely involved the two identified countries, the possibility that the two countries were in fact part of a larger trade route should be considered. In the seizure data, an "origin country" represents the first known point in the trade route. Whether this country was the actual country of origin of the seized specimens, or a country of transit or re-export, remains uncertain. Similarly, a "destination country" represents the last known (intended) point in the trade route, without there being any certainty as to whether this country really represents the final destination. Therefore, pangolins "originating" from Lao PDR, may in reality have been brought into the country from abroad, and shipments "destined" for Lao PDR may in reality have been on their way to Lao PDR in order to be re-exported (most likely to end-use markets such as Viet Nam or China).

Even Lao PDR's local pangolin trade appears to mainly cater to foreign customers in the areas surveyed. In Vientiane and Luang Prabang, pangolin scales were predominantly found in the tourist parts of town and prices were often given in Chinese Yuan. In Vientiane's Chinese market, the shops that offered pangolin scales for sale were run by ethnic Chinese and employed Chinese-speaking staff (Or, pers. obs.). Relatively large quantities of scales were also found in Muang Sing; a tourist city close to the Chinese border.

### Chinese and Vietnamese demand

Chinese demand appears to be an important stimulus for the international pangolin trade. Of Lao PDR's recorded pangolin seizures, no fewer than 47.1% were destined for China. In China, pangolins are either consumed as a luxury meat with purported tonic benefits or used for medicinal purposes. According to Challender *et al.* (2016), pangolin scales have been imported into China from neighbouring range countries including Lao PDR, Viet Nam and Myanmar since the early 1990s as Chinese pangolin populations declined. This is further corroborated by the Environmental Investigation Agency's (EIA) recent study of the illegal wildlife trade in the Golden Triangle SEZ, which, according to EIA, exists largely to cater for the growing number of Chinese tourists (Anon., 2015a). Nijman *et al.* (2016) had similar findings in Myanmar in which the "Chinese market" was identified as the main driver of the pangolin trade there.

Restaurants in Lao PDR are known to serve wildlife dishes including Tiger *Panthera tigris*, elephant, Sambar *Rusa unicolor*, muntjac, Eurasian Wild Pig *Sus scrofa* and pangolin (Nooren and Claridge, 2001). During this study, no restaurants were surveyed for pangolin meat. However, it was casually observed to be available in at least one restaurant in Boten. EIA (2015) also reported on pangolin meat being available in restaurants within the Golden Triangle SEZ. Again, places like Boten and the Golden Triangle SEZ cater to Chinese tourists whom consider pangolin a luxury meat.

