

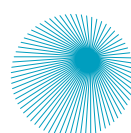
MONITORING ONLINE ILLEGAL WILDLIFE TRADE

**FEATURING RHINO HORN PILLS
AND WILDLIFE SUBSTITUTIONS**

NOVEMBER 2025



GI-TOC



GIFP
Global Illicit Flows
Programme



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ACRONYMS AND ABBREVIATIONS

ANW	Angong Niu Huang Wan
B2B	Business to business
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
GI-TOC	Global Initiative Against Transnational Organized Crime
GMS	Global Monitoring System
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute of Environment and Renewable Natural Resources)
IWT	Illegal wildlife trade
IUCN Red List	International Union for Conservation of Nature Red List of Threatened Species
MENA	Middle East and North Africa
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales (Secretariat of Environment and Natural Resources – Mexico)
UNODC	United Nations Office on Drugs and Crime



THE GLOBAL MONITORING SYSTEM FOR ONLINE MARKETING OF ILLEGAL WILDLIFE TRADE

The last decade and a half have seen an alarming surge in illegal wildlife trade (IWT) on the internet. However, a dearth of data regarding the scale of the market, its dynamics, operations and ramifications, especially on a global scale, is a significant hindrance to combating this crime. To address this, ECO-SOLVE has developed a Global Monitoring System (GMS) to monitor global online IWT systematically and to gather data to feed into law enforcement activity and to inform policymaking. The GMS is a network of data hubs in countries whose domestic online markets are considered the largest or most consequential in their regions. National monitoring nodes are being set up in a staggered process and the size and scope of the network will grow with each edition of the Global Trend Report. This report draws on data from April 2024 to August 2025 from 10 data hubs. By identifying areas of high pressure on endangered species and ecosystems, monitoring may enable targeted interventions and inform law enforcement action to prosecute those responsible for wildlife crimes. Additionally, monitoring can help detect emerging trends and shifts in the trade, allowing for timely and effective responses to new threats and challenges.

This is the fifth publication in a series of Global Trend Reports that aim to showcase and contextualize trends in online IWT. Reports will be published throughout the three years of the ECO-SOLVE project, with two to four reports per year. Drawing on findings generated by the GMS, each Global Trend Report will highlight the latest trends in statistical data, including the

DEFINING ONLINE ILLEGAL WILDLIFE TRADE

Online wildlife trafficking refers to the illegal trade in protected wildlife species and their derivatives facilitated through online platforms and digital means. It encompasses a wide range of activities, including the sale of live animals, exotic pets, animal parts and products derived from endangered species.



number of advertisements found, the species advertised and the platforms that host these adverts. Diving deeper into individual topics, the reports will offer regional breakdowns and include sections that contextualize and analyze findings, while also investigating changes in regulations and their effects on online IWT as well as trends in law enforcement. The reports will also discuss case studies of online IWT.

Following the structure of the previous Global Trend Reports, the fifth issue begins with a trend analysis of online IWT drawing on data from regular monitoring carried out between April 2024 and August 2025 across the 10 GMS data hubs. The report then discusses issues of traditional medicines driving IWT as a method of evading sanctions, and the growing issues around wildlife product substitution.

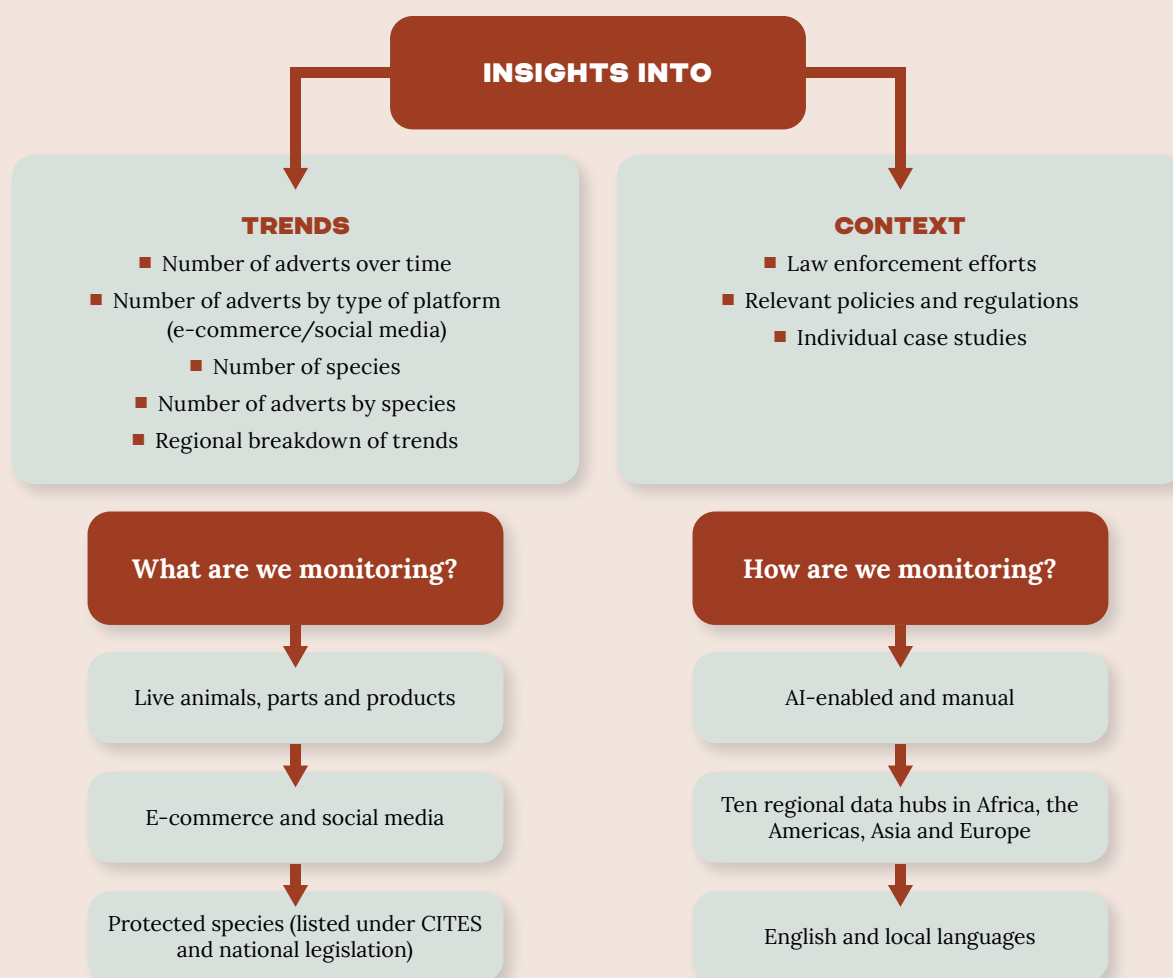


FIGURE 1 Global Trend Reports – insights and trends.

Methodology

The main data analysis presented here draws on data collected by the GMS related to online advertisements for the illegal sale of wildlife. ECO-SOLVE derived general figures, such as the number of advertisements per data hub over time; the platforms where they appear; the protection status of the species under international and national regulations; and the extent to which online markets are concentrated. ECO-SOLVE also developed analyses of interactions between these variables to enhance understanding of the nature of online trade.

For the data to be comparable across space and over time, data hubs follow a structured manual monitoring routine. Monitoring is done at standard temporal intervals for the same platform types. In addition, data hubs monitor species that are included on established global and national lists of vulnerable and endangered species. Akin to methodologies that monitor market trends (e.g. inflation) by analyzing a 'basket' of goods that collectively represent the wider economy, the ECO-SOLVE GMS establishes both national and global species baskets to represent the broader online IWT market. It considers the species' protection status under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), their conservation status under the International Union for Conservation of Nature Red List of Threatened Species (IUCN Red List), their protected status under national laws and regulations, as well as their relevance and priority to (local) law enforcement.





TRENDS IN ONLINE IWT MARKETS: GMS DATA APRIL 2024–AUGUST 2025

Since the previous Global Trend Report, which covered data inputs from Brazil, South Africa and Thailand, the GMS has scaled up to 10 global hubs. Indonesia, Nigeria, Colombia and Mexico have been added, along with contributing partner organizations that cover Cameroon (TRAFFIC), the South Asia region (Wildlife Trust India) and the Middle East and North Africa (MENA) region (the International Fund for Animal Welfare). This expansion has enabled a more geographically specific picture of online IWT, while also drawing attention to previously under-monitored markets. For comparison, the fourth trend report (covering 1 November 2024 to 31 January 2025) documented 3 192 adverts, with Facebook accounting for approximately 95% of all detections. The present dataset, covering the end of January through to the end of August 2025, captures an additional 10 062 adverts across the 10 hubs, reflecting both greater reach and evolving online marketplaces.

