GLOBAL TREND REPORT

MONITORING ONLINE ILLEGAL WILDLIFE TRADE

INSIGHTS FROM BRAZIL AND SOUTH AFRICA

OCTOBER 2024

ECO SOLVE

GI-TOC

GIFP
Global Illicit Flows Programme

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ACRONYMS AND ABBREVIATIONS

ACCO	Alliance to Counter Crime Online
ATM	African traditional medicine
BRL	Brazilian real
CBFA	Community-based fishing agreement
CITES	Convention on the International Trade in Endangered Species of Fauna and Flora
GMS	Global Monitoring System
HHI	Herfindahl–Hirschman Index
IBAMA	Brazilian Institute of Environment and Renewable Natural Resources
IUCN Red List	International Union for Conservation of Nature Red List of Threatened Species
IWT	Illegal wildlife trade
SANBI	South African National Biodiversity Institute
ZAR	South African rand

THE GLOBAL MONITORING SYSTEM FOR ONLINE MARKETING OF ILLEGAL WILDLIFE TRADE

The last decade and a half has 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 is developing a Global Monitoring System (GMS) to systematically monitor global online IWT and 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. The GMS's 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 Report. This Global Trend Report draws on data from two national data hubs: Brazil and South Africa. 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 second 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 about two to four reports released per year. Drawing on findings generated by the GMS, each Global Trend Report will highlight the latest trends in statistical data,

DEFINING ONLINE ILLEGAL WILDLIFE TRADE

The online illegal wildlife trade refers to the illegal trafficking of 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.[1]

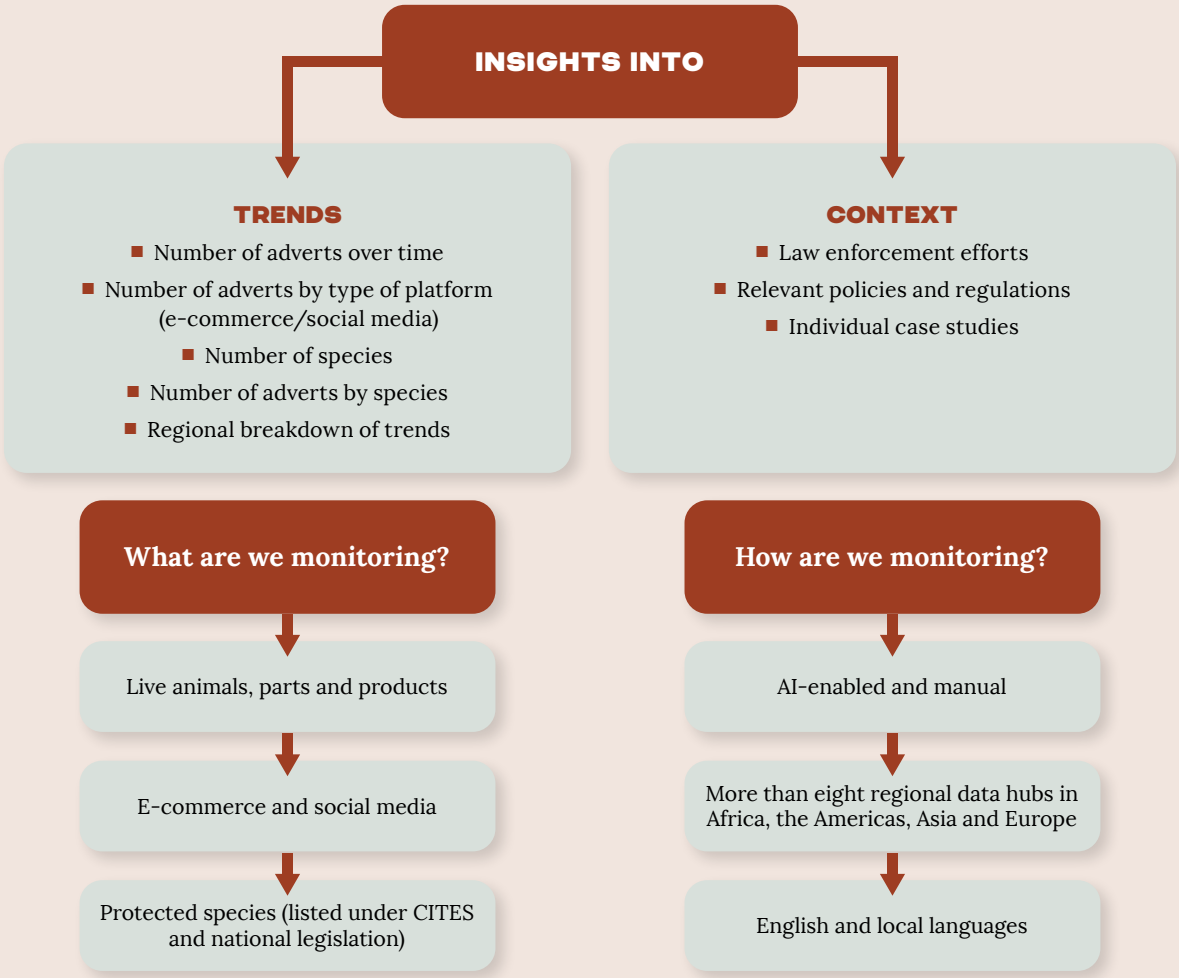

FIGURE 1 Methodology for capturing and contextualizing trends in online IWT.

including the number of advertisements found, the species advertised as well as 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 first Global Trend Report, the second issue begins with a trend analysis of online IWT drawing on data from regular monitoring carried out between May and July 2024 by GMS data hubs in Brazil and South Africa. The report then takes a closer look at the online and offline illegal trade in Pirarucu in Brazil, as well as the trade routes used and links to cocaine markets. The third section presents a case study of the illegal wildlife trade as linked to traditional medicines in South Africa, highlighting gaps around regulations and enforcement.

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 the online trade.

For the data to be comparable across space and over time, data hubs follow a structured manual monitoring routine. Monitoring is employed under 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, ECO-SOLVE creates national and global species baskets to represent the broader online IWT market. We take into account the species' protection status under CITES (the Convention on the International Trade in Endangered Species of Fauna and Flora) and national regulations, their conservation status under the International Union for Conservation of Nature Red List of Threatened Species (IUCN Red List) and their legal status under criminal law, as well as their relevance to (local) law enforcement.

TRENDS IN ONLINE IWT MARKETS

The following analysis draws on GMS monitoring of the online IWT market for 26 target species during a three-month period (May–July 2024) in Brazil and South Africa. In this period, the GMS detected 477 advertisements for 69% (18) of the target species, with 55% (264) of the advertisements registered by the data hub in Brazil and 45% (213) by the data hub in South Africa. The Brazil hub detected eight species, with an average of 33 advertisements per species, while the hub in South Africa detected 13 species, with an average of 16 advertisements per species.

The diagram in Figure 2 illustrates the connections between platform types, specific platforms and species, based on where advertisements were found. Each path links a platform type to a specific platform and then to a species, representing the distribution of advertisements. The width of each arrow corresponds to the number of advertisements detected at that point – wider arrows indicate larger quantities.

As shown in Figure 2, social media platforms accounted for 78% (374) of the advertisements, while e-commerce platforms accounted for 22% (103). Facebook was the most active platform for IWT marketing. It also had the greatest species diversity, including all 18 target species in its advertisements. The country-specific e-commerce platforms with the most advertisements were OLX in Brazil and Public Ads in South Africa. The e-commerce platforms featured only 50% of the target species. These general figures point to a similar pattern: for the monitoring period, online IWT was more intense and diverse on social media platforms than on e-commerce platforms.

Analysis of the advertisements' text supports existing research on IWT by demonstrating the prominent role of private messaging apps such as WhatsApp in facilitating the illegal sale of wildlife. Of 427 advertisements with textual information, 17% (72) indicated that sales would occur exclusively through WhatsApp, that WhatsApp was necessary for obtaining further information or that additional species were available through WhatsApp.

