

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD



**TRACEABILITY SYSTEMS
FOR A SUSTAINABLE
INTERNATIONAL TRADE
IN SOUTH-EAST ASIAN
PYTHON SKINS**



UNITED NATIONS



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For the purpose of this Study:

- South East Asia refers to the following countries: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.
- Marking, marking system or re-marking for the purposes of this Study entails any system that permits the traceability of a skin.
- The word “tagging” is often used as a synonym for “marking” in regards to traceability systems.

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Contents

Note ii

Acknowledgements ii

Acronyms v

Executive summary vi

I. INTRODUCTION 1

 Background 1

 CITES process and UNCTAD’s contribution..... 1

 Consultation process of this Study 3

 Python skins trade in South East Asia 4

II. MARKING AND TRACEABILITY 7

 Marking systems 7

 Two-tier traceability system 7

 Type of marking options 9

 Conclusion 14

 Supply chain for snake skins and point of tagging 14

 Re-tagging 15

 Other traceability issues 17

III. COMPLEMENTING CITES PERMITTING SYSTEMS 21

 Shipment declarations..... 22

 Trade monitoring 22

 Sustainable sourcing strategies 24

IV. IMPROVE CONSERVATION AND SUSTAINABLE USE FRAMEWORKS 27

 Non-detriment findings..... 27

 Annual quotas 27

 IUCN/SSC Boa and Python Specialist Group 29

V. ENHANCE COMPLIANCE AND ENFORCEMENT 31

VI. ENHANCE CAPACITY BUILDING 33

VII. ENCOURAGE STAKEHOLDER ENGAGEMENT 35

 Industry stakeholder initiatives 35

VIII. DEDICATED FUNDING..... 37

IX. EQUITABLE COST AND BENEFIT SHARING..... 39

X. ANIMAL WELFARE AND HUMANE KILLING GUIDELINES..... 41

XI. CONCLUSIONS..... 43

XII. KEY FINDINGS AND NEXT STEPS..... 45

 Marking and traceability systems..... 45

 Other traceability issues 45

Complementing the CITES permitting systems.....	46
Improve conservation and sustainable use frameworks	46
Enhance compliance and enforcement.....	46
Enhance capacity building.....	47
Encourage stakeholder engagement	47
Dedicated funding	47
Recommend equitable cost and benefit sharing	47
Animal welfare and humane killing guidelines.....	47
Next steps.....	47
ANNEXES	49
References	50
Consultations	51
Notes	52

Acronyms

AAC	Alligator Advisory Council
AMS	Adaptive Management Strategies
AVA	Agri-food and Veterinary Authority of Singapore
ASEAN-WEN	South East Asia Nations Wildlife Enforcement Network
BMP	Best Management Practices
BPSG	IUCN/SSC Boa & Python Specialist Group
CDB	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoP	Conference of the Parties (to CITES)
CSG	Crocodile Specialist Group
EC	European Commission
EU	European Union
FWC	Florida Fish and Wildlife Conservation Commission
FWF	Florida Wildlife Federation
FWS	United States Fish and Wildlife Service
GRTS	Global Reptile Trade Study
IACTS	International Alligator Crocodile Trade Study
IGO	Intergovernmental Organization
INV	Inventory designation of stockpile skins
IRATA	Indonesian Reptile and Amphibian Trade Association
ISO	International Organization for Standardization
ITC	International Trade Center
IUCN	International Union for Conservation of Nature
IWG-RS	International Working Group- Reptiles
JLIA	Japan Leather Industries Association
LDWF	Louisiana Department of Wildlife and Fisheries
MA	Management Authority
MSY	Maximum Sustainable Yield
NDF	Non-Detriment Finding
NFC	Near Field Communication
NGO	Non-Governmental Organization
OIE	World Organization for Animal Health
PNG	Papua New Guinea
PPP	Public-Private Partnership
PRF	Python Resource Fund
RESP	Responsible Ecosystem Sourcing Platform
RFID	Radio Frequency Identification
RJC	Responsible Jewellery Council
SA	Scientific Authority
SC-SWG	Standing Committee Working Group on snake trade and conservation management
SSC	Species Survival Commission (IUCN)
SRSTA	Singapore Reptile Skin Traders Association
SVL	Snout-Vent Length
TCM	Traditional Chinese Medicine
TOR	Terms of Reference
TRAFFIC	Trade Record Analysis of Fauna and Flora in Commerce
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Program
UNEP-WCMC	UNEP World Conservation Monitoring Center
UNIC	Unione Nazionale Industria Conciaria
VCC	Visual Computing Consultancy
WCMC	World Conservation Monitoring Center
WWF	World Wildlife Fund
YAMP	Yellow Anaconda Management Program

EXECUTIVE SUMMARY

The 15th and 16th meetings of the Conference of the Parties to CITES decided to consider the feasibility of implementing a traceability system for snake skins based on available studies and reports, after guidance and recommendations from its Standing Committee. In response, UNCTAD and the CITES Secretariat jointly commissioned this scoping study on “Traceability Systems for a sustainable international trade in South East Asian Python Skins” (referred to as the Study hereafter) to provide analysis and options regarding existing marking and tracing systems, a traceability system to confirm the legal origin of snake skins, and the economic feasibility of current technologies to implement such a traceability and marking system. Specific recommendations to the CITES Animals Committee and Standing Committee would be elaborated by UNCTAD and the CITES Secretariat on inputs received from stakeholders during the consultations, briefings, meetings, peer reviews and workshops conducted in the course of preparing the Study, and from the discussions on the Study.

This Study has been prepared on the basis of inputs received from stakeholders during extensive and intensive consultations, briefings, meetings, peer reviews and workshops. Three key conclusions emerged from this work as follows: (1) there is an urgent need to mark all python skins traded, (2) there should be an inventory and tagging of all python skin stockpiles in South East Asia, and (3) there was recognition of the need for dedicated funding sources to annually support monitoring programs including research, management, enforcement, compliance, trade monitoring and conservation education. Related and additional findings from the Study are summarized below.

Marking of python skins

There is an urgent need to mark python skins traded to ensure that such trade is legal, sustainable and verifiable (traceable and independently monitored), with benefits to commerce (economic gains), conservation (habitats and wetlands), and communities (local people and cultures). Improved traceability would contribute to confirming origin and legal sourcing, and together with export permits would strengthen the credibility of the CITES certification system. At the same time, it is noted that improved traceability and tagging systems can help prevent but cannot totally overcome false declarations of origin, laundering of wild skins or direct smuggling. It is thus important for Parties to CITES and relevant stakeholders to accord high priority to traceability and sustainability issues, with timely and strict penalties for non-compliance.

Among the different traceability systems considered, a two-tier system emerged as a preferred option. It would comprise a mandatory first tier from dried snakes’ skins to finished leather (tannery bottleneck). A low-cost, barcoded ‘button style’ tag was preferred as the feasible marking choice for the first-tier. A second tier from manufacturing to retail product was also supported, however no clear consensus emerged on whether it should be optional or mandatory. The implication of a mandatory marking of finished products requires thorough review. RFID technology is considered an option for the marking under the second tier. The preference for a two-tiered traceability system was also based on the emergence of local manufacturing capacity as a value added strategy, with increased incomes for local communities including apprentices and craftsmen.

