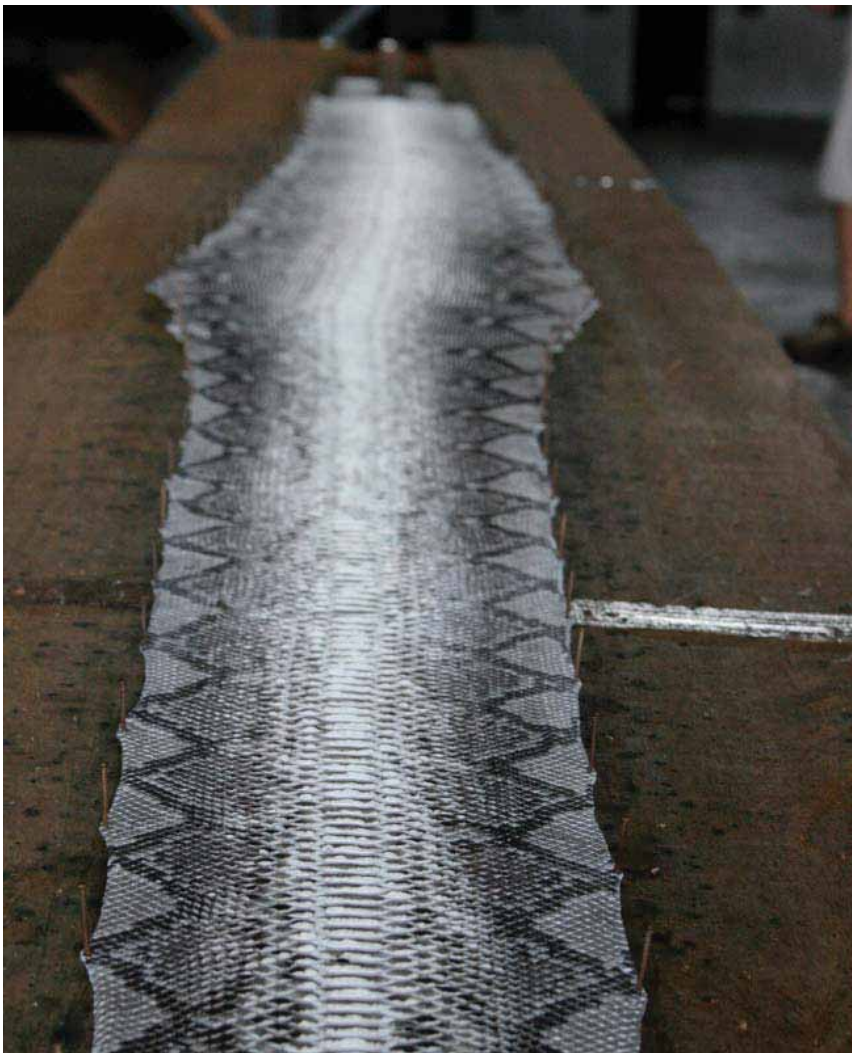
International Trade Centre

TECHNICAL PAPER

THE TRADE IN SOUTH-EAST ASIAN PYTHON SKINS



Boa & Python SPECIALIST GROUP

TRAFFIC
the wildlife trade monitoring network

THE TRADE IN SOUTH-EAST ASIAN PYTHON SKINS

Abstract for trade information services

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International Trade Centre (ITC)
TRAFFIC International
World Conservation Union (IUCN)
The Trade in South-East Asian Python Skins
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This report describes the trade flows of python skins in South-East Asia and identifies the main points of value addition in the supply chain for the five most heavily traded python species – provides information on the regulation of python skin trade; analyzes the trade flows in python skins from key exporting countries in South-East Asia; gives an overview of the value chain of pythons; reviews welfare and sustainability issues regarding python harvesting for the skin trade; presents recommendations in a number of areas of concern relating to illegal trade, trade measures, sustainability and animal welfare; includes bibliography (p. 51-54).

Descriptors: **Hides and skins, Leather, Endangered Species, South Asia, East Asia, Indonesia, Lao PDR, Singapore, Viet Nam, Value Chain, Sustainable Development**.

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English

The International Trade Centre (ITC) is the joint agency of the World Trade Organization and the United Nations.

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Foreword, ITC

The trade in wildlife provides income to millions of people around the world, particularly to rural communities in developing countries. The trade is, however, characterized by widespread illegality and there is real concern about its lack of transparency and sustainability.

Many of the efforts to protect biodiversity lie within the context of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This agreement provides tools for governments to protect and regulate the export of species. Thousands of non-governmental organizations, foundations and communities are also working towards sustainable use of the world's flora and fauna. The challenges are great. As a result of growth in wealth, there is an increasing demand for wildlife products. Efforts to maintain sustainable management are undermined by poverty, smuggling and weak enforcement capacity. There is lack of transparency in the wildlife trade. Greater knowledge about how the supply chains work is needed to help find innovative solutions for combatting illegality and ensuring survival of species. The International Trade Centre (ITC) is therefore delighted to have had the opportunity to use its expertise to analyse the wildlife trade.

Following discussion with CITES, ITC selected the South-East Asian python snakes in our study of wildlife trade. These enigmatic animals have been the subject of trade between Asia for the European fashion and leather industries for more than 50 years. The python skin has become a classic and demand is growing. Starting out as a skin sold in an Indonesian village for US$ 30, a python skin handbag from famous Italian and French fashion houses can fetch up to US$ 15,000. However, experts have raised concerns about the conservation of these species. Furthermore, animal welfare groups have campaigned against cruelty in the transport and slaughter of snakes.

There is very little information available on how the python supply chain operates. This report is intended to fill this information gap. It examines in detail the flow of trade, the value-addition stages, the loopholes in the permitting system that allow illegality, the sustainability of harvests and animal welfare issues.

The report was prepared in partnership with the Boa & Python Specialist Group of the International Union for Conservation of Nature (IUCN) and TRAFFIC. I would like to acknowledge their hugely valuable contribution. This partnership has been effective in bringing together expertise from our respective worlds of conservation and trade to analyse a complex value chain. I would also like to acknowledge the contribution of the CITES Secretariat and Parties in supporting this work. ITC is grateful to the Government of Denmark for funding this study through ITC's Trade and Environment Programme.

The report makes a set of recommendations which is intended to support the CITES process, in particular discussions at its Conference of Parties in March 2013 in Bangkok. I also hope that the report will help galvanize fashion houses, regulators and traders to increase the transparency of the trade. Above all we hope that this report will help improve the sustainable management of this valuable species and so safeguard income streams for collectors and their families.

Patricia Francis
Executive Director
International Trade Centre

Foreword, CITES Secretariat

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) stands at the intersection between trade, environment and development and it promotes the conservation and sustainable use of biodiversity. CITES recognises the aesthetic, scientific, cultural, recreational and economic value of wild fauna and flora.

The 176 Parties to CITES regulate international trade in close to 35,000 species of plants and animals – with international commercial trade generally prohibited for 3% of these species, and with international commercial trade for the remaining 97% regulated to ensure the trade is legal, sustainable and traceable.

CITES has been at the cutting edge of the debate on the sustainable use of biodiversity for the past 36 years and it has records of over 12,000,000 international trade transactions in its data-bases, and records are growing at the rate of 850,000 a year. These records provide a valuable overview of the extent of international trade and they provide wildlife users and managers with a unique tool to understand sustainability.

CITES-regulated trade involves a chain of interlinked processes and events that have an impact on the status of wild populations. The 'value chain' approach used in this study helps the reader to understand the formal institutional arrangements as well as the highly complex informal relationships between the whole range of actors and activities involved in the management, production, and marketing of a wildlife product. It also describes some of the relationships established between actors involved directly and indirectly in each stage of the chain (e.g. producers, processors, distributors, traders, regulatory and support institutions).

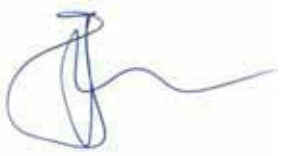
Trade in South-East Asian python has been regulated under CITES since the Convention entered into force in July 1975. With the exception of the Indian subspecies of the Asiatic rock python (*Python molurus molurus*), all species are included in Appendix II – being species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization that is incompatible with their survival.

The pythons of South-East Asia are not only an extremely important part of the fauna of this region, but also an important source of revenue for rural peoples in several countries. The Convention's scientific committee for fauna – the CITES Animals Committee – has carried out a number of enquiries into the sustainability of the trade in skins (and other products) that have been authorized in several of these species over the years. The South-East Asian Parties concerned with these enquiries have subsequently implemented remedial measures to put the trade on a more sustainable footing.

In order to ensure that international trade only takes place under the auspices of a correctly issued CITES permit, States Party to CITES have also taken measures to ensure all trade is legal. The relevant authorities have made many seizures of illegally traded specimens of South-East Asian pythons in recent years as a result of this effort. Constant vigilance is however required and in 2010, China and the United States of America joined forces to call for an examination of the conservation implications of the snake trade in Asia to consider biological, implementation, and enforcement issues. The fifteenth meeting of the CITES Conference of the Parties agreed to this examination and the results will be discussed at the sixteenth meeting of the Conference of the Parties to be held in Bangkok, Thailand in March 2013.

In this context, the present study from the International Trade Centre (ITC) is a very timely initiative. Conscious of the need to provide our Parties with the most up-to-date information possible in order to make fully informed and well-founded decisions, the CITES Secretariat has provided support and encouragement to ITC to undertake this work.

I am confident that the results presented in this report will prove very valuable to the CITES Parties as they strive to refine and further develop policies to ensure that future international trade in South-East Asian pythons under CITES is legal, sustainable and traceable.



John E. Scanlon
Secretary-General
CITES Secretariat

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The report was prepared by Alexander Kasterine (ITC), Ralph Arbeid (Consultant), Olivier Caillabet (TRAFFIC) and Daniel Natusch (IUCN/SSC BPSG).

BPSG is a global network of herpetologists and conservationists who work to understand and protect boa and python species. TRAFFIC is a non-governmental organization which is a joint programme of IUCN and WWF.

The project is funded by the Government of Denmark through its support for ITC's Trade and Environment Programme.

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Further information on partner organizations and programmes

ITC's Trade and Environment Programme, visit: http://www.intracen.org/projects/tccep/

BPSG:http://www.iucn.org/about/work/programmes/species/who_we_are/ssc_specialist_groups_and_red_list_authorities_directory/amphibians_and_reptiles/

CITES: www.cites.org

TRAFFIC: www.traffic.org

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Abbreviations

Unless otherwise specified, all references to dollars ($) are to United States dollars, and all references to tons are to metric tons.

The following abbreviations are used:

AVA	Agri-Food & Veterinary Authority of Singapore
AVMA	American Veterinary Medical Association
BDFFP	Biological Dynamics of Forest Fragments Project
BKSDA	Balai Konservasi Sumber Daya Alam (Regional Forestry Office)
BPSG	Boa & Python Specialist Group (SSC/IUCN)
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Content Management System
CoP	Conference of the Parties
EC	European Commission
EFSA	European Food Safety Authority
ERP	Enterprise Resource Planning
EU	European Union
ICT	International Council of Tanners
INCOTERMS	International Commercial Terms
IRATA	Indonesian Reptile and Amphibian Trade Association
ITC	International Trade Centre
IUCN	International Union for Conservation of Nature
MA	Management Authority
NDF	Non-detriment finding
NGO	Non-governmental organization
PERHILITAN	Department of Wildlife and National Parks (DWNP), Peninsular Malaysia
PHKA	Perlindungan Hutan dan Konservasi Alam (Directorate General of Forest Protection & Nature Conservation)
RAMSAR	Convention on Wetlands (Ramsar, Iran, 1971)
RAWS	Regional Animal Welfare Strategy
Rp	Indonesia Rupiah
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SA	Scientific Authority
SSC	Species Survival Commission (IUCN)
TCM	Traditional Chinese Medicine
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Division
WCMC	World Conservation Monitoring Centre
WTO	World Trade Organization

Executive summary

Background and objective of study

South-East Asian pythons are heavily exploited for skins, food and traditional Chinese medicines, with nearly half a million python skins alone exported annually. The trade provides cash income for a large, but unknown, number of rural people across the region that collect, breed and process pythons. The high number of skins traded has raised concerns about the conservation impact of harvests upon wild python populations and the potential animal welfare issues associated with this trade. This report describes the trade flows for the five most heavily traded python species from South-East Asia (*Python reticulatus, Python molurus bivittatus, P. curtus, P. brongersmai and P. breitensteini).* It identifies the main points of value addition in the supply chain and considers aspects of illegality. In addition, it reviews the current understanding related to the sustainability and welfare issues regarding python harvesting for the skin trade and offers a series of recommendations to help guide relevant stakeholders, including CITES, governments, the private sector and NGOs, on improving the mechanisms by which trade operates.

Trade flows

The Reticulated Python, *P. reticulatus* is the most heavily traded species in South-East Asia with approximately 340,000 skins exported annually. Around 100,000 Burmese python *P bivittatus skins* are exported annually with smaller numbers (c. 80,000) of Short-tailed pythons (*P. curtus, P. brongersmai and P. breitensteini)* also exported. The Republic of Indonesia and Malaysia are the main source of pythons for the skin trade, most of which come from the wild. Recently the Socialist Republic of Viet Nam and, to a lesser degree the Lao People's Democratic Republic (Lao PDR), have become more prominent in trade due, particularly, to large exports of skins produced from pythons that are declared as bred in captivity.

Illegal trade

There is strong financial incentive for illegal trade in python skins. Hunters are typically poor and hunt pythons as an additional source of income. Skins have a high value relative to their bulk and are easy to conceal in shipments. Weak monitoring and enforcement at customs makes the risk of seizure low. In source states, enforcement of conservation regulations is often weak and penalties for smuggling an insufficient deterrent. There is also considerable scope for unscrupulous traders to abuse the permitting system through different types of false declarations to authorities. These may include;

- Concealment within shipment of legal skins or other products;
- False declaration of skin sizes within shipment;
- False declaration of the source of skins as "captive-bred", "pre-convention" or "seized".

Proving that illegal trade takes place is outside the scope of this report. However, through analysis of the trade data and interviews with industry and regulators, the authors have found indications of where illegal activity may be taking place and suggest ways to overcome these problems. These problems relate primarily to stockpiling, captive breeding claims, weak monitoring and lack of traceability. Each of these is discussed in the report.

Stockpiling

Around 60% of exports are re-exported through the Republic of Singapore. For business purposes, traders in Singapore (and in Indonesia) stockpile skins. Stockpiling is a common, legal practice, but without a strong monitoring regime, stockpiling can facilitate the laundering of illegally sourced skins. In the absence of monitoring, there is also the scope for re-exporting skins using a falsely declared origin, for example, as "captive-bred".

Recommendation: Singapore and Indonesia are encouraged to make an inventory of its stockpiled skins and to establish a regular monitoring and control system. All results of the inventory and monitoring should be made publicly available.

Captive breeding

Over 20% of exports of *P. reticulatus* are declared as captive bred (from Viet Nam and Lao PDR) (c. 80,000 skins p.a.). All Burmese pythons (c. 60,000 skins) are declared as captive bred. There are several concerns about captive breeding. The commercial case is not convincing, particularly for *P. reticulatus*. The cost of breeding, feeding and maintaining skins to reach slaughter size appears much higher than the market price.

Recommendation: Viet Nam and Lao PDR authorities verify the commercial case for captive breeding pythons.

Weak trade monitoring

Discrepancies exist in the reporting and actual harvests of *Python brongersmai* from Malaysia, indicating that an illegal trade in the species may exist. Given Malaysia's porous borders and similarity in natural habitat to Indonesia, it is possible that the snakes originate in Indonesia and are exported from Malaysia with CITES permits declaring them as Malaysian.

Recommendation: The Malaysia and Indonesia authorities are urged to review the export and sourcing of *Python brongersmai*.

Traceability

Given the concerns regarding the possible abuse of the permitting system, there have been discussions at international fora like CITES about the need for a traceability system. Such a system would allow the fashion industry to demonstrate that its sourcing is legal, sustainable and minimizes suffering of snakes during slaughter.

Recommendation: The fashion industry is encouraged to establish a traceability system complementing the existing CITES permitting system to allow identification of skins along the length of the supply chain and assure the skins legal provenance and sustainable sourcing.

Trade bans

The European Union currently has a ban in place on skins sourced from Malaysia. This is likely to have resulted in a fall in incomes for rural people in the country as skins are sold to lower value, regional markets.

Recommendation: The Malaysian authorities are urged to carry out a sustainability assessment of sources (a non-detriment finding study) to demonstrate due diligence to the EU.

The Swiss Parliament voted in early 2012 to ban imports of python skins from Indonesia on the grounds of perceived cruelty during slaughter. The Parliament has not made a scientific study of slaughter methods used across range states. Indonesia's method is the most humane encountered in the trade. Banning only Indonesia's exports is thus inconsistent and discriminatory.

Recommendation: The Switzerland's Upper House is encouraged to vote against the ban in Autumn 2012.

Species identification

Difficulties involved with distinguishing between species of python facilitates the false declaration and potential laundering of illegally sourced skins. The lack of controls at borders is also an incentive for concealment of illegal consignments.

Recommendation: Capacity building for customs officials in both importing and exporting Parties is recommended to reduce the scope for illegal trade.

The value chain

Around 96% of the value of the trade is captured by the European fashion industry. The remaining 4% from collectors, processors and exporters in range states, principally in South-East Asia. Hunters capture around 0.5% of the final value of a high-end python skin handbag. The skin is sold by the collector to slaughterhouses for US$ 10 per metre. Prices for finished leather handbags can reach US$ 10,000, a product based on one 3 metre skin. The demand is highest for skins measuring 3 to 4 metres. Limited value addition in exporting countries is made through processing, mostly for regional markets. Demand in high-end markets (i.e. the EU) is for raw skins as European tanners can process to specific high quality requirements of the European fashion industry.

Sustainability

Despite concerns regarding the sustainability of the trade of pythons for skins, a number of attributes make these species resilient to high levels of harvest. For example, they are broadly generalist in their habitat and dietary requirements, and have fast growth rates and high reproductive outputs. By comparison, specific aspects of the harvest itself increase the likelihood of any given harvest level being sustainable. Because of their nocturnal and cryptic nature, most pythons are collected opportunistically, meaning that large numbers cannot be collected at one time from a single location. Furthermore, the remote distributions of many python populations make harvesting economically unviable.

Nevertheless, this report finds grounds for concern regarding the sustainability of harvesting pythons for the leather industry. The limited, albeit dated, information available from Indonesia reveals that large numbers of pythons are slaughtered before they reach sexual maturity. It is possible that this reduction in the number of mature, breeding adults (particularly females), may have impacts upon the ability of populations to remain at stable levels.

There is a paucity of information available to determine whether current harvest levels are sustainable or not. Population field studies aimed at assessing whether off-take levels are non-detrimental to wild populations are very difficult to undertake, meaning alternative methods of population monitoring should be considered.

Recommendation: Because the data indicate that a high proportion of harvested pythons are sexually immature, this report recommends a precautionary approach to harvesting. Legally binding minimum skin size limits should be researched and implemented to ensure the protection of immature snakes. In order to improve understanding of population trends and to allow for an efficient adaptive management of the harvest, this report recommends monitoring initiatives aimed at using data derived from the harvest itself (i.e. population structure and reproductive condition of specimens captured) rather than relying on collecting data from population field studies which is a complex and time consuming process.

Animal welfare

The report describes three common methods of python slaughter. These include decapitation (Malaysia), brain destruction (Indonesia) and suffocation (Viet Nam). The suffocation method appears to result in a considerable time before death is reached (15 to 30 minutes). Currently, Indonesia appears to employ the most appropriate method of slaughter in terms of keeping suffering to a minimum.

Recommendation: All slaughterhouses are encouraged to use brain destruction as a slaughter method and to introduce an anvil type system to reduce suffering through badly aimed blows. Viet Nam and Malaysia slaughterhouses are encouraged to use brain destruction prior to suffocation and decapitation respectively. In addition, research into alternative, and potentially more acceptable, methods of slaughter should be carried out.

1. Introduction

South-East Asian pythons are large bodied, non-venomous and strikingly coloured constrictors, attributes that have resulted in their skins being highly prized for luxury fashion goods. Nearly half a million python skins are reportedly exported from South-East Asia annually. However, the proportion of these obtained from legal sources, and the extent of illegal skin trafficking, remains unknown, precluding an estimation of actual annual exports. Pythons are also exploited for food and for use in traditional Chinese medicines. The trade provides cash income for a large, but unknown, number of rural people across the region who collect, breed and process pythons. This report describes the trade flows for the five most highly traded python species from South-East Asia (*Python reticulatus*, *Python molurus bivittatus*, *P. curtus*, *P. brongersmai* and *P. breitensteini*.). It identifies the main points of value addition in the supply chain and considers aspects of illegality.

The high number of skins traded has raised concerns about the conservation impact of harvests upon wild python populations. The trade in these species are regulated under Appendix II of CITES. This report reviews the current understanding related to the sustainability of python harvesting for the skin trade. Specifically, it discusses the biological and trade characteristics of South-East Asian pythons that influence sustainability, and identifies gaps where future research is needed. The study also describes the different slaughter methods employed within the industry, given the concerns expressed by animal welfare groups over the perceived cruelty in the killing of pythons. The authors make a series of recommendations to help guide relevant stakeholders, including CITES, governments, the private sector and NGOs on how to ensure that trade in South-East Asian python skins is legal, sustainable and traceable as well as consistent with standards on animal welfare. The report was prepared to support CITES processes and other initiatives in this regard.

The authors of this report gathered information through interviews with the industry in both exporting countries in South-East Asia (Indonesia, Singapore, Lao PDR, Viet Nam and Malaysia) and importing countries (mainly the European Union). Trade figures were obtained from the UNEP-WCMC CITES Trade Database. National CITES authorities and other government officials, as well as experts in the field of wildlife conservation and veterinary medicine were also interviewed in order to understand the dynamics of and various perspectives on the trade.