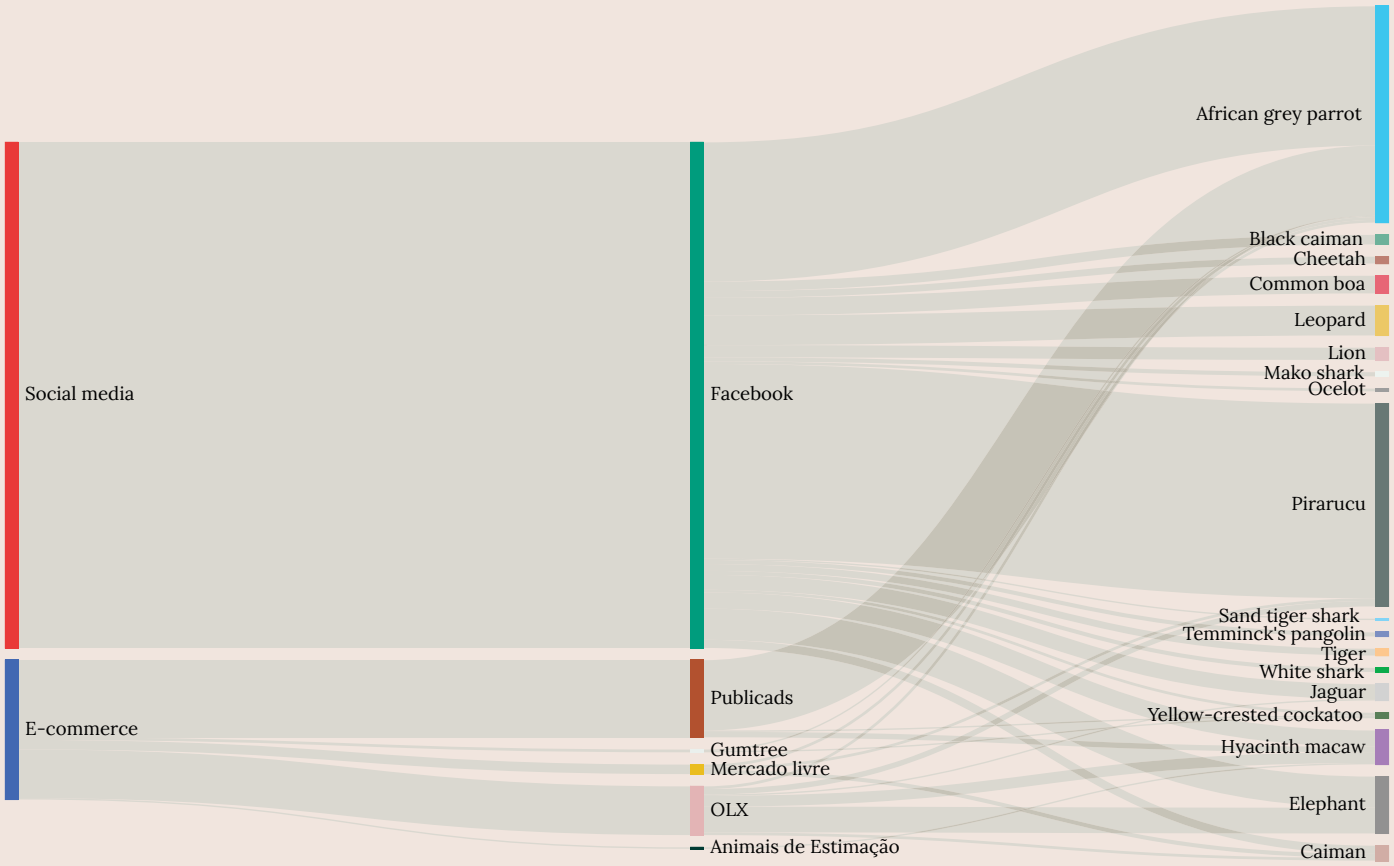

FIGURE 2 Online advertisements for IWT in target species detected by GMS data hubs in Brazil and South Africa, May–July 2024, by platform type, platform and species.

Figure 3 details the most advertised species based on the number of advertisements detected in this study. The stacked bars show the total numbers while also indicating detections per data hub. African grey parrots top the list with 160 detections, with active markets in South Africa (green) and Brazil (red). Close behind is pirarucu, with 150 detections, reflecting its significant presence in online markets, especially since all advertisements for this species come from the data hub based in Brazil. Hyacinth macaws, with 25 detections, occupy the 4th place in the graphic – it is relevant to note that this mostly reflects feather usage in illegally marketed indigenous headpieces (known as *cocares* in Brazil), although there were also living specimens in the data set.

Figure 4 presents the most advertised species in each data hub in terms of their protection status under the CITES Appendices and national legislation. Note that national protection of a species

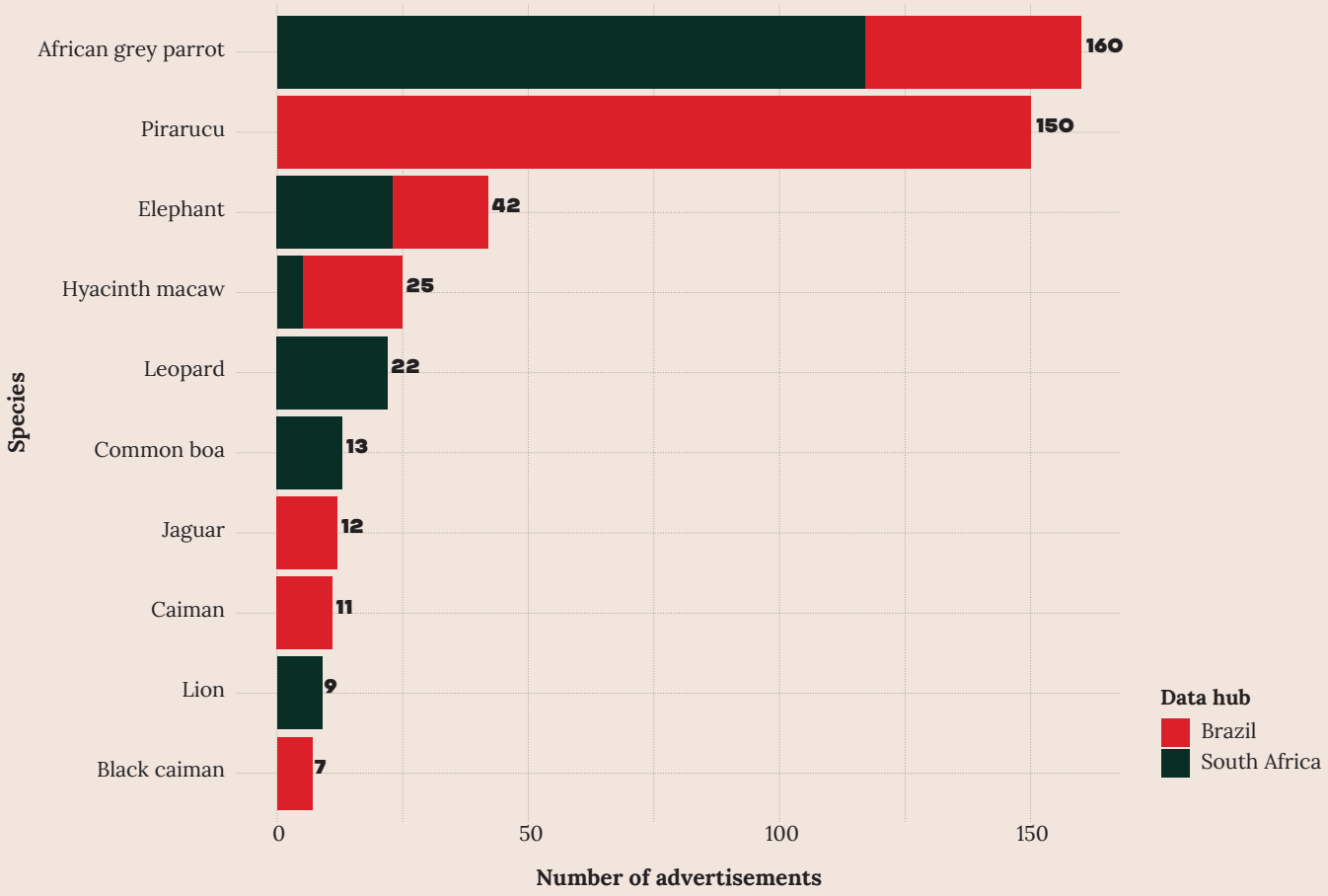

FIGURE 3 Top 10 target species, by number of online advertisements detected by GMS data hubs in Brazil and South Africa, May–July 2024.