The re-tagging of python skins after the tanning process was considered. Justification does exist to remove python skin tags during tanning operations, particularly finishing, because of its specific and unique requirements and the machinery used for the pressing, plating and millennium finishes of python skins. However, further discussions are needed with concerned industries to examine workable solutions, including on potential loopholes associated with retagging.

As part of the improved traceability system, Adaptive Management Strategies and Non-Detriment Findings can be enhanced by the collection of data on snake skin size and gender.

Inventory of python skin stockpiles in South East Asia

An inventory of python skin stockpiles in South East Asia ideally under the supervision of the local CITES Management Authority and with the data gathered remaining strictly confidential. Protocols for standardized

inventory guidelines should be developed to address tagging, pre-Convention stock (if any remains), and a budget to administer the inventory.

Snake skin skinning instructions to deter stockpiling have been successfully used in Argentina for the model Yellow Anaconda Management Program (YAMP), which also requires tagging, licensing, reporting and enhanced accountability systems. Skinning instructions may be less useful once stockpiles and annual range State quotas are tagged and account-based reporting systems and databases are operational.

Compliance, capacity building and dedicated funding sources

Range State compliance issues related less to regulatory frameworks, which were generally comprehensive, and more to compliance monitoring and the interdiction of illegal trade. The ASEAN-WEN (Wildlife Enforcement Networks) could greatly assist ASEAN range State enforcement efforts.

Compliance monitoring could be further improved with the use of transport documents that included tag number manifests, shipping declarations, electronic reporting, designated port inspections and enhanced enforcement techniques.

Capacity building and best management practices are essential building blocks to enhance research, management, enforcement, compliance, trade monitoring and conservation education. Engaging local range State biologists and scientists is an important step in developing local champions who could work to promote strategies for sustainability in local communities.

Economic incentives for legal trade, value-added tanning and manufacturing options, more development of by-product markets as well as recognition of “skin and leather values” are important ways to enhance equitable cost and benefit sharing. The importance of python trade values to local livelihoods should be highlighted in initiatives that could include linking with the media and private sector stakeholders.

A more comprehensive commercial case for the levels of captive-bred python skins reported in trade needs to be made, particularly in Lao PDR and Viet Nam.

Dedicated funding options are essential to better finance sustainability and traceability options. The Louisiana Alligator and Papua New Guinea crocodile program approaches for duties and monitoring revenue are examples to be considered in a range of 3-5% of a skin’s export value. Industry should also consider establishing a python resource fund to support range States’ efforts for enhanced traceability and sustainability. Industry should also consider funding levels and organizational structures to expedite regional testing workshops, first tier tagging, range States databases (including scanners, computers, technical expertise) and sustainable sourcing initiatives linked to UNEP-WCMC.

Trade data

The “World Trade in Skins of Large CITES-Listed Snake Species” Report completed as part of this Study, should be continued at least through CoP 17, 2016, to provide the best historical trade data for the previous 20 years. Consideration should be given to expand this trade monitoring study to a “Global Reptile Trade Study (GRTS)” in the future.

The Sustainable Sourcing program developed by UNEP-WCMC in 2011 should be reconsidered, particularly the concept of species reviews and a “Traffic Light” system to simply communicate the status of species in trade to industry participants and other stakeholders.

The issues and options of setting national quotas should be carefully reviewed to consider ways to more effectively monitor and leverage trade values to range States.

Continued dialogue and follow-up

The CITES Snakes Working Group on snake trade and conservation management could serve as a regular forum,

in addition to the IUCN BPSG for dialogue, discussions and balanced collaboration between scientists, range States and industry as an integral part of developing better protection, management, sustainability strategies and conservation education for large CITES-listed snakes. The work of the group would be supported by the CITES Secretariat, UNCTAD and other institutions with an interest in the trade of python skins.

Explore collaboration options with all stakeholders, such as public-private partnerships, in order to implement initiatives addressing issues such as tagging, stockpiling, sustainable sourcing, monitoring, animal welfare and dedicated funding issues.

The option for range States to initiate national legislation or regulations to require all python skins in trade to be tagged by 2015 and for all stockpiles of python skins be inventoried and tagged by the end of 2014 should be promoted and considered.

Workshops in range States should be scheduled and conducted in the first quarter of 2014 to further address issues concerning tagging and traceability, stockpiles, inventories, sustainable sourcing guidelines, enforcement, compliance, trade monitoring, dedicated funding and animal welfare.

A constructive industry forum that includes range States, regional trade representatives and others would also help to enhance future stakeholder engagement.

A companion “Marsh to Market” story to better educate consumers and the public about sustainable benefits for commerce (economic incentives), conservation (wetlands and habitats) and communities (local people and cultures) is needed.

The Humane Killing Guidelines from the Swiss-led Expert Panel Report should be implemented as soon as possible.

I. INTRODUCTION

Background

The Study co-commissioned by the United Nations Conference on Trade and Development (UNCTAD) and the CITES Secretariat is an ambitious attempt to undertake a scoping study on sustainable sourcing of snake skins from South East Asia. The Study is also intended to be a practical guide on how improved traceability systems could work fairly for all stakeholders, and how it could affect the livelihoods of local people and benefit conservation of the species through balanced economic incentives linked to wildlife habitats.

Species of South East Asian python concerned in this study are:

- Reticulated python (*Python reticulatus ssp*),
- Burmese python (*Python bivittatus ssp*), and
- Short-tailed python (*Python curtus*, *P. brongersmai* and *P. bretensteini*).

It emerged from stakeholder consultations and peer review of the Study that specific suggestions would be provided on direct ways to reduce illegal trade in python skins, implement a tagging and traceability system, identify dedicated funding options and suggest a timetable for implementation. It was also considered important to be clear on what a traceability system alone can offer, and where management actions need to work in conjunction with a traceability system to achieve a sustainable harvest while also reducing illegal trade.

In the course of the Study and related stakeholder consultations¹, consensus emerged on 1) the urgent need to *tag* all python skins, 2) support an *inventory* of all python stockpiles in South East Asia and, 3) recognition of the need for *dedicated funding* sources to annually support *monitoring programs* including research, management, enforcement, compliance, trade monitoring and conservation education.

This Study explores options for strengthening control and monitoring systems for international trade in python skins and for promoting further private sector engagement in sustainable sourcing and regulated trade of CITES listed species. This Study also aims to recommend actions or options that urgently consider ways to tag all python skins in trade, enhance institutional frameworks for better traceability, emphasize the importance of capacity building and dedicated funding to improve research, management, enforcement, compliance, trade monitoring and conservation education. In other words, develop practical guidelines and implementation timelines within the CITES context to benefit commerce (economic incentives), conservation (ecosystems) and communities (local people and cultures).

The terms of reference for the Study are highlighted in Box 1.