2. Biology of Asian Pythons

2.1. Burmese Python *(Python molurus bivittatus)*

Basic biology

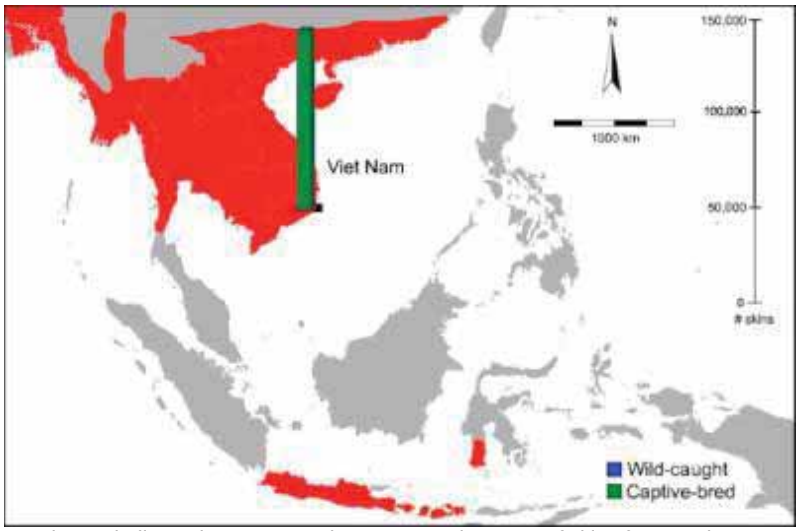
Burmese Pythons (figure 1) are large bodied (>5 m) snakes widely distributed in South-East Asia (figure 2). They inhabit moist forests, tropical woodlands and savannahs, but are known to have a close association with rivers and swampy areas (Groombridge and Luxmoore 1991). Burmese Pythons are nocturnal ambush predators, relying on camouflage to capture prey. Little information exists regarding the prey they select in the wild. However, preliminary information suggests they feed upon a variety of small mammals and birds (Corlett, 2011). Females are larger than males and produce a clutch of 15 – 50 eggs, depending on the size of the mother.

Taxonomy

Burmese Pythons are considered to be a subspecies of the Indian Python, *Python molurus*, although an increasing number of authors have suggested that they are a distinct species (Jacobs et al., 2009; Schleip and O'Shea 2010). Because the name *Python molurus bivittatus* is still used on all CITES permits and certificates we have followed this arrangement for the purpose of this report. *Python bivittatus progschai* from southern Sulawesi, Indonesia, has also been recognized as a subspecies of Burmese Pythons (Jacobs et al., 2009). This population does not appear to be harvested for the skin trade and will therefore not be considered in this section.

Figure 1 ***Python molurus bivittatus***

Figure 2 **Distribution of the Burmese Python (*Python molurus bivittatus*) in South-East Asia**



* Columns indicate the source and mean annual exports of skins from each country.

2.2. Reticulated Python (*Python reticulatus*)

Basic biology

The Reticulated Python is the world's longest snake, but although reports of 10 m individuals exist, the average size is closer to 4 m (Shine et al. 1999a). Reticulated Pythons (figure 3) have one of the widest distributions of any South-East Asian reptile species (figure 4). They inhabit tropical habitats and degraded habitats, and are commonly found in urban areas (Cox, 1997). Reticulated Pythons are nocturnal ambush predators that feed on a range of prey, such as small rodents, domestic chickens and other medium sized mammal species (Shine et al., 1999a; Corlett, 2011). This species is highly mobile, and closely associated with swamps and riverine areas (Auliya, 2006). Females reach much larger sizes than males and can produce more than 100 eggs in a single clutch. The average clutch is around 25 eggs (Shine et al. 1999a).

Taxonomy: Python or Broghammerus?

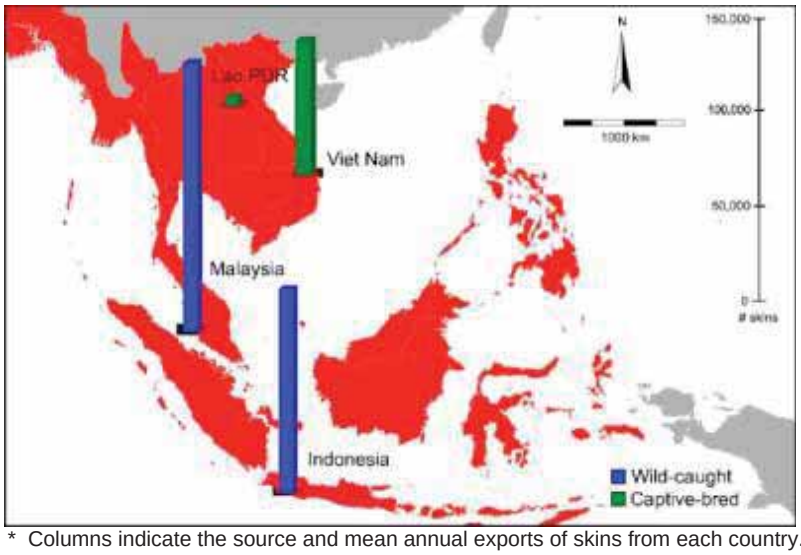
Hoser (2004) separated Reticulated Pythons from other Asian and African members of the genus *Python* and offered the generic name *Broghammerus*. Unfortunately, little evidence was provided for this arrangement and the name was not adopted. However, recent molecular work by Rawlings et al. (2008), combined with earlier morphological work by McDowell (1975), validated the split from the genus *Python*.

Figure 3 Python reticulatus

Source: D. Natusch & J. Lyons.

Under the rules of the International Commission on Zoological Nomenclature, because the name *Broghammerus* was already available it takes precedent for the generic name of this species. Nevertheless, the Latin name *Python reticulatus* is still used by CITES and for sake of ease this arrangement is followed here. Auliya et al. (2002) also described two subspecies of Reticulated Python: *Python reticulatus jampeanus* and *P. r. saputrai*. These are dwarf forms that occur in southern Sulawesi and nearby islands (Auliya et al. 2002).

Figure 4 Distribution of the Reticulated Python (*Python reticulatus* spp.) in South and South-East Asia



* Columns indicate the source and mean annual exports of skins from each country.

2.3. Short-tailed Pythons (*Python curtus*, *P. brongersmai* and *P. breitensteini*)

Basic biology

Three species of short-tailed python (figure 5) are currently recognized: *Python curtus*, *P. brongersmai* and *P. breitensteini*. These are short, heavy bodied snakes (< 2.6 m) inhabiting forested areas predominately within the Indo-Malay region (figure 6). Unlike the larger Reticulated and Burmese Pythons, short-tailed pythons appear to avoid seasonally inundated habitats, preferring dryer areas of lowland forest (Abel, 1998; Auliya, 2006). They are nocturnal ambush predators and are known to be highly sedentary. During daytime they are semi-fossorial, concealing themselves within rodent burrows and under dense vegetation where they spend extended periods (Auliya, 2006). They feed predominately on terrestrial rodents, but will also consume birds and larger mammals (Shine et al., 1999b). Females are slightly larger than males and produce modest clutch sizes of approximately 12 eggs (Shine et al. 1999b).

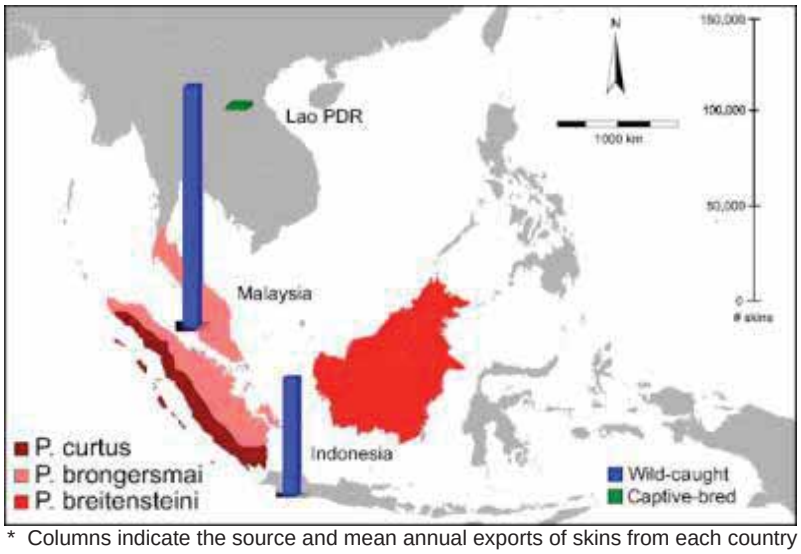
Figure 5 ***Python curtus***

Source: D. Natusch & J. Lyons.

Taxonomy

Traditionally, short-tailed pythons were treated as three subspecies that differed in morphology, colour and geographic distribution. However, Keogh et al. (2001) formally elevated the three geographically isolated subspecies to species level (figure 3). The recognition of this split by CITES had significant ramifications for the skin trade in these species because it allowed more accurate determination of the geographic origin of skins (see section 3 – Regulation of the python skin trade).

Figure 6 **Distribution of the short-tailed pythons in South-East Asia**



* Columns indicate the source and mean annual exports of skins from each country (Compiled using data in Keogh et al. 2001).

3. Regulation of the python skin trade

3.1. CITES Framework

The global python skin trade is monitored and regulated by governments via the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Concluded in 1973 (with subsequent entry into force in 1975), CITES is a multilateral, legally binding agreement that aims to prevent the over-exploitation of wild plants and animals through international trade (CITES, 2012a. Pythons (Family Pythonidae) have been listed within the Appendices of CITES since 1975. Through the Convention, a legal framework is established that facilitates greater international cooperation and regulation of the wildlife trade. Parties to CITES are supported by the CITES Secretariat, which is based in Geneva, Switzerland, and administered by the United Nations Environment Programme (UNEP).

There are currently 175 Parties to CITES, including the five countries surveyed for this report (UNEP-WCMC, 2012a). Lao PDR was the most recent of these to become a Party to CITES, joining in 2004. Viet Nam joined in 1994 and Singapore in 1987, while Malaysia and Indonesia have been members since 1978 and 1979, respectively (CITES, 2012b).

Animal and plant species covered by the Convention are listed in one of three Appendices according to the fundamental principles contained in Article II of the Convention (table 1). Only those species that are threatened or potentially threatened with extinction and affected by trade are CITES-listed; as such, species that are threatened with extinction, but not affected by trade, may not be listed. There are currently nearly 35,000 species of plants and animals listed in the CITES Appendices (CITES, 2012a).

Table 1 Summary of CITES appendices

CITES appendix	Biological and trade status	Trade measures
I	Species threatened with extinction and affected by trade.	International commercial trade in wild-caught specimens is only authorized in exceptional circumstances. Such trade requires export and import permits.
II	Species not necessarily now threatened with extinction, but may become so unless trade is regulated to avoid over-exploitation.	International commercial trade is allowed on two general conditions: the specimens were not obtained in contravention of national law and trade will not be detrimental to the survival of the species in the wild. If these conditions are satisfied, trade requires the prior grant of an export permit by the MA of the exporting country. Although the Convention does not require it, some destination countries have stricter domestic measures requiring an import permit as well.
III	Species is subject to regulation to prevent or restrict exploitation in at least one country which has sought assistance from other members to control trade.	International commercial trade is allowed if the specimen has been legally obtained and an appropriate export permit or/certificate of origin has been issued by exporting State.

Source: CITES 2012c.

3.2. CITES Permitting System

The permitting system is the principal way in which trade in CITES-listed species is monitored and regulated. Under Article IX of the Convention, each Party to CITES is required to designate at least one CITES Management Authority (MA) and one or more Scientific Authorities (SA) (CITES, 2012c). The MA administers the permitting system and authorises the issuance of import, export and re-export permits for CITES-listed species. The role of the SA is to advise the MA that the export will not be detrimental to the survival of the species concerned; to monitor exports of Appendix-II listed taxa; and to suggest suitable measures to be taken by the MA to limit exports so that traded species can be maintained throughout their range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I (CITES, 2012c) (See section 3.4. – Harvest quotas and NDFs).

The type and level of trade permitted for a CITES-listed species depends on the Appendix in which it is listed (table 1). The majority of CITES-listed species (95%) are listed within Appendix-II, including all of the python species studied here.[1] International commercial trade in Appendix-II species is allowed, providing that the SA has advised that trade will not endanger wild populations or be detrimental to the survival of the species, and that the MA determined that the specimens have been legally obtained in accordance with national legislation. If these conditions are met, an export permit can then be issued by the MA (CITES, 2012c). An import permit for CITES II-listed species is only necessary if required under the law of the importing country i.e. stricter domestic measures adopted pursuant to Article XIV, paragraph 1, of the Convention (see section 3.5 – CITES in the EU). CITES also provides that the SA should monitor both the export permits granted by the MA and the actual exports of specimens of the species concerned. Re-export certificates can be issued by a MA on the condition that the specimen was obtained in accordance with the Convention.

[1] The subspecies *Python molurus molurus*, is listed in appendix I of CITES. This species is not traded internationally for skin and is not considered in this report.

CITES permits and certificates follow a standardized format, with every permit and certificate dated and assigned a unique identification number. In addition, importer and (re)exporter details are required, as well as information on the species being traded, the number of units/specimens in the consignment, the country of origin and destination, the source of the specimens and the purpose of the transaction. Permits and certificates are valid for a single shipment and expire after a given period. Upon leaving or entering a country, an original, valid CITES permit or certificate, issued by the relevant MA, must also be presented for inspection, usually to customs.

Under Article VIII paragraph 7 of the Convention, Parties are required to submit annual and biennial reports to the Secretariat by the 31 October. Annual reports contain data collected from CITES permits and certificates issued that year while biennial reports contain information pertaining to the overall implementation of the Convention including information on legislative, regulatory and administrative measures taken. Annual and biennial reports are 'the only available means of monitoring the implementation of the Convention and the level of international trade in specimens of species included in the Appendices' [Res. Conf. 11.17 (Rev. CoP. 14)] and, as such, are of central importance to the function of CITES. Deadlines for annual reporting may be extended by the Secretariat dependent upon adequate justification from a Party. However, if the Standing Committee determines, based on the Secretariats reports, that a Party has failed to submit annual reports without valid justification for three consecutive years, it will recommend that all Parties not authorize trade in CITES-listed species from the Party in question.

All the data contained in annual reports are stored in the CITES trade database (maintained by UNEP-WCMC under a contract with the CITES Secretariat), which is available online (http://www.unep-wcmc-apps.org/citestrade/trade.cfm). The details and codes contained in this database reflect the instructions that are given to the Parties for the production of their annual reports (see http://www.cites.org/eng/notif/2006/E-ARguide.pdf). The database shows for example codes to represent non-numerical data collected from permits and certificates; countries of origin re-export and import (following a two-letter country codes in accordance with the ISO system); the species in trade; the Appendix; volumes; units; specimens in trade (with a three-letter codes, e.g. SKI=skins); the purpose of trade; and the source of the specimens being traded. Terminology and definitions are standardized in accordance with provisions laid down in Resolution Conf. 12.3 (Rev. CoP. 15) on Permits and certificates.

Virtually all python skins are exported for commercial trade (T) and are primarily obtained from four different sources, namely; the wild (W), bred in captivity (C), from "pre-convention" stock (O) and from seized illegal shipments (I). Additional source codes also exist, however; they are less relevant in this case and have not been included here for sake of brevity. Explanations for each of these sources are provided in table 2. Aside from the volume of specimens being traded, the source of python skins is one of the most important factors to be considered when examining python skin trade as it can have significant implications for the sustainability and legality of the industry (see sections on illegality and trade below).

Table 2 Main CITES source codes (CITES res. Conf. 8.5)

Source (Code)	Comment
Wild (W)	Skins derived taken from specimens taken from the wild
Captive-bred (C)	Skins derived from animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5, of the Convention (specimens of species included in Appendix I that have been bred in captivity for non-commercial purposes and specimens of species included in Appendices II and III). For CITES-II listed species, domestic legislation may require captive-breeding operations to meet certain standards and be registered with the national CITES MA. This, however, is not a requirement of the Convention.
Pre-convention (O)	Skins derived from Pre-Convention specimens (e.g. skins that were obtained before the provisions of the convention applied to those specimens OR prior to the exporting party joining CITES).
Seized (I)	Skins derived from confiscated or seized specimens.

The Convention provides a broad international legislative framework, but the responsibility for implementing the Convention lies with each individual Party and generally needs to be promulgated to implement and enforce the provisions of the Convention, including the prosecution and penalization of violations of CITES. For this reason, the presence of effective wildlife laws at the national level is critical in the regulation and control of wildlife trade in accordance with CITES.

In 1992 CITES initiated the National Legislation Project. This was established to analyse the effectiveness of member states' national legislation and provide legislative assistance in implementing CITES. Parties are categorized from 1-3; Category 1' means that national legislation meets all the requirements for implementing CITES, 'Category 2' means that some national legislation meets requirements and while 'Category 3' confers that legislation does not meet any of the requirements (CITES SC59 Doc.11, 2010). With regard to the key Parties considered in this report; Indonesia, Singapore and Viet Nam's national legislation is Category 1, Malaysia's legislation is Category 2 and that of Lao PDR has been assessed as Category 3.

3.3. Compliance and the Review of Significant Trade

Under certain circumstances, as provided under the CITES compliance procedures contained in Resolution Conf. 14.3 of the Conference of the Parties (CoP) to CITES, the Standing Committee may recommend a suspension of trade with a specific Party in one or more species, all commercial trade or all trade (see section 4.3.3). However, trade suspensions are a last resort and generally CITES takes a "supportive and non-adversarial approach…towards compliance matters, with the aim of ensuring long-term compliance".

One of the main roles of the CITES Standing Committee is to provide direction to the Secretariat on the implementation of the Convention which includes recommending trade suspensions for certain species, where appropriate. Such recommendations are made, inter alia, in consultation with the Animal or Plant Committee after a Review of Significant Trade has been carried out pursuant to provisions in Resolution Conf. 12.8 (Rev. CoP. 13). With respect to recommendations on trade suspensions, the following process is followed:

3.3.1. Selection of species of priority concern

Within 90 days of each CoP the UNEP-WCMC, at the request of the Secretariat, provides a summary of annual trade report statistics from the previous 5 years maintained within the CITES Trade Database. On the basis of these results and other information available to the Animal Committee (AC) or Plant Committee (PC), species of priority concern are selected for a Review of Significant Trade.

3.3.2. Notification of species to Range States

Within 30 days of priority species being selected at the AC/PC meeting, the Secretariat notifies range states of the species selected and also provides them with an explanation as to why the species was selected. Range States are then requested to respond within 60 days advising the Secretariat of any problems with the implementation of Article IV of the Convention. The response of the range states is then reported to the AC/PC by the Secretariat. After reviewing this information, if the AC/PC is satisfied that Article IV of the convention (Paragraph 2(a), 3 or 6(a)) is correctly implemented the species is eliminated from the review, with respect to the State in question, and the Secretariat notifies the appropriate Party within 60 days.

3.3.3. Assessment level of concern about selected species

If a species is not eliminated from the review the Secretariat (or in some cases consultants) will compile information on the biology, management and trade of the species and, where necessary, engage range states or relevant experts to obtain information. The Secretariat or consultant then gives a summary of their conclusions about the effect of trade on these species and the basis upon which these summaries were made regarding the implementation of Article IV (see box for explanation of Article IV). The species is then provisionally assessed as being of "urgent concern", "possible concern" or of "least concern". Before these results are considered by the AC/PC, the Secretariat transmits the report to the relevant range states

which are given 60 days to respond. The report, and the responses of the range states in question, is then reviewed by the AC/PC and the provisional assessment revised where appropriate. At this stage, species of least concern are eliminated from the review. Problems identified during the review which do not relate to implementation of Article IV (Paragraph 2(a), 3 or 6(a)) are addressed in accordance with provisions of the convention.

Box What is Article IV (3)?

Obligation to monitor and limit exports of Appendix II species

A Scientific Authority in each party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens. Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to *maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in appendix I,* the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species. (emphasis added)

Source: Reeve (2002).

3.3.4. AC/PC make recommendations made about species

In consultation with the Secretariat the AC/PC formulates recommendations directed toward the range states in question. For species of *urgent concern,* recommendations should differentiate between short and long term actions and propose specific activities with regard to Implementation of Article IV (Paragraph 2(a), 3 or 6(a)) of the Convention, for example; the establishment of cautious export quotas, temporary restrictions and adaptive management procedures. For species of *possible concern,* recommendations should specify further information required to enable the AC/PC to determine whether the species in question should classified as of urgent concern or least concern and also specify interim measures to regulate trade. Carrying out field studies and evaluating threats to populations are examples of such recommendations.

3.3.5. Implementation of recommendations

Deadlines for the implementation of recommendations are determined by the AC/PC and normally should not be less than 90 days or more than two years, depending on the nature of the action to be taken, after the date on which the State concerned has been notified. The secretariat, in consultation with the Chairman of the AC/PC, determines whether recommendations have been adhered to. Where they have, the species is removed from the review process.

3.3.6. Possible trade suspension

In instances where recommendations have not been implemented within the determined time frame the Secretariat recommends appropriate action(s) to be taken by the Standing Committee, which may include a trade suspension for the species and state in question. The Secretariat is required to notify the Parties as to any actions taken by the Standing Committee. In addition, a recommendation to suspend trade should only be withdrawn when the State concerned demonstrates to the Standing Committee, through the Secretariat, that it is compliant with Article IV (Paragraph 2(a), 3 or 6(a)). Recommendations to suspend trade are reviewed every two years by the Standing Committee, in consultation with Secretariat and Chairman of the AC/PC, and where appropriate, take measures to address the situation.

To conclude, the Review of Significant Trade is a lengthy process and Parties are given ample time to respond to any concerns raised by the AC/PC, Standing Committee and Secretariat with regard to trade in CITES-listed species: trade suspensions are rarely implemented and only in cases of severe non-compliance.

In early 2012 CITES launched an online, open-access Review of Significant Trade Management System (http://www.cites.org/eng/notif/2012/E022.pdf). The database provides information on cases currently under review and also allows Parties to upload responses and documents related to the Review. Reviews of Significant Trade have been carried out on all five Python species considered in this report (AC25 Doc. 9.6 pp. 60-61) and all were mainly because of high volume trade (AC25 Doc. 9.6 pp. 113-114) (see chapter 4 – Trade flows).