does not mean that there is no legal market, but rather that well-defined regulations, along with criminal penalties, constrain their capture, trading and/or breeding. All three species detected by the GMS data hub in Brazil are included in CITES Appendices (I and II) and protected by national legislation. In the South African data hub, elephants and leopards are listed in CITES Appendices and protected by national legislation, while African grey parrots are listed in Appendix I of CITES but lack national legal protection. Despite the multi-level protection status for five of the six species in Figure 4, their online illegal trade did not cease, suggesting that the existing regime on biodiversity governance has not been sufficient to keep online markets in check.

COUNTRY	SPECIES	CITES	NATIONAL PROTECTION	NO. OF ADVERTISEMENTS
Brazil	Pirarucu	II	Yes	150
Brazil	African grey parrot	I	Yes	43
Brazil	Hyacinth macaw	I	Yes	20
South Africa	African grey parrot	I	No	117
South Africa	Elephant	II	Yes	23
South Africa	Leopard	I	Yes	22

FIGURE 4 Protection status of the three most advertised species in each data hub, as detected by GMS data hubs in Brazil and South Africa, May–July 2024.

The data hubs also collected information on sellers to understand whether the online IWT market is concentrated among a small number of sellers or fragmented across many. For this, we used the Herfindahl–Hirschman Index (HHI),[2] a widely applied measure of market concentration, employing it across data hubs, within each data hub and per species. With values ranging from 0 to 1, a lower HHI suggests a more competitive or fragmented market, with many sellers holding smaller shares, while a higher HHI indicates a more concentrated market, dominated by a few sellers.

The market concentration across data hubs and data hub-specific observations is low, with HHI values around 0.018 indicating extensive seller diversity. Excluding advertisements without seller names, there were 280 unique sellers throughout the monitoring period. However, species-specific HHI values reveal a diverse range of market conditions (see Figure 5). For example, with only a single seller, the sand tiger shark market shows an exceptionally high concentration, with an HHI value of 1. In contrast, the markets for African grey parrots and pirarucu have lower HHI values (0.0156 and 0.0381), reflecting the presence of many sellers. More interestingly, there are cases such as the common boa, which has a relatively low number of advertisements compared to other species with similar HHI levels (HHI = 0.07) because each advertisement was posted by a different seller. In contrast, although there are five advertisements for tigers in total, all of them are attributed to the same individual seller. This results in the tiger market holding the highest possible HHI level (HHI = 1).

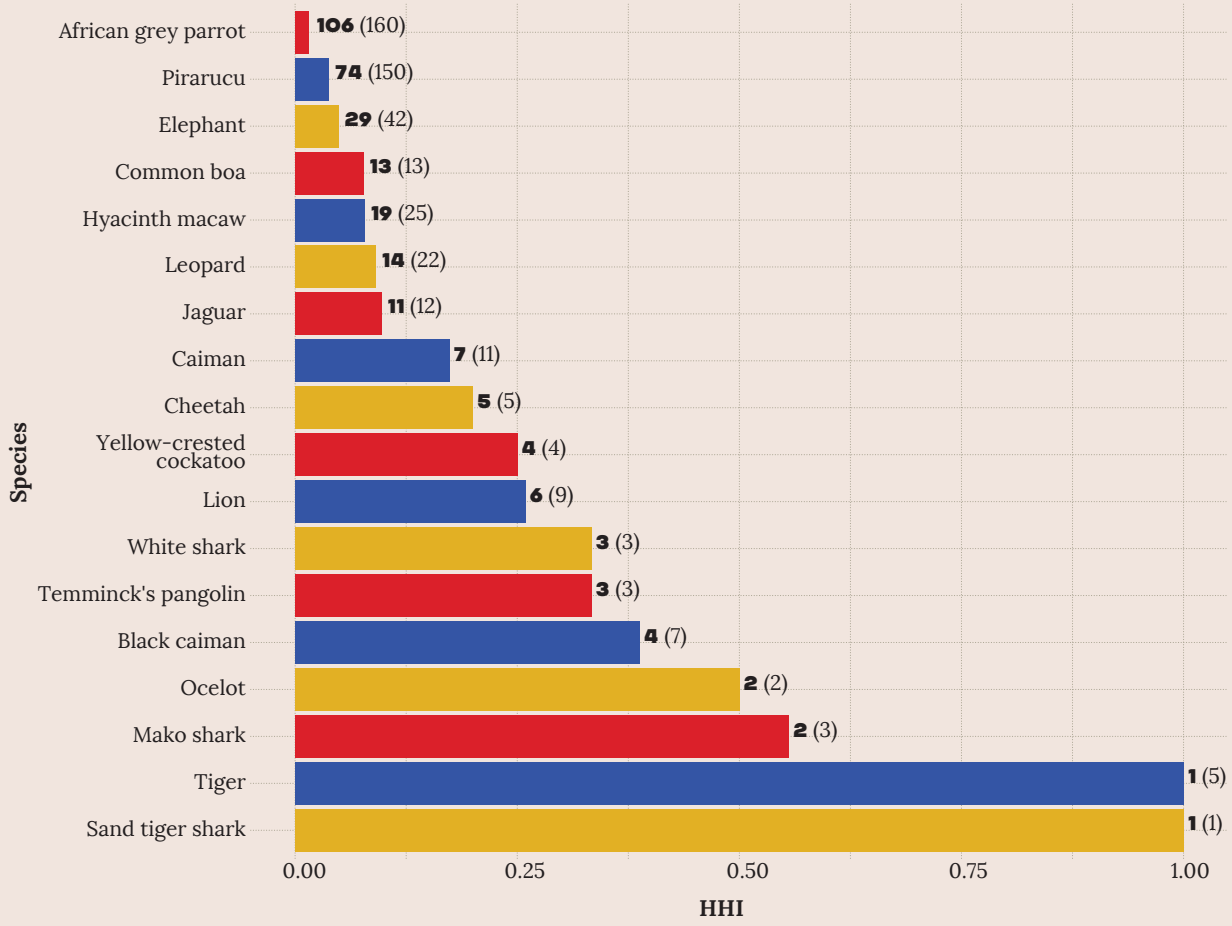

FIGURE 5 Market concentration per species, showing the number of sellers (in bold) and number of advertisements (in brackets).

NOTE: Higher Herfindahl–Hirschman Index (HHI) indicates greater market concentration.

Key points

- Hundreds of advertisements over the three months in each location indicate that online markets posed a threat to at least 18 protected wildlife species (69% of the target species). So far, the aggregate number of advertisements across data hubs indicates similar-sized markets in Brazil and South Africa.
- Social media platforms are the predominant vehicles for online marketing of IWT in South Africa and Brazil, with e-commerce platforms used to a lesser extent.
- These online IWT markets seem to be fragmented. However, if individual sellers are using a variety of account names, they may be more concentrated than they appear. Species-specific market concentration seems to be more varied.
- Given the level of formal international and national protection for the most traded species, it is clear that effective protection will require increased law enforcement action and other forms of support, such as the intelligence generated by the GMS's country-specific hubs.

RECOMMENDATIONS

- Law enforcement should prioritize allocating resources to monitoring social media platforms over e-commerce channels.
- Assessing the market concentration within the online trade of specific species can help clarify the resources required to combat illicit activities. For example, fragmented markets might be more challenging to regulate and enforce.