CITES process and UNCTAD's contribution

The United Nations Conference on Trade and Development (UNCTAD) is the focal point within the United Nations for trade and development as well as the relation between finance, technology, invest-

Box 1: Summary of UNCTAD/CITES TORs and Objectives for the Scoping Traceability Study for South East Asian python skins (March-August, 2013)

- a) Improve Traceability: (i) Tagging or marking options (matrix ranking of type, design & cost); and (ii) Institutional frameworks and compliance standards.
- b) Complement CITES Permitting Systems: (i) Licensing and reporting requirements; (ii) Shipment declarations and inspections; (iii) Permit clearinghouse reviews and inventories; and (iv) Shipping tags and export documentation.
- c) Improve Conservation and Sustainable Use Frameworks: (i) Protected areas and management units; (ii) Provincial quotas and harvest limitations; (iii) IUCN Boa & Python Specialists Group; and (iv) Yellow Anaconda Model.
- d) Enhance Compliance and Enforcement: (i) Designated ports and inspections; (ii) Training and ID manual; and (iii) Regional enforcement coordination (ASEAN-WEN).
- e) Improve Capacity Building: (i) Research and management; (ii) Enforcement and compliance; and (iii) Annual reports and trade monitoring.
- f) Encourage stakeholder engagement: (i) Supply chain participants (Harvesters and Dealers); (ii) Traders and Tanners; and (iii) Manufacturers and Luxury Brands.
- g) Recommend equitable cost and benefit sharing: (i) Supply side (raw skin); (ii) Value-added (crust and finish tanning); (iii) Manufacturing and retail; (iv) Dedicated funding sources; and (v) Determine applicability to other reptiles in trade such as snakes, lizards, turtles, etc. and by-products (meat, gallbladders, etc.).

ment and sustainable development. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is the multilateral environmental agreement established to ensure that international trade in specimens of wild animals' and plants' is sustainable, legal and traceable in order to avoid utilizations that are incompatible with their survival in the wild.

Due to their complementary goals, UNCTAD and the CITES secretariats have fostered a long-standing cooperation in ensuring sustainable and regulated trade in specimens of CITES listed species, as defined by a common Memorandum of Understanding (MoU) signed in March 2010. The three main objectives of this MoU are aimed at ensuring the conservation of species, enhancing the livelihoods of poor people in remote and marginal areas, and promoting business opportunities for entrepreneurs that fully comply with CITES requirements, as well as with national regulations. Under this MoU, particular attention is given to the role of positive economic incentives for sustainable management of CITES Appendix II and III-listed species.

Currently, UNCTAD is collaborating with the CITES Secretariat in the implementation of CITES COP 16 Decisions 16.102 to 16.105, which instructs the latter to:

Decision 16.102 c) inform Parties of the results of the International Trade Centre (ITC) Study on trade in python snakes in Asia, the UNCTAD Biotrade Initiative's

Working Group on reptile skin sourcing, when these become available, and other relevant studies and information;

16.103 The Animals Committee shall:

a) review the results of the activities indicated in Decision 16.102, paragraphs a) to c), as well as the results of the ITC Study and other relevant studies on trade in python snakes in Asia and UNCTAD Biotrade Initiative's Working Group on reptile skin sourcing, when available; and, based on these studies and reports, develop guidance and recommendations for consideration by the Standing Committee;

b) examine the Study undertaken by the UNCTAD Biotrade Initiative's Working Group on reptile skin sourcing mentioned in Decision 16.102, paragraph c), and any other relevant available information concerning:

i) existing marking and tracing systems and, where relevant, accompanying certification schemes of all kinds (and not necessarily limited to those currently in use for trade in wild species), which could provide best practices that might be applicable to snakes;

ii) a traceability system to confirm the legal origin of snake skins; and

iii) the economic feasibility of current technologies to implement such a traceability and marking system;

c) advise the Standing Committee on the feasibility

Box 2: The CITES decision making process and timetable on trade in python skins from South East Asia

- March 2013 - at Cop16 the CITES Secretariat informed its Parties, Animal Committee (AC) and Standing Committee (SC) to look at studies undertaken by ITC, UNCTAD and other information available.
- April 2014 - AC will look at studies from ITC and UNCTAD, as well as any further information that will be available and make recommendations on the way forward, considering what has been done and what is most feasible to be implemented, particularly on the issues of (i) existing marking, tracing and certification systems, (ii) traceability systems to confirm legal origin of snake skins and (iii) economic feasibility to implement the systems. AC will also make recommendations to SC that will meet in July 2014.
- July 2014 - SC will consider the reports and the recommendations from AC and make its own recommendations.
- March/April 2015 - AC may consider new information available as well as the recommendations/outputs from the SC. And an expected output could be a proposed Resolution on how the trade of snake skins should be controlled by traceability, marketing, whichever the Parties should decide.
- Summer 2015 - SC will provide the final recommendations to COP17, considering the progress made and further advise from AC.
- 2016 - At COP17, Parties will consider recommendations from SC and decide on a Resolution if Parties agree. The Resolution will be legally binding.

It is important to highlight that the above process does not exclude Parties and other initiatives from advancing and testing systems or studies being undertaken that could be fed into the CITES process.

Source: Mr. Mathias Loertscher, Chair of the CITES SC-SWG, provided during a briefing on the study jointly organized by UNCTAD and the CITES Secretariats (Geneva, June 12, 2013).

of implementing such a traceability system for snakes; and

d) report on the status of this work at the 65th and 66th meetings of the Standing Committee.

16.105 *The Standing Committee shall:*

a) consider the reports and recommendations from the Animals Committee and the Secretariat provided in accordance with Decisions 16.102 and 16.103 and, as appropriate, the results of the ITC Study on trade in python snakes in Asia, the UNCTAD Biotrade Initiative's Working Group on reptile skin sourcing, and any other relevant available information;

b) examine the Study undertaken by the UNCTAD Biotrade Initiative's Working Group on reptile skin sourcing, and any other relevant available information concerning:

i) the socio-economic implications of such a traceability system; and

ii) the potential costs of the system at all levels along the supply chain, from producers to consumers;

c) make recommendations to the Parties, the Animals Committee and the Secretariat as appropriate;

A summary of CITES decision making process and timetable is provided in Box 2.

As mentioned above, one key aspect of this Study is to explore options for strengthening control and monitoring systems for international trade in South East Asian python skins and promote further private sector engagement in sustainable sourcing and regulated trade of CITES listed species.

Decisions followed a recommendation adopted at the twenty-sixth meeting of the Animals Committee in March 2012, to consider the results of UNCTAD work on the development of an International Traceability System for Snake Skins and make appropriate recommendations at the sixteenth meeting of the Conference of the Parties in March 2013. To fulfill this objective, under the UNCTAD-CITES MoU, UNCTAD and CITES commissioned a scoping Study to provide the necessary analysis and options for consideration by CITES Parties for the eventual design of a traceability system for python skins.

