Few animal products have attracted more controversy than the use of skins and furs in the fashion industry. Animal rights advocacy groups have campaigned to reduce demand in key markets, and some countries have banned fur farming outright. But wild sourcing of pelts and skins remains a source of livelihoods for rural people in parts of the world where the source species are abundant, including areas where hunting is enshrined as a right of indigenous people.

Demand appears to be growing in many key sectors. For example, according to COMTRADE data, global exports of raw fur skins topped US$7 billion in 2013 (Fig. 1). CITES continues to record large exports of wild-sourced skins of protected species. In 2013, the CITES Trade Database documented wild-sourced exports of close to 70,000 bobcat skins,7 50,000 river otter skins,8 and 32,000 brown fur seal skins,4 as well as many finished garments made of these species.8

### Map 1

**Main flows of reptile skin seizures, 2005-2014**

![Map 1](image)

Source: World Wildlife Fund

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas). The final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

### Fig. 1

**Value of global exports of raw fur skins and pieces suitable for furriers’ use by country of export (US$1000s), 2010-2014**

![Graph](image)

Source: International Trade Centre Trade database, making use of COMTRADE data

![Values below 20 are not shown.](image)
While the skins of some animals, such as the tiger (Box "Asian big cat skins"), are primarily used decoratively, the main market for most animal skins today is the fashion industry. Fashion is, by its very nature, subject to trends and change; materials fashionable this season may not be fashionable in the next. As a result, demand for wildlife products feeding this industry can be volatile. For example, the mink farming industry is a well-established one, and it is no longer necessary to draw minks from the wild. The value of total production can vary by more than 40% year-on-year, however, and the industry has experienced many booms and busts over the course of the past four decades (Fig. 2).

The volatility of the fashion trade can make farming skins and furs of exotic animals a risky economic proposition. Wild sourcing, in contrast, requires less investment. In 2013, one-half of the CITES permits issued for skins, feathers, and hair came from wild sources. When the target species are solitary animals, wild sourcing is often carried out informally and opportunistically by rural communities. When the collectors are not directly employed by the exporters, this increases the vulnerability of supply chains to illegal sourcing. The reptile skin trade provides a case in point.

While the international fur trade has been active for centuries, the use of reptile skins for clothing, shoes, and accessories appears to be a relatively recent innovation.4 Crocodile farming dates back to the early 19th Century,9 and the trade in snakes and lizards seems to have taken off only a century later. By the mid-1930s, however, millions of reptile skins were being harvested annually in India, Indonesia, and throughout the tropics for use in manufacturing shoes, handbags, and other leather products.10 The use of crocodile skins in the West appears to have peaked in the late 1950s to early 1960s, but demand persists today, and farming is widespread, with at least fourteen countries having registered captive breeding operations for Appendix I crocodile, alligator and caiman species.11 The more recent trade in snake and lizard skins remains relatively fragmented, as described below.

The scale of the reptile skin industry is immense and growing. In 2013, over 3,500 metric tons of reptile skins, worth almost US$650 million, were legally imported internationally,12 more than twice the inflation adjusted total a decade before. Depending on the species mix, 3500 metric tons of skins could represent between two million and 50 million individual reptiles.13

While the value of the trade in alligator and crocodile skins is large enough to sustain farming in wealthier countries, the trade in smaller reptile skins is less lucrative, making wild sourcing more attractive. Recent research on pythons suggests an export value of US$100 per raw skin.14 Still, it takes time, care, and feed to raise a carnivorous reptile to harvestable length. For example, a Burmese python reportedly requires four years to reach harvestable size.15

Due to the scale of the industry, relatively low value per specimen, and limited regulatory capacity in some countries, the primary criminal threat appears to be laundering of wild caught specimens through the legal trade. Although many of the reptiles in legal trade are admittedly wild sourced, quotas are generally set for this harvest, which could provide an incentive for misdeclaration.