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THE ILLICIT MARKET FOR PIRARUCU FISH IN BRAZIL

ECO-SOLVE analyzed the pirarucu market using different methodological approaches and data sources. Primary data sources include the GMS for online trade; the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) for information on pirarucu seizures between 2000 and 2024, including locations, dates and the individuals involved with the infractions;[3] the Brazilian Institute of Geography and Statistics for data on legal breeding;[4] and an unpublished dataset on cocaine seizures.[5]

This is the first study to draw on both online and offline information to describe the illegal pirarucu trade. The data was used, first, to identify indicators of illegal activity in e-commerce and social media 'grey' markets related to pirarucu and the forms in which it is sold online, and secondly, to identify and analyze trends in illegal pirarucu trade routes and test the empirical evidence for its connection to drug trafficking.

The analysis of networks in online markets revealed concentration amid apparent fragmentation, while seizure analysis empirically demonstrated pirarucu and cocaine market convergence.

Conservation and criminal threats

Indigenous to the Amazon Basin, the pirarucu (*Arapaima gigas*, or arapaima) is one of the largest scaled freshwater fish in the world, growing up to 3 metres in length and weighing as much as 200 kilograms. In addition to meat, the species provides several valuable by-products, including the head, tongue, carcass, scales and skin. The skin, which accounts for approximately 20% of the fish's weight, is used to make a variety of leather products, including bags, shoes and accessories. With increased attention in recent years on the trafficking of pangolin scales and leather, pirarucu scales are increasingly being used in the production of boots for the US market.[6]

Due to overfishing since the 1960s, the pirarucu was included in the CITES Appendix II in 1975 and classified as 'vulnerable' by the IUCN Red List in 1986,[7] which triggered an alarm for environmentalists and local governments in the region. To preserve pirarucu numbers where the fish was threatened, the government engaged with local fishing communities to develop bottom-up community-based fishing agreements (CBFAs). Although the specific content varies, the agreements primarily establish fishing quotas and the permitted methods and types of fishing (e.g. subsistence or commercial). The government was responsible for top-down policies, such as closed fishing periods, hard quotas of approximately 30% of estimated populations in each river stretch and restrictions on the size and weight of fish that may be caught.

Over the past three decades, these measures have had a significant impact. A study published in 2016 found that the average number of pirarucu counted was 304.4 in protected lakes, compared to 9.2 in open-access lakes. CBFA initiatives accounted for 71.8% of this variation. Community management also had a positive effect on household revenue (an average increase of US$1 046.60 per household per annum), as families could sell the meat and by-products of pirarucu caught within the established limits.[8]

Despite these long-standing conservation efforts, the illegal trade in pirarucu and its exploitation by criminal groups persist. Destinations for illegal flows of pirarucu meat and by-products include North America, Europe and Asia. In 2018, the non-governmental organization Operation Native Amazon found that 100% of the protected areas and CBFAs suffer from the pressures of illegal trade. The consequences of these illegal flows are particularly detrimental to the economic welfare of legal fishermen and small communities who rely on sustainable regulated fishing practices. They face unfair competition from poachers and from traffickers who can offer lower prices for pirarucu meat.[9]

Criminal syndicates are also using shipments of pirarucu as a cover for smuggling significant quantities of drugs. In one instance, law enforcement discovered 1.6 tonnes of cocaine and cannabis hidden beneath 12 tonnes of pirarucu on a vessel near Óbidos in Pará State.[10] A senior federal police officer said that police have stopped 'dozens' of boats carrying both drugs and pirarucu in Manaus, the state capital of Amazonas.[11] This convergence of illicit markets is discussed below.

The assassination of Brazilian indigenous expert Bruno Pereira and British journalist Dom Phillips in mid-2022 highlighted the connection between wildlife trafficking and violence. The two were investigating illegal fishing activities – particularly pirarucu poaching – in the Javari Valley when they were assassinated by illegal fishermen who viewed them as obstacles to their business.[12]

The online market

In the first three months of structured monitoring, the GMS data hub in Brazil identified 150 advertisements related to the illicit trade of pirarucu. Direct and contextual evidence was used to determine the legality of the advertisements. Direct evidence of illegality would include offers of fresh pirarucu meat caught outside of permitted areas or during closed periods. Examples of contextual evidence of illegality include advertisements from fake accounts or networks of fake accounts or accounts marketing other illegal items; discrepancies between historical legal local production and advertised items; or failure to provide the source of the product.

The sample captured 74 unique sellers of pirarucu products, which indicates seller diversity. However, the market is concentrated, with over 65% of all advertisements placed by only 20 sellers (who may be individual or group entities).

The distribution of prices reflects the diversity of items being marketed. With prices ranging from 10 Brazilian real (BRL) to BRL1 650, the median is BRL40 and the mean is BRL207.60. Most transactions involve lower-priced items such as meat, but high-priced items like purses and boots significantly skew the distribution. As an illustration, the most expensive pirarucu item, a purse priced at BRL1 650, is 26% higher than the monthly minimum wage in Brazil. Despite the relative abundance of pirarucu, such items are priced higher than rarer wildlife products such as jaguar teeth and indigenous headpieces made with feathers from highly protected bird species.

Analysis of the advertisements' text provides deeper insights into the online trade. Figure 6 shows the 20 most frequently used words, excluding stopwords and generic terms. The most frequent words are categorized into three groups: sale formats, associated products and other. 'Sale formats' refer to pirarucu sales; 'associated products' are products advertised along with pirarucu. The analysis reveals that the most common online sale formats are salted, fresh (in fillets) and dry meat. Leather is advertised less frequently than meat.