Taking advantage of CITES COP 16 in March 2013, a roundtable was jointly organized by CITES Secretariat and UNCTAD. The roundtable provided a platform to discuss the issue of traceability and possible contours of the UNCTAD/CITES scoping Study which could

provide the necessary analysis, details and options for consideration by CITES Parties. The eventual design of a traceability system for snake skins would be based on the needs, inputs of the Parties themselves, industry members and civil society, as well as integrating issues such as sustainability concerns; traceability, marking, tagging and other technological options; compliance of standards and regulations; available institutional frameworks; the value of capacity building and guidance and manuals; the need for increased engagement from the private sector and conservation organizations; and cost implications especially for range States (i.e. States from which python skins are sourced).

Consultation process of this study

This Study is intended to help move forward a python skin trade that is legal, sustainable and traceable and generates positive environmental impacts (improved conservation status of the species and ecosystems), economic and social benefits (countries, private sector and local communities, improved livelihoods of local people and better recognition of their practices and cultures).

It is the third Study in a recent series of studies, "Improving International Systems for Trade in Reptile Skins Based on Sustainable Use"² and "The Trade in South East Asian Python Skins"³. A fourth Study on captive-breeding issues and assessments is currently being undertaken by some members of the IUCN/SSC Boa & Python Specialist Group and will be completed later this year.

Meetings and consultations were conducted in eight countries⁴ and inputs and viewpoints were provided by a broad range of stakeholders. Regional private sector's input was provided confidentially and the author has tried to respect all sensitive industry input in the spirit it was provided - to move the python trade towards a legal supply that is traceable and sustainable through practical and lowest cost options.

Direct input was also obtained from several luxury brands attending the UNCTAD/CITES Information Session in June 2013 as well as other events.⁵ The IUCN/SSC Boa & Python Specialist Group (BPSG) members provided important insight into sustainability and traceability issues, including planned research into DNA, Isotopic and other diagnostics useful to more accurately determine origins in the future. The BPSG Chair, and Conservation Manager of the Fun-

dación Biodiversidad Argentina, provided specific examples of Anaconda skinning instructions, the usefulness to differentiate between harvest years and a value/cost summary for the model Yellow Anaconda Management Program of Argentina.

The IUCN Crocodile Specialist Group (CSG) Chair provided references on physical marking techniques used in crocodylian captive breeding operations and observations on the use of skin sizes as both management and regulatory tools. Snake experts like Peter Brazitis (formerly the Curator of Reptiles for the New York Central Park Zoo) shared practical insights into the use of ID manuals and contacted his colleagues for opinions on ways to better use skin sizes as adaptive management tools. From the conservation organization side, the IUCN Species Survival Commission (SSC), World Wildlife Fund (WWF) and Helmholtz Center for Environmental Research provided input on the balance needed between commerce and conservation as well as encouragement for the proactive objectives of this Study. At the risk of omitting other organizations which made valuable contributions to this Study, the above are representative of a comprehensive approach to increase awareness, input and engagement of stakeholders with an interest in traceability and sustainability options for pythons.

A broad cross-section of stakeholders provided valuable input to this Study that included regional trade groups like the Singapore Reptile Skin Traders Association (SRSTA), Indonesian Reptile and Amphibian Trade Association (IRATA) and the Italian Tanners Association (UNIC). Range State meetings and field trips in South East Asia were held with Indonesia, Malaysia, Viet Nam and Singapore with CITES Management and Scientific Authorities as well as snake catchers, collectors, farmers, tanners and exporters. A series

of meetings and regular consultations were held with UNCTAD, CITES and the Chair of the Standing Committee Working Group on snake trade and conservation management (SC-WGS), including a June 2013 information session in Geneva on preliminary findings⁶ (see figure 1) as well as the UNIC Italian tanners meeting in July (see figure 2).

The first draft of the Study was subjected to a peer review process from 17 to 27 September 2013. Views obtained from the peer review enriched the Study. A follow up UNCTAD/CITES Workshop was held in Geneva October 17-18, 2013 to provide range State representatives, industry, conservation organizations and other stakeholders another opportunity to comment and provide direct input to the final draft working document.

Pythons skins trade in South East Asia

The trade in python skins takes place in ten South East Asian countries covering a vast area, with 17,000 islands in Indonesia alone. Several Python species (Reticulated python, *Python reticulatus* ssp, Burmese python, *Python bivittatus* ssp, Shorttail pythons, *Python curtus*, *P. brongersmai* and *P. breitensteini*) occur across this range with the reticulated python the most widespread from Southern China through South East Asia, Indonesia and the Philippines. The Indian python (*Python molurus*) and Burmese python (*P. bivittatus* ssp) cover an extensive range on the Indian sub-continent and South East Asia (see figures 3 and 4).

The reported python skin trade in 2010 was approximately 500,000 skins a year, with estimates of illegal trade that may equal the legal trade⁷ or approaching one million skins a year. The reported Python trade in 2011 was more than 800,000 skins (see Trade Moni-

Figure 1: UNCTAD-CITES information session June 2013

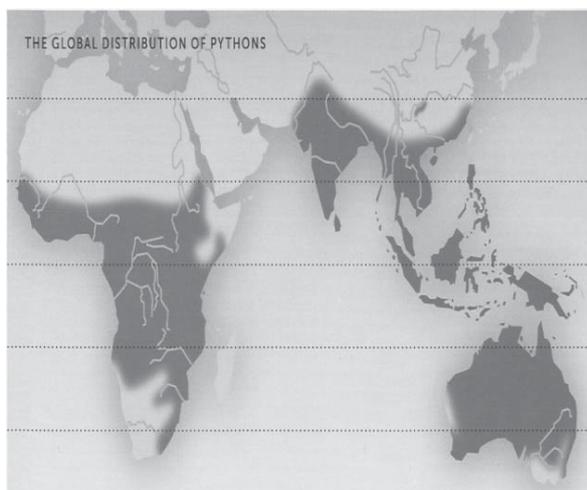


Source: UNCTAD

Figure 2: UNIC Italian tanners meeting



Source: UNCTAD

Figure 3: Global distribution of pythons

Source: M. Dorcas

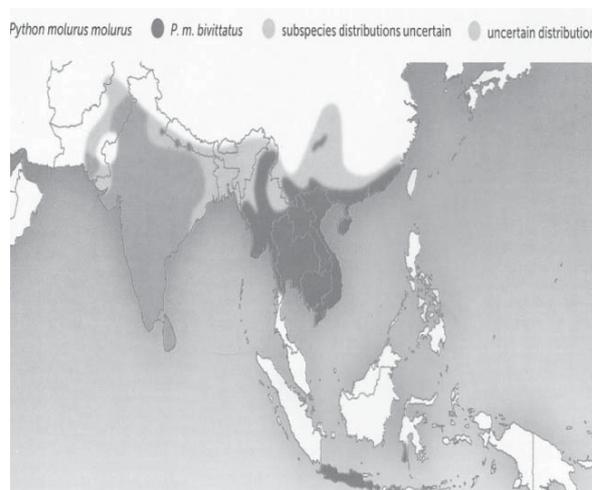
toring section). Total value is at least \$100 million in raw (dried) skins, more than twice that value in leather, and 3 to 5 times leather value at retail, depending on the manufacturing multiplier used.