3.4. Harvest quotas and NDFs

As mentioned, prior to the export of Appendix-II listed species the SA of that Party should assess whether or not trade could negatively impact wild populations. This is referred to in the Convention as the making of a non-detriment finding (NDF) (see section 6 – Sustainability). CITES does not prescribe how the SA should advise the MA about the non-detrimental nature of the trade. It also does not require Parties to establish harvest or export quotas although that many Parties in South-East Asia establish such quotas as a precautionary measure to better manage and control harvest and trade. An NDF can be very simple and straightforward, for example for abundant species ("any number of export will non-detrimental"), or highly sophisticated and complex, for example involving the annual determination of harvest, catch or export quotas, regular population surveys or monitoring activities, species management plans, etc.

In practice, many Parties lack the capacity, resources and will to execute a NDF (Nash, 1993; Apensberg-Traun, 2009; Jenkins, 2009). Instead, more or less arbitrary export (and sometimes also harvest) quotas are often established which do not take into consideration as a proxy for an NDF, based on the best available knowledge about the trade, and the status and population biology of the harvested species (Reeve, 2002; Schoppe, 2009). Needless to say, this can potentially have severe implications for wild Pythons when the impact of these exports on wild populations is not monitored and no adaptive management measures are taken. With regard to the python skin trade, Indonesia, Peninsular Malaysia and Sabah have established harvest and export quotas (see section 4 – Trade flows). In Indonesia and Peninsular Malaysia, quotas were initially established based on the previous year's harvest. Recently, a preliminary NDF began in Peninsular Malaysia with the mark-recapture method employed to evaluate populations (Indonesia CITES MA, Pen. Malaysia CITES MA, pers. comm, 24/4/12), while a NDF for pythons in Sabah is due to begin mid-2012 which will establish a harvest and export monitoring programme (Sabah CITES MA, pers. comm, 10/5/12).

3.5. CITES in the EU

The EU is the primary destination of python skins exported from South-East Asia (see section 4 – Trade flows). CITES is implemented in the 27 EU Member States through Council Regulation (EC) No. 338/97 (the Basic Regulation) and Commission Regulation (EC) No. 865/2006 (the Implementing Regulation), known more generally as the EU Wildlife Trade Regulations (European Commission, 2012). These regulations are broadly complementary to CITES (UNEP-WCMC, 2009). The Basic Regulation lays down provisions for the import, export and re-export of wildlife internally within the EU and for specimens originating from/destined for outside the EU; establishes procedures required for trade; regulates movement of live specimens; ensures member states compliance with the Regulation; and enforces sanctions against offending states (European Commission, 2012a). All CITES-listed species are included within the annexes of the basic regulation with CITES Appendices I, II and III being equivalent to Annexes A, B and C (pythons are listed in Annex B). The EU also has a fourth Annex (D) containing non-CITES-listed species which are considered to warrant monitoring.

The Implementing Regulation establishes "detailed rules for the implementation of (the Basic Regulation), …addresses practical aspects of its implementation" and "implements the bulk of currently applicable recommendations of the Conference of the Parties on the interpretation and implementation of CITES provisions" (European Commission, 2012a). The Implementing Legislation further "provides standard model forms that must be used for permits, certificates, notifications and applications for these documents as well as labels for scientific specimens" and makes "provisions for animals born and bred in captivity, artificially propagated plants, personal and household effects and for the marking and labelling of certain specimens" (European Commission, 2012a).

Import conditions are stricter under the EU Wildlife Trade Regulations than CITES. A specific Regulation (EC) No. 338/97 is in place in the EU to suspend the import into the EU of certain species from certain countries (known as the *Suspensions Regulation*). The Scientific Review Group (SRG) is established in the EU to examine whether imports comply with the conservation requirements of the Regulation (European Commission, 2012b).[2] The SRG is comprised of representatives from SA's from the EU Member States and meets 3 times a year (European Commission, 2012b).

Trade suspensions are usually implemented after the SRG forms a "negative opinion" (table 3) on the import of a species from a particular range state and after the Party in question has been consulted. Negative opinions are formed if the import of that species could have a detrimental impact on the conservation of that species i.e. not comply with the conservation requirements of the Regulation (European Commission, 2012b). Once a negative opinion is formed, all import permit applications for that species/range state combination will be rejected. However, a negative opinion is temporary and can be reversed to a positive opinion, and imports resumed, as soon as new information pertaining to the trade or conservation status of species which satisfies the Regulations conservation requirements becomes available.

Table 3 Definitions of SRG opinions

Opinion	Definition
Positive	Given current or anticipated levels of trade, introduction into the Community would not have a harmful effect on the conservation status of the species or on the extent of the territory occupied by the relevant population of the species
Negative	The information available is insufficient to form a positive opinion on an application and/or the given current or anticipated levels of trade, introduction into the Community might have a harmful effect on the conservation status of the species or on the extent of the territory occupied by the relevant population of the species.
No opinion	The species is not currently (or is only rarely) in trade, and no significant trade is anticipated, or there are insufficient data on which to make a confident positive or negative opinion.

Source: http://ec.europa.eu/environment/cites/pdf/differences_b_eu_and_cites.pdf.

The MA of an individual EU member state, under the advice of the SA, can also form a negative opinion independent of the SRG and stop issuing imports for a given species and range state. Once this happens, this is reported to the Commission who in turn informs the rest of the EU member states to refrain from issuing import permits for this species/state combination until concerns can be addressed at the next SRG meeting. If, at this meeting, the negative opinion is confirmed permit applications will not be granted. If information is presented demonstrating that the conditions for establishing the negative opinion no longer apply, for example, if the range state in question provides additional information, a positive opinion can be formed.

The EU consults on a regular basis with affected Range States in order to assess whether any new information is available which will affect the trade restriction. If concerns over imports of a species from a particular range state continue and the range state in question provides no information to the contrary, the negative opinion will formalized through a publication of the import suspension in the Official Journal of the European Communities. (European Commission, 2012c). Trade suspensions, like negative opinions, are reversible at any moment if new information is received (European commission, 2012c).

Opinions recommended for imports of the python species and Range States considered here are shown in table 4. These are discussed in relation to trade in particular species in the following chapter on Trade Flows.

2 Details of the requirements can be found at http://ec.europa.eu/environment/cites/pdf/differences_b_eu_and_cites.pdf.

Table 4 Scientific Review Group opinions on imports of pythons and range states examined in this study

Opinion	Species	Range state	SRG/Date of recommendation	Comments
Suspension	Reticulated Python	Singapore	22/12/1997	All Wild specimens
-	Reticulated Python	Indonesia	16th/(22/2/2000)	
O	Reticulated Python	Indonesia	18th(7/11/2000)	
-	Reticulated Python	Malaysia	24th/(5/9/2002)	
+	Short-tailed Python (*P. curtus*)	Indonesia	24th/(5/9/2002)	
-	Short-tailed Python (*P. curtus*	Indonesia	28th/(15/1/2004)	
+	Short-tailed Python (*P. curtus*	Indonesia	29th/(19/4/2004)	
Suspension	Reticulated Python	Malaysia	30/4/2004	
+	All Short-tailed Pythons	Indonesia	30th/(1/6/2004)	Subject to the use of specific quotas
-	Short-tailed python (*P. brongersmai*)	Malaysia	40th/(27/3/2007)	
-	Short-tailed python (*P. brongersmai*)	Malaysia	41st/(14/9/2007)	"-" Confirmed
+	Reticulated Python	Indonesia	41st/(14/9/2007)	"+" confirmed
-	Reticulated Python	Malaysia	47th/(12/3/2009)	"-" confirmed for all wild specimens
Suspension	Reticulated Python	Malaysia	49th/(11/9/2009)	Confirmation of Trade Suspension
O	Short-tailed python (*P. brongersmai*)	Malaysia	54th/(3/12/2010)	All applications referred to SRG
O	Reticulated Python	Singapore	55th/(11/3/2011)	Recommend Suspension removal
Suspension	Reticulated Python	Malaysia	58th/(2/12/2011)	Confirmation of Trade Suspension

Source: European Commission, 2012c.

Table key: "-" negative opinion; "+" positive opinion; "O"- no opinion.

4. Trade flows

4.1. Methodology

This analysis focuses on the trade in python skins from the key exporting countries in South-East Asia, namely Indonesia, Lao PDR, Malaysia, Singapore and Viet Nam. The information provided below is sourced from the UNEP-WCMC CITES trade database as well as information gathered from interviews with CITES personnel and python breeders and skin dealers during field visits in late 2011 and May 2012 as well as interviews with stakeholders in September and October 2011. The most recently available CITES trade data for the majority of Parties are from 2010. Where possible, trade data from 2000-2010 were examined to represent trade trends over time. Trade in Reticulated Python skin is presented for each country; data for the remaining taxa is examined by species.

CITES annual report data was reviewed using comparative tabulation reports produced from the CITES Trade Database. The data examined here is based on direct exports from countries of origin to their destinations as reported to the CITES Secretariat by the Parties. Skin re-exports have not been included in our analysis except in the case of Singapore (see section 4.3.1. on Singapore's trade for explanation). In

addition, only whole skin exports were examined with one whole skin considered as equivalent to one python. Trade in “skin pieces” and “skin scraps”, which contribute only a tiny proportion of the python skin trade according to the CITES Trade Database, are not included. Where exports were reported in metres, the sum was divided by 3 (taking 3 m as the average skin length) to provide an estimated number of individuals.[3] Skin exports reported by weight, which account for a negligible proportion of trade, were not examined. As such, these figures represent a conservative estimate for total trade in these species.

4.2. Illegal trade

4.2.1. Incentives for illegal trade

The illegal python skin trade is potentially a highly lucrative business; a single shipment of 10,000 3-metre Reticulated Python skins sold at US$ 30/m is estimated to be worth US$ 900,000 on the international market. A combination of scant enforcement, low detection probability and weak penalties in a country can offer substantial incentive for wildlife traffickers. According to traders interviewed for this study, the extent of the illegal trade in python skins is possibly equal to the extent of legal trade. Seizure records maintained by national governments give some insight into this the unknown side of the industry, but a significant proportion of illegal trade may remain undetected.

4.2.2. Modes of illegal trade

Concealment of python skins amongst shipments of other legally exported commodities is one way in which skins are illegally sold. According to one European importer, this method is used to supply small and medium manufacturers who have the skins legally tanned and finished on a contract basis.

Misdeclaration of the unit (e.g. whole skins as skin pieces) is another way in which skins are illegally exported taking advantage of an absence a of control for certain shipments

Elements of the illegal wildlife trade appear to revolve around the misuse or avoidance of the CITES permitting system (Holden, 1998). False declaration of the source (e.g. wild-caught declared as captive-bred), for example, has been also recognized as a way in which unscrupulous traders may target weaknesses in the CITES permitting system and launder surreptitiously sourced wildlife on the international market (Shepherd and Nijman, 2009; Lyons and Natusch 2011; Shepherd et al., 2012).

Serious concerns, raised by some governments and NGOs, surround this element of trade in python skins. However, since these transactions are carried through CITES using the permitting system, a record is maintained in the CITES trade database. Although traders may be usurping CITES, by monitoring trade and identifying gaps within the trade chain where the Convention is potentially being misused or avoided, we can highlight areas where future enforcement and intervention efforts should be focused.

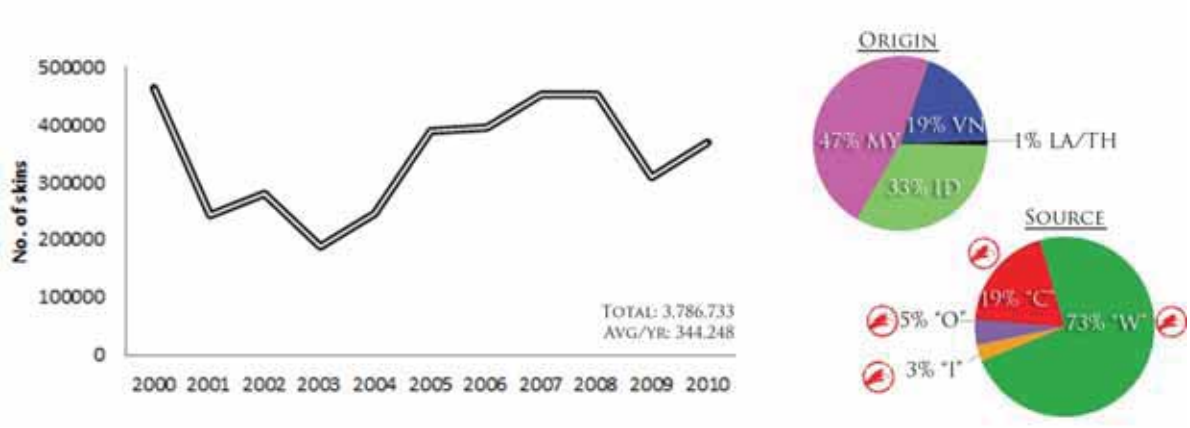
These issues are discussed in greater detail in the following sections of this chapter.

4.3. Reticulated Python (*Python reticulatus*)

The Reticulated Python is the most heavily traded python species for the international skin trade. Annual reported exports vary considerably, but average nearly 350,000 individuals per year (figure 7). The majority of these (73%) are sourced from the wild (“W”) and originate from Malaysia and Indonesia.

3 Based on statements from traders as to the average length of skins in trade. This applies only to Burmese and Reticulated Pythons from Viet Nam, i.e. not the smaller Short-tailed Pythons. Viet Nam is the only country that reports exports in metres.

Figure 7 Reticulated Python skin direct exports 2000-2010, their origin and source.



Data source: CITES Trade Database.

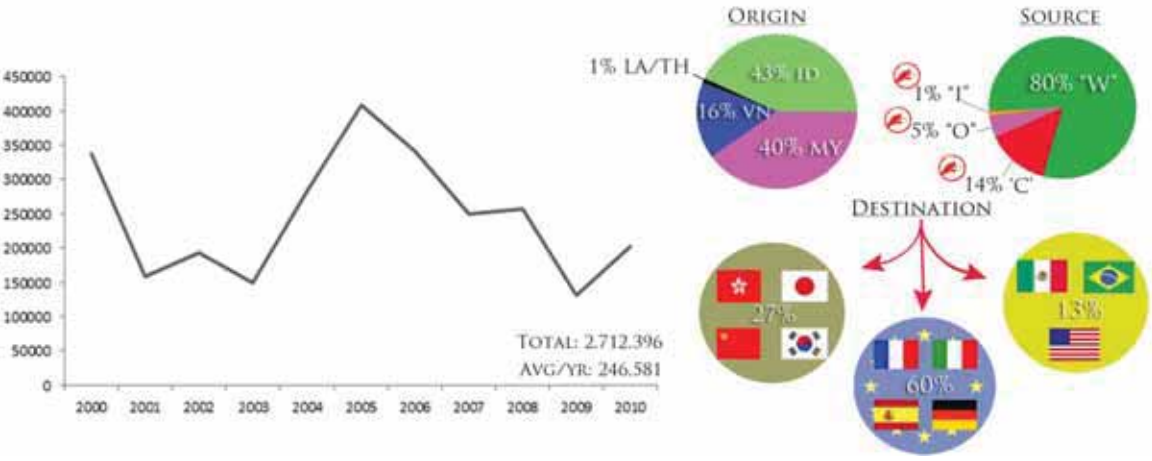
According to the traders interviewed during the report's preparation, the fluctuations in annual exports can be attributed to changing market demand rather than harvest induced population declines. However, due to the high volume of these harvests (over 200,000 individuals on average every year from Indonesia and Malaysia) concerns have been raised about the sustainability of such an off take (see section 6 – Sustainability). The remainder of animals harvested for this industry are sourced from seized illegal shipments ("I") (3%), captive-bred specimens ("C") (19%) and pre-convention ("O") (5%) specimens. Potential issues of concern with sourcing are considered below.

4.3.1. Singapore

Singapore is the most important player in the international python skin trade. Its favourable geographic location, efficient port and established global shipping routes as well as low corporate taxes create the necessary conditions for the nation State to dominate the re-exporting business of South-East Asian python skins.

In 1997, the EU banned imports of wild Reticulated Python skins from Singapore (UNEP-WCMC, 2011). However; Singapore does not export skins of this species because it is afforded national protection and not bred in captivity for commercial trade. In 2011, following the availability of information showing that current trade was not detrimental to wild populations in Singapore, the suspension on imports into the EU was lifted (UNEP-WCMC, 2011) (see section 3.5).

Figure 8 Re-exports of Reticulated Python skins from Singapore 2000-2010, their origin, source and destination



Source: CITES Trade Database.

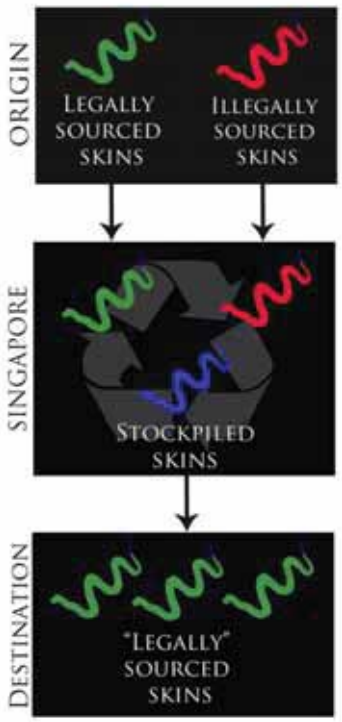
Singapore has re-exported approximately a quarter of a million Reticulated Python skins annually since 2000 (figure 8). The bulk of these skins are wild-caught from Indonesia (43%) and Malaysia (40%). Viet Nam supplies 16% of the Reticulated Python skins which are re-exported by Singapore all of which are declared as sourced from captive breeding facilities (see Viet Nam below). The remainder, small but not insignificant, is made up by imports from Thailand and, more recently, Lao PDR (see section 4.3.2) as well as from pre-convention (5%) and seized illegal shipments (1%). The majority of skins leaving Singapore (60%) are shipped to the EU; just over a quarter are re-exported within Asia, while the remainder (13%) are sent to the Americas.

Issues of concern

Traders in Singapore often import skins without immediately re-exporting them. Instead the skins are stockpiled for re-export in the future (Singapore CITES MA, pers comm.). Stockpiling itself is a common trade practice and not illegal. However, traders in Singapore do not declare their stocks making it difficult for authorities to know what stocks (and their origin) are being held. The presence of undeclared stocks provides an avenue through which illegally sourced skins can be mixed and re-exported with legally sourced skins. Below are examples (figure 9), based on information given by traders and likely scenarios suggested by the authors, of how holding undeclared stocks can facilitate the international trade of illegally sourced skins. Some of these examples may also apply to other states, however; the authors believe the practice of stockpiling facilitates these practices in Singapore in particular because of the aforementioned reasons.

Smuggling: One importer in the EU interviewed during this study stated that python skins are sometimes mixed with shipments of other commodities, allowing illegally sourced skins to be exported.

Figure 9 Illustration explaining stockpiling



Mixing illegal and legal skins: Illegally harvested Reticulated Python skins are smuggled into Singapore from Indonesia or Malaysia. The skins are combined with existing stockpiles and re-exported.

Declaring whole skins as half skins: For example, a batch of 100 whole skins is imported into Singapore. Between import and re-export, the authorities informed that the skins have been cut in half leaving 200 *half skins*. In reality, the skins remain untouched. In this way, 100 *illegally* sourced whole skins can be added to the existing number of legally sourced whole skins.

Mis-declaration of origin and source on CITES permits: The authors suggest, based on observations made during this study, that mis-declaring the origin of skins on CITES export permits is a way in which illegally sourced skins (e.g. from Indonesia) can be re-exported from Singapore (e.g. figure 10). Since the existing stockpiles are unknown, it is virtually impossible to verify the actual origin of the skins and so illegally sourced skins can be mixed with laundered.

Since 2000, Singapore has re-exported 377,582 captive-bred skins, 133,501 “pre-Convention” skins and 30,467 skins from seized illegal shipments (see section 3 – Regulation on the python skin trade for explanation).

Although one trader claimed python skins can remain intact for up to 10 years, other experts interviewed during this study maintained that it is only feasible to stockpile skins for 2 to 4 years before they degrade. The cost of preserving skins over an extended period, which requires protection from the damage caused by humidity and insects, is considerable making it unfeasible. Singapore joined CITES in 1989 while pythons have been listed in CITES since 1975, implying that some of the “pre-Convention” skins have been in storage for over twenty years. The authors suggest that this could be an indication of abuse of the CITES permit system whereby illegally sourced skins are mis-declared as pre convention in order to re-export them legally and circumvent

trade controls. This hypothesis is supported by the fact that these skins have reportedly been in storage for up to twenty years, an unlikely scenario given the deterioration risk mentioned above,

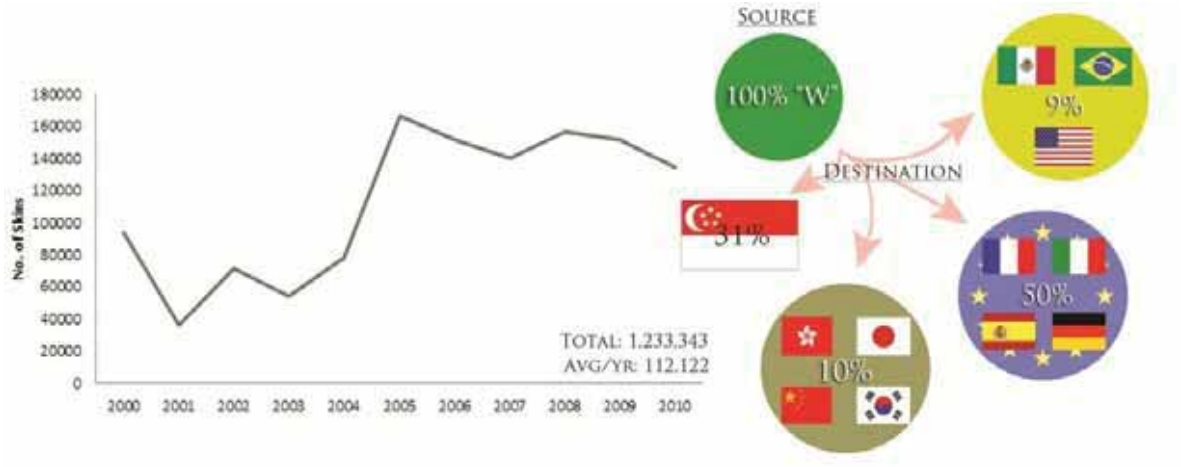
With regard to the seized illegal shipments, most skins allegedly originate from Indonesia. However, because stockpiling potentially facilitates the mixing of legally and illegally sourced skins, it is a possibility that the skins were illegally obtained and mis-declared as "seized" in order to export them. All things considered, the re-export of skins listed as "pre-convention", seized and captive-bred (see section 4.3.4.) from Singapore is an issue for concern and that the CITES permit system open to exploitation.