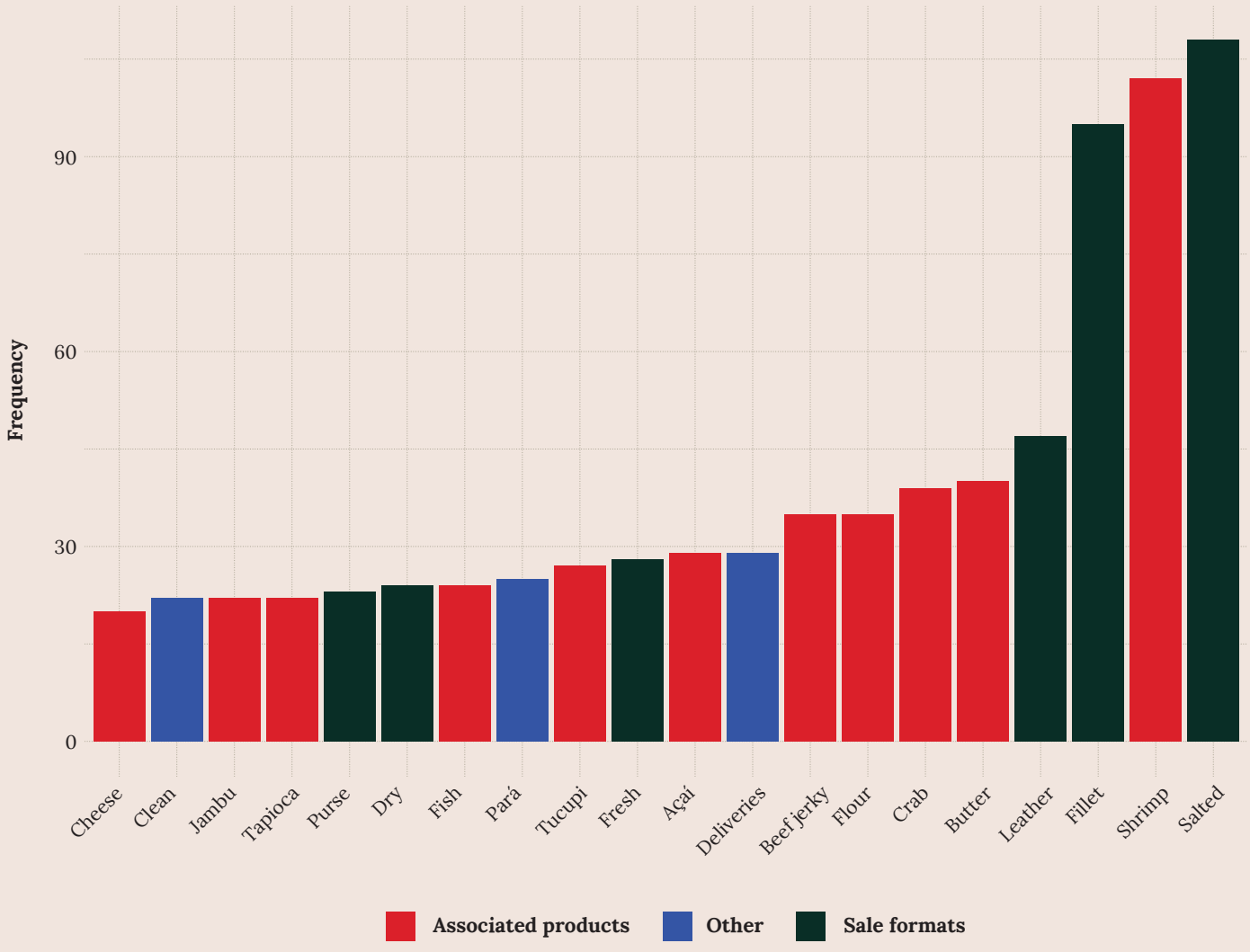


FIGURE 6 Words used most frequently in online advertisements for pirarucu.

The occurrences of 'salted' and 'dried' are significant for understanding the online illicit trade. These were originally preservation methods used during dry seasons or to keep meat without refrigeration. While local communities still salt and dry their fish, it is far less common for captive breeders to do so and even less for CBFA fishers. Since pirarucu meat is sold by the kilogram, salting is not advantageous for legal producers because it substantially reduces weight and quality. However, illicit traders can benefit because the meat can be stored for extended periods and laundered as legal meat when conditions are favourable. The salting process also makes it more difficult for law enforcement to trace the meat's origin.

Another clear pattern observed in the data is the repeated use of identical images across different advertisements, often utilizing fake social media profiles. This practice is probably a strategic effort to evade law enforcement detection and mitigate potential sanctions from e-commerce and social media platforms. By using fake profiles and the same images, sellers can quickly re-establish their listings if a profile is shut down, ensuring a continuous presence in the market.

Further network analysis by ECO-SOLVE has confirmed this concentration of apparently disconnected accounts. That a small concentration of sellers places the majority of advertisements – especially considering that many of these appear to be fake accounts – suggests that they possess resources and sophisticated strategies for maintaining their online presence. This level of organization contrasts with the more fragmented offline legal market, which consists of several CBFAs and legal breeders.

The tactical use of fake accounts appears to be employed by registered businesses that engage in parallel unregulated markets specifically for illicit products.[13] To disguise the illegal goods, these accounts often market legitimate products from the original business and exclude pictures of the illicit products, while including images of other advertised items.

Combined analyses of both online monitoring and seizure data reveal that the meat is advertised and seized in multiple forms: fresh, dried, salted and frozen. Seizures were connected to transportation and sale during closed seasons; illegal storage; predatory fishing practices; and the taking of fish below the legal weight and size. Pirarucu leather and scales appear less frequently in seizure data, possibly because these illegal by-products are used by the fashion industry and more connected to international trade.

The cocaine connection

Although news reports and law enforcement activity have indicated a relationship between the illicit trade of pirarucu and drug trafficking, it has not been tested empirically. To assess whether this relationship holds systematically, ECO-SOLVE used IBAMA seizure data to create a novel data set of 1 350 pirarucu-related violations in Brazil between 2000 and 2024. Statistical and descriptive analyses of this data shed light on other, more general, patterns in the illegal trade of pirarucu.

Figure 7 is a line plot of pirarucu seizures per annum. The years 2004 and 2008 represent the historical peaks, which could indicate heightened enforcement or more intense illegal activity. However, as they coincide with major conservation programmes launched by the federal government under President Lula da Silva – the first phase of the 2004–2008 Action Plan for the Prevention and Control of Deforestation in the Legal Amazon and the launch of the Sustainable Amazon Plan in 2008 – the peaks may be due to increased public awareness and law enforcement pressure.

FIGURE 7 Annual seizures of pirarucu in Brazil, 2000–2024.
NOTE: Data for 2024 extends to May.

There is a marked decline in seizures after 2008, with the 2010s characterized by a steady decrease, hitting the lowest point in 2013, a moment of widespread political instability in Brazil. The beginning of Jair Bolsonaro's administration in 2019 correlates with lower seizures, potentially reflecting shifts in enforcement priorities and resource allocation. The COVID-19 pandemic appears to have also affected enforcement activities, with a noticeable dip in seizures in 2020. However, the recent uptick in 2023 and 2024 suggests a resurgence in enforcement efforts with Lula's return to office.

The number of seizures each year thus seems to be strongly correlated with shifts in the intensity of enforcement rather than the intensity of illegal activities.

Figure 8 illustrates the geographic distribution of pirarucu seizures in Brazil, showing a pronounced concentration in the northern and north-western regions, particularly within the Amazon Basin. This region, being the primary natural habitat of pirarucu, points to concentrated illegal fishing and transportation efforts. Other significant (but smaller) clusters are evident in central and south-eastern regions. The cluster at the centre of the map also reflects a region where pirarucu is endemic.[14]

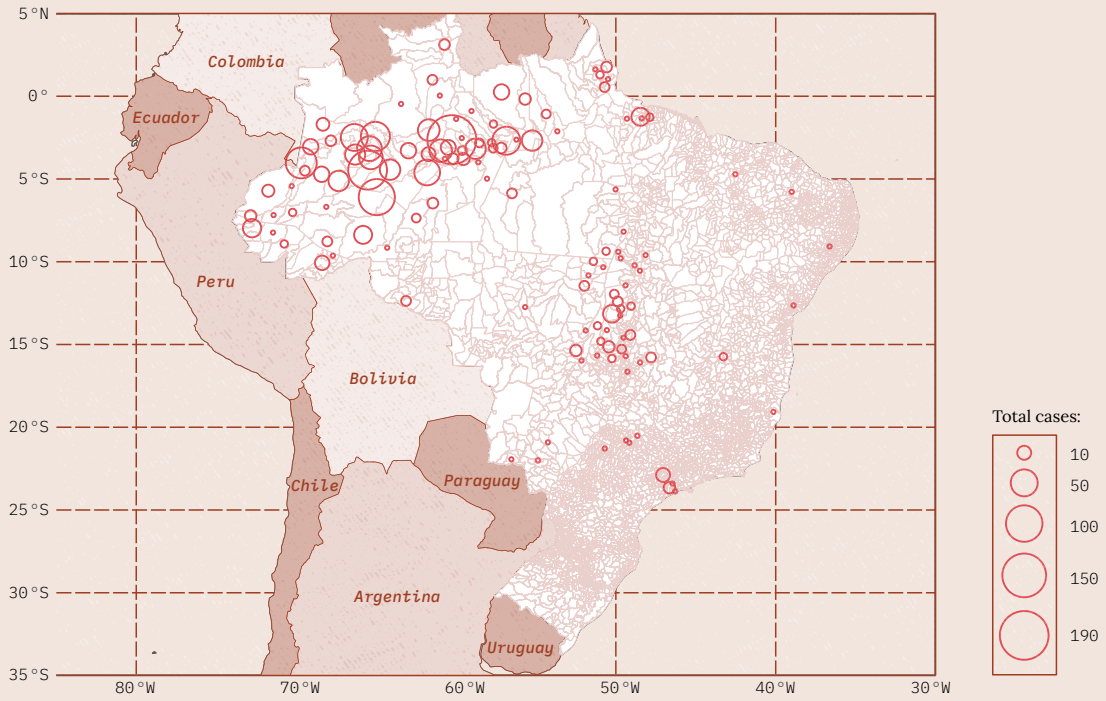


FIGURE 8 Pirarucu seizures in Brazil, 1997– May 2024.