**Reptile skins**

*Reptilia* is a taxonomic class with over 10,000 species,16 but less than 10% are CITES listed. There are 80 reptile species and five subspecies in Appendix I, 673 in Appendix II, and 40 in Appendix III. Reptiles and related products comprise a large share of the seizures in World WISE, but this total is made up of many products, ranging from live creatures to medicinal preparations. Skins and skin products also feature prominently, although most of the value derives from high-end products, such as handbags and shoes. Any of these products could have come from illegally sourced reptiles, but some are so far from the illegal source that links to criminality are difficult to discern. This analysis focuses on the relatively low value raw and tanned skin trade, where the connections are clearer.

According to the CITES Trade Database, permits were granted for the export of over 24 million individual reptile skins between 2005 and 2013. The main CITES-listed species traded for their skins can be divided into three groups: crocodilians, snakes, and lizards:

**Crocodilians:**
- The Mississippi alligator
- Three species of caimans
- Four species of crocodiles

**Snakes**
- Three species of pythons
- The Indian rat snake
- The Javan spitting cobra

**Lizards**
- Two species of monitors
- Two species of tegus

Over half of the legal CITES listed reptile skins exports during 2005 to 2013 came from wild sources. This share has decreased, however, from

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**Fig. 2** Annual value of mink pelts produced in the United States (US$ millions), selected years 1975-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>74</td>
</tr>
<tr>
<td>1980</td>
<td>124</td>
</tr>
<tr>
<td>1985</td>
<td>117</td>
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<tr>
<td>2000</td>
<td>91</td>
</tr>
<tr>
<td>2005</td>
<td>124</td>
</tr>
<tr>
<td>2010</td>
<td>187</td>
</tr>
<tr>
<td>2015</td>
<td>217</td>
</tr>
</tbody>
</table>

Source: US Department of Agriculture7
All Asian big cats — including tigers, snow leopards, clouded leopards, leopards, and Asiatic lions — are listed on Appendix I. There are believed to be as few as 3,200 wild tigers remaining across their Asian range, more than a 95% decline from just over 100 years ago. Almost 70% of these are found in India. The other Asian big cats together number approximately 10,000.

Up until 2006, Asian big cat skins were widely used to decorate traditional Tibetan costumes, known as “chupa”. For a period this was a major driving force behind the poaching of tiger, leopard, and otter skins in India and Nepal.

Following an appeal from religious leaders, the use of Asian big cat skins for that particular use has declined significantly. This example illustrates the power of culturally-tailored demand reduction.

Today, Asian big cat skins are used for ornamental purposes. Skins are sold as rugs for luxury home décor and are also purchased as prestigious gifts. Stuffed and mounted tigers are also favoured as luxury items and status symbols. Almost every part of a tiger has a market. World WISE contains seizures of tiger claws, fat, genitals, hair, heads, oil, teeth, whiskers, medical preparations and derivatives, and other products. Bones are used to make traditional medicines as well as wine, which is marketed as both a tonic and as a virility product, depending on location.

The international illegal trade in Asian big cat skins reflects many of the characteristics indicative of organized criminal activity. Since 1999, the CITES Secretariat has highlighted the role of organized criminal activity in the trade. Authorities in India for example, are targeting organized networks of Asian big cat poachers, processors, city-based dealers connected to international buyers involved in trafficking from India to China, often via Nepal or Myanmar.

63% between 2005 and 2009 to 49% between 2010 and 2013. Still, this amounts to over 14 million wild-sourced protected reptiles traded in about a decade.

Many of these species appear to be traded in relatively well-managed markets, where there is a long history of sustainable breeding or where wild populations are abundant. Others, however, have been the object of enquiries in the past and feature prominently in the World WISE seizure database. These species include:

--- The reticulated python (Python reticulatus)
--- The brown caiman (Caiman crocodilus fuscus)
--- The Indian rat snake (Ptyas mucosus)
--- The common water monitor (Varanus salvator)
--- The blood python (Python brongersmai)

Species of python, caiman, rat snake, and monitor lizard make up over 90%...
Map 2 | Main flows of reptile skins trade based on CITES export permits, 2005-2013

Source: CITES Trade Database

Note: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas). The final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.