In total, the GMS has collated 13 254 advertisements that were detected between 14 April 2024 and 31 August 2025. To date, the GMS has detected illegal wildlife advertisements on 54 online platforms, through systematic scans carried out in 29 different languages (see Figure 2).

DATA HUB	NO. OF RECORDS	FIRST RECORD	PLATFORMS DETECTED	LANGUAGES
Thailand	7 825	15/8/2024	Facebook, Line, Kaidee	Chinese, English, Lao, Thai, Vietnamese
South Africa	1 440	14/4/2024	Facebook, WhatsApp, Junkmail, Gumtree, Public Ads, TikTok	Afrikaans, English, Zulu
Brazil	1 234	14/4/2024	Facebook, Instagram, WhatsApp	Portuguese
Indonesia	866	24/3/2025	Facebook, Instagram, TikTok, Tokopedia, Shopee	English, Indonesian
South Asia	780	6/3/2025	YouTube, Instagram, Facebook, TikTok	Arabic, Bengali, English, Hindi, Nepali, Tamil
MENA	392	2/3/2025	Facebook, OpenSooq, Haraj	Arabic, English
Mexico	333	1/7/2025	Facebook, TikTok, Instagram, Mercado Libre, Amazon	English, Spanish
Colombia	258	19/3/2025	Facebook, WhatsApp, Public Ads, Mercado Libre	Spanish
Nigeria	76	9/6/2025	Facebook, informal farm sites	English
Cameroon	50	10/7/2025	Store423031, Facebook, TikTok, TradeFord, 21Food, EC21	English, French

FIGURE 2 Breakdown of structured monitoring statistics by data hub, showing number of advertisements detected, date of first recorded input (hub activity start date), key platforms where the ads were detected and languages of keyword searches by each hub.

NOTE: Platforms with <10% contributions have been omitted.

Despite the expansion of geographic coverage, platform concentration persists. Facebook accounted for 83.8% of all detections (Figure 3), down only slightly from the 95% reported in the fourth global trend report. E-commerce platforms now account for 12.8% of activity, while business to business (B2B) and messaging apps together account for less than 5%.

This highlights the continuing centrality of Facebook in monitoring efforts and enforcement of regulatory interventions. However, the extended dataset also underscores the need to tailor platform specific takedown strategies across a widening set of venues.

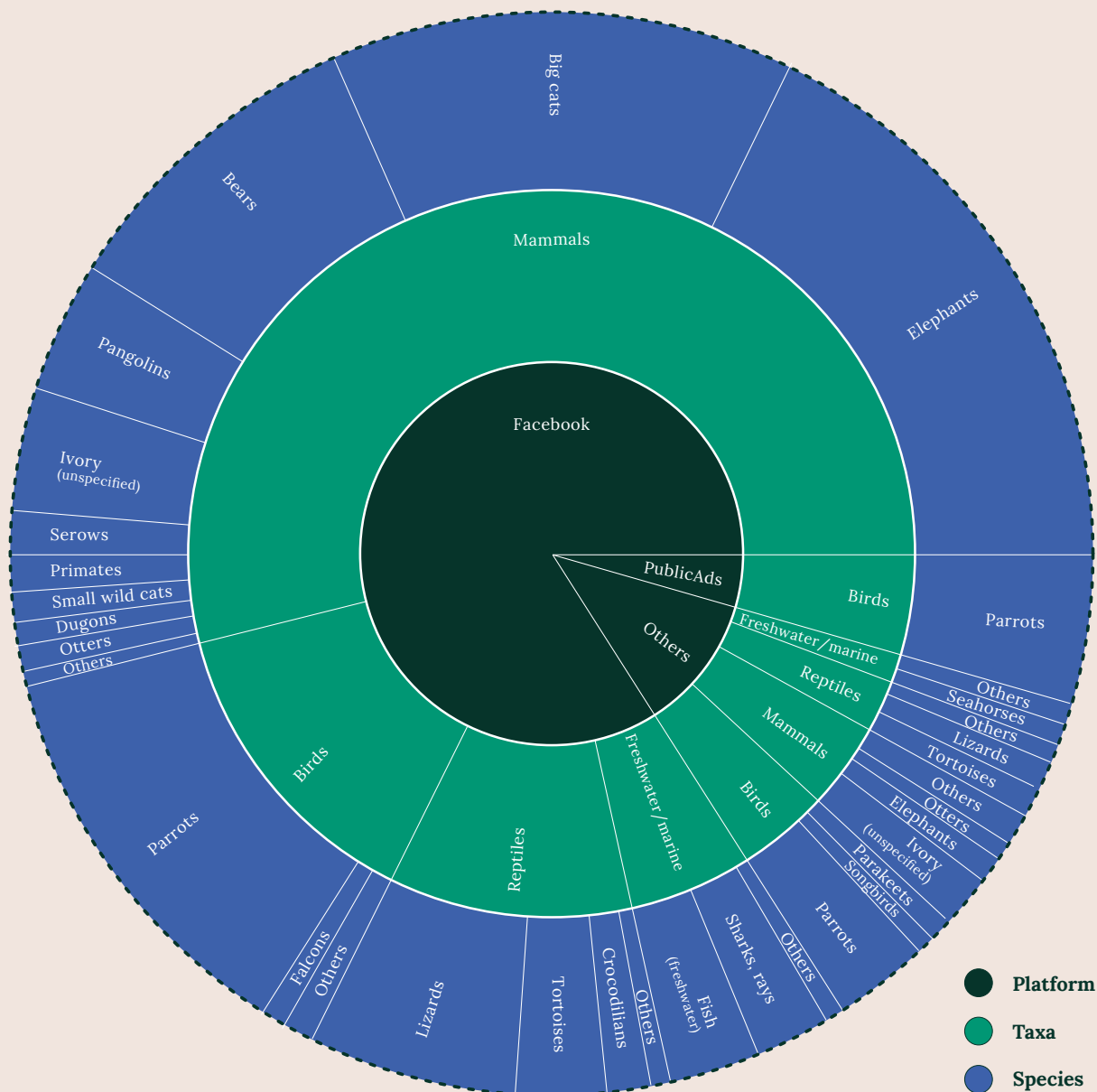


FIGURE 3 Online illegal wildlife trade detections by platform, taxonomic group and species (14 April 2024–31 August 2025).

The trade remains dominated by wildlife parts and derivatives (Figure 4), which account for 67% of all detections, compared to 31% for live animals. By taxonomic group, mammals dominate with 7 668 detections, followed by birds (2 973), reptiles (1 732), freshwater/marine taxa (857) and amphibians (24). For mammal parts, elephants and big cats (tigers, lions and jaguars) predominate. The African grey parrot (*Psittacus erithacus*) remains the most frequently recorded species for live pet trade, mirroring patterns highlighted in the previous trend report and reinforcing their status as enforcement and online regulatory priorities. Importantly, 84% of all adverts involve species listed in CITES Appendix I or II and none of the adverts came with pertinent paperwork or permit information.¹

Number of detections



FIGURE 4 Distribution of online illegal wildlife trade detections by taxonomic group and product type across 10 GMS data hubs (14 April 2024–31 August 2025).

NOTE: Bars show the number of adverts recorded, broken down by standardized taxa (mammals, birds, reptiles, freshwater/marine and amphibians) and stacked by product form (live, parts, whole, extract or other). Facet windows display each data hub separately with scales adjusted to highlight local variation.

Beyond overall volumes, the current dataset reveals early signals relevant for the thematic analysis (Figure 5). Across hubs, the GMS reveals distinct priorities for species and market drivers shaped by demand and platform marketing dynamics.

Thailand remains dominated by ivory, big cat and bear derivatives linked to traditional/spiritual beliefs and medicinal markets. Meanwhile, Indonesia is largely characterized by the persistent trade in Appendix II seahorses, and juvenile otters and reptiles marketed as pets. Brazil and Colombia show overlaps between ritual use, subsistence and commercialized markets, whereas South Africa and Nigeria display culturally specific demand for leopard and pangolin parts.

Mexico and South Asia underscore the risks of substitution and laundering in big cat and parrot trades, while the MENA region and Cameroon demonstrate how high value species and parts from animals such as parrots, falcons and pangolins, as well as ivory, circulate through cross-border online networks. In Cameroon, monitoring revealed an advertisement for a human skull alongside a lion skull on the B2B platform TradeFord. The trafficking of animal skulls as well as human remains is a concerning issue in Cameroon; such items are used in occult rituals and traditional medicine.²

In South Asia, analysts flagged several YouTube channels aimed at children as a new vector for online IWT. These channels often portrayed children showcasing live protected species such as tortoises and parrots, framing them as playful or desirable pets. While the videos did not always amount to explicit sales offers, they frequently encouraged viewers to ‘subscribe for more information.’ Additionally, these accounts are labelled as pet shops or pet businesses – a tactic that simultaneously normalizes possession of protected wildlife and risks drawing children into the trafficking ecosystem as both sellers and promotional intermediaries.