Misdeclaration as synthetic leather: In 2010, 470 Reticulated Python skins which had been falsely declared as synthetic leather were seized by Singapore's Agri-Food & Veterinary Authority - AVA (Anon, 2012). The skins, which constitute a tiny proportion of Singapore's re-exports, were thought to originate from Sumatra, Indonesia, and were incinerated by authorities in Singapore in 2011 following public and media pressure. Destruction of the contents of an illegal shipment is a controversial measure that can be taken by authorities to dispose of seized goods. Re-selling the contents and putting the proceeds toward a cause is another option (see Recommendations).

4.3.2. Indonesia

Indonesia is currently the largest exporter of Reticulated Python skins. Since 2000 Indonesia has exported on average over 112,000 skins annually, all sourced from the wild (figure 11). Unlike the other main exporters of Reticulated Python skins, a relatively small proportion of skins are exported via Singapore (31%) with the majority being exported directly to the EU (50%).

Figure 10 Exports of Reticulated Python skins from Indonesia 2000-2010, their source and destination



Indonesia established an annual export quota of 162,000 skins for Reticulated Pythons in 1997; currently the harvest quota stands at 175,000 skins, 90% of which (157,500 skins) is for export, with the remainder designated for local use. Traders are only permitted to export semi-processed skins, a value-adding measure designed to support the local industry (see section 5 – Value chain of pythons). The export of raw skins and quantity of skins surplus to the quota is illegal.

Indonesia has a complex quota-setting system in place. Harvest quotas are established for different provinces and are distributed to hunters while export quotas divided up amongst members of the Indonesian Reptile and Amphibian Trade Association (IRATA). Transport of harvested wildlife and/or parts of it (meaning live animals, skins or others), is subject to a domestic transport document called SATS-DN (see appendix I for an example). With this transport document skins can travel throughout Indonesia, allowing to trace shipments, although not individual skins. For export each individual skin is issued with an ID sticker (figure 11), which has a unique number and is glued to the skin. The ID number is then reported on the CITES export permit.

Figure 11 Indonesian identification sticker and seal

ID sticker CITES export inspection

Source: R. Arbeid.

Issues of concern

Stockpiling and smuggling

During this study several thousand stockpiled skins were observed in Indonesia. According to traders interviewed during this study, hunters, out of necessity for income, ignore quotas and continue to illegally harvest snakes throughout the year and sell them to slaughterhouses. In order to maintain good business relationships with slaughterhouses, traders continue to purchase skins even after the quota is met. Although measures are in place to regulate this trade, these reports suggest that there is a lack of enforcement and monitoring of the python skin trade.

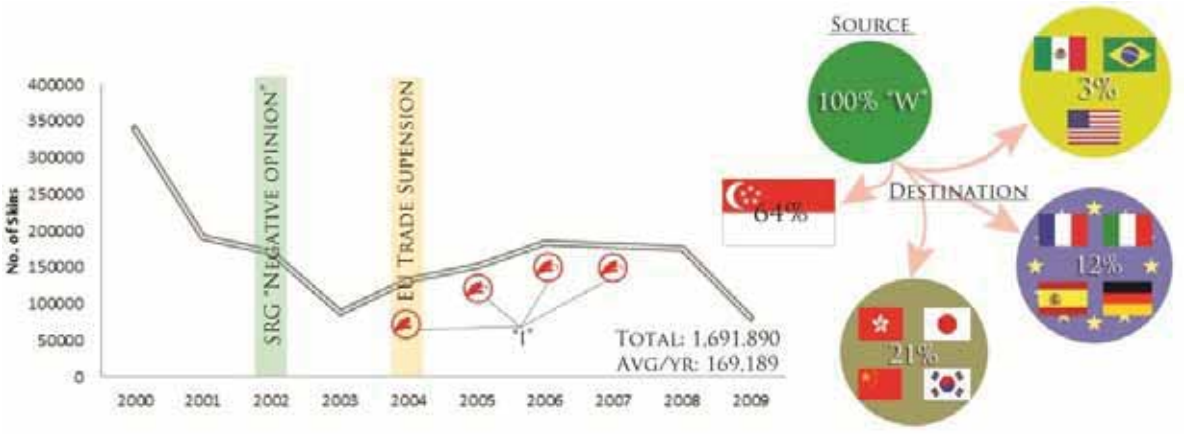
Indonesia's large land area, extensive coastline and porous land borders provide ample opportunity for these illegally harvested python skins to be smuggled to neighbouring Malaysia and Singapore. From here, falsified CITES permits and mis-declared source and origin codes could be used to launder these illegally harvested skins on the international market. Examples of these scenarios are presented here with regard to the trade in captive-bred Reticulated Pythons from Viet Nam and Lao PDR, via Singapore; captive bred East Sumatran Pythons from Lao PDR; and previously Short-tailed Pythons from Malaysia.

4.3.3. Malaysia

Before 2000, Malaysia was the largest exporter of Reticulated Pythons skins; however, exports have declined dramatically since the beginning of the century (figure 12). Although recognized as a single Party by CITES, Malaysia is geographically divided into East Malaysia, comprised of the states of Sabah and Sarawak, and Peninsular Malaysia which comprises eleven states. Peninsular Malaysia, Sabah and Sarawak have distinct governance and legislation and each have their own MA, but they are represented internationally by a central CITES MA/SA located in the peninsula. Peninsular Malaysia is the predominant exporter of Reticulated Python skins. Sabah exports small volumes and has had a quota of 12,000 Reticulated Python skins in place since 2011. No python skins are exported from Sarawak (Sarawak CITES MA, in litt.).

There has been a noticeable decline in Peninsular Malaysia's python skin exports since 2000 (figure 12). According to the Malaysian CITES MA (PERHILITAN), this is due in part, to a government crackdown on illegal trade in python skins (see section 4.5) (pers. comm., 26.4.2012). In 2000, Malaysia exported more than 340,000 Reticulated Python skins. More recently, however, Malaysia has exported an average of ~170,000 wild-sourced skins per year, the majority of which (64%) are sent to Singapore for re-export. More than one-fifth is sent to other Asian countries. There is one python skin tannery in Malaysia, however, the bulk of skins exported are raw. Malaysia also has two python meat processing plants which export dried meat to China though CITES. Gall bladders are dried and consumed locally. The python meat exporter interviewed did not export gall bladders although it is possible that dried gall bladders are exported from Malaysia.

Figure 12 Exports of Reticulated Python skins from Malaysia 2000-2010, their source and destination



In 2002 an export quota of 280,000 skins was implemented there. That same year the EUs Scientific Review Group (SRG) established a “negative opinion” and rejected all import permits applications for Reticulated Python skins from Malaysia as the “quota was higher than given trade in recent years” (see appendix II). In 2004, the import of skins originating from Peninsular Malaysia into the EU was suspended. The EU has reviewed this suspension periodically, most recently in 2011 (see section 3.5); however, no evidence has been made available to demonstrate non-detriment of imports to the EU.

Since the suspension of imports of Reticulated Python into the EU; total exports have dropped and stabilized, Peninsular Malaysia has carried out a preliminary NDF and a new wildlife law has been implemented. Additionally, despite anecdotal reports suggesting that current harvest levels are unsustainable, there is no hard data available to determine whether trade is sustainable or not (see section 5 – Sustainability). The EU has reviewed this suspension periodically since its recommendation, however’ according to PERHILITAN, they are unaware as to why imports to the EU are suspended.

Malaysian traders interviewed during this survey report a ~30% loss in income from sales as a result of not being able to sell to the EU. According to these traders, skins have instead been exported in the region at a lower price. This lower price would necessarily result in lower prices paid to hunters who rely heavily on the additional income.

Since 2008, an annual export quota of 180,000 skins has been in place for the peninsula (CITES, 2012e). Of this, a maximum of 90,000 skins can be exported to Singapore, as, according to PERHILITAN (Pers. comm., 26.4.2012), stockpiling allows Singapore to exert control over market price and supply and so reduces the bargaining power of Malaysian exporters. As such, this measure was taken to stabilise and protect the industry in Peninsular Malaysia (PERHILITAN, pers. comm. 26.4.2012).

Issues of concern

Weak monitoring and control

International monitoring of python trade in Malaysia is hampered by the fact that exports from essentially two independent states, Peninsular and Sabah, are represented as a single party to CITES, making it difficult to establish how much of which species are coming from where, particularly for the Reticulated Python (and previously Short-tailed Pythons, see section 4.5) which is distributed in both areas. This creates a lack of transparency and potentially provides a means through which illegally sourced skins can be laundered through CITES by falsely/not declaring the exact origin within Malaysia.

Between 2004 and 2007, Malaysia re-exported 60,134 Reticulated Python skins from seized illegal shipments. The majority of these re-exports consisted of three consignments of 8,000, 32,000 and 12,134 skins in 2005, 2006 and 2007, respectively, and originated from Thailand. The remaining 8,000 skins were ex-origin and were re-exported in 2004. That such substantial numbers of skins were seized in Thailand is somewhat perplexing.

Misdeclaration of seized skins

Thailand plays a minor role in the python skin trade, sometimes exporting several thousand captive-bred Reticulated Pythons in a year. According to the CITES trade database, Thailand rarely imports and re-exports skins. Given the substantial volume of these seizures it is, the authors of this study feel it is improbable that these skins originated in Thailand and more likely originated in the larger exporting countries, that is, Indonesia, Malaysia or Viet Nam. Why skins from Indonesia, Malaysia or Viet Nam would be transiting through Thailand and be seized during four consecutive years only is unclear. Further to indicating the potential scale of the illegal trade in python skins, the authors posit that this could potentially be an indication of illegal activity, whereby illegally obtained skins are re-exported from Malaysia using dubious CITES permits mis-declaring the source as seized shipments in Thailand. In total, these skins could have a potential market value of several million dollars, providing considerable incentive to engage in illegal trade.

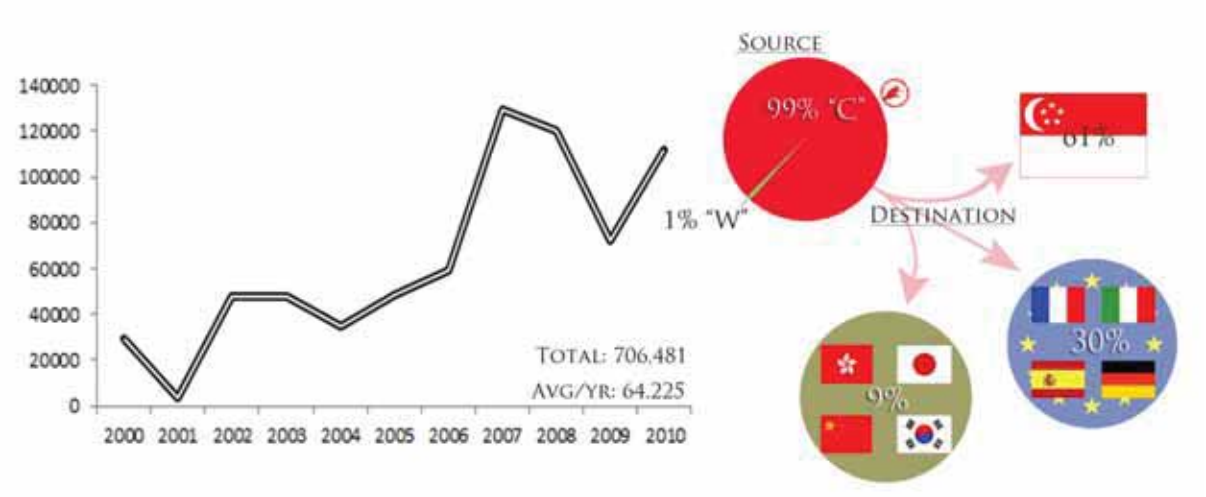
Smuggling

Given the issues concerning stockpiling in Singapore, as well as the large proportion of Malaysia's trade which is conducted via Singapore and the geographic proximity of the two countries, opportunities exist for skins to be illegally re-exported via Singapore. This would contravene both CITES legislation and the EU trade ban. In addition, Malaysian skins are exported raw and are potentially more desirable to EU importers than the semi-processed Indonesian skins (see section 5 – Value chains of pythons). Both of these factors provide a possible incentive for dishonest traders to launder the skins.

4.3.4. Viet Nam

Viet Nam has been recognized as the primary exporter of Burmese Python skin for some time (see below); however, over the past decade it has become an increasingly important player in the Reticulated Python skin trade (figure 13). In 2010, according to the CITES trade database annual exports of Reticulated Python skins outstripped those of Burmese Pythons.

Figure 13 Exports of Reticulated Python skins from Viet Nam 2000-2010, their source and destination



On average, more than 64,000 Reticulated Python skins are reported as exported from Viet Nam annually. The majority of these skins (61%) are exported to Singapore and nearly one third are directly exported to the EU. All of these skins are exported raw (see section 5 for definition of different skin states).

In contrast to Indonesia and Malaysia, virtually all of Viet Nam's exports of Reticulated Python skins are declared as captive-bred. According to Vietnamese CITES authorities, captive breeding of this species began in the early 1990s with breeding stock obtained from the wild in Viet Nam. According to the Viet Nam CITES (North) MA, there are currently ~100,000 Reticulated Pythons held in captivity (Viet Nam,

CITES MA, pers. comm. 7/5/12). The majority of these farms (~80%) are said to be located in southern Viet Nam (in the vicinity of the Mekong delta) where the climate is more suitable for the captive propagation of ectothermic species.

Issues of concern

Captive breeding and permitting

The case for the existence of large scale captive breeding of Reticulated Pythons in Viet Nam is not clear for two reasons. There is a lack of data demonstrating that captive breeding is economically or biologically viable and there appears to be serious discrepancies in the export figures reported to the CITES Secretariat and those maintained by Viet Nam's Southern MA.

Python farmers, tanners, exporters and the CITES MA interviewed during field surveys in Viet Nam stated that there are few farms currently breeding Reticulated Pythons in Viet Nam. In addition, the market price for both species is equal (see section 5 – Value chain of pythons). It is therefore unclear why python farmers would choose to breed Reticulated Pythons. During field visits in Viet Nam, a number of bred Reticulated Pythons claimed to be captive-bred were observed in one farm. However, whether this species is bred in the reported volumes remains highly in doubt.

According to annual trade figures reported to the CITES Secretariat by Viet Nam's central MA, located in Hanoi, 100,000 Reticulated Python skins were exported by Viet Nam in 2010. However, according to documents shown to the authors in May 2012 by the CITES MA in southern Viet Nam, where the vast majority of python farms are located, only 40,000 skins were exported. The MA were unable to explain their discrepancy (Viet Nam CITES MA, 7/5/12).

Taking into account these problems, the authors believe that this is potentially an indication of illegal activity. One suggested scenario is that Reticulated Pythons are being illegally caught in Indonesia and Malaysia and smuggled into Singapore. From there, traders could mix the skins with existing stockpiles and using false declaration of source on CITES permits (i.e. recorded as "captive-bred" in Viet Nam), they are re-exported abroad, mainly to Europe. In this way, enforcement authorities and importers are misled as to the true origin and source of the shipments while the skins, and the snakes, never touch Vietnamese soil.

4.3.5. Lao People's Democratic Republic

Lao People's Democratic Republic (Lao PDR) only recently began trading Reticulated Pythons. In 2009 Lao PDR exported 5,000 skins while in 2010, 20,000 skins were exported. All of these skins were reportedly bred at a single farm in Lao PDR. This facility also breeds and exports Burmese Pythons and East Sumatran Short-tailed Pythons (see below), as well as a host of other vertebrate species. According to Lao PDR CITES officials, this farm sourced its parent stock from Thailand, Cambodia and Viet Nam around 10 years ago and today can produce over 70,000 captive bred pythons of the three species combined annually.

Issues of concern

Captive breeding and permitting

Recently, doubts have been raised by TRAFFIC about the legitimacy of captive-bred Reticulated Python skin exports from Lao PDR. Concerns remain over the capacity of a single farm to produce such large numbers of animals. The authors of this study visited Lao PDR in May 2012 with a view to meeting CITES officials there and to visiting this farm to substantiate these claims.

The Lao PDR CITES officials provided some information on the farm in the form of photographs, however, these did not prove that pythons were in fact being captive bred. Efforts were made to organise an outing to the farm, however; despite being informed of our study well in advance and having a permission letter signed by the appropriate government department, the farm owner would not allow us to visit the facility. Two reasons were given. Firstly that the snakes had been all been removed from the facility for its cleaning and secondly that the owner was in Viet Nam for medical treatment and could not supervise the visit,

despite having been previously notified of the research teams visit. Additionally, the son of the owner in question, also working in the business, is an employee of the Lao PDR Ministry of Commerce (Lao PDR CITES MA, pers. comm.).

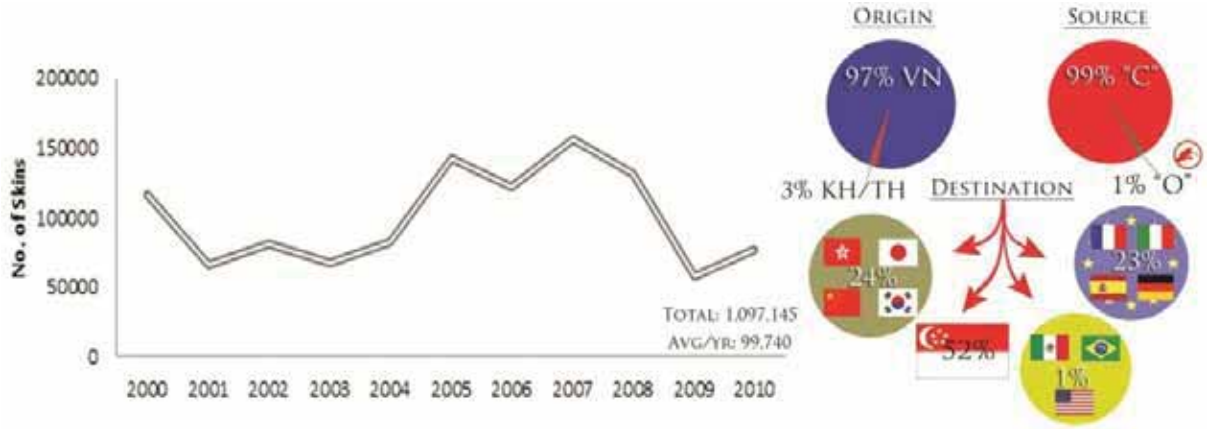
Based on the experience from this field visit, the evasive behaviour of the farm owner in question and the lack of any evidence to the contrary, this research suggests that it is unlikely captive breeding in Lao PDR is taking place on any scale close to official export figures. It is possible, but not proven, that this farm could be acting as a front for illegally laundered skins, using dubious permits. All things considered, the trade in Reticulated Python skins from Lao PDR is highly suspicious.

4.4. Burmese Python (*Python molurus bivittatus*)

4.4.1. Viet Nam

Viet Nam exports nearly 100,000 Burmese Python skins on average every year, 97% of world exports in the species. All of these skins are sourced from animals declared as captive bred (see section 3.2 for definition) (figure 14). In the past Cambodia has exported small numbers of wild-caught Burmese Python skins but has not had any exports since 2006. Thailand occasionally exports up to a few thousand Burmese Python skins in a given year, most of which are claimed to be bred in captivity.

Figure 14 Exports Burmese Python skins 2000-2010, their origin, source and destination



Half of all the skins leaving Viet Nam are re-exported via Singapore with the remainder directly exported to the EU (23%) and elsewhere in Asia (24%).

Issues of concern

Pre-convention skins

Since 2000, 5,491 “pre-convention” Burmese Python skins of unknown origin have been re-exported from Singapore. As suggested above, this is increasingly unlikely as time passes and as such is a possible loophole through which illegally sourced skins are laundered into the international market.

Captive breeding and permitting

Doubts have previously been raised about the economic and biological feasibility of breeding pythons for commercial trade. The research team visited two captive breeding facilities and one satellite farm during field visits to Viet Nam. According to the CITES MA and breeders interviewed during surveys, python farms have a particular system in place that makes captive breeding feasible on both levels. Big farms sell hatchlings to numerous small, “satellite” farms that rear the snakes to market size and then sell back to the big farms for slaughter. This avoids high management costs to supervise rearing thousands of Burmese Pythons in single large farm breeding.

According to these breeders, Burmese pythons can be fed for one year on inexpensive chicken necks and heads for US$ 24, keeping feed costs low (see figure 15). One breeder also stated that he fed his stock piglets, bought from a local pig farm for US$ 0.50/ kilo and fed the animals vitamin supplements According to these breeders as well as the CITES MA, the Burmese Pythons that are being bred in Viet Nam for the skin trade can reach slaughter size (>2.5 m) within 10 months on this diet. However, this figure has been contested with breeders in Indonesia maintaining that it such a growth rate is not possible.[4]

Figure 15 Feeding Burmese Python in Viet Nam captive breeding site

Source: O. Caillabet.

From site visits conducted by the research team, it is apparent that Burmese Pythons are being bred in Viet Nam and possibly in considerable numbers for the skin trade. Whether they are being bred in the numbers reported in CITES exports, however, remains unclear at this point. The sample size of facilities visited was low (3) and biased towards the two largest exporters in the country. Staff costs, husbandry, enclosure construction and maintenance, veterinary costs and other costs must also be considered to gather an accurate representation of the feasibility of commercial captive breeding. Additionally, questions remain over the biological potential of raising Burmese Pythons to slaughter size in the time frame outlined by breeders.