The unfortunate reality of challenges to protect threatened or endangered species, manage those that can be sustainably utilized and conserve habitats essential for their survival, often requires convincing policymakers and civil society that conservation is in the public interest and deserves adequate funding levels to support research, management, enforcement, compliance, trade monitoring and conservation education.

It is important to highlight the positive impact that sustainable use of natural resources has on local livelihoods, conservation of vital wildlife habitats, and benefits to the culture and heritage of communities.

Economic incentives and dedicated funding are essential building blocks to improve and enhance the sustainable use of some natural resources with benefits to commerce (economic incentives), conservation (ecosystems) and communities (local people and cultures). And that Capacity Building and Best Management Practices (BMP's) are equally important foundations for all sustainable management programmes.

This Study considers a preliminary framework for an improved python skin traceability and sustainability system. The CITES Parties have the opportunity to resolve many issues in this complex trade. An implementation phase should be considered, including workshops, tag testing and ongoing dialogue between science, trade and range States in coopera-

Figure 4: Native distribution of Indian & Burmese pythons

Source: M. Dorcas

tion with CITES, UNCTAD and relevant actors. More engagement with UNEP-WCMC and IUCN BPSG are also worthy and achievable goals.

The ultimate goal for python skin or any other sustainable use programme should be a regulated trade that is legal, sustainable and traceable. And once those goals are reasonably met, a companion “Marsh to Market” story that explains simply the benefits of sustainable use to wetlands, habitats, local people and cultures, should be developed to inform better policymakers and the public.

Considering the current body of knowledge, some options were identified that can be implemented unilaterally or regionally by range States, re-exporting or importing CITES Parties. Of particular importance would be a series of workshops in range countries to:

1. Gain a better understanding by stakeholders of the urgent need to improve traceability,
2. Discuss options for the first point of tagging and ways to help mitigate currently high illegal trade levels.
2. Present findings from the expert panel on Humane Killing of Reptiles Report⁸ and actions needed to eliminate methods determined to be inappropriate and inhumane in favour of an approved and humane method.
3. Discuss the importance of origin and accuracy of size or gender data to support the adaptive management of pythons, setting of quotas and increased credibility of non-detriment findings.

The implementation of traceability systems by python range States does not necessarily require waiting for the adoption of a Resolution by CITES during CoP 17,

in 2016. If range State traceability requirements were consistent and reasonably standardized, incremental implementation through national legislation or regulation might be considered. An example of how this could

be achieved is the template of crocodylian skin tagging (Alligator, 1972; Nile Crocodile, 1983) that existed until the CITES Universal Tagging Resolution for all crocodylians was adopted in 1994 (Resolution Conf. 11.12).

II. MARKING AND TRACEABILITY

Marking systems

The traceability of products using different marking systems has become important in international trade to facilitate the tracking of a product from its point of origin to the point of retail when it is bought by a consumer. Traceability is important in addressing, for example, food security issues. In the context of this Study, traceability is important in tracing and verifying the legal origin of snake skins and to ensure they are sustainable. Hence the key CITES principles of sustainability⁹, legality¹⁰ and traceability¹¹ can be simultaneously promoted in the case of trade in large snakes' skins. The definition and implementation of a traceability system for python skins would have to overcome certain difficulties, including stockpiling, as well as transportation of skins between catchers, slaughter houses and tanneries.

Traceability systems are tools for sustainable supply chains and it is important to have clearly defined their objective(s). Major stakeholders from the private sector would like the supply chain to indicate the origin of the skins and whether they are legal and biologically sustainable. The earlier a traceability system can be established the better it is but range State consensus was clear that tagging of pythons should not occur at the community catcher level since this could have negative impacts on local people participation and livelihoods. The system has to be not only scientifically robust but also economically feasible. That is, the systems need to be able to resist the tanning (first tier) process, and remain invisible in the final product if marking at retail is employed (second tier).

Traceability is important due to the following reasons: (i) elimination or at least reduction of illegal snake skins trade with the aim being to reduce it to negligible levels where it is no longer undermining confidence in the sustainability of the trade of the legal snake skins trade, (ii) facilitation of real time scientific control over exports, (iii) objective verification of the type of snake skins, (iv) facilitation of customs verification, (v) improvement of animal welfare and consumer reassurance regarding sustainability, and (vi) simplification of bureaucratic process in verifying and identifying snake skins.¹²

Any traceability system needs the commitment from, and acceptance by, all stakeholders. It should also avoid ambiguity of meaning and implementation in order to ensure effective and compliance. This is partic-

ularly important if range States (unilaterally or regionally) gradually initiate tagging and traceability systems in 2014 and 2015, before a universal tagging resolution for large CITES-listed snakes is considered during CoP 17, in 2016. It is also important to consider how to link them to the CITES permit process (paper permits and the future electronic permits that need to be implemented by exporting and importing countries).¹³ It would be of utmost importance to ensure that all information is compatible and comparable. There would therefore be a need to standardize the information and link it to CITES. However, companies can individually define and enhance the information required based on their needs and strategies.

During the course of this Study and in related consultations, stakeholders expressed their preference for a two-tier traceability system for trade in snake skins.¹⁴ This would involve a mandatory first tier (from dried snake skins to finished leather), and a second tier from manufacturers to retail shelves.

However, the final decision, concerning which type of marking and traceability system to use, will rest with the Parties to CITES. Parties to CITES will also need to decide whether only the first tier (dried skins from range States to finished leather at the final tannery bottleneck) will be mandatory or whether the second tier (manufacturer to retail) should also be compulsory.

Two-tier traceability system

A two-tier traceability system for trade in snake skins would involve the following:

- First tier: encompassing the value chain steps from dried snake skins to finished leather (tannery bottleneck). This phase would be for the local actors/range State authorities to implement on a mandatory basis but would also include tanneries in importing countries.
- Second tier: encompassing the value chain steps from the tanneries until the retail shelves. This second phase would be for the different private sector industries to implement on a non-mandatory basis unless CITES Parties decided to also make the marking of manufactured python products compulsory.

It is important to mark snake skins at the range State or country of origin of the snake before they are exported and at the earliest feasible point of the supply chain. When adopting a two-tier traceability system, the crucial marking point will take place at the first tier. Thus, the skins' legality and validity can be proven at

the country of importation and the skin is easily traceable. The marking system used would be recorded and verified against customs, databases, etc. The allocation of any type of tags by range States requires a record of who the tags were issued to with subsequent verification of tag numbers exported, in inventory, lost, stolen or damaged. This establishes an original range State database that is the foundation of traceability throughout the supply chain. A range State database detailing those who received tags is the foundation of a traceability system. Before a skin can be legally exported a list of those tags (manifest to CITES permit or shipment declaration document) must be verified by the range State's CITES Management Authority. This verification can be manual, electronic or direct validation (particularly if dedicated funds are collected at export) and is cross-checked with the master list of all tags issued at the end of each year. At a time to be determined by the CITES Management Authority, all issued tags must be accounted for either as exports, inventory, lost, stolen, damaged or unused tags (which must be returned).