HUB	PRIORITY SPECIES/ PRODUCTS	PRIMARY MARKET DRIVER	KEY MARKETING TACTICS
Thailand	Elephant ivory amulets, tiger and bear teeth, lion teeth, African grey parrot, baby orangutan	Spiritual and religious beliefs; pet trade	Use of Facebook Stories for 24-hour visibility with automatic deletion; generic animal images pulled from Google used to signal stock is available; emergence of lion parts due to legal ownership loophole.
Indonesia	Monitors (Appendix I/II) – juveniles; seahorses (Appendix II) – dried; hawksbill and green sea turtles	Pet trade; traditional Chinese medicine	Direct keywords for seahorses (no coded terms); juvenile monitor lizards probably captive bred without permits; dried seahorses mixed with ginseng/alcohol for traditional Chinese medicine.
Brazil	Caimans (leather and ritual use), pirarucu, sharks	Ritual use; fashion; subsistence fishing	Rise in caiman parts for Afro-Brazilian rituals; pirarucu ads taken down after federal police action; stability year-on-year in ad volumes.
Colombia	Red-footed tortoise, shark oil/cartilage, cotton-headed tamarin	Pet trade; medicinal oil; wild capture	Animal emojis used instead of species names; group admins ask for ‘general animal’ posts to mask sales; repeat tortoise breeder active in multiple groups.
South Africa	Leopard skins and parts	Traditional attire; cultural ceremonies	Spike in sales of leopard skins (linked to cultural events); rise in Facebook business pages; TikTok emerging as a channel.
Mexico	Jaguars, lions, tigers, parrots, primates, rhino parts, ivory	Exotic pet trade; taxidermy, worked wildlife products (ivory, exotic leathers)	Claims of official registration (through SEMARNAT) used as cover for prohibited species; live big cats sold for status; WhatsApp catalogues used for private trade.
Nigeria	West African giraffe, pangolin meat, vultures, ivory	Pet trade; bushmeat; traditional uses	‘Farms’ fronting for live endangered species incl. West African giraffe; bushmeat offers incl. pangolin meat for export; women (vulnerable group) selling ivory and pangolin meat.
South Asia	Parrots (Alexandrine parakeet, African grey parrot, rose-ringed parakeet), Bengal monitor lizards, Himalayan musk/deer musk products	Pet trade; wildlife meat/skins; traditional medicine	Shift from Facebook to YouTube; parrots and Bengal monitor lizards dominate; deceptive musk deer ads; use of children's YouTube channels posting videos as if showing off the animals, with requests to ‘subscribe’ as a sales tactic to provide prices to customers.
MENA	African grey parrot, African elephant ivory, falcons	Pets and jewellery (both as status symbol)	Facebook groups frequently sell parrots and falcons. Ivory products sold as ‘mammoth ivory’. Iraq, Jordan, UAE hotspots.
Cameroon	Pangolins, African grey parrots, sea cucumbers, pythons, crocodiles	Pet trade; bushmeat; traditional uses; bulk sales likely linked to Asian markets	Pangolins (skins, scales, meat), pythons and crocodiles being sold as bushmeat; pangolin scales offered every week (100 kilograms) on B2B platforms; illegal parrots sold openly on e-commerce platforms. Lion skulls bundled with human skulls; traders shifting to B2B platforms.

FIGURE 5 Priority species, primary market drivers and key online tactics observed across 10 GMS hubs (14 April 2024–31 August 2025).

NOTE: Data highlights both the diversity of taxa targeted and the adaptive methods used by sellers to exploit cultural demand, regulatory loopholes and platform specific features.



NORTH KOREA'S RHINO HORN PILLS: AT THE NEXUS OF CONSERVATION AND SECURITY

Recent post-COVID online detections across Asian social media and e-commerce markets have revealed a proliferation of listings for North Korean Angong Niu Huang Wan (ANW) pills. While ANW is a common traditional Chinese medicine, the North Korean version, also known as Angung Uhwang Hwan, is distinctive and highly problematic: it is marketed as containing genuine rhino horn (as seen on the product labels themselves). In contrast, the Chinese formulation of ANW has replaced rhino horn with buffalo horn in its official pharmacopoeia since 1990. This illustrates how rhino horn, one of the world's most valuable illicit wildlife commodities, is laundered through online platforms, creating both conservation and global security challenges.

A 2020 report by the United Nations Office on Drugs and Crime (UNODC) traces the illegal supply chain for rhino horn and ivory. It shows that significant profits are made at each stage, from source in Africa, through transit to consumption in Asian markets. This creates illicit financial flows that multiply criminal profits many times over.³

At the wholesale level, the Wildlife Justice Commission documented rhino horn trading at US\$10 700 to US\$22 300 per kilogram in Asian markets such as Vietnam between 2016 and 2022.⁴ Packaging of North Korean manufactured ANW explicitly lists 0.12 grams of rhinoceros horn per pill, meaning a six-pill box contains about 0.72 grams. Retail prices for such boxes range from US\$300 to US\$600 in foreign markets.⁵ That equates to US\$420 to US\$830 per gram of horn when embedded in ANW; 20–40 times higher than wholesale prices documented by the Wildlife Justice Commission and consistent with the magnification of price described by the UNODC. By incorporating small amounts of rhino horn into what is labelled as traditional medicine, North Korean factories and distributors potentially convert relatively modest raw material costs into disproportionately high returns in hard currency. This makes ANW highly profitable for traffickers and strengthens the incentive to continue sourcing rhino horn.

Intermediaries – such as the Dandong Representative Office of Tucheng Technology Cooperation and Exchange Company of North Korea (朝鲜土城技术合作交流会社丹东代表处) – online *daigou* (cross-border shopping agents) and smugglers advertise across Chinese platforms.¹¹ Once smuggled across the border into China, consignments are likely trucked to Haixin District or Dalian for international export by sea (Figure 6). These routes allow ANW and related products (such as tiger bone wine) to spread across Asia, where they surface on regional e-commerce and social media platforms in Japan,¹² Hong Kong,¹³ Singapore,¹⁴ Malaysia,¹⁵ Cambodia,¹⁶ Thailand,¹⁷ Vietnam¹⁸ and Myanmar.¹⁹ The products also proliferate in tourism posts from Laos on Douyin, a video platform.²⁰ The supply chain into South East Asian countries appears to be marketed toward Chinese consumers, with nearly all online advertisements written in Chinese. This supply chain exploits Laos and other nations with weak governance to supply North Korean ANW to Chinese tourists who visit these countries.²¹