ECO-SOLVE tested the correlation between pirarucu and cocaine seizures using monthly data (2022–April 2024) for the 62 municipalities of the state of Amazonas (see Figure 9).[15] The results indicate a positive and statistically significant correlation. While municipalities with at least one seizure of pirarucu also have 61% more cocaine seizures than municipalities without pirarucu seizures, each additional pirarucu seizure is correlated with 19% more cocaine seizures. This finding echoes news reports of pirarucu being used to conceal smuggled cocaine, but more importantly, it uncovers a correlation between the two illicit trades that is much stronger than previously recognized.

This case study has highlighted the relevance of combining different data sources to understand the functioning of specific illicit economies. Data from online monitoring revealed key characteristics not discernible from seizure data, such as the hidden organization of fake Facebook accounts – uncovered through network analysis – price dynamics and complementary products. Unlike historical seizure data, information collected by the GMS through structured online monitoring can be employed to measure the scope and intensity of current illegal activities. Online data can also support the intelligence-led law enforcement responses that are crucial to effectively address illegal online markets.

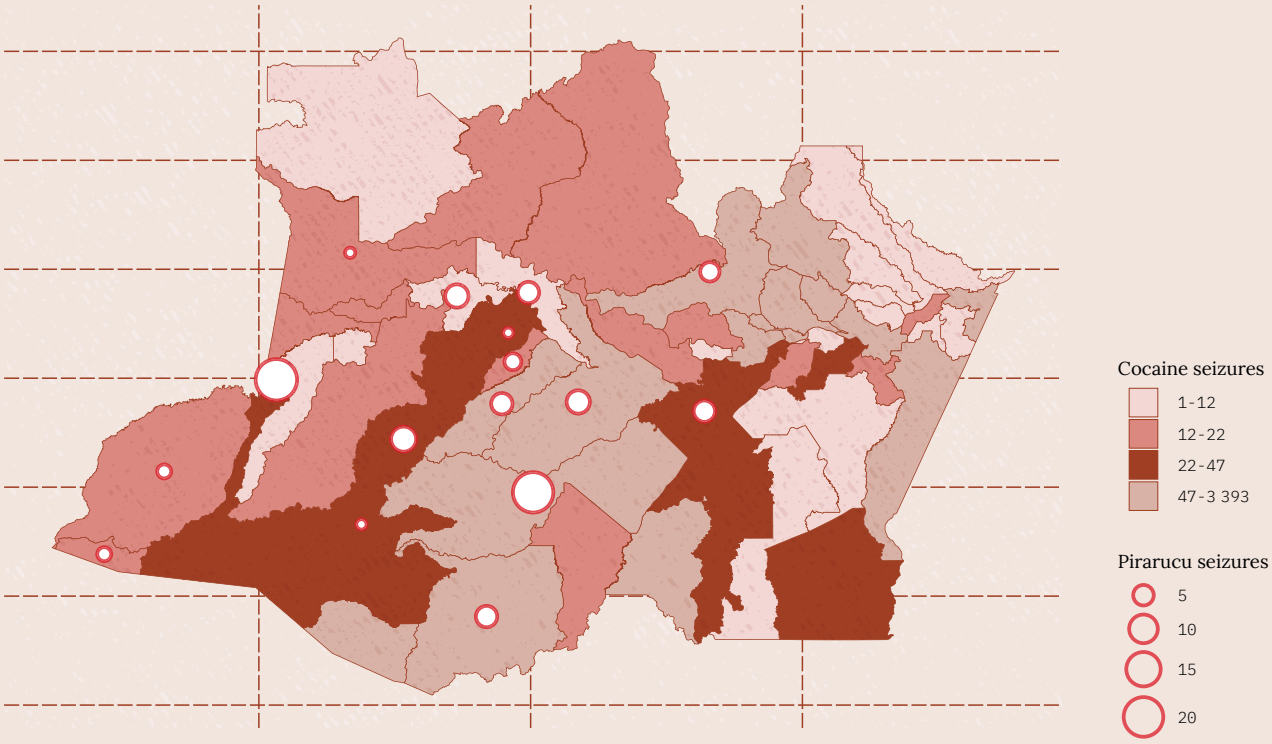


FIGURE 9 Pirarucu and cocaine seizures in Amazonas State, Brazil, 2022–April 2024.

RECOMMENDATIONS

- Determining the legality of online advertisements is challenging but essential. Law enforcement should use contextual evidence to identify online IWT when direct evidence of illegality is lacking.
- The integration of intelligence and data (e.g. GI-TOC's GMS data and computational techniques such as network analysis) is a powerful combination to identify and combat IWT.
- A voluntary online certification, which takes traceability challenges seriously and ensures that small producers are not marginalized, would potentially mitigate the challenge of identifying online IWT when legal and illegal markets exist concurrently, such as in the case of pirarucu.

ILLICIT TRADE IN ANIMAL PARTS FOR AFRICAN TRADITIONAL MEDICINE IN SOUTH AFRICA

The use of animals and animal-derived materials in African traditional medicine (ATM) is central to many indigenous cultures in South Africa. Such practices may thus play a substantial role in the long-term population survival of species targeted for harvesting and exploitation in the medicinal trade.[16]

In South Africa, plants and animals are used to heal physical ailments and for other purposes, including improving relationships and attaining good fortune.[17] Traditional medicine (generally known as 'muthi') is predominantly derived from plant products,[18] but it also incorporates a range of animal parts and derivatives, including entire skins or skin pieces, subcutaneous fat, oil, bones, carcasses, organs, hooves, paws, talons, quills, feathers, fur and scales.[19]

While the markets for illegal use of wildlife in ATM both within and outside of South Africa are significantly smaller than international traditional medicine markets, [20] South Africa's contribution to the illegal wildlife trade warrants a multifaceted response. This market sits at a complex intersection of constitutionally protected rights to practice culture, the role played by traditional healers and others, the need to protect and conserve indigenous wildlife and the challenges of enforcing the law, both offline and online, where the relevant agencies are understaffed and underfunded.

Although plants and animals are often sold at physical markets, sellers and ATM practitioners have taken to e-commerce and social media platforms to advertise their products and services. Data from the GMS monitoring of these online markets for IWT activity raises fresh concerns about their regulation.

The online trade

From April to July 2024, the South African Data Hub of the GMS, which is not currently tracking illegal trade in flora, detected 61 advertisements for suspected animal parts and derivatives potentially linked to ATM. The advertisements are mainly for animal parts and derivatives, but also include live pangolins. The advertisements account for about 13% of all wildlife advertisements (459) (live specimens and animal parts) found by the GMS in the same period and about 30% of advertisements for animal parts and derivates (209).[21]

Monitoring activities during the research period found the examples below on Facebook Marketplace.

Title: Python skin, only 2.5 meter long
Price: ZAR3 000

Title: Tiger skin
Price: ZAR45 000

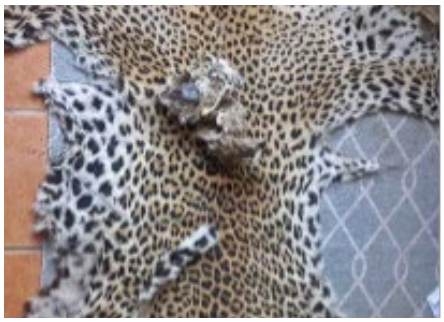
Title: Antique Cheetah skin
Price: ZAR10 500

Title: Stopping witchcraft using strong muthi
Price: ZAR1 800

Title: Selling pyton oil and wanted one
Price: ZAR4 000

Title: Vintage female lion skin on felt backing
Price: ZAR25 000

Title: Ivory, the elephant horn
Price: ZAR20 000



Title: Leopard skin full
Price: ZAR5 000

Title: Pagoline
Price: ZAR500 000

Title: Zulu attire
Price: ZAR11 000

Some animal parts and derivatives, such as bones and teeth, have not been altered, while others have been turned into products such as amulets or pendants. Animal hides, including leopard and cheetah, are also used for African traditional clothing and ceremonial regalia.