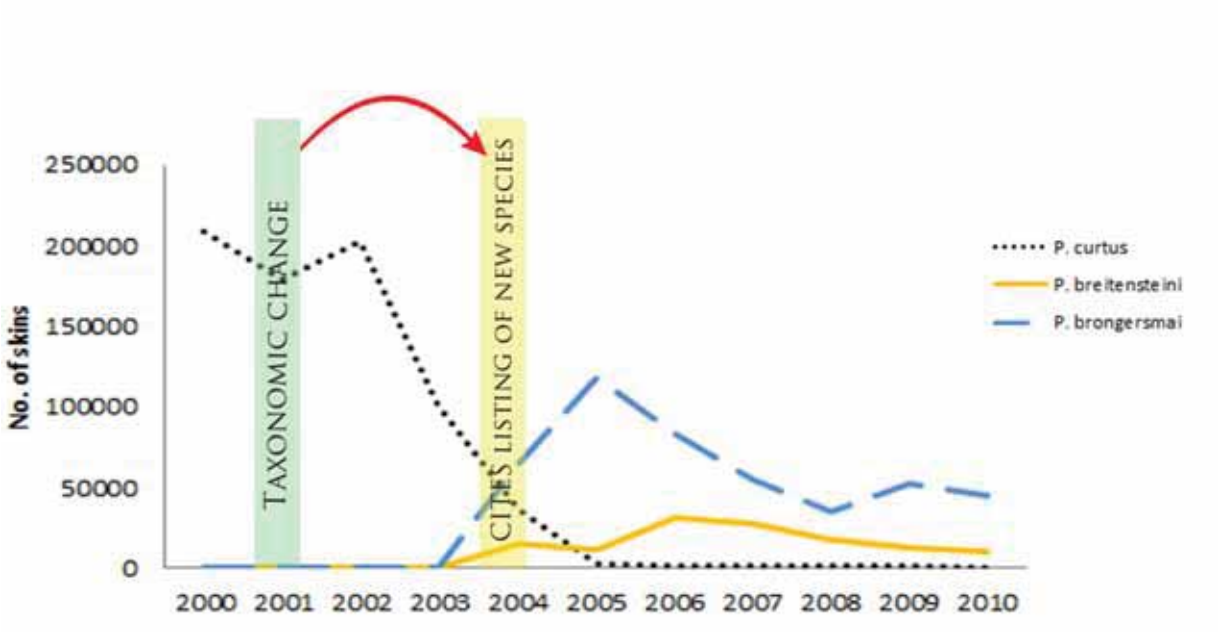
4.5. The Short-tailed Pythons

The term Short-tailed Python collectively refers to the three species of short-bodied pythons distributed in South-East Asia. These three species were previously considered as a single species, *Python curtus*. In 2001, *P. curtus* was split into three separate taxa, namely; the West Sumatran Short-tailed Python *P. curtus*, the East Sumatran short-tailed Python *P. brongersmai* and the Borneo Short-tailed Python *P.*

4 Indonesia's country report March 2011 contests these figures: It takes 4 years to reach harvestable length. A one year old snake is 1.5 m long and is fed 2 rats per week at $ 0.50 per rat. Larger snakes feed on 4 rats per week. The estimated total cost to feed a snake in four years is minimum US$ 199 (excluding salaries), against a skin price of about US$ 100.

breitensteini (Keogh et al., 2001). This taxonomic change, accepted into CITES in 2004, has had a dramatic impact on trade in these species (figure 16).

Figure 16 Exports of Short-tailed Python skins 2000-2010



Suddenly, exports in the West Sumatran Short-tailed Python, now the most geographically restricted of the three species (see section 2 – Biology of Asian pythons), plummeted as exports in the other two species increased. In 2004, the same year that the species were split, the SRG formed a negative opinion and imports of Short-tailed Python skins from Indonesia were temporarily refused. However, this opinion was reversed later that year and at the 30th meeting of the SRG a positive opinion was formed subject to Indonesia implementing export quotas for each of these species (sees section 3.5). Trade in each of these species is discussed in greater detail below. For the sake of brevity, hereafter they will be referred to by their shorter Latin names.

Issues of concern

Distinguishing species

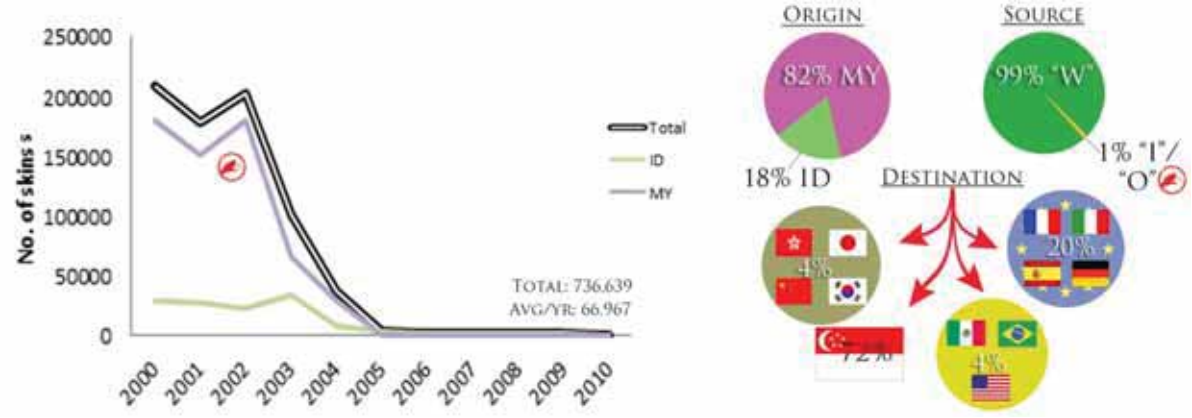
A difficulty which arises in the monitoring and regulation of trade in the Short-tailed Pythons is that the skins from the three species, especially when dried post slaughter, are very similar and are only distinguishable by counting the number of ventral scales, making it extremely difficult for enforcement agencies and other relevant regulatory authorities (customs, quarantine etc.) to differentiate between species, and prevent abuses of CITES. This obviously allows for intentional and accidental misrepresentation of species on CITES permits, and makes monitoring quota-restricted harvest and trade extremely difficult for authorities to manage.

4.5.1. West Sumatran Short-tailed Python (*Python curtus*)

Prior to the taxonomic split between 150,000 and 200,000 *P. curtus* skins were exported from Indonesia and Malaysia annually with Malaysia exporting the vast majority of these (82%) (figure 17).

Apart from 1% of skins which were “pre-convention” or from seized illegal shipments, all of these skins were declared as wild harvested. The majority of skins (72%) were sent to Singapore for re-export to the EU importing one fifth of the *P. curtus* skins directly exported between 2000 and 2010. An export quota of 45,000 skins for *P. curtus* was established by Indonesia in 1997. The quota hovered around this mark until 2004 when the taxonomic change was recognized by CITES, at which stage the quota dropped to and remains at 1,944 skins per year. Even at this low level, the quota is not always realized.

Figure 17 Exports of *Python curtus* skins 2000-2010, their origin, source and destination



Issues of concern

Distinguishing species

Prior to the taxonomic change, Short-tailed Pythons from Peninsular Malaysia, Sumatra and Borneo were being harvested for their skin and exported as one species. Problems arise when we try to account for which of the reclassified species comprised which portion of the trade in *P. curtus* prior to 2002, particularly when examining Malaysia's past exports.

Discrepancies in reporting and actual harvests

Between 2000 and 2004 more than 600,000 *P. curtus* skins were exported by Malaysia. According to annual reports published by Peninsular Malaysia's MA at the time, no hunting licenses or CITES export permits were issued (Chiew, 2003). In addition, both Sabah and Sarawak's CITES MAs stated that there has been little if any exports historically of *P. curtus* (now *P. breitensteini*) skins from East Malaysia (Sabah MA, pers comm 10/5/2012; Sarawak CITES MA, in litt.). *P. brongersmai* is the only one of the three Short-tailed Python species which is distributed in Peninsular Malaysia where it is not abundant in the wild (Khadiejah, pers comm. to D. Natusch, 26/4/2012).

The fact that Short-tailed Pythons were not harvested in Borneo and Sarawak and are not common in Peninsular Malaysia indicates that during this time there were hundreds of thousands of wild-caught Short-tailed Pythons being illegally traded every year likely originating in Indonesia (Chiew, 2003). Once the species were split, *P. curtus* exports could no longer be claimed to be originating in Malaysia and hence the huge decline in exports. Had the taxonomic change not occurred, these harvest levels are likely to have continued unbeknownst to enforcement officials, demonstrating the potentially huge unknown illegal component to the trade in pythons.

4.5.2. East Sumatran Short-tailed Python (*Python brongersmai*)

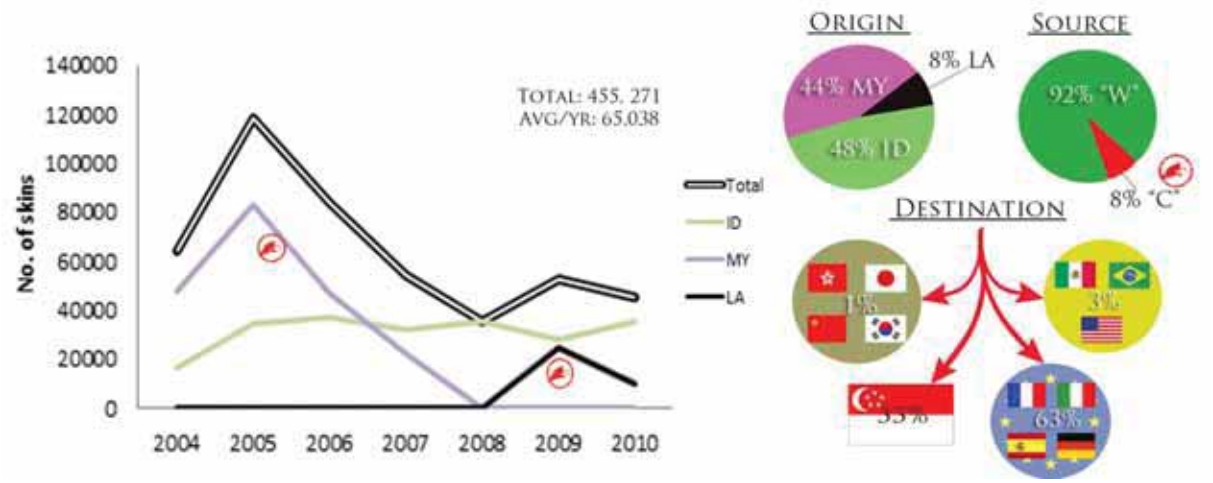
Since 2004, an average of around 65,000 *P. brongersmai* skins have been exported every year mostly from Indonesia (48%) and Malaysia (44%) where they were harvested from the wild (figure 18).

A comparatively small percentage of skins are exported to Singapore (33%) with the majority (63%) directly exported to the EU. The remainder of trade in this species is accounted for by skin exports from Lao PDR which exported 25,000 *P. brongersmai* skins in 2009 and 10,000 skins in 2010, all declared as captive bred stock.

Since 2004, Indonesia has established an export quota of 36,936 skins for *P. brongersmai*. From that time Indonesia's exports have remained constant. Trade in Malaysia lies in stark contrast to this peaking at 83,000 skins exported in 2006 and plummeting to 0 by 2008. The SRG formed a negative opinion and temporarily refused imports of *P. brongersmai* skins from Malaysia in 2007. In 2009, this decision was changed to a no opinion allowing import licenses to be issued after each application had been referred to and reviewed by the SRG (see section 3.5 – CITES in the EU). This decision was taken after Peninsular

Malaysia's CITES MA wrote the EU detailing the new Wildlife Conservation Act under which *P. brongersmai* are completely protected (European Commission, 2009).

Figure 18 Exports of *Python brongersmai* skins 2000-2010, their origin, source and destination



Issues of concern

Exports between 2000 and 2007

Malaysia directly exported over 200,000 *P. brongersmai* skins between 2004 and 2007, a remarkable figure given that this species is both rare and protected in Peninsular Malaysia and absent from East Malaysia. This did not go unnoticed; according to Peninsular Malaysia's CITES MA (pers. comm., 26.4.2012), following concerns over its legality, the government began a crackdown on this trade, shortly after which in 2008 exports of *P. brongersmai* skins fell to zero. Although the Malaysian government's response is encouraging, these trends nonetheless indicate the potentially huge illegal trade in python skins. For this species alone the figures suggest that up to 80,000 *P. brongersmai* were being illegally harvested from the wild annually (see export trends, figure 18).

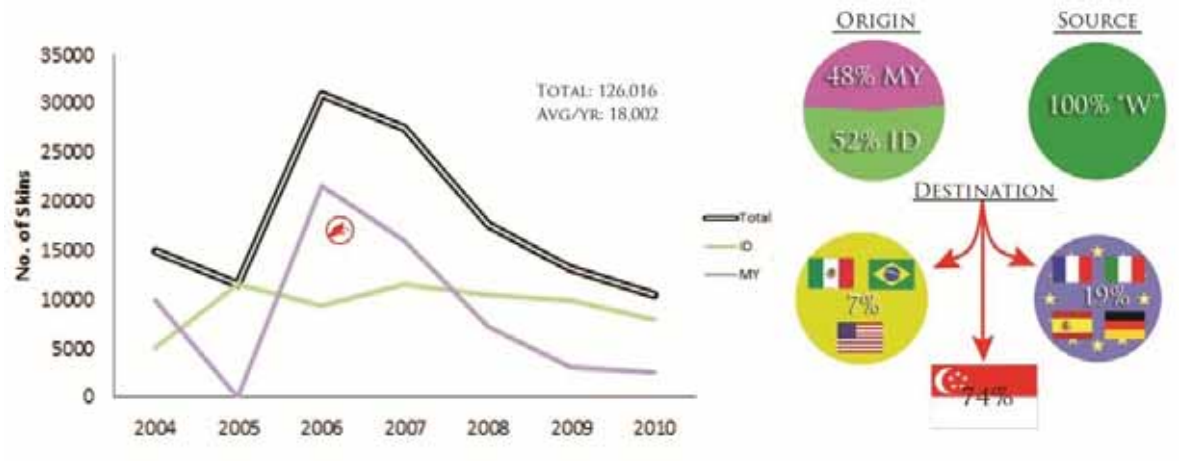
Another concern is the role that Lao PDR plays in the trade of *P. brongersmai*. This species is not native to Lao PDR yet 8% of the trade is sourced from the country. Skins from this species have the same market value per metre (but are less profitable on a per piece basis because they are shorter) as the Reticulated and Burmese Pythons, which are native. As such, it is unclear why anyone would want to start breeding this species for the skin trade outside of its range.

As previously mentioned, concerns have been raised about the feasibility of commercial captive breeding of pythons for skin (section 4.4.1). Reported exports of *P. brongersmai* (and other species, see section 4.3.5) suggest that this farm in Lao PDR is one of the largest operations in South-East Asia. The capacity of a single farm to breed such large numbers of pythons is difficult to believe. The research team were granted permission by the relevant Lao PDR government authority to visit this premises; however, the farmer would not allow access, raising suspicions even further. This considered exports of 'captive bred *P. brongersmai* from Lao PDR are highly dubious and might be indicative of illegal activity elsewhere along the trade chain.

4.5.3. Bornean Short-tailed Python (*Python breitensteini*)

P. breitensteini is, overall, the least traded python species for the skin trade. Approximately 18,000 skins from this species are exported annually from Indonesia and Malaysia (figure 19).

Figure 19 Exports of *Python breitensteini* skins since 2000 as well as origin, source and destination



Since 2004, these two countries have exported roughly equal numbers of skins all sourced from wild. Nearly three quarters of these skins are exported to Singapore with 19% and 7% directly exported to the EU and the Americas, respectively.

Trade trends are similar to those of *P. brongersmai* with exports from Malaysia temporarily exceeding those of Indonesia before reducing in volume considerably. An annual export quota of 10,800 skins has been in place in Indonesia since 2004 where exports have remained relatively stable.

Issues of concern

Discrepancy between reported harvests species distribution

Within Malaysia*, P. breitensteini* is distributed only in the East Malaysian states, however; few if any skins from this species have been exported from here in the past according to the CITES MA's of Sabah and Sarawak. This suggests that these skins were then exported from Peninsular Malaysia, despite the fact that this species is not distributed in the Peninsula. This considered, the authors posit that this is suggestive of illegal activity, with *P. breitensteini* possibly being harvested in Indonesia and exported from Malaysia using Malaysian CITES permits (see Chiew, 2003). The decline in trade seen after 2006 is partially attributable to improved enforcement in Peninsular Malaysia (see *P. brongersmai* above also) (Pen. Malaysia CITES MA, pers. comm.). Again, while encouraging, this suggests a potentially large illegal harvest of up to 20,000 individuals of this species alone in a single year.

4.6. Proposed traceability schemes

As discussed above, lack of transparent stockpiling, effective monitoring and the potential abuse of CITES permitting has made management of legal trade difficult. As a result, it is difficult for all stakeholders to assess provenance and sustainability.

As a result, one initiative coordinated by UNCTAD is examining the scope for a traceability system. It is proposed that a study with financial backing from several major fashion brands examines the scope for tagging skins in order to allow each skin to be traced to its source and so show the provenance and legality of each skin.

The challenge for such a scheme would be how to collect data on species, origin (geographical area of the capture of the snakes), place of slaughter, gender, length and date of capture or slaughter. The system would also need to be cost effective, simple to apply upstream and easy to monitor at each stage of the supply chain. It must allow for the division of skins into pieces without losing the traceability capacity of the pieces. Other challenges include designing a system that could not be abused through, for example, faking tags or paperwork.

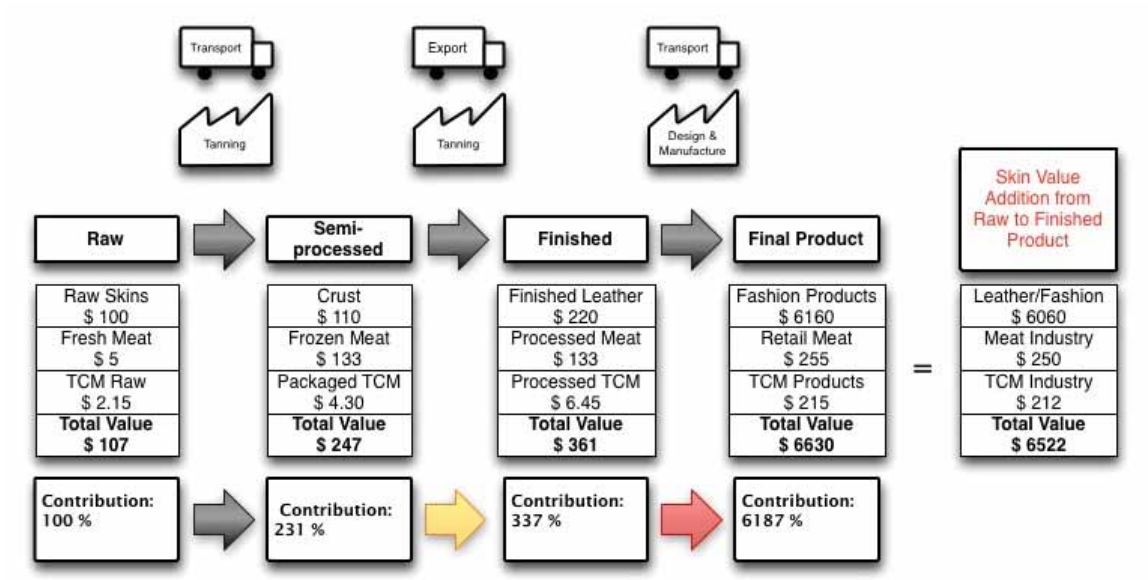
5. Value chain of pythons

5.1. Overall value of the sector

The value of the sector is estimated to be around US$ 1 billion per annum. This is based on 470,750 skins traded with different assumed values according to end use and volumes traded. Given the likely illegal trade flows, this figure could be substantially higher.

Figure 20 shows the value addition along the supply chain. Figures 21 and 22 illustrate the whole supply chain flow. The meat and gall bladder are worth around 7% of the total value of the trade. A hunted snake sold for slaughter for US$ 30 represents around 0.5% of the final value of a high-end python skin handbag

Figure 20 Value addition of python skins (US$ per skin)



Note: Estimates for the TCM values are conservative, as it was not possible to obtain prices. No publications were found for python gallbladder semi-processed, finished and finished products prices. TCM contains only a percentage of pure gallbladder in its retail product and that percentage varies apart from not being disclosed.

Not all skins are transformed from raw to crust or finished leather in the source countries. The cost of processing from raw to crust is an estimated average between the cost in the exporting countries and the importing countries. The leather prices are 2011 market prices and communicated by interviewed stakeholders in origin and importing countries. The figure presents the final value of a high-end bag for around US$ 6,000.