Importing countries' CITES Management Authorities then verify CITES permits by tag number manifests and require inventory records be kept by tanners receiving raw (dried) or crust skins. If a core group of tanners guarantee that only tagged skins can be converted to leather and accurate account-based inventory systems are in place (i.e., stockcard system in Singapore or Detention Register in Italy for example) then a legal trade framework is verified through range States, importing countries and tannery databases that all originate from the initial tag issuance record. This utilizes the Tannery Bottleneck as the final point of verifying legal trade.

This is the main reason why stakeholders consulted for the purposes of this Study considered that the first tier should be mandatory, whereas the second could be optional. If the legality and validity of the snake skins is proven at the point of import and at the foreign tannery level, then marking the skins after the tanning process (when done in another country other than the country of origin) would be for the benefit and information of the final consumers and/or the actors involved in the higher levels of the value chain, but not to determine the legality and validity of the skin, since that would have already been determined earlier in the value chain. Once the snake skin is imported and validated by a CITES authority, if an illegal import has not been detected by that point, it will be almost impossible to detect at any further point. Nevertheless, should there be another export point after the tanning process, the marking system could again serve the purpose of determining the legality and validity of the snake skins.

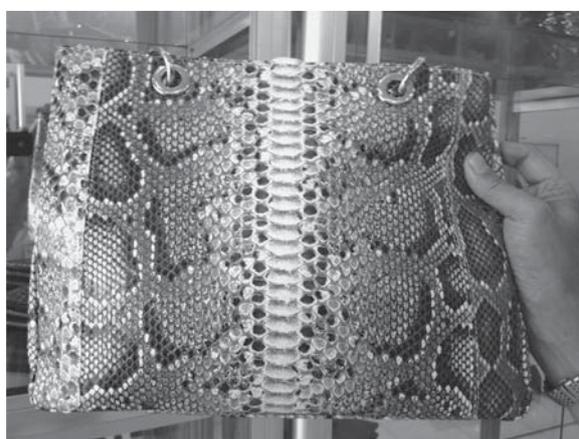
Since the second tier marking of manufactured products could be optional or compulsory, it is up to the CITES Parties to decide the issue. Due to lack of consensus among stakeholders, Parties to CITES would need to decide on the following:

- Whether the second tier marking should be optional or compulsory;
- Whether finished skins intended for re-export would require re-tagging;
- Whether python skins will be re-marked;
- Provide clarification on intentional removal of tags (for pressing, plating and millennium finishes); and
- Provide clarification on what to do with broken or lost tags during the tanning process.

Figure 5: Local manufacturers



Figure 6: Locally manufactured bag



The preference for a two-tier system was also based on the emergence of local manufacturing operations (particularly in Indonesia, Malaysia and Viet Nam) that utilized some of the indigenous python skins to make products for domestic or regional markets (see figures 5 and 6). Indonesia, for instance, established a harvest quota of 90% for export and 10% for domestic purposes.¹⁵

Many actors in the first stages of the value chain have limited resources. Therefore it would be advisable to employ the lowest cost tagging system for the first tier of the traceability system, especially taking into account that it would be mandatory in nature.

The first tier of proposed mandatory tagging requires the tannery bottleneck to help ensure that only legal python skins are tanned into leather. Although approximately 50 tanners worldwide are currently involved in the tanning of python skins,¹⁶ this Study confirmed that 13 from the EU, 2 from Japan and 17 regional tanners from Indonesia, Malaysia and Viet Nam account for at least 75% of the python leather tanning. Consequently, the effective use of a “tannery bottleneck” is achievable (limited number of tanners capable to convert dried skins into high quality leather). Inquiries have also been made in China and Mexico to expand contact with the core group of tanners involved in the python trade. Legal trade can only be reasonably verified at the harvest, transport, processing or tanning level, so subsequent marking of finished products can help ensure chain-of-custody to retail, but the validation of legal trade needs to be achieved between the dried skins to leather stage.

Improvements in tagging and traceability systems can make illegal trade more difficult, detectable and provide a better framework for interdiction. Such improved systems however cannot overcome issues of governance or an enabling environment that may remain entrenched in some levels of the supply chain. In those cases, CITES Parties should consider expedited processes to focus on compliance and notice of timely action for non-compliance. The expedited processes could include immediate notice to clarify inconsistencies in trade statistics or reporting, CITES-sponsored missions to directly confirm or corroborate the situation, reasonable (but limited) time for corrective action and, as last resort, to trade suspensions in the instances of false documentation of origin, laundering of wild skins through captive-breeding facilities or smuggling to circumvent tagging and traceability systems. The importance of rebuilding confidence in

the Government-to-Government certification role of CITES in the South East Asian region cannot be overstated.

Also it's important to note there can be a tendency in traceability systems to over-emphasize the monitoring and verification of the legal trade. A balance between finding ways to expedite the legal trade while also focusing on the means to detect, deter or apprehend illegal trade is important. Assistance and information from legal traders is essential. While regulators can follow leads to illegal trade routes and perpetrators, the stakeholders in the industry tend to know what their competitors are doing as part of normal business practice. The relationship and confidence established over time between regulatory agencies and a responsible core of legal trade is an integral part of ultimately diverting illegal trade to legal sources. Then sustainability of the resource can be better confirmed, range States' interests are better served and the livelihoods of local people as well as community cultures are enhanced fairly for all.

Type of marking options

Traceability marking systems can include serially-numbered loop or button-style tags (some with barcodes), Radio Frequency Identification (RFID) tags, DNA or isotopic markers, subcutaneous microchip or other tracing methods. Consultations on the desirable features of a traceability system emerged with a number of useful perspectives. These included the following characteristics:

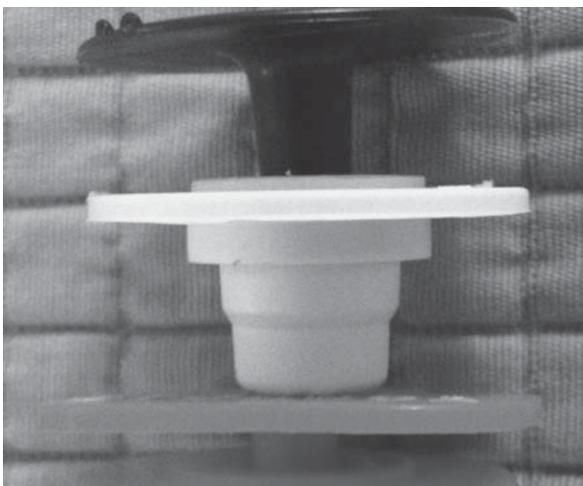
- Specific to trade in python skins while drawing upon systems currently used, such as for crocodilian skins or yellow anaconda skins;
- Lowest cost available, if not ‘costless’,¹⁷ especially for range States;
- Effective, easy to apply and simple to distribute;
- Pragmatic and business-friendly;
- Fraud proof to the extent possible so as to avoid counterfeit;¹⁸
- Have real time online registration in place (which could be compatible with mobile technology to register skins);
- Accounts for the difference between harvest from the wild and from breeding farms;
- Provide revenues that can be used by range States to finance the implementation of the traceability system; and
- Based on technical and scientific analysis, as well as based on population and trade data.