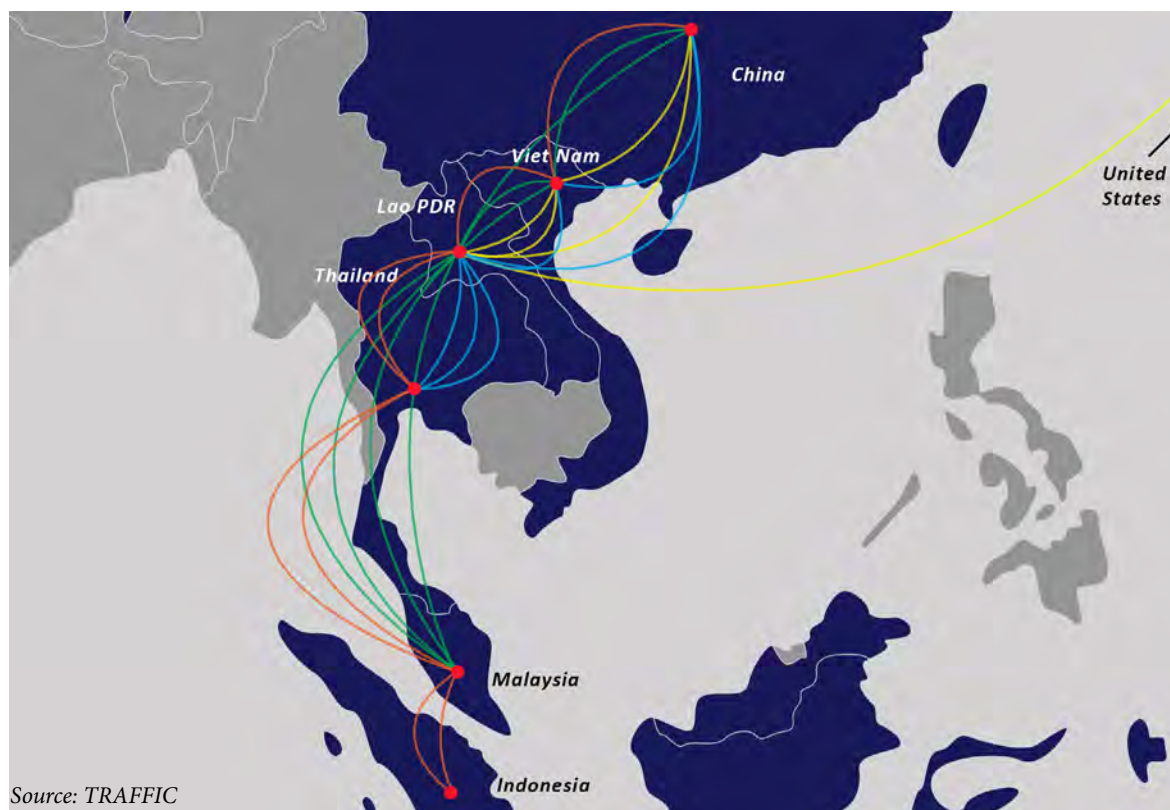
Demand from Viet Nam appears to be another main driver in the international pangolin trade, with 38.2 % of recorded seizures in Lao PDR indicating Viet Nam as the next destination. While it remains unclear how many of these shipments would have been subsequently re-exported to China, Viet Nam has been known to be a large consumer of pangolin products both for meat as well as medicine (Nguyen and Nguyen, 2009; Challender *et al.*, 2015) and is likely to function as a second important end destination. Viet Nam is a persistent consumer market in Asia for wildlife species and a key factor in the decline of species in Viet Nam and surrounding regions (Shairp *et al.*, 2016). After two decades of rapid economic growth, newly wealthy consumers are purchasing wildlife to advertise their status—including luxury wild meats, the price of which is often associated with the rarity of a species and its wild origins (Drury, 2011; Shairp *et al.*, 2016). Pangolins are often the most expensive meat on the menu in Vietnamese restaurants (Gannon, 2014; Shairp *et al.*, 2016).

### Key routes and commodities traded

In most cases, incomplete information made it impossible to determine exact trade routes. However, certain trends were clearly detectable. A large number of the shipments that went through Lao PDR were smuggled in from Thailand. Of the 43 seizure records, there were 22 incidents that involved Thailand. The province of Nong Khai, in north-eastern Thailand was particularly implicated—not surprising given it is separated from Lao PDR only by the Mekong River, including a road bridge leading to Vientiane, making it a key smuggling route in the region for contraband including illegal wildlife (Chouvy, 2013). Like Lao PDR, Thailand appears to be an important transit country in the international pangolin trade. On several occasions, pangolin shipments were brought into Thailand from Indonesia and/or Malaysia with the intention to smuggle them into Lao PDR and subsequently into Viet Nam and/or China (**Figure 5**).