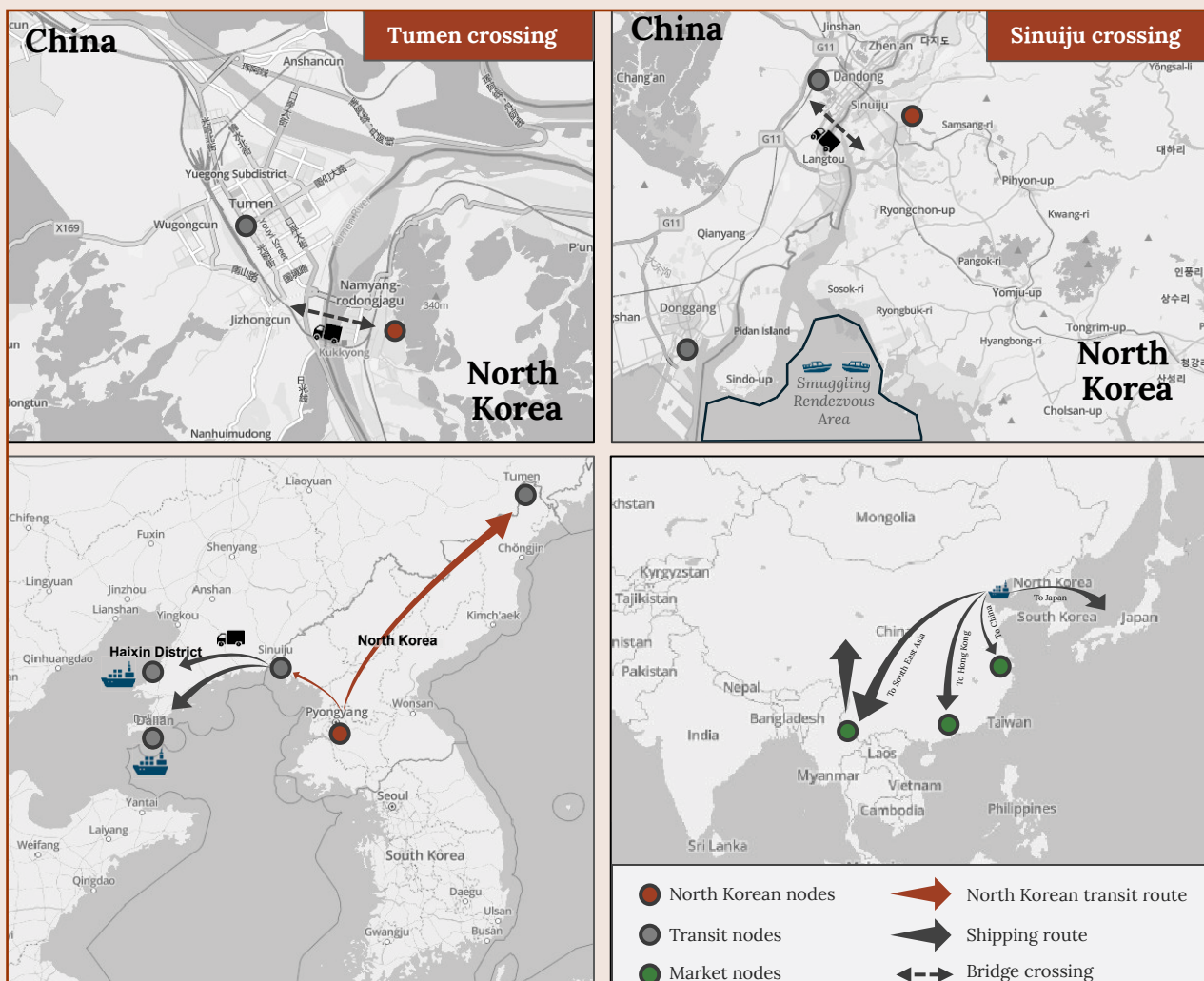


FIGURE 6 Illicit trafficking routes of North Korean ANW pills. Top panels: key border crossings at Tumen (left) and Sinuiju (right), showing cross-border smuggling corridors into China.

NOTE: Bottom left: production and transit flows from Pyongyang through Sinuiju and Tumen toward Haixin District and/or Dalian for maritime export. Bottom right: onward distribution routes by sea from China to domestic markets (node at Shanghai) and to regional markets in Japan, Hong Kong, South East Asia and back into China.

WHAT WE DO AND DO NOT KNOW ABOUT NORTH KOREAN ANW PILLS:

- **Known:** North Korean ANW pills are marketed as containing rhino horn (ingredient lists explicitly include 'rhino horn'). North Korean diplomats have been involved in trafficking rhino horn.
- **Unknown:** There is no publicly released, conclusive forensic (DNA or chemical) evidence that North Korean-manufactured ANW pills contain rhino horn. 

There was a peak in demand for traditional Chinese medicine products such as ANW during the COVID-19 pandemic – especially in China (see Figure 7) – and residual high demand has continued in recent years. In 2024, the legal ANW pill industry exceeded 100 million yuan (US\$14 million), in large part due to a surge in Chinese medicine exports to South East Asian markets.²²

Boosted by wildlife traffickers who exploited the COVID-19 pandemic,²³ ANW has also been promoted by so-called predatory journals.²⁴ These journals charge authors fees to publish papers that do not undergo proper peer reviews, enabling articles to appear as scientific while actually bypassing the checks that protect research quality.

Aside from the North Korean pills that claim to contain rhino horn, it was alleged in an interview by the Elephant Action League with a trafficker that Chinese companies – notably including Tong Ren Tang Pharmaceuticals, based in Beijing – were using rhino horn smuggled from Vietnamese syndicates in their ANW products.²⁵ While other sources dispute these claims,²⁶ this company has been known to include illicit wildlife parts such as leopard bone, pangolin scales, musk and saiga horn in its products.²⁷ Additionally, online auction records show Tong Ren Tang's green ANW boxes, apparently from before China's 1993 ban on the use of rhino horn in traditional medicine, still in circulation with listed ingredients explicitly including rhino horn (see image below).²⁸



An auction in 2023 sold pre-ban Tong Ren Tang ANW pills (which still contained rhino horn) as 'artwork' for 1 million Japanese yen (US\$6 700); the document presented alongside the item shows 'rhinoceros horn' as a listed ingredient.²⁹

Market data shows how consumer behaviour can be exploited opportunistically. A Google Trends analysis of the term 'Angong Niu Huang Wan' (安宫牛黄丸) reveals spikes in ANW searches during major health crises, primarily in China.³⁰ These spikes coincide with H1N1 in 2005,³¹ scrub typhus from 2006 to 2014,³² scarlet fever in 2011,³³ COVID-19 from 2020³⁴ and whooping cough in 2024 (Figure 7).³⁵ In fact, while traffickers openly promoted the 'authentic' North Korean version of the product during the COVID-19 pandemic,³⁶ the Chinese government added it to an approved list of SARS remedies,³⁷ enabling domestic trade and potentially increasing demand for rhino horn. These patterns demonstrate that periods of public health emergency correlate with rising demand for ANW – and embedded within this, demand for ANW that contains rhino horn. For enforcement agencies, this is a predictive indicator: future outbreaks can be expected to trigger an increase in attempts to traffic illicit traditional Chinese medicine products as demand spikes in China.

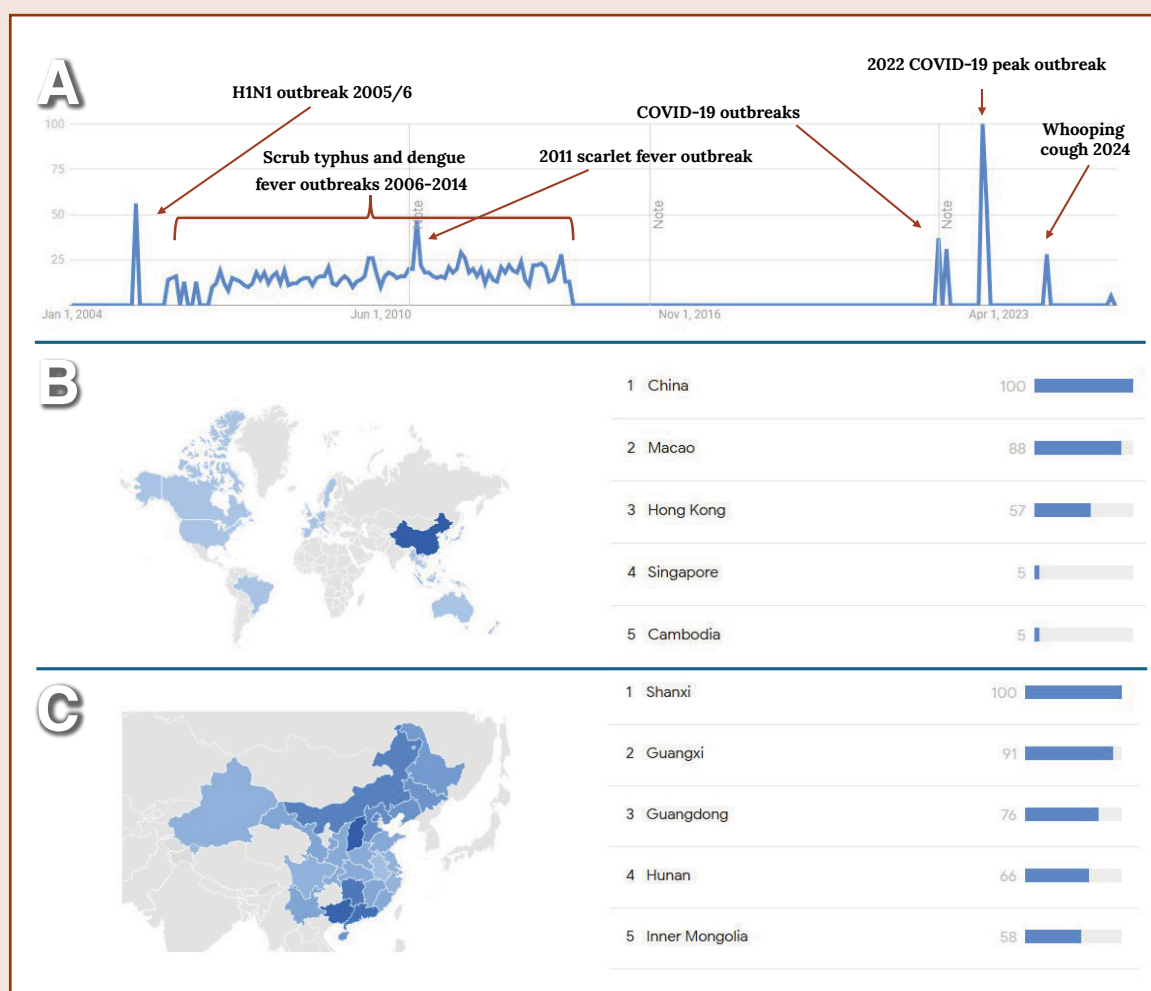


FIGURE 7 GI-TOC analysis of Google Trends results for search term ‘安宫牛黄丸’ (Angong Niu Huang Wan). (A) Time-series of search interest in China (2004–2025), with notable peaks coinciding with regional or global disease outbreaks (H1N1, scarlet fever, COVID-19 and whooping cough); (B) Distribution of overall interest by country (2004–2025), showing highest intensity in China, Macao and Hong Kong, with lower but notable signals in Singapore and Cambodia; (C) A zoom in on the subnational distribution of search interest in China (2004–2025), led by Shanxi, Guangxi, Guangdong, Hunan and Inner Mongolia.