Figure 21 Upstream value chain: collection to export

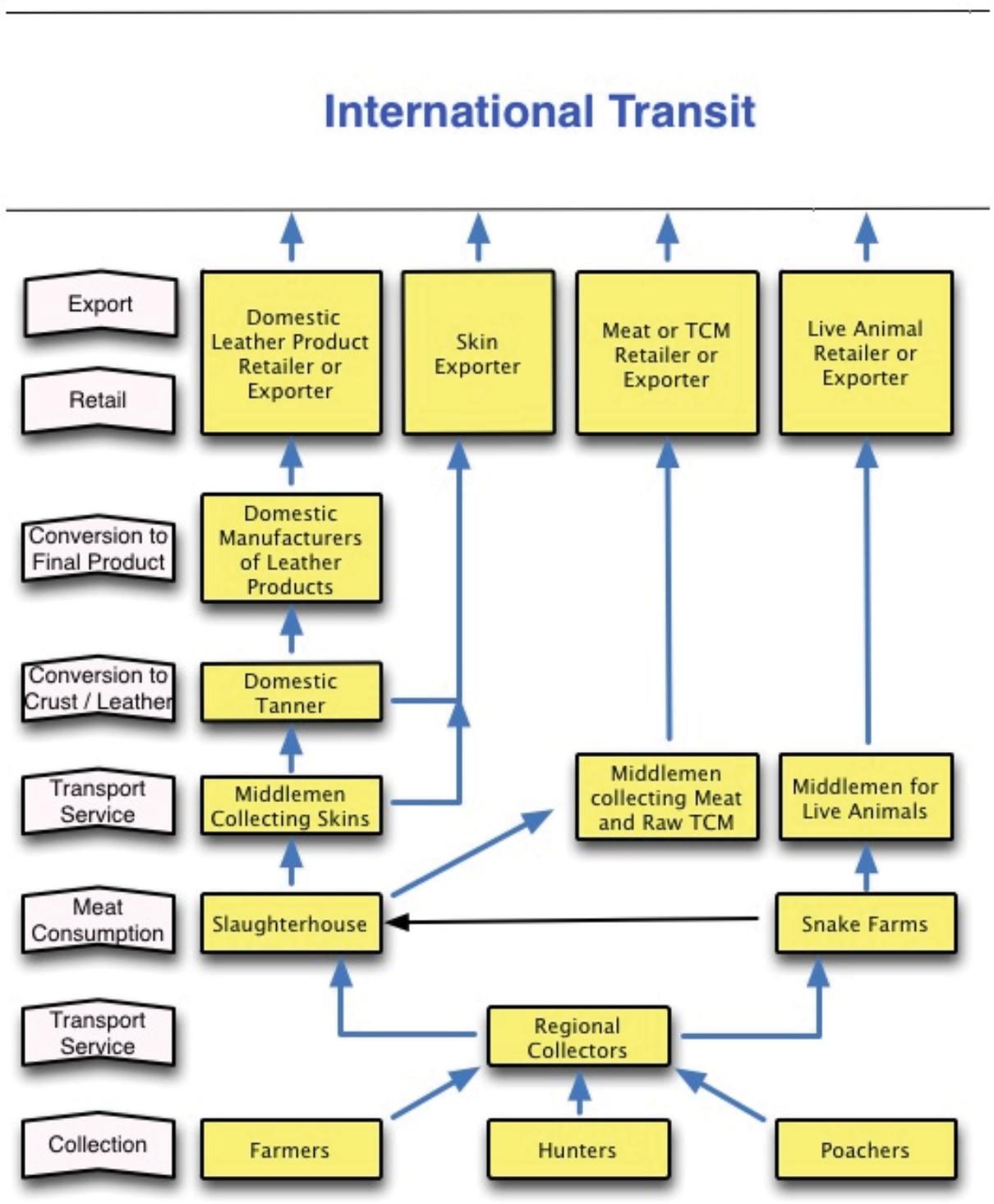
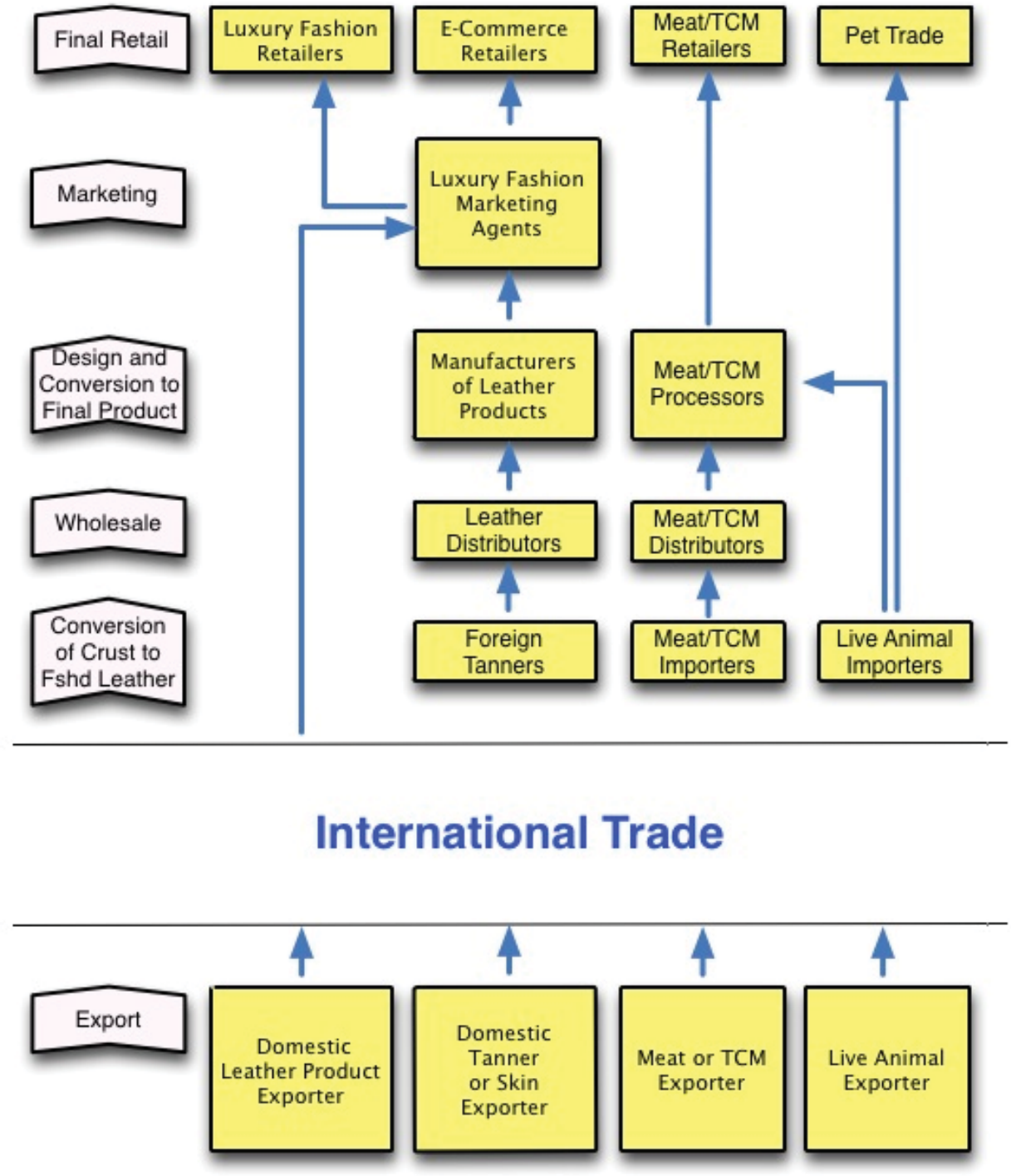


Figure 22 Downstream value chain: import to retail



5.2. Collection, slaughter, processing and drying

Primary sale value US$ 10 per metre

Primary sourcing of snakes is through wild collection or captive breeding of snakes. Reticulated Python skins that are most in demand are those between 3 and 4 metres and are sold by collectors for around US$ 35 per snake in Indonesia (November 2011).

Value addition: slaughter, processing and drying: US$ 30 (300%)

Following slaughter and processing the dried skin fetches around US$ 100, the fresh meat US$ 3 and the dried gall bladder US$ 2. Animals are slaughtered (see section 6 – Sustainability) and their skins, meat and gall bladder removed (figures 23 and 24). In Indonesia domestic tanneries process skins to a semi-finished state called “crust”. In Malaysia and Viet Nam, domestic tanners process the skins to the semi-tanned “wetblue” state, which is then dried (figures 25, 26, 27). Depending on buyer’s demand skins can be bleached to take out the pattern and/or dyed (see figures 28 and 29). Tanning adds around 50% of value to the product. Indonesia requires by law final processing ensuring some value addition takes place in the country. However, many EU importers prefer raw skins. Domestic tanners also add value through dying skins (figure 30). Considering that raw skins from Malaysia and Vietnam are exported at approximately US$ 100, the actual value addition through tanning is US$ 10 per skin.

Figure 23 Frozen and packed snakemeat

Figure 24 Drying of gall bladders

Figure 25 Processing of skins to “wet blue” stage (Viet Nam)

Figure 26 Bleaching of skins (Viet Nam)

Figure 27 Drying of skins (Viet Nam)

Figure 28 Drying of skins (Malaysia)

Figure 29 Dyed and pressed skins (Malaysia)

Figure 30 Domestic tanneries offering different dyes

Source: O. Caillabet.

5.3. Export and re-export

Value addition: Unknown

The majority of skins are exported to Singapore. A small proportion of skins are exported directly to final destination markets. It was not possible to determine the margin on export and re-export stages due to unwillingness of traders to share commercial information.

Prices for skins are determined by the following factors: length and width of the skins (the width of 30/35 cm is the highest in demand, because it is used for whole panels in handbags); raw or crust; the pattern; the yield;[5] the quality (evidence of knife cuts or holes caused by the skinning process, open wounds, scars and the state of conservation, quality of tanning and finishing).

Prices for Burmese and Reticulated Python skins do not differ greatly. The pattern of Reticulated Pythons is considered more attractive for the market, but the cutting yield for Burmese Pythons is better. Table 5 presents indicative prices (December 2011) based on skin width and level of processing (raw to fully finished). Table 5 also shows how width and length of a skin are correlated. For example, skins with a width of 30/35 cm have a length of between 3 to 4 metres.

Table 5 Example of prices of python skins from Indonesia (Autumn 2011)

Skin width (cm)	Raw skin (US$/m)	Crust leather (US$/m)	Fully finished (US$/m)
-/27 (-2.5 m)	26 – 28	28 – 30	48 – 60
27/30 (2.5-3.0 m)	28 – 30	30 – 33	55 – 70
30/35 (3.0-4.0 m)	30 – 33	35 – 40	60 – 100
35/+ (4+ m)	33	33	50 – 110

Source: Interviews with the industry.

Note: All prices are indicative and assume a grade of “fair average quality”. Second graded skins fetch 25% less and third grade skins 50% less at raw level. In processed leather, the price reduction for second grade skins is 10% less than the first grade and the third grade 20% less than the first grade.

5.4. Tanneries (importers)

Value addition (raw to fully finished): US$ 32 (100%) per metre

There are approximately 50 tanneries known processing python skins worldwide. They are also the main importers. The major tanneries are situated mostly in Italy, but also France and Spain. Tanneries for python leather are also found in Mexico, the United States, the Republic of Korea, Brazil and China and process leather for mid to lower range leather goods.

According to interviews with tanneries in the EU, around 70% exports are classified at origin as I/II grade and destined for EU tanneries. The remaining 30% is classified as III grade and sold to Mexico, the United States and China. Processing costs are higher in Europe due to a combination of use of more sophisticated chemicals and formulas, higher labour and other operating costs and stricter environmental standards. Finishing costs can be much higher for the luxury market where some techniques are very expensive and labour intensive. Prices of finished leather vary significantly depending on the type of finish applied to skins. The finishing of python leather can go from very basic to extremely sophisticated where for example the pattern of reticulatus skins are hand coloured scale by scale. These exclusive leathers are sold at high prices up to US$ 125/150 per metre.

[5] Cutting yield is the percentage of the usable leather surface that is actually transformed into an object. The higher the non-usable surface is, the lower the yield and the less objects can be made.

5.5. Manufacturers and retail

Value addition: US$ up to US$ 10,000 (4,445%)

The manufacturer buys finished leather and transforms that into shoes, belts, garments and accessories (see figure 31). Manufacturers are located mainly in Italy, France, Switzerland, Germany and Spain. An estimated 30% of the manufacturers are based in the United States, the Republic of Korea, Japan, Mexico and Brazil. A leather bag made from only half a skin can be sold by a luxury fashion retailer between US$ 5,000 to US$ 10,000.

The leading corporations and brands involved in the design, manufacture and retail of python skins are LVMH (Hermes), PPR (Gucci) and Prada. Other important luxury brands involved in the trade include, inter alia, Dior, Burberry, Chanel, Giorgio Armani. Python leather is also used by many smaller high-end design houses in Europe and mid-range manufacturers.

Fashion designers also use imitation snakeskin leather for all kinds of purposes from shoe wear, bags, apparel (figure 32). High quality imitation python leather, printed (with transfers, which are plastic sheets with a design) on cow leather, sells fully finished for about EUR 12/m (US$ 17/m). This is almost seven times cheaper than good quality genuine skin. Python patterns are also printed on cloth.

Figure 31 High-end python skin bag and shoes in Florence shop window

Source: R. Arbeid.

Figure 32 Imitation python leather

Source: R. Arbeid.

6. Sustainability

6.1. What is sustainable use?

In its simplest form, sustainability is the ability to endure (Erdelen, 1998; Webb, 2002). In balanced ecosystems, and in the absence of random environmental events, wildlife populations should be self-sustaining (Caughley and Sinclair, 1994). However, when humans use wildlife, individuals are permanently removed from the population. If harvest levels are greater than population growth then declines may occur (Erdelen, 1998). The Convention on Biological Diversity has adopted the following definition of sustainable use: *"Sustainable use" means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.*

Understanding the biological sustainability of the South-East Asian python trade is clearly of importance both for the long-term conservation of wild species and the maintenance of long-term commercial activities of rural people and communities. The Addis Ababa Principles and Guidelines for Sustainable Use of Biodiversity provide a framework for assisting Governments, indigenous and local communities, resource managers, the private sector and other stakeholders, about how to ensure that their uses of biological diversity will not lead to its long-term decline. Unfortunately, however, estimating suitable levels at which wild populations can be sustainably harvested remains problematic. There is currently no common formula based on the biology of a species itself that allow us to predict sustainable harvests. Consequently, this necessitates an adaptive management policy[6] of ongoing monitoring, assessment and adjustment, whereby wildlife managers have to rely on a degree of experimentation applicable only on a case-by-case basis to help determine sustainable harvest regimes (see Erdelen, 1998; Webb et al., 1998; Webb, 2002 for further discussion).

6.2. Biological factors affecting harvest sustainability

Knowledge of the biological attributes of harvested species is crucial for understanding that species resilience to harvest. For example, species that have short generation times and high reproductive outputs may be able to withstand greater levels of harvest than those that produce small numbers of young infrequently, or take a long time until first reproduction.

However, time to reach maturity and reproductive output are only two aspects of a species' biology that are taken into account when attempting to determine sustainability. A number of other parameters that are commonly thought to determine whether a species can maintain high or low levels of harvest are listed in table 6 (summarized from Erdelen, 1998; Primack, 2010).

[6] Adaptive management is a management policy used widely in conservation management, whereby the resource is monitored, assessed and adjusted frequently because there are so many unknowns. i.e., experimentation, learn as you go.

Table 6 Biological attributes commonly affecting sustainability and their relationship to high and low levels of harvest

Variable	Use resilience level	
	High	**Low**
Distribution	Broad	Narrow
Habitat specificity	Broad	Narrow
Dietary specificity	Generalist	Specialist
Reproductive output	High	Low
Growth rate	High	Low
Reproductive rate	High	Low
Time until maturation	Short	Long
Population density	High	Low
Population connectivity	High	Low
Dispersal ability	Good	Poor
Genetic variability	High	Low

(Taken from Erdelen, 1998; Primack, 2010.) For example, if a species' reproductive output is high then it is more likely to have a high resilience to use than a species that has a low reproductive output.

6.3. Specific attributes of South-East Asian pythons

Some of the attributes of South-East Asian pythons and their suitability for use are discussed below and summarized in table 7. For example, if the *habitat specificity* of Reticulated Pythons is broad, they are better suited to high levels of use than species that can survive only in one habitat type.[7]

Table 7 Specific attributes of South-East Asian pythons

Python attributes	Burmese Python	Short-tailed Pythons	Reticulated Python
Distribution	Broad	Broad	Broad
Habitat specificity	Broad	Broad	Broad
Dietary specificity	Generalist	Generalist	Generalist
Reproductive output	High	Medium	High
Growth rate	High	High	High
Reproductive rate	?	Medium	Low
Time until maturation	Short	Short	Short
Population density	?	?	?
Population connectivity	High	High	High
Dispersal ability	High	Low	High
Genetic variability	Likely to be high		

Distribution – South-East Asia's heavily traded pythons have large distributions spanning a number of countries (figures 1, 2, 3). Although some of the Short-tailed Python species are restricted to Sumatra and Borneo, their occurrence within these areas is extremely broad.

Habitat specificity – If South-East Asian pythons could only survive in a single habitat type then loss of that habitat would be detrimental to these species. However, South-East Asian pythons use a number of different habitats ranging from primary and secondary forests to swamps and riverine areas (Auliya, 2006).

[7] Most of the data presented are for the more intensively studied Reticulated (*P. reticulatus*) and Short-tailed Pythons (*P. brongersmai*) and all conclusions are based upon data from wild pythons as considerable uncertainties are involved in extrapolation of biological parameters from captive-bred to wild pythons (Shine et al., 1999a).

In addition, there is evidence to suggest that Burmese and Reticulated Pythons thrive in environments modified by humans (Cox, 1997; Shine et al., 1999b). For example, a number of authors have suggested that small pythons (particularly Short-tailed Pythons) have become increasingly abundant due to an increase in oil palm plantations in South-East Asia (Groombridge and Luxmoore, 1990; Shine et al., 1999b). Contrastingly, large Reticulated Pythons are uncommon in oil palm plantations because they appear to favour a wide range of large bodied prey (Shine et al. 1999a). Therefore, it is possible that larger snakes favour more complex primary habitats, which afford better shelter opportunities, and where the diversity of large prey items is greater than in modified habitats. More work is needed to clarify this assumption.

Diet specificity – If these pythons only preyed upon a specific species then loss of that species could be detrimental to the survival of these pythons. However, dietary analysis of freshly slaughtered snakes shows that Reticulated and Short-tailed Pythons are diet generalists, preying largely on mammalian prey (Shine et al. 1998b, 1999b). They are, therefore, highly suited for exploiting man-made habitats, such as oil palm plantations. Rodents form approximately 94% of the diet of pythons inhabiting these plantations (Shine et al., 1999b). Rat densities within oil palm can be >400 individuals/ha, making them significant agricultural pests (Stuebing and Gasis, 1989; Puan et al., 2011). Because pythons may play an important role in regulating rat abundance, this should be factored into their harvest management.

Reproductive output – If South-East Asian pythons only had small numbers of offspring then large harvests may leave few individuals able to contribute to future generations. All pythons are egg layers. South-East Asian pythons have a high reproductive output, with female Reticulated Pythons producing an average of 25 eggs per clutch (Shine et al., 1999a). However, clutch sizes in pythons are strongly correlated with maternal body size and very large Burmese and Reticulated Pythons are capable of producing more than 50 and 100 eggs in a single clutch, respectively. By contrast, Short-tailed Pythons produce medium clutch sizes of 12 – 15 eggs (Shine et al., 1999b).

Growth rate – In contrast to their more temperate counterparts, tropical snakes in general have fast growth rates. However, pythons show marked variation in growth rates dependent upon available food resources (Madsen and Shine, 2000). In captivity, and with constant food supplies, Burmese and Reticulated Pythons can reach 2.5 m in less than 1 year (Natusch unpublished data). Specific growth rates of wild individuals are not known, but they are likely to be high for all three species of python.

Reproductive rate – Based on dissections of Sumatran Reticulated Pythons brought to slaughterhouses only 34% of mature females were reproductive in any given year (Shine et al., 1999a). These results may be somewhat biased, however, because reproductive females of this highly cryptic species are likely to remain concealed within hiding places, only moving infrequently and thus avoiding collection. Moreover, reproductive rates may vary from site to site and year to year depending on environmental conditions. Nevertheless, female Reticulated and Short-tailed Pythons probably reproduce only every 2 – 4 years (Shine et al., 1999a,b).

Timing until maturation – Compared to many temperate species of snakes, these pythons reach sexual maturity relatively quickly. Reticulated Pythons are at least 60 cm in length when they hatch and males mature at smaller sizes compared to females (Shine et al. 1998b, 1999b). Males can mature as early as 137 cm snout-to-vent length (SVL) while females mature at 230 cm SVL (Shine et al. 1999; figure 1). Maturity is, therefore, likely to be attained within the first or second year of life. However, size at maturation shows some striking spatial variation, with individuals in northern Sumatra maturing at different lengths from those in the south (figure 33).

Population density – If python densities were low then populations would be less able to withstand large harvest than if their densities were high. Several studies have attempted to estimate the population densities of South-East Asian pythons, but mean actual densities are still unknown due to the logistical difficulties involved. A small number of studies have, however, calculated an index of python population size resulting in minimum densities ranging from 0.7 to 1.62 individuals/ha for Short-tailed Pythons, and least 0.05 individuals/ha for Reticulated Pythons (Auliya 2006 and references therein).

Population connectivity – Although much of Asia has experienced high levels of habitat degradation and forest loss, the broad diet and habitat use characteristics of these pythons means population connectivity among populations remains high. Large pythons are highly mobile (see below) and have been known to occupy heavily modified habitats (Cox, 1997). These attributes, in addition to their ability to remain

unnoticed near human habitation suggest that many seemingly isolated python populations are, in fact, highly connected.

Dispersal ability – Large pythons are extremely mobile. They are able swimmers and can utilise riverine corridors and inundated habitats to reach new areas. In fact, Reticulated Pythons were one of the first vertebrate species to recolonize the volcanic Indonesian island of Krakatau after its eruption in 1884 (Rawlinson et al., 1992). Conversely, Short-tailed Pythons are smaller bodied and more sedentary than their larger cousins. Radio-telemetric studies have revealed that individuals spend large amounts of time within rodent burrows, moving short distances only infrequently (M. Gaulke in Auliya, 2006).

Genetic variability – South-East Asia's heavily traded pythons are among the most widespread animal species on the continent. Although specific data for these species are lacking, their large area of occurrence suggests significant levels of genetic variability. Studies by Keogh et al. (2001) revealed high levels of genetic variability within Short-tailed Pythons, justifying their separation into three distinct species (see section 1 – Introduction). Although two of these species are restricted to the islands of Sumatra and Borneo, both islands cover large areas, and there is no reason to assume that genetic variability is low.

6.4. Harvest factors affecting sustainability

In addition to the biological characteristics of the pythons themselves, specific aspects of their harvest play an important role in the sustainability of the trade.