Number of reptile skins traded (thousands)
- 3 260
- 1 000
- 500
- 200

Values below 200 000 are not shown.
The sum of the arrows represent 68% of the international trade.

Fig. 3 | CITES-listed reptile skins legally exported by source (millions of reptile skins), 2005-2013

Source: CITES Trade Database

Of the reptile skin seizures recorded in World WISE. In terms of legal CITES trade, water monitors, reticulated pythons, blood pythons, and Indian rat snakes are primarily sourced from the wild in Southeast Asia, while brown caimans are primarily sourced from farms in South America.

Source of reptile skins

Reptile skin suppliers exist on five continents: Africa, Asia, Australia, North America, and South America. Just two countries — Colombia and Indonesia — issued half the CITES export permits granted in the last decade or so, however.

Of the top six source countries for legal reptile skins, five are also the top source countries from which illegally...
CASE STUDY: Reptile skins

The seizure record is dominated by two regions (South America and Southeast Asia) and types of reptile (pythons and caimans).

Colombia reported exporting more CITES-listed reptile skins than any other country. The trade involves caimans, particularly brown caimans (Caiman crocodilus fuscus). Very few brown caiman skin exports are reported as wild-sourced, although Colombia lies within its natural range. The caiman farming industry in Colombia was initiated in 1987 and has been described as "extensive and sophisticated." Aside from production quotas, the country has imposed skin size limits on exports to exclude wild-caught adults being exported as captive-bred.

Nonetheless, crocodile trade experts have expressed concerns that farms were exaggerating their production capacity in order to secure large export quotas, and then filling these quotas with wild-caught caimans. Larger skins were allegedly trimmed to export length. In 2016, the IUCN Crocodile Specialist Group estimated 30% of the caiman exports from Colombia since 1990 were of wild low value, decreasing their attraction for traffickers, and it may take several live specimens to make up a kilogram of skin. There may also be an under-reporting of seizures. World WISE seizure data are weak for some key source regions, particularly Latin America, so seizures made in the region may not be included in the database. And if illegally sourced skins are being introduced to the supply chain before export, they would be recorded as legal trade.

The relationship between the legal and illegal trades varies by species and traded reptile skins recorded in World WISE originate: Indonesia, Argentina, Colombia, the United States, and Malaysia. The volumes detected in illegal trade over the past decade are much smaller, however: on average, for every 1,000 skins legally traded, one illegally traded skin is recorded in World WISE. Given the unknown rate of detection, the recorded seizures may not be reflective of the underlying illegal market.

There could be several reasons why relatively few reptile skin seizures are reported. Reptile skins are relatively

Fig. 4  Share of total reptile skins seizures by type of reptile, aggregated 2005-2014

Source: World WISE

Python 50%
Caiman 19%
Rat snake 15%
Monitor lizards 7%
Tegu lizards 3%
Crocodiles 1%
Alligator 1%
Others 4%

Fig. 5  Share of CITES-listed reptile skin exports by country of export, aggregated 2005-2013

Source: CITES Trade Database

Colombia 26%
Indonesia 24%
United States of America 13%
Viet Nam 8%
Malaysia 10%
Argentina 8%
Others 8%
Zimbabwe 3%

Fig. 6  Reptile skin seizures by country identified as source (number of skins), aggregated 2005-2014

Source: World WISE

Senegal 780
France 596
Mexico 875
Viet Nam 383

Malaysia 990
United States 1,156
Colombia 2,607
Argentina 5,011
Indonesia 7,311
Other 6,171
origin, harvested contrary to Colombian law, suggesting some four million illegal skins have entered trade since that time.29

In contrast to the caiman farming industry, according to the CITES Trade Database, most of the legal python skin exports from Southeast Asia were reportedly wild-sourced, and their collection represents a significant livelihood for rural people. To better understand this market, field research was carried out in Indonesia and Malaysia, the two largest wild-sourced reptile exporters, in 2015. This research found that although there is a comprehensive system for monitoring reptile skin exports, there are serious challenges to implementing the quota system for harvesting. It appears that this system may still be fed by illegally gathered reptiles, and a parallel system of illegal exports also exists. The following discussion is based on this field research.30