Trade is further complicated by a parallel lookalike product economy.³⁸ In Hong Kong, companies like Koryo Chil Bo Pharmaceuticals Limited (高麗七補製藥有限公司), registered in 2024, use a company name and branding patterns that are strikingly similar to the authentic North Korean Koryo Chilbo Pharmacy (高麗七宝药店) and market ANW products that closely mimic the appearance of those manufactured in North Korea (see images below).³⁹ While the listed ingredients do not indicate the presence of rhino horn, Hong Kong continues to be identified in multiple reports as a major rhino horn transit hub.⁴⁰ The blurred distinction between authentic and knock-off products makes enforcement more challenging, sustains consumer appetite and potentially fuels demand for the authentic product. It is also worth noting that the imitation product labels show the use of *ejiao* (donkey skin gelatin), a wildlife product that has led to a collapse of China's domestic donkey population⁴¹ and is known to be linked with the illegal wildlife trade.⁴²



Examples of authentic North Korean ANW pills containing rhino horn (A–C) and lookalike brand ANW pills advertised online (D–F).⁴³

Thousands of rhinos are poached each year for their horns.⁴⁴ Recent indictments of South African rhino farmers for trafficking to Asian markets highlight the ongoing scale of the trade from both captive and wild populations.⁴⁵ However, North Korea's role in rhino horn trafficking elevates the situation from a conservation challenge to an international security concern. North Korea is subject to comprehensive UN Security Council sanctions (Resolutions 1718 and subsequent measures) and parallel US and EU sanctions, all of which target illicit revenue streams such as those managed by Bureau 39, an office of the North Korean state dedicated to generating hard currency earnings.

Diplomatic personnel have been implicated in at least 18 smuggling cases since the late 1980s,⁴⁶ including a 2022 allegation in South Africa involving US\$65 million in rhino horn.⁴⁷ While that figure reflects retail valuations rather than direct profit, the business model around ANW demonstrates how that value could be amplified dramatically. A simple search for ‘buy Korean Angong Niu Huang Wan’ (购买朝鲜安宫牛黄丸) on Douyin returns hundreds of posts promoting what is claimed to be authentic North Korean ANW.⁴⁸ Most of these adverts were posted between 2021 and 2025, indicating that North Korean state-linked factories and distributors may be exploiting pandemic and post-pandemic demand to cultivate a profitable and expanding market niche.

Against the backdrop of North Korea’s estimated US\$1.47 billion 2023 defence budget,⁴⁹ revenues from mass manufacturing and selling ANW may be modest in absolute terms. However, the resilience of such sales to sanctions and the resultant hard currency earnings from Chinese markets makes ANW strategically valuable. Reports by the UN and other experts confirm that wildlife trafficking forms part of North Korea’s broader toolkit for sanctions evasion and that profits could be channeled through Bureau 39 to support prohibited programmes.⁵⁰

Given that a single alleged shipment of rhino horn valued at US\$65 million could, once processed into ANW, be amplified 30–40 times over, the potential revenue climbs significantly. Even a fraction of this could bankroll strategic programmes. Defence experts estimate that North Korea’s long-range missile and launch programmes cost US\$3–10 million each,⁵¹ so ANW sale proceeds would be sufficient to finance dozens of tests or multiple missiles outright. The convergence of biodiversity loss and sanctions evasion underscores why the rhino horn trade constitutes a significant security threat as well as a conservation emergency.

A final caveat should be added: while the rhino horn trade’s links to North Korea should be treated as a security concern, framing North Korea’s participation in this trade solely through a securitized lens risks a ‘green militarization’ approach that repeats past errors. An excessive focus on the use of force at the expense of transparency has previously resulted in human rights abuses and increased corruption risks in various countries. A prime example is Tanzania’s 2013 Operation Tokomeza, which was halted after a parliamentary probe that confirmed resort to extra-judicial killings and torture.⁵² There has also been long-running controversy over lethal anti-poaching measures in India’s Kaziranga National Park.⁵³ Finally, there is evidence of corruption among rangers in high-risk settings.⁵⁴

A balanced strategy is therefore essential – one that combines conservation measures and counters organized crime action with demand reduction activities. Such an approach is crucial to addressing biodiversity loss, crime and security, without resorting to green militarization.

RECOMMENDATIONS

- Customs and border enforcement – risk profiling during health outbreaks: Use Google Trends and disease outbreak data as predictive tools: spikes in ANW searches (and other illicit traditional Chinese medicine searches) signal increased trafficking risk from North Korea. Customs in China and regional hubs (Thailand, Vietnam and Malaysia) should heighten inspections of traditional medicine shipments during epidemics and also monitor products flowing from North Korea through the Dandong border area, through bridge access, access to railway cargo, or by monitoring vessel rendezvous where the Yalu River meets the Yellow Sea.
- Testing of North Korean ANW: Seizures of North Korean ANW should be tested for rhino horn and evidence should be made publicly available for law enforcement to determine product composition. One starting point could include several sites identified as being associated with the product in a recent GI-TOC report on IWT shops in Laos.⁵⁵
- Financial intelligence units and sanctions authorities – follow the money: Given the documented role of North Korean diplomats and entities in rhino horn smuggling, financial intelligence units and UN/EU sanctions bodies should treat ANW and related trade flows in traditional Chinese medicine as red flags for sanctions evasion. These efforts should include monitoring freight forwarding companies linked to Sinuiju, Tumen and Dalian.
- Health ministries and international medical journals – counteract misinformation: These entities should actively debunk and retract predatory journal articles promoting rhino horn as an active ingredient of ANW, while reinforcing the fact that rhino horn has no proven medicinal efficacy. Journals and ministries should flag and retract spurious references in public databases like the US National Institutes of Health to prevent further legitimization of illicit trade in wildlife products.
- INTERPOL, the World Customs Organization and national security agencies – recognize North Korean ANW and rhino horn trafficking as a dual threat: Incorporate ANW and rhino horn trafficking into counter-proliferation frameworks. Recognize that rhino horn products are not only the result of environmental crimes but also potentially contribute to funding North Korea's military programmes. 