This is the online manifestation of a larger wildlife trade, as discussed below. Given the informal nature of the ATM market, its scale is difficult to quantify. A 2023 report by South Africa's Anti-Money Laundering Integrated Task Force has linked traditional healers, as an occupation, to IWT through the Financial Intelligence Centre's reporting of suspicious transactions and activities.[22]

South African legislation and regulations

Many of the species used in ATM and detected for sale by the GMS are on the IUCN Red List and included under CITES, indicating that they are already at risk due to trade and other threats (see Figure 11). However, as CITES is concerned with international trade, it does not address national markets like South Africa's ATM market.

While ATM and the use of parts and derivatives of wild animals are both regulated by national and provincial legislation in South Africa, there is no integrated approach that specifically addresses the use of wild animals within ATM practice.

The Traditional Health Practitioners Act (Act No. 22 of 2007),[23] which provides a regulatory framework to ensure the efficacy, safety and quality of traditional healthcare services, states that no traditional health practitioner may practice in the country unless they are registered in terms of the Act, but this has been impossible to enforce given challenges with effectively implementing the mandate of the Traditional Health Practitioners Council of South Africa.[24] The proposed Traditional Health Practitioners' Regulations 2024 will attempt to formalize and regulate traditional healing practices in the country.[25] Because the Act and the proposed regulations do not regulate the use of specific animal or plant species, they offer no basis for law enforcement to address IWT in the traditional medicine market.

Trade in wild animals is covered by the National Environmental Management: Biodiversity Act (Act No. 10 of 2004), which provides for the management and conservation of South Africa's biodiversity, the protection of species that warrant national protection, and the sustainable use of indigenous biological resources.[26] The Act provides for 'threatened or protected species' regulations, which govern activities that involve listed species, their parts and derivatives, including hunting, harvesting, transporting and selling. The Act also provides for biodiversity management plans. The recent Vulture Biodiversity Plan considers the use of vulture body parts in traditional medicine, highlighting that 'the indiscriminate killing of vultures for use in traditional medicine is unsustainable'.[27] At the provincial level, trade in wildlife and wildlife products is regulated by a range of nature conservation ordinances and environmental management acts.

Figure 10 illustrates seizure incidents in South Africa reported by the Wildlife Trade Portal between 2020 and 2024 of species known to be linked to traditional medicine.[28] Seizure data offers some insight into the enforcement activities of South African authorities concerning protected species. However, not all seizures are linked to traditional medicine markets and seizure data alone is not a reliable indicator of the extent of trafficking and use of these species.

This data should also be interpreted with an understanding of the broader market dynamics and enforcement priorities. The substantial representation of pangolins, rhino horns and

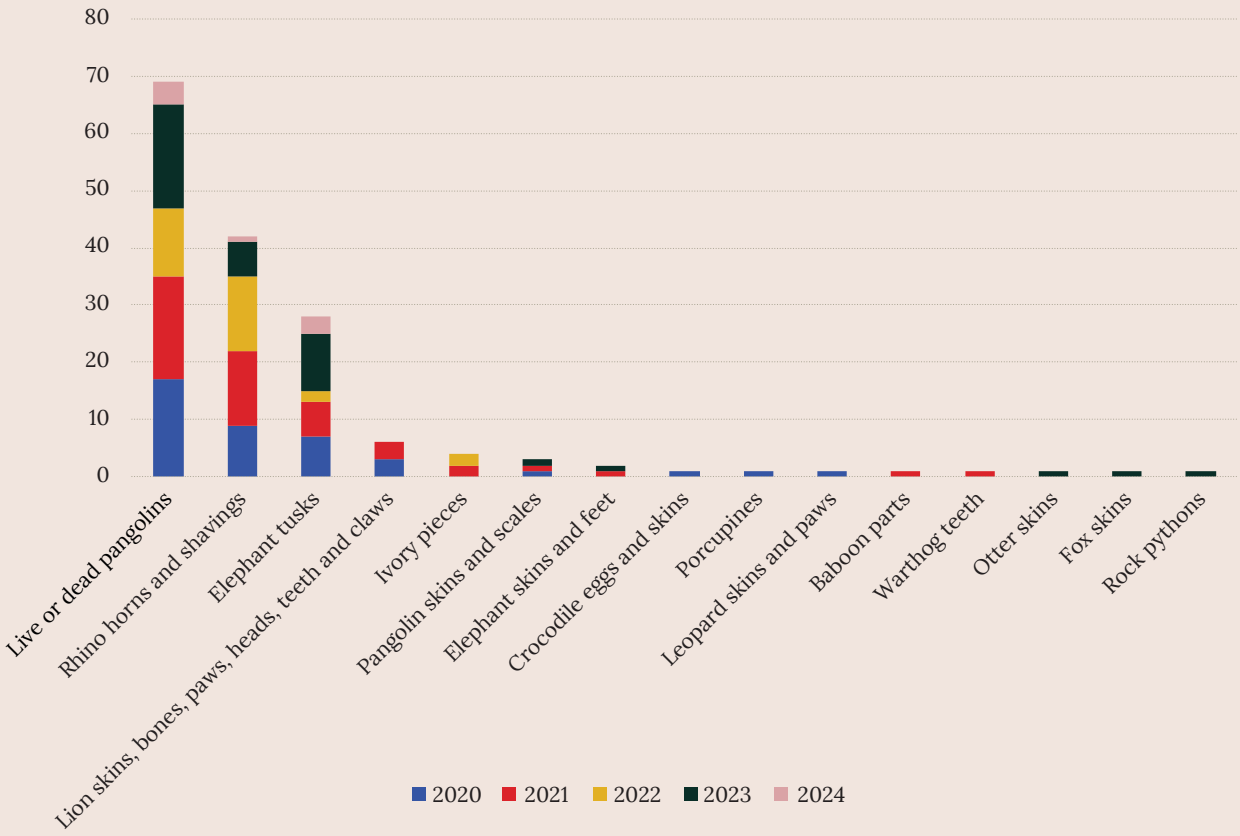


FIGURE 10 Incidents of seizures in South Africa of illicit wildlife species known to be connected with traditional medicine, 2020–2024.

SOURCE: TRAFFIC International, Wildlife trade portal, www.wildlifetradeportal.org

shavings, elephant tusks and lion derivatives in the seizure data can be attributed to international demand from traditional medical and cultural practices in other countries, in addition to such use in South Africa. The international trade may also draw heightened law enforcement attention as authorities prioritize cross-border trafficking. This could lead, on the one hand, to increased seizure of these species and, on the other, to reduced oversight of local trade in other species.

Despite the extensive legislative frameworks established by national and provincial laws to regulate traditional medicinal practices and the trade in wild animals, illegal trade within this market remains inadequately controlled. This persistent issue is particularly problematic at the provincial level, where enforcement bodies lack sufficient personnel and funding to effectively implement and uphold existing regulations. The variety of provincial legislative frameworks, some of which are still being brought into line with CITES, adds a further complication. In turn, ATM practitioners, traders and consumers are insufficiently aware of the regulations and the associated penalties, which include fines and imprisonment.

Nature and extent of the traditional medicine market in South Africa

Traditional medicine products are used and traded across various socio-economic and geographic contexts in South Africa, from urban centres embedded in the global market to informal markets and local subsistence economies. It has been estimated that between 60% and 80% of the South African population will consult a traditional healer during their lifetime.[29] Statistics South Africa's 2023 General Household Survey indicates that 0.3% of households used traditional and spiritual healers between January and December 2023.[30]

Animal parts are harvested from approximately 232 vertebrae species (excluding marine species) for ATM purposes in South Africa.[31] The use of different species is dependent on geographic location and seasons, while the ways in which individual species are used and remedies constituted vary between traditional healers as well as within and between communities.[32] Given such variations, there is no documented data for the number of treatments that require plant or animal parts or the proportion of these that involve animal parts.