Another concerning trend is the increasing incidence of trade into Asia of African pangolin species. As Asian pangolin populations continue to decline, and economic ties between Africa and Asia integrate further, pangolin products are increasingly being shipped in from Africa (Challender and Hywood, 2012); a trend that has been on the rise since around 2009 (Challender, 2011). However, this phenomenon appears to have escalated in the past couple of years, with more frequent seizures of pangolin shipments originating from Africa and often involving large quantities. Between 2000 and 2012, the weight of scales seized in a single incident ranged from 1 kg to 200 kg (Challender and Hywood, 2012). These numbers now commonly range from 250 kg to 2000 kg (Gomez *et al.*, 2016). As recently as 2016, two seizures involving shipments from Cameroon and Nigeria took place in Hong Kong, amounting to 4000 kg and 7300 kg of scales respectively; the largest recorded seizures of scales from Africa so far (Anon., 2016a; Anon., 2016b).

**Figure 5: Pangolin trade routes in Asia, with each line representing an observed trade route, disregarding the frequency with which it was observed. Colours vary according to the reported country of origin (Orange = Indonesia; Green = Malaysia; Blue = Thailand; Yellow = Lao PDR).**

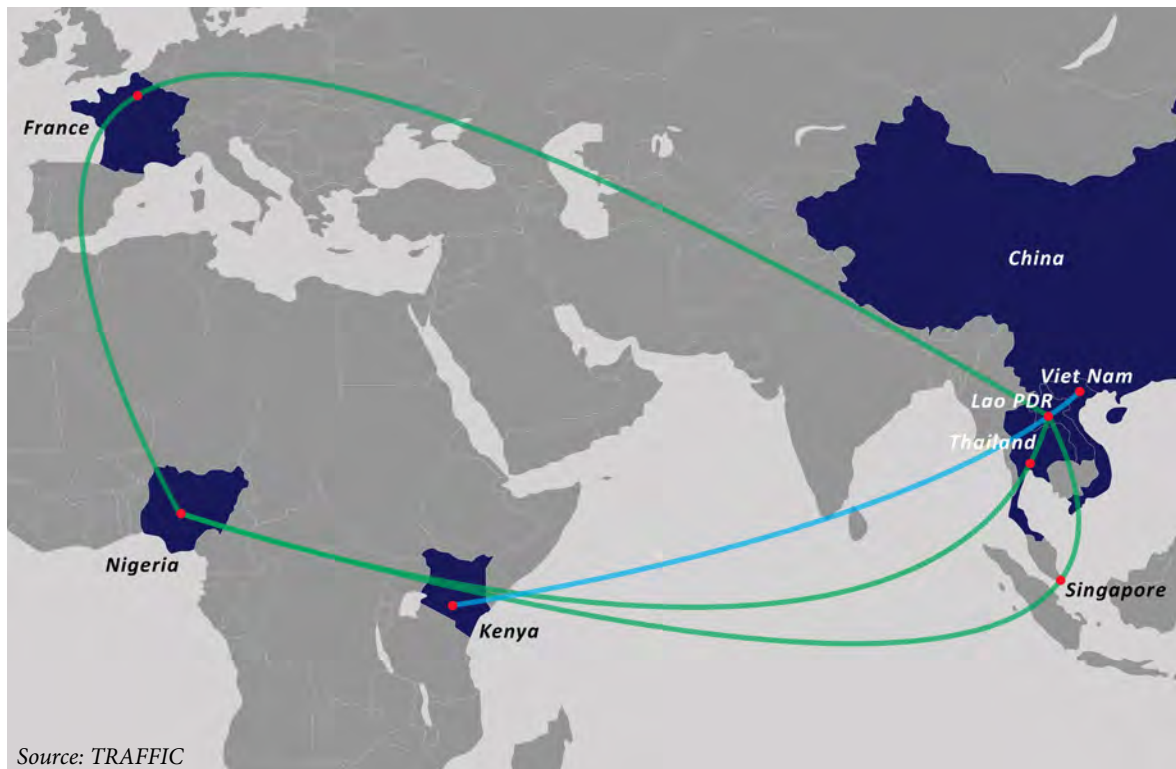


A recent study has found the pangolin trade between Nigeria and China to be blooming, with several large seizures of pangolin scales and meat taking place between 2011 and 2015 (Gomez *et al.*, 2016). This study also found that whenever shipments were not directly shipped from Nigeria to China, they were (to be) smuggled in through Lao PDR. These shipments were reportedly sent to Lao PDR either via Singapore, Thailand or France (**Figure 6**).