Indonesia has a complex system for monitoring and regulating the harvest and export of reptile skins. A national quota for wild harvest is determined, and provinces and districts are assigned a share. Exporters are allowed access to 90% of this quota, and 10% is reserved for domestic consumption. Before export, these skins must be processed at a local tannery; in 1986, the Indonesian Ministry of Trade banned the export of raw skins, in order to retain the value added for the local economy. While this system is sound in theory, the extremely decentralized nature of wild sourcing makes enforcement problematic, particularly at the gathering stage.

In 2010, it was estimated that there were almost 200,000 people involved in the reptile skin trade in Indonesia, mostly collectors.32 The harvesting of most reptiles, especially snakes, occurs during the rainy season when they are breeding, roughly corresponding with winter in the Northern Hemisphere. While licenses to gather are required under law, it appears that a good deal of the harvest is carried out opportunistically by rural people, and whole communities may engage in reptile gathering as a secondary source of income during times of peak availability. When demand is high, collectors may be commissioned and given advance payment to collect some species.33 Field research in 2015 indicates collectors are paid about US$4 for a live reticulated python, depending on the size of the snake. This is the highest value paid for a single reptile, money that represents a windfall for opportunistic collectors, but licensed collectors must collect large volumes if they pursue snakes as a full time profession. The low price per wild skin also makes it difficult to see how python farming could be economically viable.

The way that the inputs of opportunistic collectors are consolidated seems to differ by region. In most of Indonesia, the collectors either sell to local middlemen or, if they live close enough, directly to reptile slaughterhouses. Middle-men typically double or triple the price paid when they sell it on to larger buyers or the slaughterhouses. Larger buyers may also travel to collection sites themselves.

The slaughterhouses are generally small and medium enterprises, and, in some areas, may consist of a single specialized Skinner. In addition to the skins, slaughterhouses produce meat, which is used for local consumption, fish bait, or crocodile feed. Python meat is also exported: according to CITES trade data, Indonesia and Malaysia together exported an average of 22 metric tons of python meat per year between 2009 and 2013, although this only represents perhaps 2,000 to 4,000 snakes.34 Python gall bladders are also harvested for traditional medicine, and may be exported. All these products are additional sources of income for rural communities, but are secondary in economic importance to the skin trade. To maintain collection networks, slaughterhouses may continue to buy reptiles even after annual export quotas are reached, with the extra skins being applied to the next year’s quota. As with many wildlife products, stockpiling of skins in source and transit countries may be problematic, as it makes accounting more difficult and offers opportunities for laundering illegally sourced skins.

Although quotas are announced for harvest, those licensed to gather are not assigned an individual quota, and many of the collectors are not licensed at all. It is those who turn the reptiles into saleable skin products that hold the permits for harvest. After a national quota on wild harvest is established, tanneries are allocated a share. Tanneries and exporters arrange to have harvest permits issued to slaughterhouses (who are registered with the local wildlife department offices). These larger companies accrue most of the proceeds of the skin trade (Fig. 7). The decentralized and informal nature of the collection process creates considerable legal ambiguity in the market. Collectors and even slaughterhouses may sell to processors and exporters who may feed legal or illegal markets.

For the most part, the lack of accountability in the gathering of pythons, and perhaps other reptiles as well,

Fig. 7: Average distribution of proceeds within Indonesia from the export of a reticulated python skin typically sold at US$54
allows processors and exporters to remain blind to the illegal sourcing of their raw materials. It is difficult for a tannery to know whether the skins they are processing have been sourced from a protected area, for example. In contrast, all registered exporters are required to have integrated tanneries, as the export of raw skins is currently prohibited. Some fully integrated producers – who control the supply chain from collection to retail – do exist. Some even export overseas, but these are exceptional.35

Field research also indicates that illegal exporters exist, but, for some reason, the number of skins recorded in World WISE remains low. It is also clear that the volumes being traded (both domestically and internationally) often exceed the harvest quotas set as part of the regulatory system.