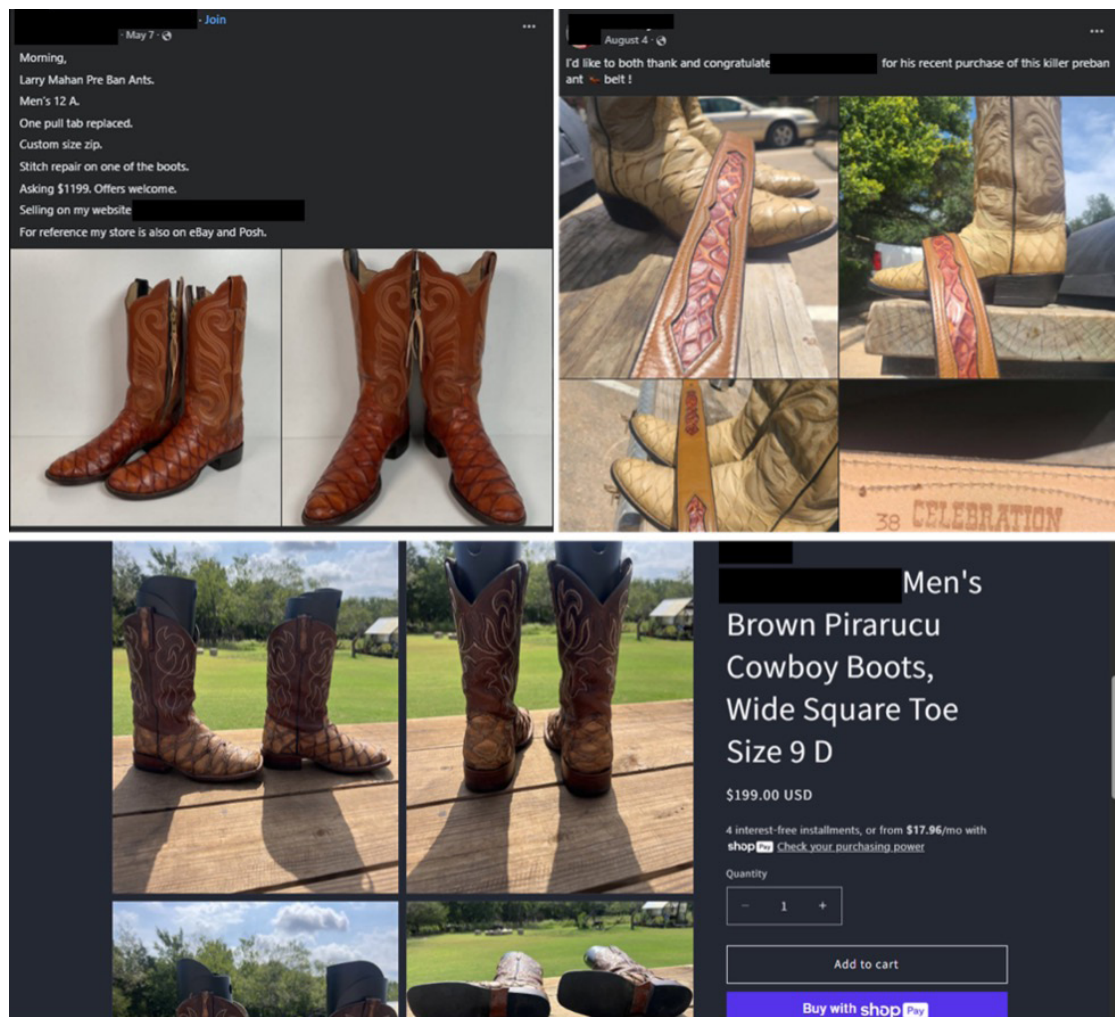
WILDLIFE SUBSTITUTIONS AND TAXIDERMY LOOPHOLES: DEMAND FINDS A WAY

North Korea's ANW pills show how illicit actors convert a banned wildlife input into a portable, 'value-added medicine' that moves across borders and platforms. The same market logic – persistent demand meeting adaptive supply – also drives broader substitution patterns in IWT around the world. When one species becomes hard to source or risky to trade, sellers pivot to substitutes and launder processed products (e.g. wildlife parts, powders, extracts, jewellery, taxidermy, leatherworking) through quasi-legal channels.⁵⁶

When enforcement tightens on one species, illicit markets rarely disappear – they adapt. Substitution in IWT follows predictable pathways: swapping to inorganic or synthetic analogues; shifting sourcing to new range states or to captive-bred or 'artificially propagated' supply; and replacing a targeted species with a lookalike or functional equivalent.⁵⁷ Alongside these tactics, taxidermy and leatherworking form a major regulatory blind spot. Once parts are mounted or cut into panels, routine species identification and provenance checks become difficult: tanning and finishing processes degrade DNA and introduce inhibitors, making reliable molecular identification challenging even with specialized protocols.⁵⁸

The problem is compounded through online trade, where worked items (e.g. carved or polished ivory) are hard to distinguish without physical examination – an issue acknowledged in the updated CITES/WWF/TRAFFIC identification guide for ivory and ivory substitutes.⁵⁹ In parallel, legal carve-outs (e.g. 'personal and household effects' exemptions designated by CITES and analogous national rules) can allow certain worked specimens to move with reduced documentation, a risk flagged in policy analyses as a potential loophole for 'legal-looking' cross-border trade.⁶⁰

From pangolin to pirarucu: Mexico's exotic leather pivot



Online advertisements of pangolin and pirarucu boots, showing coded language such as 'ants' and ant emojis to refer to pangolin leather boots.

Pangolins have long been targeted for meat and traditional medicine, with patterned leather derived from skins and scales entering luxury markets. By the mid-2010s pangolins were the most heavily trafficked wild mammals globally.⁶¹ Between 1990 and the early 2000s, the North American exotic leather industry became an additional significant driver of pangolin trafficking.⁶²

The fashion industry is one of the most lucrative markets for illegal wildlife products.⁶³ Demand within wealthy western nations, particularly in the US and Canada, is driving both licit and illicit wildlife product markets within this industry. Thousands of exotic leather products are seized annually and these worked products originate from animals caught in their natural habitats and from farms that give rise to significant animal welfare concerns.⁶⁴

When all trade in pangolin species was banned by their uplisting to CITES Appendix I in 2016,⁶⁵ markets adjusted. A 2019 investigation flagged leather derived from pirarucu – *Arapaima gigas*, one of the world's largest species of freshwater fish, native to the Amazon – as a potentially emerging substitute in US exotic goods markets, due to this species' large, diamond-shaped scale pattern and high-yield hides.⁶⁶ This species has also been in previous Global Trend Reports due to its online presence in Brazil and its proximity to the cocaine trade.⁶⁷ Subsequent CITES trade data through to

2023 confirms a decline in pangolin leather exports from Mexico, substituted by an exponential increase in pirarucu exports, with the US once again the dominant importer (Figure 8).⁶⁸ Pirarucu leather is increasingly positioned as a substitute for pangolin leather because it offers a visually similar scaled texture but comes from a species listed under CITES Appendix II, rather than Appendix I, making it a less risky option for luxury markets than pangolin skins. Notably, the vast majority of pirarucu imported and exported from Mexico is reported as wild sourced.

In Brazil, the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) regulates pirarucu through community-based management plans, closed seasons, transport licences and 'export only' designations from managed or compliant captive sources. While CITES Appendix II allows regulated trade, the scale and consistency of wild sourcing raise concerns about sustainability and measuring adherence to quotas under legitimate permits.⁶⁹

Management of Brazil's quota is decentralized to federal states, so proving an upwards breach of the overall national quota requires reconciling: (1) the authorized harvest for each state/community with (2) export licenses granted by the Sistema de Emissão de Licenças Cites e não Cites by year and quantity of skins and (3) counterpart import statistics in destination countries. IBAMA publishes the export license ledger. However, the aggregate annual harvest authorization for the whole of Brazil is not published, making it difficult to confirm an overall quota breach without stitching these datasets together.

What is clear is that there have been laundering and seizure spikes tied to permitting (i.e. illegally sourced fish being transported under the cover of legal paperwork)⁷⁰ and an increase in poaching by mafia organizations that control pirarucu ranges.⁷¹ Even Brazil's own traceability work acknowledges a chain-of-custody gap after skin removal (tags travel with the meat/carcass; traceability of the skin is then lost without a dedicated system).⁷² Laundering is therefore a significant risk from this stage of the process onwards.

In Bolivia, on the other hand, pirarucu populations have been introduced and have even become invasive,⁷³ making them a potential source for a more sustainable trade. However, framing Bolivia's introduced pirarucu stocks as a sustainable source is contentious. These stocks might reduce pressure on some native stocks elsewhere, but they also normalize a pathway whereby high-value species are intentionally seeded outside their native range states to enable exploitation. This is an approach with well-known precedents that have had severe ecological consequences. One case in point is the commercial introduction of Nile perch to Lake Victoria in East Africa in the 1950s – a catastrophic decision that resulted in the extinction of cichlids, a native fish, and the eutrophication of the lake ecosystem.⁷⁴

GMS data hubs in Brazil and Colombia have recorded 367 online offers of live juvenile pirarucu, dried meat/skins and whole specimens. Meanwhile, the Mexican hub has documented pirarucu leather boots and accessories concentrated in León, Guanajuato (the epicentre of leather goods in Mexico). In parallel, North American sellers continue to openly market 'pre-owned' pangolin boots using coded terms such as 'ant' (short for anteater), 'pre-ban' and emojis on Facebook Marketplace, TikTok, eBay and storefront websites. This indicates the existence of legacy stock, active demand channels and capacity for international shipments.

Additionally, pirarucu boots are being marketed as authentic pangolin boots and vice versa. Some listings mislabelled pirarucu as pangolin,⁷⁵ while others passed off imitation print as genuine pangolin or pirarucu.⁷⁶ This comes in a context where consumers often struggle to distinguish between pirarucu and pangolin boots.⁷⁷ In the absence of effective regulations governing imports and exports or document presentation policies for exotic leathers online, these factors make both legal and illegal trade difficult to monitor and assess.