Harvest locations – The locations from which pythons are harvested are important for determining sustainability. For example, because of the cryptic nature and nocturnal habits of pythons, local people collect most individuals opportunistically while carrying out unrelated daily activities (e.g. farming). Thus, the majority of pythons are likely to be collected from disturbed habitats frequented by people rather than less accessible areas of primary forest. Moreover, the distance of collection sites (highland areas of Kalimantan and Sumatra or offshore islands, for example) from slaughterhouses, and the cost of transporting large pythons, suggests that some populations may not be viable for commercial harvests.

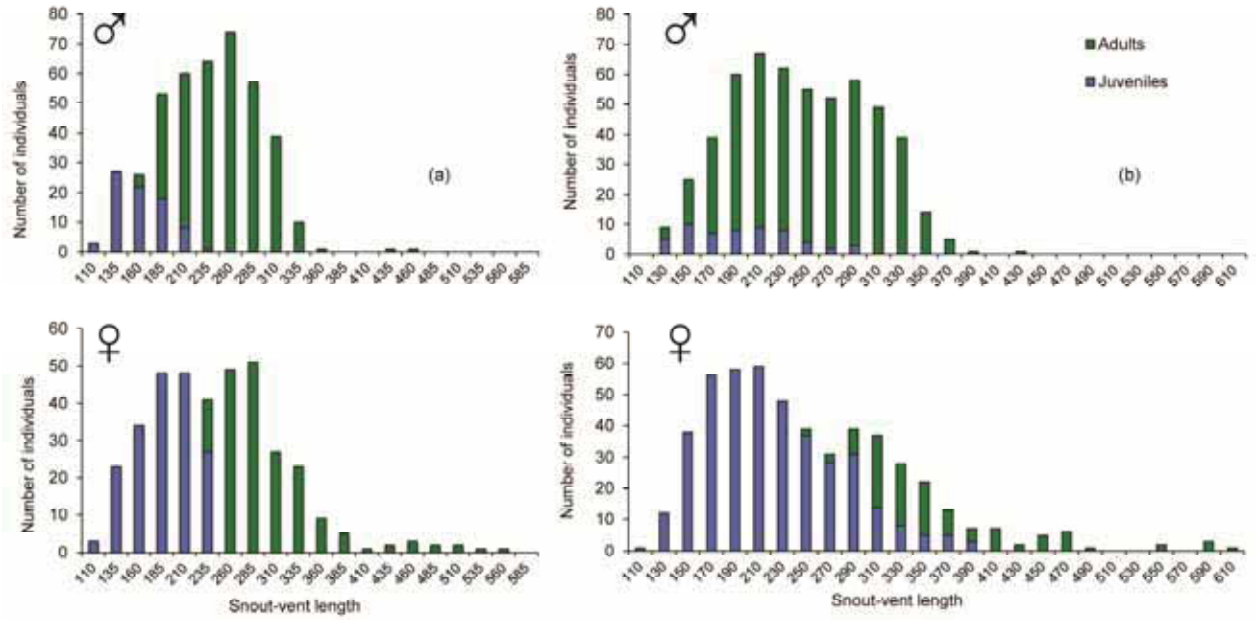
Collection techniques – The techniques used to collect pythons also can have a major effect on the sustainability of harvests. Collection practices that permit the harvest of large numbers of individuals from single locations (e.g. collection of temperate species of snakes outside hibernation sites; Warwick et al., 1991) or destroy habitats (e.g. bush rock damage by pet collectors; Shine et al., 1998d) can significantly reduce wild populations. In the case of South-East Asian pythons, however, although some individuals are caught using traps and baited hooks, the majority are not targeted in this way (Chairuddin et al., 1990; Shine et al., 1999a). An understanding of the ecology of pythons in general strengthens this conclusion. For example, because pythons spend much of their time concealed within hiding places they are most frequently collected opportunistically while moving. Therefore, males may be harvested in greater numbers than females because they spend more time searching for mates. Indeed, examination of Reticulated Pythons brought to slaughterhouses in northern and southern Sumatra showed that 64% and 83% of the harvest was comprised of males, respectively (Shine et al., 1999a). Consequently, harvests are more likely to be sustainable if larger numbers of males are collected because many females can be fertilized by a single male. In contrast, Short-tailed Pythons reveal a more cautionary tale. Several individuals are known to co-habit within a single burrow, and when it rains heavily the snakes are forced to the surface allowing a larger number of snakes to be targeted at specific times of the year (i.e. the wet season)(Abel, 1998; Auliya, 2006).

Optimal skin sizes and harvest demographics – The number of immature female pythons slaughtered in Sumatra is noteworthy. For example, figure 33a reveals that more than 50% of female Reticulated Pythons slaughtered (but up to 75% in southern Sumatra, figure 33b) are not sexually mature, thus reducing the number of individuals contributing to population recruitment. Similarly, large numbers of female Short-tailed Pythons are slaughtered before reaching sexual maturity and the same appears to be true for Reticulated Pythons captured in Peninsular Malaysia (Auliya et al., unpublished data). Although slaughterhouses claim that they do not purchase snakes below a minimum size, these sizes are determined primarily by market demands for skin size rather than by consideration of harvest sustainability.

Figure 32 illustrates that large numbers of immature snakes are harvested from both populations. It also illustrates the spatial variability between northern and southern Sumatra: a much larger proportion of immature snakes are collected from southern Sumatra.

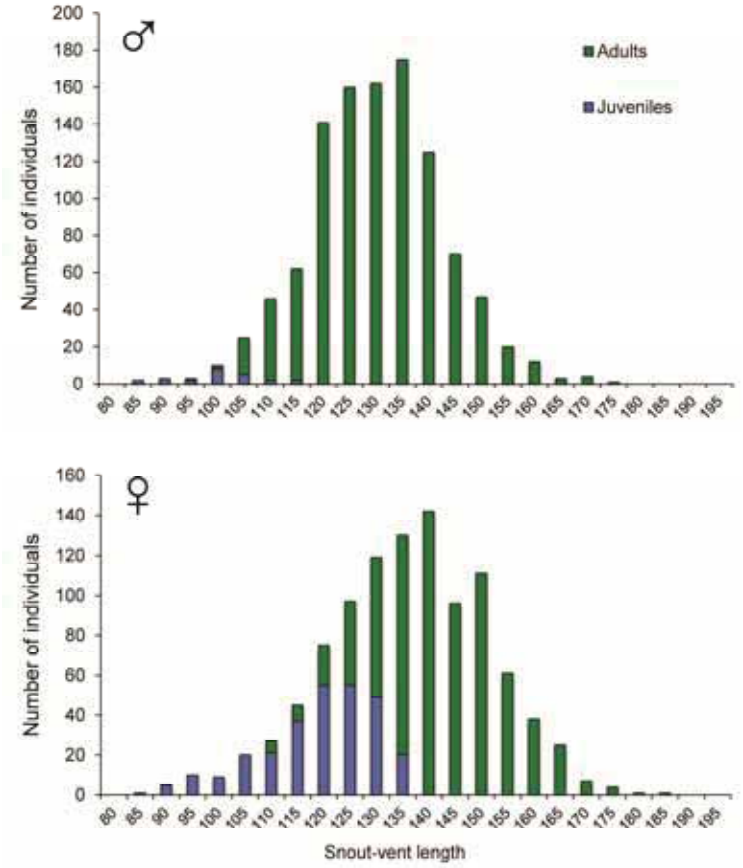
Because many of the females collected are immature, they are unable to contribute to future generations and therefore population growth.

Figure 33 Body size distributions of male and female Reticulated Pythons harvested from northern (a) and southern (b) Sumatra in the late 1990s



Source: Shine et al. (1998b, 1999a).

Figure 34 Body size distributions of male and female Short-tailed Pythons (*Python brongersmai*) harvested from Sumatra in the late 1990s



Source: Shine et al. (1999b).

6.5. The making of CITES non-detriment findings

Under Article IV of CITES, Parties shall only grant an export permit for an Appendix II listed species when the designated Scientific Authority of the exporting Party has advised that trade will not be "detrimental" to the survival of the species in the wild. Furthermore, once exports are underway, the Scientific Authority must monitor the actual levels of export to ensure that the species is maintained throughout its range at a level consistent with its role in the ecosystem and well above the level at which the species might become eligible for inclusion in Appendix I.

This assessment is known as a non-detriment finding (NDF) and may take into account aspects such as the distribution, biological and ecological attributes of the traded species, national status and trends, legal and illegal harvest and trade data, management measures and protection status. Rosser and Haywood (2002) provide guidelines to assist CITES Scientific Authorities for undertaking NDFs as well as case studies for their implementation. Recently, emphasis has been placed on using population field studies to assess the potential for trade to result in utilization that is compatible with a species' survival. In the past, harvest quotas for pythons in countries such as Indonesia and Malaysia have been established based upon previous harvest levels themselves rather than independently based on knowledge of the population dynamics of the traded species (see section 4 – Trade flows from Indonesia and Malaysia). Indeed, studies to date also have frequently relied upon information from hunters and exporters themselves to assess population trends and abundance (Chairuddin et al., 1990; Groombridge and Luxmoore, 1990; Webb et al., 1996; Auliya, 2000). Although population field studies are not required to form part of a NDF, because of the high levels of trade in South-East Asian pythons, an understanding of the dynamics of wild populations and their trends is important. However, in 2011, the CITES Asian Snake Trade Workshop in Guangzhou, China, found that few population studies for pythons had been carried out by South-East Asian range states. The workshop concluded that there was simply not enough information available to assess the

biological sustainability of current harvests of python species. Unfortunately, population field studies are very difficult to undertake, particularly for cryptic ambush predators such as pythons. These difficulties are discussed below along with suggestions for future research directions to enable more effective estimates of sustainability.

6.6. Moving away from traditional field studies

In a number of cases, NDFs and assessments of harvest sustainability have largely focused on understanding the population dynamics of the traded species in the wild. Various researchers have attempted to obtain this information using field studies (Abel, 1998; Riquier, 1998; Auliya, 2006; Kamil, pers. comm. 2012). Although these studies provide interesting insights into the natural history of pythons, they do little to determine whether harvests are sustainable. The approaches used have relied upon mark-recapture methods for estimating population sizes. However, the sedentary, highly cryptic attributes of pythons mean their detection probability is very low, resulting in low capture and recapture rates (Mazzerole et al., 2007). This, together with the logistical difficulties regarding the ability to secure funding and carrying out remote fieldwork has precluded achievement of robust population estimates even for python species that are highly abundant (Natusch and Natusch, 2011). For example, the studies by Abel (1998), Riquier (1998), Auliya (2006) and Kamil (pers. comm. 2012), obtained information from fewer than 22 Reticulated Pythons. Further difficulties arise because all of the above studies used traps to survey wild pythons and are therefore biased towards the sizes of individuals that can be captured. Therefore, the snakes that are marked are not representative of the natural population demographic. Finally, due to a limited knowledge of python home ranges and movement patterns, the area limits of estimated populations are not easily defined, making approximation of population densities somewhat arbitrary.

This begs the question; are field studies on pythons with the aim of informing the sustainability of any authorized harvest levels worthwhile at all? While all information is worthwhile, the logistics of obtaining a true understanding of a species' biological status and trends, independently in the field, is truly daunting biologically, and may not be worthwhile in the long term. Even if the logistical and financial obstacles of long-term (>5 year) field studies were to be overcome, they would only provide information for a single area at a single point in time. As illustrated above, the extreme temporal and spatial variability of tropical landscapes in South-East Asia, and python ecology itself, mean that data collected from one population may have little relevance when discussing populations of the same species from a different time and place.

Based upon the considerable constraints outlined above, alternative approaches to traditional field studies to achieve NDFs should be considered. Monitoring and assessing sustainability should be equivalent to fisheries management, where the population cannot be "seen" but where inferences are drawn from the harvest itself on a continuous basis. Fortunately, the source of this information is already available in the form of python slaughterhouses. Not only are these facilities a significant resource of biological information (e.g. body sizes and maturity of harvested snakes), but they also provide a focal point for the ongoing monitoring of the harvested population. Any substantial decline in wild populations should be indicated by a reduction in harvest volumes and shifts in python body sizes – information that would scarcely be obtainable using field-based studies. Baseline biological and trade data has been gathered in this way for a number of harvested python species (Shine et al. 1999a,b; Lyons and Natusch, 2011; Natusch and Lyons 2012a,b,c).

7. Slaughter practices and animal welfare

7.1. Concern over slaughter practices

Increasingly, concerns have been raised about the potential welfare implications for snakes slaughtered for the leather industry, particularly in the EU. Advocacy from animal welfare NGOs and the showing of a documentary on slaughter practices in Indonesia in 2011 has led to the issue becoming one of public concern in some European countries. This pressure has led Switzerland's parliament to vote in favour of

ban on the trade in python skins.[8] At the time of publication, the Federal Council was going to make a decision on this motion.

During visits, to slaughterhouses in Indonesia, Malaysia and Viet Nam, the research team observed three different methods for the slaughter of pythons.

7.2. Brain destruction

In Indonesia, pythons are killed by a blow to the head using a hammer or mallet. Some slaughterhouses also decapitate the animal after the blow to the head. The animals are then hung or nailed to rafters by the head and filled with water using a hosepipe inserted into the mouth. This swells the body facilitating the skinning process. Similar practices have been observed in Malaysia,.

According to a 1997 EC report on euthanasia of animals (EC 1997), concussion, and eventual brain destruction, via a strong blow to the head is an acceptable and humane form of euthanasia for reptiles. A similar conclusion was reached by ANZCCART (1993). However, it is noted therein"…as the technique requires experience it is recommended “with reservations".

This report consulted one veterinarian (Brunetti, pers. comm) who argues that death is instantaneous if the brain of a snake is destroyed. According to him, cranial concussion causes instant death. The body will show spasms but there is no suffering.

Despite the generally positive professional opinion of this form of euthanasia, animal welfare groups object to this practice on the grounds that the animal is not immediately killed and hence causes unnecessary suffering.[9] However, there is no scientific evidence supporting this claim. There is also objections to the methods in which snakes are transported and stored, and with large quantities of snakes kept in unsuitable containers (for periods of time prior to slaughter).[10]

7.3. Decapitation

In Malaysia, in one slaughterhouse which was visited, pythons were decapitated and hung by the tail to a rafter. They are then filled with water, using a hose inserted into the oesophagus of the snake (figures 35 and 36). It was unknown if the snakes were stunned before decapitation. A similar slaughter method to that used in Indonesia is also used in Malaysia (figure 37).

8 On 3 May there was an initial vote by the national council of Switzerland of 91 votes in favour of the ban and 73 against (with 3 abstentions). http://www.parlament.ch/ab/frameset/d/n/4903/379646/d_n_4903_379646_379723.htm (only in German) and background http://www.parlament.ch/f/suche/pages/geschaefte.aspx?gesch_id=20104104 (in French).

9 In 2011, ITC interviewed 5 leading animal welfare groups to gain a perspective on their viewpoint. Species Survival Network / Pro Wildlife, Pax Animalis, Animal Welfare Institute, Humane Society International / Warisan, Royal Society for the Prevention of Cruelty to Animals, United Kingdom).

10 There are also concerns from NGOs over transport in the pet trade. The pet trade however lies outside the scope of this report.

Figure 35 Decapitated snake is filled with water (Malaysia)

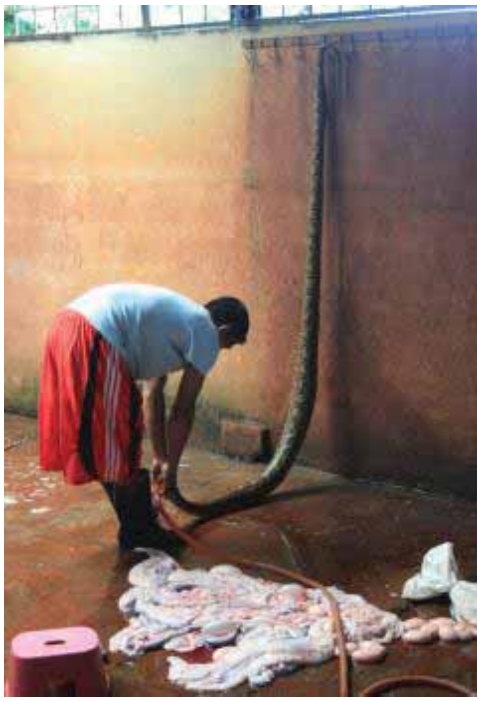


Figure 36 Snakes hung before being filled with water in Malavsia

©TRAFFIC South-East Asia/M. Auliya

Figure 37 Decapitation of snake in Indonesia

Source: http://www.timepass69.com/start3-s155/where-our-leather-bags-come-from.

According to two expert reports (EC 1997; Warwick 1990). decapitation alone is not an acceptable method of euthanasia as the reptilian metabolism is renowned for its ability to function at a low respiration and heart rate. Nerve tissue is therefore far more tolerant to a reduction in oxygen supply compared to mammals. Crocodilians, for example, may remain conscious for up to one hour 53 minutes after head severance (Warwick 1990).

7.4. Asphyxiation

In Viet Nam, the research team observed at one slaughterhouse that the live snakes (P. *bivittatus*) have their mouths and anus sealed using rubber bands. An air compressor is then used to fill the animal's alimentary canal with air (figures 38 to 40) which has the same effect as filling the animal with water (i.e. to

Figure 38 Python's mouth sealed during asphyxiation

Figure 39 Use of air compressor to asphyxiate python

facilitate skinning), only the animal is still alive, not having had its head cut off or its brain crushed first. Post-inflation, a rubber band was also tied around the heart to cause cardiac arrest (figure 41).

Figure 40 Python following inflation with air compressor

Figure 41 Python taped around the heart during asphyxiation

Source: O. Caillabet.

According to the CITES MA and those farmers and traders interviewed, this is the most commonly employed slaughter method in Viet Nam's snake industry. The team observed that the animal continued to move for around 15-30 minutes after inflation. Whether these movements were the result of conscious writhing or post-mortem spasms is unknown. This method is apparently preferred over decapitation/ concussion as the Vietnamese interviewed said it is less cruel.

8. Conclusions and recommendations

8.1. Trade

The size of the trade in python skins from South-East Asia is considerable and provides an important source of income for many people in the region, particularly low income groups in rural areas. This report describes trade flows, areas of value additions and identifies a number of areas of concern relating to illegality, trade measures, sustainability and animal welfare. This are summarized below and recommendations are made to address these issues.

8.1.1. Stockpiling in Singapore

Stockpiling is a common and legitimate trade practice and states have no obligation to declare stockpiles. However, undeclared stockpiles of python skins that are not regularly controlled or monitored in Singapore may create a lack of transparency and traceability within the industry and facilitate the laundering of illegally sourced skins on the international market.

The authors believe that mis-declaring the source and origin of skins on CITES export permits (e.g. as being sourced from pre-convention stock and seized illegal shipments) could provide a means through which CITES trade controls could be circumvented. Given Singapore's major role as a re-exporting hub in this industry, until the source and origin of skins re-exported from Singapore can be validated, concerns should remain as to the provenance and legality of skins re-exported from Singapore.

Recommendation: Following a recommendation from the Secretariat, Singapore's CITES SA (Agri-Food & Veterinary Authority - AVA) are urged to make an inventory of existing python skin stockpiles and establish a regular monitoring and control programme for such stockpiles, possibly in combination with tagging and traceability requirements. The source and origin of skins can be established by comparing stocks with previously issued CITES permits. In order to ensure greater transparency, Singapore's Management Authorities are urged to disclose publicly the number of skins from each species stored in stockpiles

Recommendation: For consumers and importing parties concerned with the true source and legality of skins being used, the direct import of skins from Parties of origin, rather than through Singapore, or other importing and re-exporting countries without transparent systems in place, is recommended to promote legitimate sourcing.

Recommendation: Commercial stocks of pre-Convention skins should be verified, inventoried and registered by the relevant Management Authorities.

8.1.2. Stockpiling in Indonesia

A large number of skins stockpiled by traders in Indonesia were observed during this study. According to these traders, the observed stockpiles were bought from slaughterhouses and could not be exported as they exceeded each of these tanners' export quota.

Recommendation: Indonesian authorities are encouraged to make an inventory of existing stockpiles of python skins from each species and to establish a regular monitoring and control programme for such stockpiles, such as that proposed for Singapore (above). In order to promote transparency within the python skin trade, the authorities in Indonesia are also urged to disclose the number of skins from each species stored in stockpiles to the CITES secretariat.

8.1.3. Stockpile management post-census

Once stockpiles have been identified, a system will need to be put in place to deal with skins which are potentially of illegal origin. Destruction of such skins is an option, however; this could discourage traders from cooperating and undermine the process.

Recommendation: The authors suggest that a more appropriate solution would be to allow traders to sell stockpiled skins on the market. This could be done gradually, in order to avoid a crash in market price. Additionally, skins would need to be tagged to prevent them from being illegally sold on the market again. A percentage of the proceeds from the sale of skins could go toward the implementation of a traceability system or scientific research for wild pythons in trade. This would represent a profit loss for traders, ipso facto acting as a penalty for having engaged in illegal trade.

8.1.4. Captive breeding in Viet Nam

The feasibility of commercially breeding Pythons in captivity is unclear. Although it is apparent that Viet Nam is breeding pythons in captivity for the skin trade, the authors are unconvinced that Viet Nam has the capacity to breed the number of Reticulated and Burmese Pythons that are recorded in CITES annual exports. Considerable doubts surround the captive breeding of Reticulated Pythons in Viet Nam for two

reasons. Firstly the feasibility is far from proven. Whilst it appears some breeding of Burmese pythons is taking place, more evidence is needed to support the claim that large number of either Burmese or Reticulated python are being bred on a commercial basis.

Secondly, there are notable discrepancies between annual Reticulated Python export figures reported to the CITES Secretariat and that shown to researchers by Vietnam's CITES (Southern) MA. According to the MA, 75% of annual exports of python skins from Viet Nam are comprised of Burmese Pythons, yet, in 2010 according to CITES trade data, more Reticulated Python skins exported than Burmese Python skins. The fact that Viet Nam's CITES Southern MA was unable to account for these discrepancies is troubling.

Recommendation: With regard to the reported inconsistencies in Reticulated Python exports reported to the CITES Secretariat from Viet Nam, the CITES Standing Committee should urge Viet Nam's CITES MA to account for this and ascertain the source of the discrepancy.