Figure 7: Indonesia export sticker

The traceability system should also build on the existing permit systems. These systems include the following:

- CITES permit systems;
- National registry systems of collectors, traders and exporters;
- National monitoring, checking and inspection points of specimens (for national/regional permit issuance); and
- Identification of each skin with a sticker (see figure 7).

To support the identification of legal trade - real-time information on tag numbers will be important so that importer and exporter countries can share data to verify shipments. This will require development of new means for Parties to share data in an automated manner. UNEP-WCMC has been a repository of CITES trade data for several decades. It would be possible to work with them to develop a database of tag numbers. Currently, the UNEP World Conserva-

Figure 8: Button style tag, Argentina (top) and Colombia (bottom)

tion Monitoring Centre (UNEP-WCMC) is working with the CITES Secretariat and the Parties to CITES to explore means to re-develop the informatics infrastructure for the CITES trade database and has also done some pilot work with European Union countries to explore means for expedited data sharing. Further efforts are being implemented to facilitate generation of real-time data and foster sharing of information, as well as allowing the use of mobile phones to scan information, which could be linked to the WCMC-UNEP database. UNEP-WCMC has recognized that there is now an opportunity for real-time monitoring of snake skins tags and for ensuring that these needs can be delivered in conjunction with the other IT infrastructure developments.

Additional references to DNA studies and isotopic markers were also considered, but new research in these areas will likely be more useful to better determine origin or help differentiate wild specimens from captive reared. The practicality of using these more sophisticated methods in the field were questioned by some experts even though they may eventually prove to be invaluable to help better determine origin, differentiate captive reared from wild stocks or for forensic analysis as part of enhanced oversight and enforcement.

The main elements that will be key to deciding which marking-system to use in the first tier of the value chain include:

- Lowest cost available system;
- Practicality for field application;
- Tested resistance to tannery processes;

Figure 9: Bar code scanner

Figure 10: Sample bar code button tag system

- Feasibility to link the marking system with the management database available in each State; and
- Feasibility to link the marking system with the UNEP-WCMC permit database.

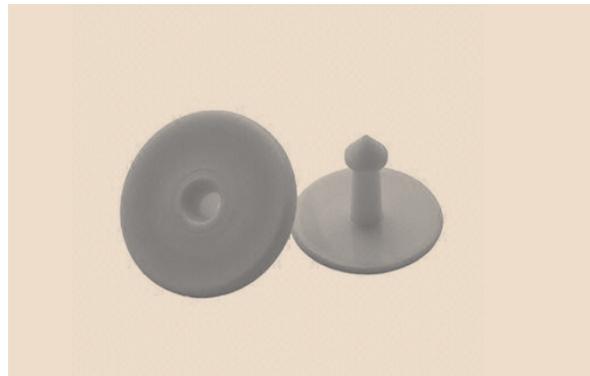
Either a bar-coded tag (see figures 10 and 11) or RFID chip (see figure 16) could be linked through the range State to CITES trade databases managed by UNEP-WCMC for production of annual reports on snake skins in trade, which was another reason a two-tier tagging system would be preferable.

a) Loop or Button Style Tags

This type of tagging system is currently used for successfully tracing other types of reptile skins, specifically all crocodylian skins in trade and the Yellow Anaconda skins from Argentina.

The exact cost of bar-coded button style tags designed specifically for python skins is yet to be determined since none of the CITES approved list of tag manufacturers currently make such a bar-coded button tag. A button style tag with an “ear flap” for a bar code is available (Figure 10), but this type of tag has not been tested through the tanning processes. Based on experience with bar codes added to loop style tags used to mark American Alligator skins (figure 14) only a nylon based tag material with laser-etched bar codes has successfully withstood all of the reptile skin tanning processes. We continue to work with tag analysts to determine lowest cost alternatives for a bar coded button style tag (QR or 2-D technology discussed later in this section).

However, serially numbered button tags are available and are used in large quantities, particularly for caiman skins that originate in Latin America. An estimation can be made from the cost of these types of tags when used for other reptile skins. For example, each

Figure 11: Sample button style tag for QR barcodes

button-style Argentina Yellow Anaconda tag costs US\$0.57 for quantities of 5,000 units. Crocodylian loop tags in Indonesia cost US\$0.30 each for similar small quantities. The alligator loop tag (with bar code) used in Louisiana in large quantities of more than 300,000 per year costs US\$0.17 per tag. The volume order plays an important role in lowering the cost of each individual tag.

In addition to the cost of the tag itself, when calculating the total cost of the system, the cost of the required scanner (figure 9) for the barcodes should also be taken into account. In the case of the present marking system, there is a variety of brands producing these required scanners and they can be relatively inexpensive (approximately US\$150 per unit on average). The number of scanners required would depend upon the volume of skins, number of designated ports, CITES Management Authority and Enforcement staffing. Comparatively, both bar code and RFID technologies require scanners so the number of units needed is comparable.

i) Button style: This system is already being implemented for the purposes of tagging yellow anacondas from Argentina (*Eunectes notaeus*). This particular tagging system has proved acceptable for yellow anaconda range States and tanneries. However, the Argentina tag has a large gap between the two interlocking sides. Tanners and industry consulted for the purpose of this Study agreed that a much smaller gap would be preferable for the purposes of tracing python skins. A similar tagging system was deemed to be the button-style tag used in Colombia (figure 8) for the *Caiman fuscus* skin. This correction would reduce “jiggling or pulling out” in handling or tanning processes.

If this type of marking system were to be used on python skins, the “button tags” would need to be sig-

Figure 12: Tags applied to *Caiman fuscus*

nificantly larger to incorporate all the information required (i.e. range State, year, province if applicable, serial number and bar-code) (see examples of button style tags above). The diameter of the Colombia button-style tag is 1.25 inches (3.2 cm). Industry experts estimated that a diameter of at least 2 inches (5.1 cm) would be necessary to accommodate all data plus provide “quiet space” on both sides of the barcode to facilitate scanning.

A QR barcode is also available for use and could be more easily incorporated into the smaller button-style format and still provide 64 bits of information. With a 9 digit sequence, the QR barcode would avoid any duplicates in the estimated quantity of skins to be tagged. This barcode is compatible with a range of scanners and reading devices including a Smartphone. The initial cost estimate for a QR barcode button-style tag is approximately US\$0.18-0.30 cents based on final size, volume & specificity.