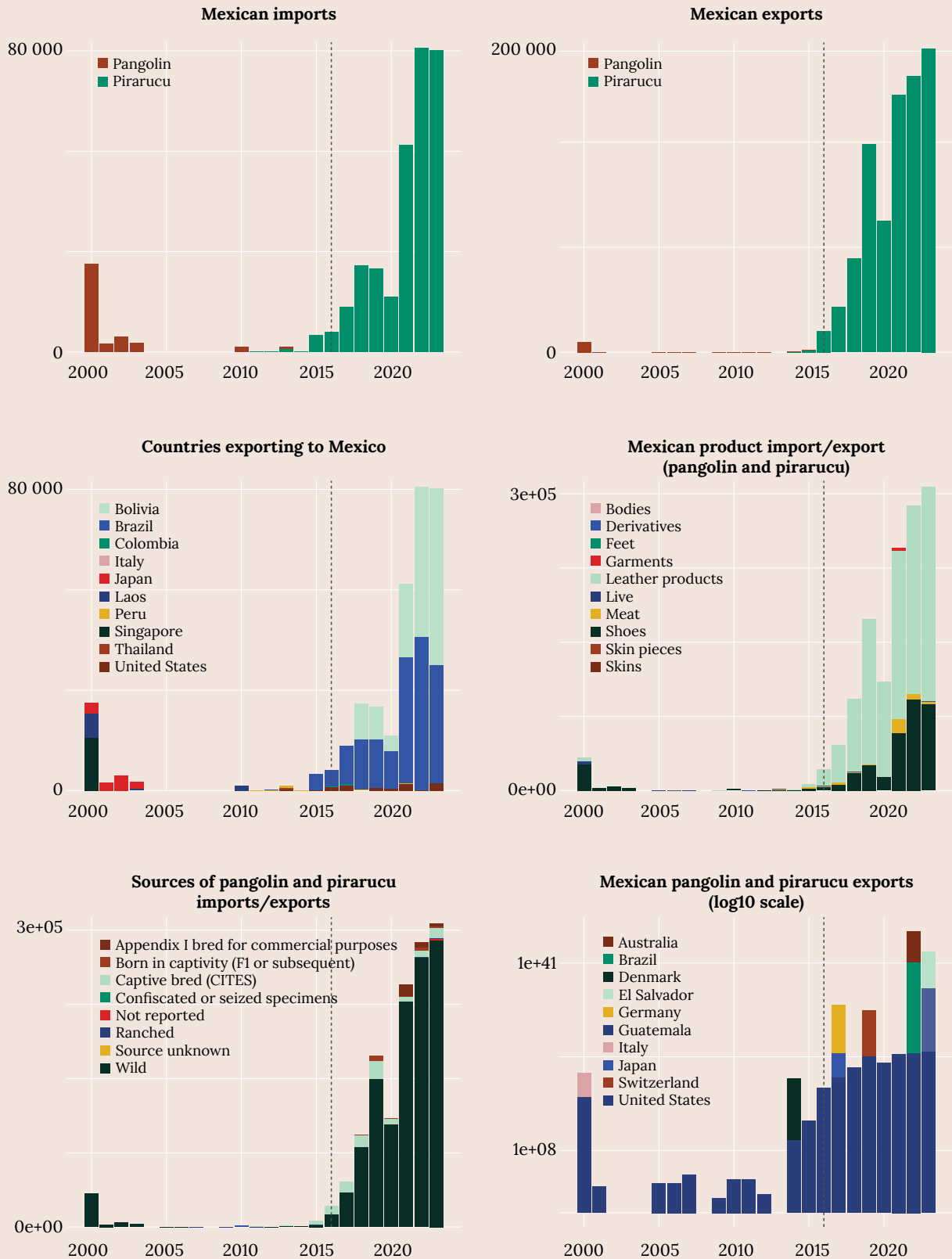


FIGURE 8 Trends in commercial Mexican imports and exports of pangolin and pirarucu products reported to the CITES Trade Database (2000–2023).

NOTE: Vertical dashed line marks 2016, the year pangolins were uplisted to CITES Appendix I. The final graph (bottom right) shows imports of Mexican pangolin and pirarucu products by country and volume (on a log scale for visibility of non-US countries). When data was available from both the importer and the exporter but the volumes did not match, an average of the two volumes was used (around 2% of quantities were not represented by number of specimens/individuals).

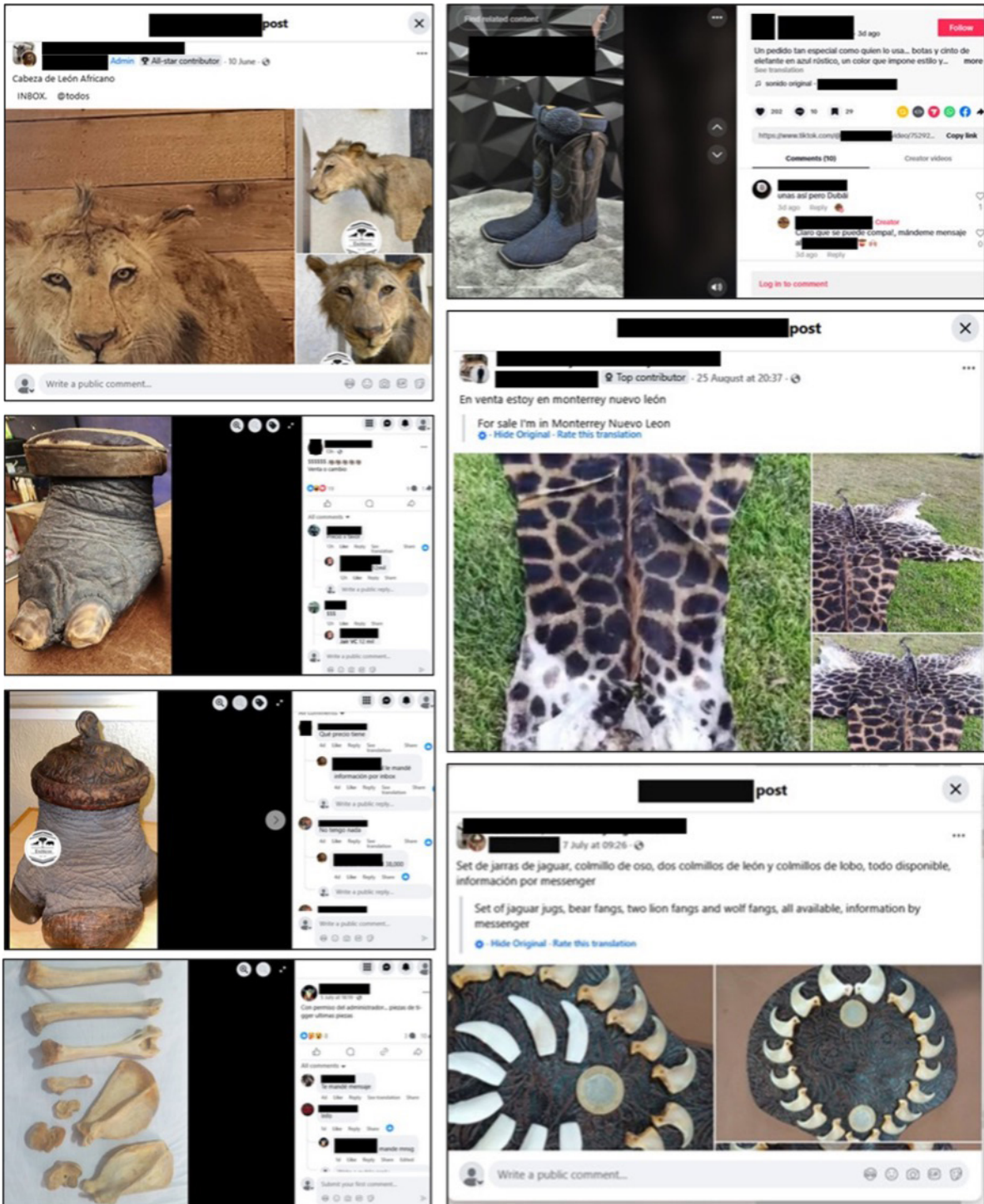


MOUNTED AND MARKETING: MEXICO'S TAXIDERMY AND LEATHERWORKING BLIND SPOT

Mexico's online trade ecosystem is vibrant, especially on social media. The Mexico data hub under the GMS has identified highly active Facebook groups and pages offering a multitude of taxidermy items such as hunting trophies, batches of skins and mounted specimens. Alongside these, the same groups advertise worked wildlife products such as jewellery carved from claws, teeth and bone, as well as ivory figurines, such as Japanese ivory netsukes (ornately carved toggles).

Both taxidermy and worked products detected on social media in Mexico have been derived from various species spanning Africa, Asia and the Americas, many of which are derived from species listed under CITES Appendix I. Detected advertisements include non-native/protected taxa (elephants, rhinos, manta rays, pythons/crocodilians, pangolins, pirarucus and mona monkeys) and nationally protected species (including jaguars and spider monkeys). These adverts often make no mention of legal origin, tagging or CITES documentation; sellers frequently use coded language, emojis and deliberate misspellings to evade moderation.

In Mexico, the Secretariat of Environment and Natural Resources (SEMARNAT) issues permits for wildlife use, taxidermy and the exotic leather trade. States and municipalities can act through coordination agreements with the secretariat. In 2016, Mexico tightened ivory rules on imports, exports, re-exports and commercialization in compliance with the CITES recommendation to ban all domestic ivory markets that potentially contribute to poaching and illegal trade. However, a concurrent proposal to prohibit the export, import and re-export of exotic specimens for ivory and leather/taxidermy stalled after a legislative review that cited a potential conflict with the General Wildlife Law's sustainable use objectives.⁷⁸ Although the amendments for ivory were approved, the amendments for leather and taxidermy were not approved.