Recommendation: The mis-declaration of species as captive bred to circumvent the CITES permit system has been highlighted as a significant problem. Further research, started as soon as possible, is needed to determine if captive breeding of Burmese and Reticulated Pythons for the commercial skin trade is feasible and to establish that pythons are not being illegally traded from Viet Nam. Given its central importance, this is something which CITES or the fashion industry should consider funding of this issue to CITES. As part of this study, the creation of a manual to aid MAs in range states to determine whether captive breeding is feasible for Pythons should also be considered

8.1.5. Captive breeding from the Lao People's Democratic Republic

There is considerable scepticism on the part of the authors of this study and other experts that captive breeding of Burmese Pythons, Reticulated Pythons or East Sumatran Short-tailed Pythons is taking place in the numbers reported in annual CITES trade reports.

This is derived from the obstruction to the research encountered during field visits to Lao PDR's sole commercial breeder and exporter; the lack of evidence that captive breeding is taking place; remaining questions as to the feasibility of commercially breeding pythons for the skin trade and the fact that these species one of these species (East Sumatran Short-tailed Python) is not native to Lao PDR.

Recommendation: The CITES Secretariat should urge Lao PDR's MA to establish as a matter of urgency whether the facility (Vannaseng Farms) in question has the capacity to breed the number of pythons reported in annual exports, and to make the results of their investigation known to the Secretariat. If Lao PDR does not have the internal capacity to determine whether reported exports are legitimate an independent consultant should be hired to carry out the work. We further suggest that the SRG consider the temporary suspension of import of skins from until it can be proven that these skins have been legally obtained.

8.1.6. Origin of Malaysia skins

Weak monitoring combined with confusion over the origin of skins from within Malaysia (Peninsular Malaysia, Sabah and Sarawak) can facilitate illegal trade allowing traders to mis-declare skins and launder them on the international market.

Recommendation: Following a recommendation from the CITES Standing Committee, Malaysia's CITES MA (PERHILITAN) is urged to create a system which allows the different states of origin to be verified (e.g. MY1, MY2 etc.)

8.1.7. Re-selling seized skins

Re-selling seized skins can create revenue for local governments and wildlife departments, however, there is a risk that illegally sourced skins can be falsely declared as seized in order to circumvent the CITES permitting system, allowing them to be illegally laundered on the international market.

Recommendation: The sale of confiscated skins should, partially contribute to funding research or developing traceability systems.

8.1.8. Traceability scheme

Stakeholders from both the private sector and public bodies have been engaged in discussions on the feasibility of introducing a traceability system to track physically the supply chain for pythons.

Recommendation: Stakeholders (governments and private sector) should be encouraged to develop a traceability system complementing the existing CITES permit system to allow identification of each individual skin through the chain of custody. As a first step, it is recommended to carry out a feasibility study to design a simple, safe and cost efficient system that enables individual skins to be tracked from the slaughterhouse to the manufactured item (see section 4.6).

8.1.9. EU and Swiss trade bans

The EU suspension on imports of Reticulated Python skins from Peninsular Malaysia appears to have had a negative effect on rural hunters. Since the ban the Range States' reported CITES exports (and most likely value of exports) have fallen considerably. An annual export quota has been implemented and a preliminary NDF has been carried out. PERHILITAN, the Malaysian MA, maintains that it does not know why the trade suspension is in place, yet; the EU has reviewed the suspension since these measures were taken and PERHILITAN has been in contact with the EU in order to have the negative opinion on *P. brongersmai* imports changed in 2009.

Recommendation: As a step toward getting the import suspension lifted, and improving income of rural hunters by re-opening the European market, PERHILITAN is urged to carry out an NDF along the lines suggested in this recommendation 8.2.1. IN the past Indonesia has been very successful at reversing negative opinions of the SRG: Peninsular Malaysia could seek advice from their neighbours in getting this trade suspension lifted.

The Swiss ban on import of Indonesian snake skins, if approved, is very unlikely to have any direct effect on livelihoods or income loss, although it may well bring animal welfare issues to consumers' attention. It does not appear that Swiss Parliament has made a scientific assessment of animal welfare practices in range states, but rather is driven by political pressure in response to NGO lobbies. Indonesia's method of euthanizing snakes is the most humane encountered in the trade. Banning only Indonesia's exports is thus inconsistent and discriminatory towards Indonesia.

Recommendation: A decision by the Swiss Parliament to ban trade with Indonesia should be reconsidered given the apparent lack of scientific assessment and the fact that other countries have equally or less humane forms of euthanasia.

8.1.10. Species and unit identification at customs

Difficulty in distinguishing between the different species of pythons, especially the Short-tailed Python species, could facilitate the mis-declaration of species being traded and the laundering of illegally sourced stock. Similarly, a lack of controls on shipments and substantiation of the units claimed to be contained within the shipment (e.g. skin scraps, whole skins etc.) can allow illicitly sourced skins to be sold on the market.

Recommendation: Capacity building and training materials for customs and enforcement officials in importing and export Parties is recommended to reduce the potential for this to happen. In addition, the implementation of a traceability system would be of great support to species identification at customs.

Recommendation: Parties should consider implementing restrictions on the units of export with a view to closing potential loopholes which might facilitate illegal trade. This could be achieved, for example, by only permitting whole python skins and skins measured in metres, for example, to be traded. Similar to the permitting of crocodilians each python skin could be numbered and measured and these data reported on the export permit.

8.2. Sustainability

Achieving sustainable levels of use for South-East Asian pythons is extremely important. Not only are these large predators of intrinsic value in their own right, but they also serve a role in ecosystem function (for controlling rodent populations, for example) and are important to the livelihoods of rural communities.

Although there are concerns about the sustainability of harvesting pythons for skins, there is little evidence of a reduction or crash in populations. Traded quantities and sizes of skins have apparently not changed, despite these species being traded for up to 60 years. Undoubtedly, harvesting does reduce local populations, however, it is implausible that trade will result in the extinction of these snakes.

Nevertheless, caution should be exercised when setting harvest levels, particularly for Reticulated Pythons. For example, only a small proportion of female Reticulated Pythons are reproductive in any given year (~34%) and large numbers (up to 75%) of females collected are immature. This means that the renewal of populations could be compromised if harvest levels are too high. Moreover, the restricted distribution of distinct island forms of Reticulated Pythons (Auliya et al., 2002) predisposes them to detrimental effects of over-harvesting. Therefore, ongoing monitoring of harvested pythons is required and harvest quotas should be flexible enough to adapt in order to ensure the long-term sustainability of this industry.

The following recommendations are made with the aim of improving future monitoring and sustainability assessments of South-East Asian pythons. It should be noted that Shine et al. (1998a) also made similar recommendations for Indonesia; however, these appear not to have been implemented.

8.2.1. Better monitoring of harvests

Field based and single year studies do not provide adequate information to assess sustainable harvest levels. Ongoing monitoring of harvests is therefore a more reliable and feasible approach to understanding population dynamics and trends over time and allowing for adaptive management.

The current system of harvesting, whereby large numbers of snakes from a wide geographic area are funnelled through a restricted number of facilities, could allow large amounts of data to be gathered cost effectively. This information should allow any changes in harvest volumes and body sizes to become apparent, allowing harvest quotas and sizes restrictions to be adjusted where applicable. With commitment from regulators and the industry, routine monitoring of the harvest demographic over a number of years could accrue information needed to improve future management.

Recommendation: An adaptive management approach to the python skin trade should be considered in place of setting quotas based upon population field studies.

Recommendation: Model NDFs for trade in pythons should be developed and promoted in Range States.

Recommendation: Harvest demographic studies based on pythons brought to slaughterhouses are needed for the distinct island forms of Reticulated Python (Auliya et al. 2002) to ensure these isolated populations are not over-harvested.

8.2.2. Increasing ecological knowledge

Recommendation: A number of field-based, mark recapture studies have been undertaken for the species of heavily traded pythons. As a next step to increasing our understanding of python ecology, radio-telemetry studies should be considered. This technique is unique because it would allow determination of home range sizes and clarification of habitat use characteristics, for example, between oil palm plantations and natural forest. Using this information, wildlife managers could better understand area limits for python populations as well as habitat specific population density.

8.2.3. Ensuring population recruitment

Reducing the number of immature snakes collected should be considered in order to increase population recruitment.

Recommendation: Evaluating of the feasibility of establishing legal minimum skin size limits to ensure the protection of immature snakes. This should help to reduce the number of immature snakes collected, allowing a greater proportion of individuals to reach sexual maturity, potentially breed, and thus contribute to population recruitment. Parties Scientific Authorities should consider promoting this method, which can be easily applied and monitored by customs in either importing or exporting countries through random skin size checks. However, because of the spatial and temporal variability of python biology, further consideration should be given to how to decide upon minimum harvest sizes for each sex (see point 1 above).

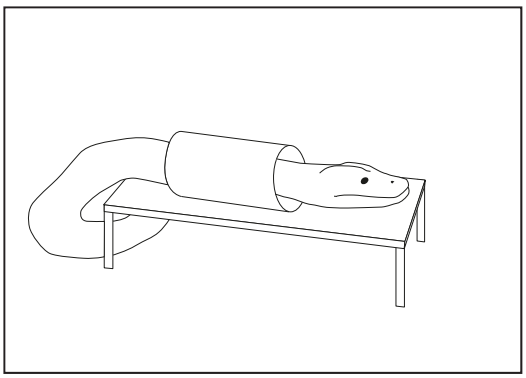
8.3. Euthanasia methods and animal welfare

This report observed different slaughter methods ranging from decapitation (Malaysia), brain destruction (Indonesia) and suffocation (Viet Nam). Because of the considerable time before death is reached (15-30 minutes), the suffocation method could lead to unnecessary suffering compared to death via brain destruction. Currently, Indonesia employs the most appropriate method of slaughter, keeping suffering to a minimum while remaining practical and suited to local conditions.

Recommendation: Further research is needed to assess whether pythons are stunned before decapitation. However, if not, Malaysian slaughterhouses should be encouraged to destroy the brain via a strong blow to the head before decapitation occurs.

Along with sustainability and legality, the issue of welfare is implicit in any discourse on the future regulation and traceability of the snake skin trade. A global unified traceability system has been recommended to establish the source and origin of snakes in the skin trade: we suggest that a recognized, universally accepted slaughter method should also be part of this traceability system. However, the primary source countries of pythons for the skin trade are faced with considerable economic and social barriers. As such, any proposed system would have to be very low cost and easy to implement.

Figure 42 Anvil type slaughter system



Recommendation: The introduction of an anvil type slaughter system (figure 42) for all python skin source countries. The snake is fed through a metal tube which is secured to a steel platform or table. This allows the head to be held in place and insures that the snake can be accurately hit with a hammer or mallet, destroying the brain and minimising suffering. Such a system is cheap and easily applicable.

Appendix I Indonesian domestic travel document for wildlife SATS-DN

KEMENTERIAN KEHUTANAN
DIREKTORAT JENDERAL PERLINDUNGAN HUTAN DAN KONSERVASI ALAM

SURAT ANGKUT TUMBUHAN DAN SATWA LIAR DALAM NEGERI (SATS-DN)
Nomor : 105/SATS/BKSDA-08/XI/2011
Tanggal : 18 Nopember 2011
Masa berlaku tgl. : 19-11-2011 s.d. 27-11-2011

Balai Besar / Balai *) : KSDA Sumatera Selatan
Bidang Wilayah / Seksi Wilayah *) : -

Dasar :

Jenis Dokumen	Nomor	Tanggal
Ijin Mengambil/Menangkap Tumbuhan dan Satwa Liar	SI.286/IV-K.8/2011	21 Maret 2011
Surat Permohonan Angkut	18/XI/ECW/2011	09 Nopember 2011
Berita Acara Pemeriksaan	KT.081/IV-K.8/2011	17 Nopember 2011
SATS-DN Asal	-	-

Ijin mengangkut tumbuhan dan satwa liar dan atau bagian-bagiannya, untuk keperluan: Komersial / ~~Non Komersial~~ *)

No.	Nama Jenis		Jumlah Ekor/kg/m3/pcs	Keterangan
	Indonesia	Latin		
1.	Kulit ular gendang	Python brongersmai	125 lembar	
2.	Kulit ular sanca sawah	Python reticulatus	300 lembar	
3.	Kulit biawak air tawar	Varanus salvator	1.500 lembar	

PENGIRIM:

Nama / Nama Perusahaan / Nama Lemtaga	: Ny. Enggawaty / PT. Enggawaty
Alamat lengkap, Telepon, Fax	: Jl. Perindustrian II Komp. Sukarame Indah Blok C3 No.1
	RT.11 RW.03 Km.9 Palembang
Alat Angkut	: Darat / Laut / Udara *) Dari : Palembang Ke : Makasar

TUJUAN PENGANGKUTAN:

Nama / Nama Perusahaan / Nama Lembaga	: Sumarto Gozal / PT. Sumber Murni Lestari
Alamat lengkap, Telepon, Fax	: Jl. Kima 4 Kav. 9 Kawasan Industri Makasar

*)Coret yang tidak perlu.

PEMERIKSAAN PENGANGKUTAN

Dikeluarkan di : Palembang
Pada tanggal : 18-11-2011

Diangkut dari :	Palembang	Tiba di : MAKASAR	a.n. Kepala Balai,
Pada tanggal	19 Nopember 2011	Pada tanggal : 26 NOVEMBER 2011	Kasubbag Tata Usaha,
Tanda tangan, Nama, NIP Petugas Pemeriksa, Stempel	Yuniasati, BSc NIP 19610616199003200	Tanda tangan, Nama, NIP Petugas Pemeriksa, Stempel	Haidir, S.Hut, M.Si NIP 19730729199803100

■ Lembar ini wajib dibawa oleh barang/spesimen).

AA 046830

Appendix II EC review of Python species imports under CITES Regulation

EC CITES REGULATION

REVIEW OF IMPORTATION OF SPECIES IN ANNEX B

	REPTILIA: PYTHONIDAE
SPECIES:	*Python reticulatus*
RANGE STATES UNDER REVIEW:	Malaysia (Peninsular) (quota 280000 skins, 1000 live)
OTHER RANGE STATES:	Bangladesh, Brunei Darussalam, Cambodia, India : *Nicobar Is*, Indonesia , Lao People's Democratic Republic, Myanmar, Philippines, Singapore, Thailand Viet Nam
RED LIST RATING:	-
PREVIOUS EC ACTION:	Not for Malaysia
CITES SIG. TRADE:	1988

CONSERVATION STATUS (including effect of trade on extent of territory occupied):
Bangladesh: 'While always confined to rain forests in the east and southeast, habitat destruction has reduced and fragmented the range and only two small populations remain, in Sylhet and Chittagong (Khan, 1982). Reportedly common within its restricted range (Bangladesh CITES MA, 1986).' (Luxmoore *et al.* 1988)
Cambodia: 'There appear to be no recent records (Saint Girons, 1972), although the species would be expected to occur throughout (Smith, 1943).' (Luxmoore *et al.* 1988)
India: 'Confirmed reports appear to be restricted to the Nicobar islands in the Union Territory of the Andamans and Nicobars; recorded from Car Nicobar, Teressa, Trinkat, Nancowry, Great Nicobar and Little Nicobar (Whitaker and Whitaker, 1983 [1990]). Other sources (Daniel, 1984; Tikader, 1983) state that the species also occurs inmainland India, in the extreme north-east, but these reports seem to be unconfirmed. Restricted distribution, numbers unknown (Whitaker and Whitaker, 1983 [1990]); officially considered Threatened (Tikader, 1983).' (Luxmoore *et al.* 1988)
Indonesia: 'Widespread, west to Sumatra and the adjacent Mentawai group, and east to Halmahera, Seram and Tanimbar (but not to New Guinea) (De Rooij, 1915; de Haas, 1950). Present in Kalimantan, Sulawesi, Java, Lombok, Natuna, Tanimbar, Sumba and Sumbawa (Indonesia CITES MA, 1986). One early twentieth century source cites this species as very common (De Rooij, 1915), no recent information available.' (Luxmoore *et al.* 1988). 'Informants cited by Gusti et al. (1990) suggested that pythons are now less common than formerly in many parts of South and Central Kalimantan, and traders were concerned that the declining supply of skins is a threat to their livelihood. Traders who visit villages to buy skins reported that between 10 and 50 useable skins might be obtained from a given locality each month; Gusti et al. Interpret this to suggest that python populations are at fairly low levels. An average catch for a four- or five-man collecting expedition lasting seven to 20 days would comprise between two and eight snakes in the 3- to 6-m size range; this is equivalent to between four and 12 man-days per snake. The following five paragraphs summarise the views of skin dealers interviewed in Indonesia by Luxmoore. In so far as dealers might have their own business reasons for giving incomplete or misleading information, although we have no evidence that this is the case, some caution is advised in interpreting their comments. The consensus was that pythons in general remain readily available to the skin trade, although decline is apparent in some areas (e.g. Sumatra) and some difficulty in obtaining skins can in part be attributed to increased competition in the trade. The term "python" here will usually refer to *P. reticulatus*, as the most widespread and abundant species. Most dealers confirmed that whilst skin supplies had in general remained level, many more people were involved at all levels of the trade, including collectors, middlemen and main dealers, and vast new areas of land (e.g. transmigration areas) had been opened up. These observations can most readily be interpreted to indicate a significant decline in the occurrence and density of python populations in some regions. **Java** (Jakarta): One dealer in Jakarta reported that large skins formerly available from Kalimantan had become more difficult to obtain, perhaps since the extensive 1987 fires in the country; another reported no difference in the supply of python skin during the seven years he had been trading, and the same applied to another who had been trading for 20 years. However, a fourth trader reported some decline in turnover, which he attributed to much increased competition. **South Sumatra** (Palembang): An exporter reported no difference in the supply of skins

during the 20 years he had been in business. Two buyers agreed that it was easy to obtain skins 10 or 20 years ago when few trappers were active and the market was more restricted; most snake skins now come from transmigration areas, where many of the immigrants collect snakes for part of their income, and where snake populations would be expected to have a relatively high density initially. Reportedly, a group of five or six men could catch 20-30 pythons during a two-week expedition. **North Sumatra** (Medan): Of the two dealers interviewed, one reported buying 50 000 m of python skin in 1979 but twice this amount in 1989 (the significance of this is uncertain); the second reported that there were 30% fewer pythons than a decade ago because of forest loss and increasing human populations, on the other hand, he asserted that one man could collect 20-30 pythons in one week (which is a large catch). **Kalimantan**: One buyer in West Kalimantan reported that more skins are available now compared with a decade ago because there are now more collectors; another in East Kalimantan asserted that there are still plenty of pythons in the forest and collectors do not have to travel far from rivers in order to catch them.' (Groombridge and Luxmoore 1991). Abundant (Yuwono 1998). 'Some species like the water monitor (*Varanus salvator*), the reticulated python (*Python reticulatus*) and, more recently, the blood python (*Python curtus*) have been collected from the wild in large numbers and there is no evidence yet that numbers are declining or that there is a shift in size classes in specimens brought to the skinneries.' (Erdelen 1998). 'The population density of such a large predator as *Python reticulatus* seems relatively low, especially in plantation areas. A location free of hunting impacts as in West-Kalimantan, seems not to exist in North Sumatra.' (Abel 1998). 'To draw conclusions on population densities of *P. reticulatus* is too early as the field study is not yet completed.' (Riquier 1998). 'Hundreds and thousands of giant snakes (*Python reticulatus*) are taken from the wild to be killed for their skins each year, raising doubts about the longterm sustainability of this offtake. We visited four locations in northern Sumatra (Medan, Seisuka, Rantauprapat and Cikampak) at four times of year and gathered information on the sizes, sexes, reproductive status and food habits of 784 slaughtered pythons. Pythons in northern Sumatra mature at larger body sizes than do those studied previuosly in southern Sumatra (Palembang). Thir seasonal timing of reproduction is shifted appreciably, presumably because the two areas lie on opposite sides of the equator. The slaughtered animals are mainly adult males and adult plus juvenile females. Females attain larger sizes than males, but very large females are rarely captured. This bias may reflect size-related shifts in habitat selection; smaller snakes (including adult males of all sizes, and recently-matured females) feed primarily on commensal rats and hence are abundant in disturbed (agricultural and village) habitats. Female pythons produce large clutches (mean = 24.2) of large eggs (mass > 250 g), but reproduce only once every 2 to 4 years. The apparent ability of reticulated python populations to withstand high levels of offtake may reflect their demography (rapid growth rates, early maturation, high fecundity), their flexibility in diets and habitat use, and their ability to evade detection (because neither foraging nor thermoregulation require extensive movements).' (Shine *et al.* 1999)

Peninsular Malaysia: 'Cantor (1847) reported that the species was "very numerous in the Malayan hills and valleys" in the mid-nineteenth century. At the end of the nineteenth century said to be one of the commonest snakes, pythons of up to 6 m (20 ft) then being "by no means uncommon" (Ridley, 1899). Reported very common in the late 1950s at Asahan, Malacca, where "because of its depredations of fowls, it is viewed with considerable disfavour". Similarly, said to be still quite common despite exploitation, and still readily to be seen (B. H. Kiew *in litt.*, 25 February 1986). Still abundant in Perlis, within the security area of northern Peninsular Malaysia (S. Ambu *in litt.*, 17 February 1986), but disturbance, habitat loss, persecution and exploitation for food reportedly causes appreciable mortality in other parts of the peninsula, where, by implication, the species may often be less than abundant.' (Groombridge and Luxmoore 1991)

Singapore: 'Present (Ridley, 1899), no details available. Said to be "still far from rare" on Singapore in 1922, when several specimens were captured within Municipal limits (Sworder, 1922), and five individuals were included in a collection of snakes made over seven months, chiefly around the Nee Soon Forest Reserve (Harman, 1961). Apparently still relatively common (P. Gopalakrishnakone, *in litt.*, 13 March 1986), although no details of distribution or abundance are available.' (Luxmoore *et al.* 1988)

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RECOMMENDATION: Although the indications are that the species is still fairly common in some parts of Peninsular Malaysia there have been suggestions that populations are decreasing in some areas. Given that the quota is higher than the reported trade in recent years (and 100,000 more than the figure for 1999) we recommend a negative opinion for Peninsular Malaysia.

NEGATIVE opinion

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