Malaysia differs from Indonesia in that those gathering the snakes appear to be more tightly controlled. The collectors are more likely to be licensed and sell directly to a limited number of slaughterhouses. Licensed collectors receive a greater share of the export value than their informal Indonesian counterparts, as much as US$60 per skin, of which they must pay a small portion as a license fee. Although some collectors report capturing as little as one python in a week, others say they have caught as many as ten in one day. Gathering can be profitable, so much so that some collectors are professional wildlife hunters. Licensed hunting does have its burdens, however: record keeping requirements for collectors are extensive and failure to comply can result in imprisonment.

After Indonesia’s ban on raw skin exports in 1986, Malaysia began supplying specialized tanners overseas, who prefer to conduct the tanning themselves. It is possible that some of the raw skins exported currently may be sourced from other countries.

**Destination markets**

The destination of 38% of the reptile skins for which CITES permits were issued between 2005 and 2013 was Singapore. Singapore is recognized as having some of the finest reptile leather tanneries in the world,36 and is a significant re-exporter. Europe, Japan, and North America are also hubs for the trade.

Singapore was also the destination of 16% of the reptile skins seized between 2005 and 2014, second only to Spain (Fig. 9).

Most of the value of the reptile skin products industry appears to lie in the final production and retailing of fashion items. Data are not available for the breakdown of proceeds in destination markets, although designer reptile skin products can retail for tens of thousands of dollars. Data are available for those who produce and export finished python skin products from Indonesia, such as handbags, however. Finished product manufacturers claim almost three-quarters of the export value of the product, while collectors receive only about 3%.

**Fig. 8** Shares of CITES-listed reptile skin exports by country of import, aggregated 2005-2013

**Fig. 9** Reptile skin seizures by country identified as destination (number of skins), aggregated 2005-2014

**Fig. 10** Average distribution of proceeds within Indonesia from the export of a reticulated python skin finished product typically sold at US$108

Singapore 38% Others 16% Singapore 31% Germany 5% China 10% United States of America 5% Large buyer, $9.72 Florida 16% Other 17% Collector, $3.24 First buyer, $9.72 China 4% Large buyer, $5.40 Spain 31% Collector, $3.24 Skinner/tanner, $9.72 Singapore 16% Skinner/tanner, $9.72 United States 16% Product manufacturer, $79.92 Spain 31% Product manufacturer, $79.92
Analysis

Compared to other species-products, the large-scale smuggling of reptile skins appears to be a relatively uncommon practice, or at least a relatively undetected one. Rather, illegally caught reptiles may be introduced into legal supply chains within the source country when field collection is not directly monitored, allowing them to be exported as legal trade. Reptile skins are particularly vulnerable to this practice because of several characteristics of the species and the market that makes use of them.

The income-generating activity of collecting reptiles for the skin trade presents low barriers to entry. The CITES-listed reptiles most targeted in the skin trade – reticulated pythons and water monitors – are found in both rural and urban areas. They are relatively easy to transport, and require no special equipment to acquire. Since almost anyone can participate, regulating collection is challenging.

The nature of the market also promotes informality in production. Because demand is linked to fashion, it comes and goes, and, in places like Indonesia, most reptile skins are worth too little on an individual basis for farming to make much sense or for wild sourcing to be a full time profession. In these cases, reptiles are essentially “crowd sourced”: the word goes out that certain buyers will purchase live snakes, and the collectors organize themselves. This decentralized and episodic sourcing is extremely difficult to control in a country the size of Indonesia. Regulation is conducted further downstream, where the flow of skins consolidates at tanneries and points of export.

Variable demand can also be of benefit to enforcement, however, since it tends to promote consolidation of international trade chains. For example, pythons, particularly reticulated pythons, are a highly vulnerable species. They are the most seized species among the reptiles according to World WISE, and almost two-thirds of regulated exports of reticulated python skins are wild-sourced. Since illegally sourced python skins can enter licit trade, it is important to compare legal exports to sustainable production, and this is easier to do when the legal market is relatively simple.