Shipments originating from Africa seized in Lao PDR only contained scales, and in previous research only scales and meat (Gomez *et al.*, 2016). In fact, 83.2 % of all reports of seized pangolin scales analysed in this study were of African origin. Trade in Asian pangolins on the other hand, consisted predominantly of live animals and “individuals” (whole animals for which it was unclear whether they were alive or dead). There may be several reasons for this. From a practical point of view, scales are more easily concealed than live animals and require less attention during extended travel, making them more suitable for the intercontinental trade. Additionally, scales may be a by-product of pangolin meat consumption in Africa (Pietersen *et al.*, 2014), and thus scales may subsequently be transported to Asia and sold for higher profits than they would in Africa.



**Figure 6: Pangolin trade routes between Africa and Asia, with each line representing a single record. One record was omitted from this map due to a lack of specificity regarding the country of origin (“Africa”).**



## Law enforcement

Lao PDR's porous borders and high levels of alleged corruption, have raised the country's profile as a major conduit for the trafficking of high value and highly threatened wildlife (Anon., 2015a; Anon., 2015b). Of the 43 reported pangolin seizures, only one took place in Lao PDR. This is a stark contrast to the large number of seizures that were conducted in both Thailand and Viet Nam during the same period (involving shipments going to—or coming from—Lao PDR). The lack of in-country seizure records from Lao PDR may be explained by a lack of reporting (of incidents to (inter-)national authorities) and by lack of enforcement effectiveness. The latter is confirmed by the fact that during the market surveys, pangolins scales were openly traded (alongside other illicit wildlife products, including rhino horn shavings, Helmeted Hornbill casques, Tiger teeth, bear teeth, bile and claws and large amounts of elephant ivory), without apparent fear of repercussion.

Similar findings were made by the CITES Secretariat during a recent mission to Lao PDR which was aimed at assessing the country's implementation of the provisions of the Convention to regulate and control the trade and use of CITES-listed species (Anon, 2016c). Conclusions drawn from this visit included Lao PDR being targeted by organized crime groups to smuggle wildlife through its borders into other countries in Asia due to a combined lack of enforcement capacity and significant weaknesses and loopholes in national laws where wildlife trade is concerned (Anon, 2016c).

## CONCLUSION

Lao PDR is situated in Southeast Asia, where it shares its porous borders with Cambodia, China, Myanmar, Thailand and Viet Nam; all of which are countries persistently implicated in the illegal wildlife trade. However, while wildlife trade legislation, monitoring and law enforcement efforts have improved in neighbouring countries, it seems that Lao PDR is being exploited as a low-risk transport hub for illegal wildlife goods, including pangolins. Lao PDR's weak laws and ineffective enforcement allow pangolins from both Asian and African countries to be shipped through the country and into consumer countries such as China and Viet Nam. Furthermore, it would appear that China has significant influence over trade activities within Lao PDR that is encouraging Chinese tourist/investors including the establishment of hotspots that perpetuate the illicit trade in wildlife as is evident in Boten and the Golden Triangle SEZ.

Although protective national laws are in place for Lao PDR's native pangolin species, and the CITES zero quota for international trade should offer protection for all Asian species, it does not seem that these measures are being properly enforced. While all four African species are listed in Appendix II of CITES, there are no established export quotas in place to regulate their international trade further, and poaching and trafficking continues to deplete wild populations. Globally, the illegal trade in African pangolins appears to be rapidly increasing. Whereas the frequency of pangolin seizures in Lao PDR has not increased over the past five years, the quantities that were seized in each incident have.