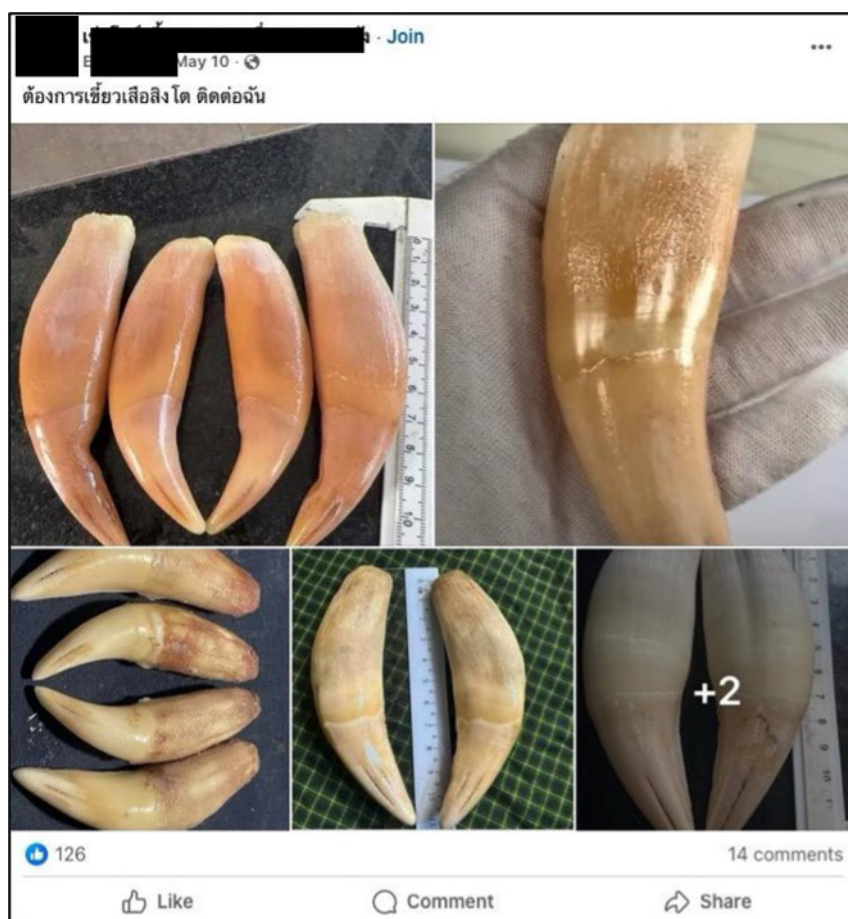
Various exotic leathers, taxidermy and wildlife parts advertised on Mexican taxidermy Facebook and TikTok groups between April and August 2025.

Budget and staff constraints within enforcement agencies have led to a primary focus on the trafficking of live specimens. Limited scrutiny of animal parts and extracts creates an enabling environment in which processed parts circulate quite easily – and this is precisely the niche where substitutions and laundering flourish.

Big cats by proxy: lions and jaguars as substitutes for tigers

Despite the global ban on the commercial trade in tigers, demand for tiger bones, canines and skins persists, tied to medicinal uses and status signalling.⁷⁹ While South Africa has no registered captive breeding facilities for tigers, it remains one of the largest exporters of tigers in the world.⁸⁰ The GMS South Africa hub has encountered at least 15 records of tiger advertisements on social media.

However, the availability of tiger products is declining internationally and markets have adapted by switching to lion and jaguar parts.⁸¹ In Thailand and Vietnam, lion bones and teeth now appear on platforms and social media groups that have historically centred on tiger products. GMS detections from Thailand include Thai amulet (เครื่องราง) Facebook groups advertising lion canines (demand for canines was previously predominantly centred on tiger canines) due to exploitation of the legal trade in domestic lions. However, a discrete choice study found that only around 20% of respondents would opt for lion bone wine above tiger bone wine, underscoring the effects of availability and legal risk on choices.⁸²



Lion canine teeth advertised in a Thai amulet Facebook group in May 2025.

South Africa has also been the epicentre of exports of lion bones and skeletons. Taxidermists and brokers process carcasses, prepare skeletons and move consignments under a veneer of permits (sometimes falsified or exploited through regulatory ambiguity) that facilitate routing via Laos and Vietnam. Bones are co-mingled with legitimate cargoes and shell entities obscure beneficial ownership.⁸³

Jaguar skins, teeth and bones from Bolivia, Suriname, Brazil, Peru and Ecuador also began to feed Asian market demand arising from risk aversion to Asian big cat parts, with scarcity and price differentials catalyzing substitution.⁸⁴ Suriname's jaguar paste – derived from boiled down carcasses⁸⁵ – mirrors tiger paste as a product.⁸⁶

Led by Earth League International and the Netherlands branch of the International Union for the Conservation of Nature, Operation Jaguar mapped Chinese-speaking networks across four countries from 2019. It shone a spotlight on concealment in timber containers and the use of international couriers and routes via the Netherlands, Brazil, Vietnam and Hong Kong.⁸⁷ Amid weak responses by law enforcement agencies, there is growing concern that the illegal jaguar trade is moving online, as illustrated by 58 GMS detections of jaguar products, primarily from Brazil and Mexico.⁸⁸



Jaguar parts advertised online (Facebook and TikTok).

Substitution obscures the true diversity of species exploited, ranging from the pirarucu and pangolin substitutions discussed above to big-cat stand-ins, with products mislabelled (e.g. lion or jaguar parts sold as tiger parts and tiger parts marketed as lion parts to exploit domestic trade loopholes). It also complicates the formulation and implementation of coherent international policy responses – such as North America removing pangolin goods from circulation to avoid newly introduced products, Latin America regulating legal pirarucu trade, and South Africa’s intent to phase out captive lion farming and associated canned hunting.⁸⁹

Additionally, processing wildlife products transforms identifiable wildlife into commodities (e.g. panels, mounts, skeletons and ‘vintage’ cowboy boots) in a context where identification of species and provenance become increasingly difficult to verify. This lowers detection risks online and at borders, while enabling relabelling and pseudo-legality through loaded language (e.g. ‘pre-ban’). It also creates flexible inventories that can be drip-fed into markets long after bans have been introduced, creating more grey areas and complications for enforcement.

RECOMMENDATIONS

- Close documentation gaps in exotic leather hubs: National wildlife management and enforcement agencies in Mexico and Brazil and the CITES Secretariat should require verifiable species identification and traceable sourcing for all exotic hides (e.g. pirarucu, elephant, sharks/rays, pangolin, crocodilian). Mandatory third-party audits should be introduced in production and export centres (e.g. León, Guanajuato) to prevent laundering of prohibited species through legitimate leather industries.
- Strengthen cross-border monitoring of proxy species: INTERPOL, the World Customs Organization and national customs agencies (particularly South Africa, Brazil, Mexico, Peru, Suriname and Vietnam) should develop joint enforcement alerts and risk profiles for lion and jaguar parts moving along tiger trade routes and facilitated by online sales. Jaguar and lion parts should be integrated explicitly into tiger enforcement frameworks to pre-empt substitution exploitation.
- Mandate platform due diligence for ‘pre-ban’ and ‘vintage’ wildlife products: Major social media and e-commerce platforms (e.g. Meta, TikTok, eBay, Mercado Libre, Shopee, OLX) should enforce proof-of-documentation uploads before allowing adverts that use terms like ‘pre-ban’ and ‘estate’ or coded emojis to go live, or when a species listed under CITES Appendix I or Appendix II is involved.
- Enhance forensic and identification capacity for processed wildlife: National forensic labs, the CITES-endorsed wildlife forensics network and the UNODC should invest in training and equipment for molecular identification of taxidermy and leatherwork products where DNA is degraded (e.g. hides, mounted trophies). Standardized protocols and regional labs would reduce the enforcement blind spot around processed goods.
- Tighten exemptions and clarify grey market categories: The CITES Standing Committee and key legislatures (Mexico, South Africa, EU, US) should review and narrow ‘personal and household effects’ exemptions that allow worked products to move without full documentation. Domestic legislation should be aligned to close loopholes for antique, ‘curio’ or ‘restoration’ markets that enable laundering into legal-looking supply chains. 



NOTES

- 1 Species listed under CITES Appendix I 'are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial'. Exemptions under Appendix I are exceptional in nature, mainly centring on scientific research. Species listed under CITES Appendix II are categorized as those that are 'not necessarily now threatened with extinction but that may become so unless trade is closely controlled'. The CITES appendices, <https://cites.org/eng/app/index.php>.
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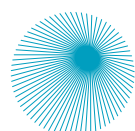
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