Almost three-quarters of legal exports of reticulated python skins between 2004 and 2013 came from Malaysia and Indonesia, and more than half were shipped to Singapore. Careful monitoring of this trade chain could help secure the species at relatively little cost.

Aside from the field research, there are other reasons to believe that illegally sourced reptiles are entering the legal supply chain prior to export. According to COMTRADE, close to 4,000 metric tons of reptile skins were reportedly legally imported in 2013. The volumes reported seized in World WISE were much smaller: about 2,600 skins on average per year. Seizures of large volumes of illicit skins – comparable to shipments seen in the legal trade – are rare.16

This low volume of detected illegal trade could be due to some weakness in enforcement particular to reptiles; other protected species illegally traded in the region are detected in much larger volumes. But it is more likely that illegally sourced reptile skins are simply introduced into the legal supply chain before export. Since farming of some species for the skin trade does not appear to be viable in some areas, given the low value paid for wild sourced animals, it seems likely that sources are commonly misdeclared. The fundamental vulnerability, however, seems to be limited control over the harvesting of wild reptiles in the field.

Endnotes

1 Including Austria, Croatia, and the United Kingdom.
2 Lynx rufus
3 Loxotra canadiensis
4 Arcticeps flaviceps
5 Pecari tajacu and Tayassu pecari
6 Based on export data in the CITES Trade Database: http://trade.cites.org/
7 Based on data released on 24 July 2014, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture (USDA); http://apps.nass.usda.gov/AgCensus/Exp/Uploads/2014/07NASS-mink0714.pdf
11 See the CITES website “List of Species”, https://cites.org/eng/common/reg/ch/species.html
12 Based on COMTRADE data. This is the total declared value for HS codes 410320: Reptile skins, raw; 410640: Tanned/crusted hides and skins of reptiles; 410330: Leather further prepared after tanning/crusting of reptiles; 410721: Reptile leather, vegetable pre-tanned and 410729: Reptile leather, other than vegetable pre-tanned.
13 Skin weights vary substantially, but trade figures suggest a weight of around 0.07 kg for skins of smaller lizards like Varanus salvator and Tupinambis species on the one hand, and 1.5 kg for a crocodile skin on the other. Ines Arroyo-Quiroz, Ramon Perez-Gil and Nigel Leader Williams, “Mexico in the international reptile skin trade: A case study”, Biodiversity Conservation, vol. 16 (2007), p. 933.
18 Based on estimates in the IUCN Red List database: http://www.iucnredlist.org
19 See the description of “use and trade” at the jambuara tigris listing on the IUCN Red List: http://dx.doi.org/10.2305/IUCN. UK.2015-2.2RLTS.T15955A50659951.en
20 See the description of “use and trade” at the gharial listing on the IUCN red list: https://dx.doi.org/10.2305/IUCN. UK.2015-2.2RLTS.T15955A50659951.en
22 Where the shipment was defined in meters of skin, these figures were converted to number of skins using an average length of Python molurus (5 m) and Python reticulatus (4m). “Farmed” includes a small number of exports declared as “ranched” (sourced as eggs or juveniles from the wild but reared in a controlled environment) as well as those reported “born or bred in captivity”,
23 Based on import data. Includes re-exports of previously seized skins, which may have been taken in an earlier time period.
24 Includes re-exports.
25 Dividing the COMTRADE-declared value by volume gives an average value of less than US$20 per kilogram.
27 Ibid.
29 Ibid, paragraph 5.
30 See online methodological annex for details on field research.
31 Indonesian Ministry of Trade, Decree No. 306 of 1986.
35 For example, the Indonesian handbag manufacturer Raflo:http://www.raflo.co.id/
37 Where the shipment was defined in meters of skin, these figures were converted to number of skins using an average length of Python molurus (5 m) and Python reticulatus (4m).
38 For a fuller description of the methods, see the online methodological annex.