Improved law enforcement efforts in Lao PDR remains crucial to the effectiveness of CITES regulations, and therefore to the conservation of pangolins globally. Such improvement should include shutting down establishments like markets, shops and restaurants that sell illegal wildlife products; strengthening monitoring of illegal wildlife trade across Lao PDR's borders; strengthening its national wildlife laws by incorporating stricter penalties.

TRAFFIC's research and analysis specific to pangolin trade aims to make practical contributions to efforts by relevant government agencies of Lao PDR, as well as those by the CITES Secretariat and CITES Parties in supporting Lao PDR, to improve implementation and enforcement of the Convention. This includes follow-up to recommendations detailed in the Secretariat's report to the 67th Meeting of the CITES Standing Committee regarding Application of Article XIII in the Lao People's Democratic Republic (SC67 Doc. 12.1 – see Anon, 2016c).

## RECOMMENDATIONS

### CITES and national legislation

- Proposals to list all eight pangolin species in Appendix I of CITES should be supported at CoP17 (i.e. Proposals 8 and 12) as this places an overall higher degree of international protection, and will enhance efforts to safeguard pangolins and support regulatory control mechanisms by non-range States.
- National legislation requires urgent improvement to enable effective law enforcement, which is currently ineffectual due to weaknesses in the law that prevent arrests, prosecutions and convictions. Currently considered a Category 3 country by the CITES National Legislation Project, meaning that its *"legislation (...) is believed generally not to meet the requirements for the implementation of CITES"*, Lao PDR needs to amend its national wildlife laws to incorporate CITES implementing legislation, including legislation protecting all species of pangolins not native to the country and providing for stricter deterrents / penalties for serious wildlife-related offences, especially when perpetrated through organized groups, transnationally and repetitively.

## Law Enforcement

- Law enforcement capacity should be enhanced to improve proactive investigation into international wildlife crime in general and the pangolin trade in particular. Multi-agency collaboration, both at national and international levels, should be enhanced to tackle the international and organized criminal networks involved in smuggling pangolins across Lao PDR's borders. This should include members of Lao PDR Wildlife Enforcement Network (WEN), notably the environmental police, Customs, the Department of Forest Inspections (DOFI), prosecutors and judges, to investigate mid-high profile cases that involve organized and transboundary activities.
- Increased surveillance of trade in Special Economic Zones (SEZ) and in the other trade "hotspots" identified in this report is also needed.
- Increased prosecution rates including more severe penalties should be realized in order to deter potential wildlife criminals.
- Lao PDR should aim to improve its reporting to the CITES Secretariat as per the new annual illegal trade reporting requirements i.e. CITES Notification 007 that was issued in February 2016. Seizure reports, including comprehensive accounts of actions and outcomes, specifics of seizure and prosecution details are imperative to the analysis of the country's wildlife trade levels and trends, and, eventually, a better understanding of the international illegal wildlife trade.
- Better co-operation and co-ordination between the Customs agencies of Lao PDR and Thailand is required in order to increase detection rates along the Lao-Thai border (which has proven to be a crucial transit point in the international pangolin trade).
- Better co-operation and co-ordination is also needed between Lao PDR and China and Viet Nam, which should include extra vigilance concerning exports from Lao PDR to these two countries.
- In the case of Chinese citizens caught smuggling wildlife products from Lao PDR into China, or involved in illegal purchase, sale or transport of protected species in Lao PDR, moving seizures and apprehension of suspects to prosecution (in both Lao PDR and China) would help increase deterrents to illegal wildlife trade.

## Future Research

- Continued research into Lao PDR's role in the international illegal wildlife trade in general, and the pangolin trade in particular, is needed in order to obtain a current and improved understanding of the trade levels and dynamics in this crucial transit hub. Such research should include seizure analyses and market monitoring, especially in SEZs.
- Beyond Lao PDR, additional research into the global pangolin trade will help guide law enforcement efforts, with the goal of improving the effectiveness of interventions. Such research should include: 1) continued research into the Asian pangolin trade, including seizure and trade route analyses, and drivers of demand; 2) increased research into the trade of African pangolin species to Asia, including seizure and trade route analyses, and drivers of demand.