In addition to online markets, traditional medicine and its components are sold at herbal or muthi markets around the country. The Faraday Market in Johannesburg is the largest informal wholesale and retail market for traditional medicine in the Gauteng province. An investigation published in 2011 found about 63% (147) of all non-marine vertebrate species known to be used in ATM for sale at the Faraday Market, including mammals, reptiles, birds and amphibians. The most commonly traded were rock monitors, water monitors, Nile crocodiles, southern African pythons, puff adders, chacma baboons, Cape porcupines, vervet monkeys, warthogs, African elephants, ostriches and owls. Derivatives of these animals included bones, porcupine quills, horns, skin (whole or pieces), carcass, skull or head, teeth or tusks, pangolin scales, hooves, legs, feet or paws, intestine, penis or scrotum, tails, jaws, nose, shells, eggs, feathers, beaks, wings, and oil and fat.[33]

Animal skins, such as those of lions, leopards and cheetahs, are used symbolically for their strength and power.[34] These animal skins are used in rituals and ceremonies and for the attire of traditional leaders and healers.[35] Other animal parts are used, for example, to promote protection against enemies, good luck, intelligence, prosperity and strong relationships. Bones of animals are ground into powders and used in mixtures to treat various ailments, such as baboon bones used to treat arthritis.[36] The fat of various species is utilized in ointments and balms to treat physical conditions. For example, crocodile fat is mixed with ground bark of broad-leaved quince (*Cryptocarya latifolia*) to treat chest pain, or with ashes of burnt powdered bark of Natal guarri (*Euclea natalensis*) to treat abnormal growths.[37] According to African mythology, porcupines are filled with protective powers because of their armour of quills. Their internal organs, burned and ground with herbs and crushed tree bark, are prescribed by traditional healers to enhance strength and protection.[38] In the Zulu tradition, porcupine quills are occasionally used to make incisions on the skin when applying topical medicines.

The use of the following species in ATM has been documented in the literature; all are protected in South Africa under the National Environmental Management: Biodiversity Act.

Species	Products, parts, derivatives	CITES	IUCN Red List
 **Lion** (*Panthera leo*)	Bones, bone pieces, bone products (bone glue), skeletons, skull, claws, teeth, skin, liver, hunting trophy, fat/oil, gelatine.[39]	Appendix II	Vulnerable
 **Vulture** (various species)	Feathers, bones, brains, flesh, claws, eggs, fat.[40]	Appendix I (some species)	Critically endangered or Endangered (depending on the species)
 **Leopard** (*Panthera pardus*)	Skin, claws, teeth, bones, fat, flesh.[41]	Appendix I	Vulnerable
 **Cheetah** (*Acinonyx jubatus*)	Skin, claws, teeth, bones, fat, flesh.[42]	Appendix I	Vulnerable
 **Chacma baboon** (*Papio ursinus*)	Bones, teeth, fat, skin, flesh, hair, hands and feet.[43]	Appendix II	Least concern
 **Cape porcupine** (*Hystrix africaeaustralis*)	Quills, fat, flesh, bones, organs[44]	Not listed	Least concern
 **Southern African rock python** (*Python natalensis*)	Skins, fat, flesh, bones, gallbladder, heart, eggs, head.[45]	Appendix II	Least concern
 **Vervet monkey** (*Chlorocebus pygerythrus*)	Bones, fat, flesh, organs, hair, claws, teeth.[46]	Appendix II	Least concern
 **Nile crocodile** (*Crocodylus niloticus*)	Scales, teeth, bones, eggs, head.[47]	Appendix II	Least concern
 **African savanna elephant** (*Loxodonta africana*)	Ivory, skin, bones, hair, fat, tusks, dung.[48]	Appendix II	Endangered

FIGURE 11 Protected species most commonly used in South African traditional medicine.

The growing global demand for traditional medicine products has turned some wildlife parts into lucrative commodities. The ATM trade in South Africa provides income for hunters, traders and traditional healers.[49] But economic uncertainty and high rates of unemployment also contribute to the unsustainable harvesting of these resources. A large percentage of traders at the Faraday market and other muthi markets are poor, single or widowed rural women who are the sole breadwinners in their households.[50]

Responding to IWT in African traditional practices

Sustaining wild animal populations is essential, especially in South Africa, where income-providing ecotourism – an industry that thrives on biodiversity and megafauna – and hunting are integral parts of the country's conservation strategy. The promotion of substitutes for endangered wildlife products in traditional cultural practices has gained attention as a viable response.

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In southern Africa, the Nazareth Baptist (Shembe) Church, with its 4 million members, is the principal cultural-religious user of illegal leopard skins in the world.[51] In 2013, the international NGO Panthera launched its Furs for Life programme to reduce the demand for leopard skins within the Shembe community. This programme has since distributed almost 19 000 synthetic imitation leopard-skin shoulder capes to Shembe followers in South Africa.[52] Research indicates that, although authentic skins are still acquired, demand decreased significantly over a three-year period as members increasingly favoured the substitutes. The shift resulted from a better understanding of declining leopard numbers and the rising 'conservation' status of the synthetic capes.[53] The introduction of imitation animal skins as a culturally acceptable alternative has also gained traction in other countries. Panthera's Saving Spots project, launched in Zambia in 2019, provides synthetic leopard, serval and lion furs to the Barotse Royal Establishment of the Lozi people.[54]

Similarly, encouraging the development and use of plant-based alternatives may help to reduce wild animal use in ATM. For example, Birdlife International has recently begun work with West African NGOs and traditional healers to find herbal alternatives to vulture parts in their traditional medicine treatments.[55]

The promotion of substitutes is a promising strategy in what needs to be a broader multilateral approach to address illegal wildlife consumption in traditional medicine. This will include legislation and law enforcement, regulated social media platforms and increased awareness, but ultimately it will require the collaboration and multiple perspectives of traditional healers, muthi gatherers and traders, conservation practitioners from academia and civil society, and policymakers and law enforcement officials, such as was previously hosted by the South African National Biodiversity Institute (SANBI).

The demand for medicinal plants places pressure on remaining populations of these plants, impacting their survival. In 2020, SANBI piloted the development of a Biodiversity Management Plan for threatened medicinal plant species in Mpumalanga, South Africa, bringing together various stakeholders including law enforcement officials, conservation practitioners, traditional healers and community representatives from various municipalities to discuss the sustainable management and use of medicinal plants.[56] The Biodiversity Management Plan contributed to a national process of managing threatened plant species.[57]

This case study illustrates the complex interlinked nature of culture, conservation, regulation and IWT in South Africa's traditional medicine trade. Online monitoring revealed new insights into the IWT including species potentially utilized in South African traditional medicine as well as price dynamics. While existing legislation addresses biodiversity protection, gaps in enforcement and regulatory frameworks limit its effectiveness. A multilateral response is needed to curb IWT in South African traditional medicine inclusive of a wide range of stakeholders.

RECOMMENDATIONS

- Substitutes for endangered wildlife products in traditional cultural practices should be promoted as a viable response.
- Encouraging the development and use of plant-based alternatives may help to reduce wild animal use in African traditional medicine.
- A broad multilateral approach is needed to address illegal wildlife consumption in traditional medicine.

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14 The data shows no significant relationship between pirarucu seizures and municipalities with legal breeding facilities.

15 Several Poisson regression models were implemented with different combinations of unit and time fixed effects (municipality, month and year). The municipality fixed effects control all unit-specific time-invariant observed and unobserved confounding; time fixed effects control all time-varying common shocks. Two definitions of the independent variable are employed: the first is a dummy that indicates whether at least one pirarucu seizure happened at a given municipality–year–month combination; the second is a count of pirarucu seizures in the same combination. For all the models, standard errors are clustered at the municipality level.

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