## REFERENCES

- Anon. (2000). Amendments to Appendices I and II of the Convention adopted by the Conference of the Parties at its 11th meeting in Gigiri, Kenya, from 10 to 20 April 2000. CITES, Geneva, Switzerland.
- Anon. (2015a). Sin City: Illegal wildlife trade in Laos's Golden Triangle Special Economic Zone. EIA, March 2015. Online at: <https://eia-international.org/wp-content/uploads/EIA-Sin-City-FINAL-med-res.pdf>. Accessed on: 4 July 2016.
- Anon. (2015b). Wildlife seizures in 2014 highlighting Lao PDR's role in trafficking. Online at: <http://www.traffic.org/home/2015/1/6/wildlife-seizures-in-2014-highlight-lao-pdrs-role-in-traffic.html>. Accessed on: 4 July 2016.
- Anon. (2016a). Pangolin Seizure in Hong Kong Demonstrates Need for Stronger Protection for World's Most Trafficked Mammals. Online at: <http://www.ifaw.org/united-states/news/pangolin-seizure-hong-kong-demonstrates-need-stronger-protection-world%E2%80%99s-most-trafficked-mammal>. Accessed on 5 August 2016.
- Anon. (2016b). Largest Known Seizure of Pangolin Scales, It's Devastating! Online at: <http://pangolinconservation.org/2016/07/19/largest-known-seizure-of-pangolin-scales-its-devastating/>. Accessed on: 5 August 2016.
- Anon. (2016c). Application of Article XIII In the Lao People's Democratic Republic. SC67 Doc. 12.1. CITES Sixty-seventh meeting of the Standing Committee Johannesburg (South Africa), 23 September 2016 (<https://cites.org/sites/default/files/eng/com/sc/67/E-SC67-12-01.pdf>).
- Challender, D. (2011). Asian pangolins: increasing affluence driving hunting pressure. *TRAFFIC Bulletin* 23(3):92-93.
- Challender, D. and Hywood, L. (2012). African Pangolins: Under increased pressure from poaching and intercontinental trade. *TRAFFIC Bulletin* 24(2):53-55.
- Challender, D., Waterman, C. and Baillie, J.E.M. (2014a). *Scaling up Pangolin Conservation. IUCN SSC Pangolin Specialist Group Conservation Action Plan*. Zoological Society of London, London, UK.
- Challender, D., Baillie, J., Ades, G., Kaspal, P., Chan, B., Khatiwada, A., Xu, L., Chin, S., KC, R., Nash, H. and Hsieh, H. (2014b). *Manis pentadactyla*. Online at <http://dx.doi.org/10.2305/IUCN.UK.2014-2.RLTS.T12764A45222544.en>. Accessed on 20 June 2016.
- Challender, D., Nguyen Van, T., Shepherd, C.R., Krishnasamy, K., Wang, A., Lee, B., Panjang, E., Fletcher, L., Heng, S., Seah Han Ming, J., Olsson, A., Nguyen The Truong, A., Nguyen Van, Q. and Chung, Y. (2014c). *Manis javanica*. Online at: <http://dx.doi.org/10.2305/IUCN.UK.2014-2.RLTS.T12763A45222303.en>. Accessed on 20 June 2016.
- Challender, D., Harrop, S., MacMillan, D.C. (2015). Understanding markets to conserve trade-threatened species in CITES. *Biological Conservation* 187:249-259.
- Challender, D., Baillie, J., Waterman, C., Pietersen, D., Nash, H., Wicker, L., Parker, K., Thomson, P., Nguyen, T.V., Hywood, L. and Shepherd, C.R. (2016). On scaling up pangolin conservation. *TRAFFIC Bulletin* 28(1):19-21.
- Chouvy, P.A. (2013). Drug trafficking in and out of the Golden Triangle. An Atlas of Trafficking in Southeast Asia. The Illegal Trade in Arms, Drugs, People, Counterfeit Goods and Natural Resources in Mainland, IB Tauris, pp.1-28, 2013. Online at: <https://halshs.archives-ouvertes.fr/hal-01050968/document>. Accessed on: 5 August 2016.
- Csardi, G. and Nepusz, T. (2006). The igraph software package for complex network research. *International Journal of Complex Systems*, 1695.
- Drury, R. (2011). Hungry for success: Urban consumer demand for wild animal products in Vietnam. *Conservation and Society*, 9(3): 247 - 257.
- Duckworth, J.W., Salter, R.E. and Khounboline, K. (Ed.) (1999). Wildlife in Lao PDR: 1999 status report. Vientiane: IUCN-The World Conservation Union/Wildlife Conservation Society/Centre for Protected Areas and Watershed Management. Vientiane, Lao PDR.
- Gannon, M. (2014). Rare Pangolins May Be Eaten to Extinction, Conservationists Warn. Online at: <http://www.livescience.com/47073-pangolins-may-be-eaten-to-extinction.html>. Accessed on: 5 August 2016.
- Gaubert, P. (2011). Family Manidae (Pangolins). In: Wilson, D. E. and Mittermeier, R. A. (Eds.) *Handbook of Mammals of the World*. Barcelona: Lynx Edicions.
- Gomez, L., Leupen, B.T.C. and Tian, K.H. (2016). The trade of African pangolins to Asia: a brief case study of pangolin shipments from Nigeria. *TRAFFIC Bulletin* 28(1):3-5.
- Harrison, M., Roe, D., Baker, J., Mwedde, G., Travers, H., Plumtre, A., Rwetsiba, A. and Milner-Gulland, E. (2015). Wildlife crime: a review of the evidence on drivers and impacts in Uganda. London (UK): IIED



- Heath, M. E. (1992a). *Manis pentadactyla*. *The American Society of Mammalogists* 414:1-3.
- Heath, M. E. (1992b). *Manis temminckii*. *Mammalian Species* 415:1-5.
- Nguyen, D.N.V. and Nguyen, X.D. (2009). The pangolin trade in Vietnam. In: Pantel, S. and Chin, S.Y. (Eds.) (2008). *Proceedings of the Workshop on Trade and Conservation of Pangolins Native to South and Southeast Asia, 30 June-2 July 2008, Singapore Zoo, Singapore*. TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia. Pp. 164-168.
- R Core Team (2015). A language and environment for statistical computing. *R Foundation for Statistical Computing*. Vienna, Austria.
- Shairp, R., Verissimo, D., Fraser, I., Challender, D. and MacMillan, D. (2016). Understanding urban demand for wild meat in Vietnam: implications for conservation Actions. PLOS ONE, DOI:10.1371/journal.pone.0134787.
- Shepherd, C.R. (2008). Overview of Pangolin Trade in Southeast Asia. In: Pantel, S. and Chin, S.Y. (Eds.) (2008). *Proceedings of the Workshop on Trade and Conservation of Pangolins Native to South and Southeast Asia, 30 June-2 July 2008, Singapore Zoo, Singapore*. TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia. Pp. 6-9.
- Shepherd, C.R., Connelly, E., Hywood, L. and Cassey, P. (2016). Taking a stand against illegal wildlife trade: the Zimbabwean approach to pangolin conservation. *Oryx*, doi:10.1017/S0030605316000119.
- Zhao-min, Z., Hong, Z., Zhang, Z.X., Ze-hui, W. & Han, W. (2012). Allometry of scales in Chinese pangolins (*Manis pentadactyla*) and Malayan pangolins (*Manis javanica*) and application in judicial expertise. *Zoological Research* 33(3):271–275.







TRAFFIC, the wildlife trade monitoring network, is the leading non-governmental organization working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.

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