Figure 14: Bar coded loop tag

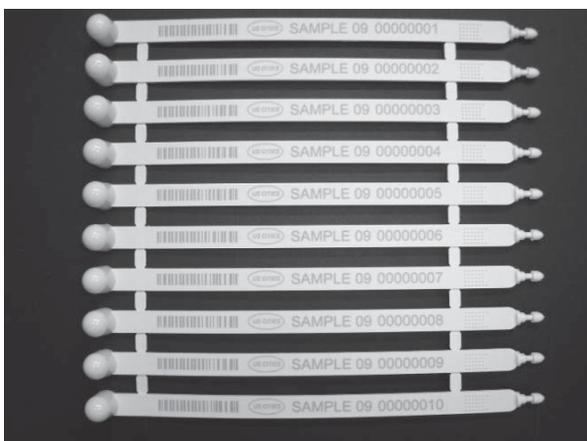


Figure 13: Colombian button style tag



Tag analysts have also recommended that a 2-D barcode format should be considered and are further researching tag design and costs for this type of marking system for python skins. An advantage for both the QR and 2-D button style bar coded tag is the availability of low cost compatible database systems.

ii) Loop style: The pictures below show two different types of loop style tags already used for other animal skins and are widely used to tag crocodilian skins in trade.

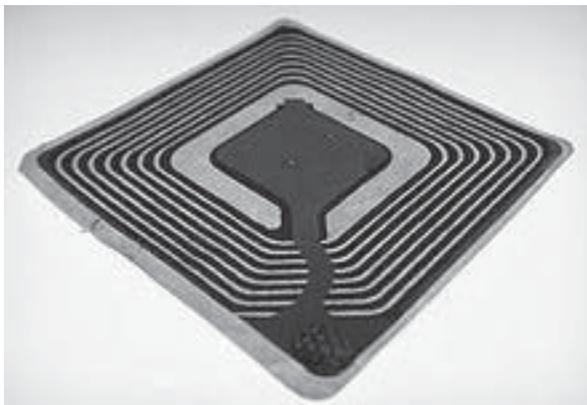
While some of the tanners consulted for the purposes of this Study thought the loop style crocodilian tags could also work with python skins, the majority thought a button style tag was preferred. The concern with the loop style tags was the potential for tangling of skins in the tanning process or increased chance to “pull out” of snake skins, which are considerably thinner than other reptile skins.

An important aspect of this type of tag (as used with

Figure 15: Loop style tag



Source: <http://www.trevorowenltd.com/poly-check.htm>

Figure 16: Example of a generic RFID chip

Source: http://en.wikipedia.org/wiki/File:RFID_Chip_004.JPG

other reptile skins) is the interlocking mechanism designed to be tamper proof which prevents the re-use of tags. Tags should only be allocated to private sector participants that are licensed, subject to inspection, responsible for regular reporting and required to return any unused tags to the issuing authority (CITES Management Authority or regional designee) or report those lost or stolen. The security provisions (permanently interlocking) are essential to help ensure only one tag is used for each skin harvested or exported.

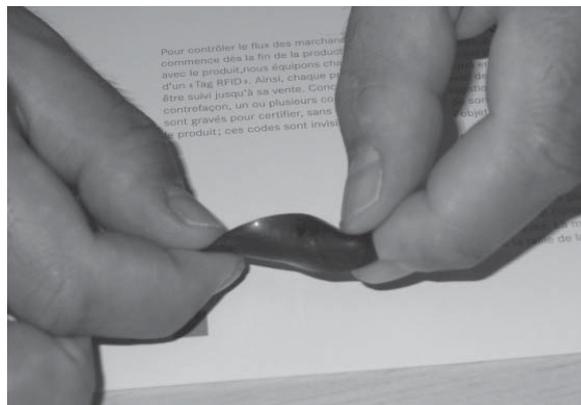
b) Radio-frequency identification (RFID) tag

RFID is being used with track and trace products in supply chains, as well as for other non-commercial purposes like identification. RFID tags can be used in place of bar-codes to facilitate electronic reading of data. Below is an example of a generic RFID tag.

While several RFID companies expressed an interest in the python tagging and traceability systems, the two most detailed proposals were All4Retail and Visual Computing Consultancy (VCC). VCC in particular has been working with the International Working Group on Reptiles Skins (IWG-RS) of the Responsible Ecosystems Sourcing Platform (RESP) and some luxury brands to develop an “end-to-end” traceability system.

i) All4Retail:

The All4Retail Softag (figure 17) is a soft material chip, of approximately 0.6 mm thick, containing data, as well as an antenna that enables the gathering of information via radio frequencies.¹⁹ This Softag can either be inserted or sewn into the skin and is manufactured to resist all chemical and mechanical processes through the value chain. However, the system has not

Figure 17: AFR soft tag

yet been tested through the tanning process. The estimated cost of the A4R Softag would depend on specific application to the retail product manufactured.

ii) VCC RFID tags:

RESP and VCC were working, until summer 2013, on a possible “end-to-end” traceability system. For that purpose, they tested different RFID technologies. This testing resulted in the choosing of two different RFID chips which successfully passed the testing phase in a German tannery.

The dimension of these chips is approximately 3cm in diameter. They would be attached to the skin using a stapling gun at the tail-end of the skin. These chips would contain all the necessary tracing information for skins, which would be accessed via entry screens, either with a laptop or a mobile reader. A global database compiling all this information would need to be developed which could be accessed via laptop or a mobile reader.

From the tannery level of the value chain onwards, this particular traceability system developed by RESP-VCC would use a “dust particle” RFID technology. This procedure uses a proprietary application method and is applied to the complete snake skin. The “dust particle” RFID tag would then remain on the skin until the final product. Standard RFID readers or mobile phones using NFC²⁰ reader technology would allow users to access all data within this tag.

This “dust particle” RFID tag would also allow users to access all data from any part of the snake skin, independently of whether the skins had already been cut and separated for the final manufacturing process.

However, although tested in a German tannery, this

Table 1: Cost of tags (US\$)

System	Estimated cost	Other costs involved	Inclusion of a database in the estimated cost
Button tag (Yellow anaconda)	0.57		No
Loop tag (Indonesian crocodile)	0.30		No
Barcoded loop tag (Louisiana alligator)	0.17	Scanner (150 aprox.)	No
QR barcode button style tag	0.18-0.30*	Scanner cost requested	Partial
All4Retail RFID chip	Requested		
VCC RFID system	1.30-2.50	Requested	Yes

Note: All marking systems would require the use of computers or similar electronic equipment.

* The price will change based on final actual size, volume & specificity

system has not yet been fully tested in the field. Pilot projects are still pending and the global database has yet to be developed.

The cost of this RFID system is within the range of US\$1.30 to US\$2.50 per skin. This price, contrary to all the above price estimates, includes the cost for a global database.

Conclusion

During this Study period, some major tanners of reptile skins were independently considering and comparing the relative advantages and disadvantages of bar-coded tags versus RFID technologies. Even when quantities of several hundred thousand skins a year were considered for control and inventory purposes, the bar-coded tags were selected as the lowest cost option and were preferred for the time being. There was considerable tanner interest in the RFID technology if prices per unit declined (as most technologies generally do), particularly if lower cost scanning equipment required to validate tag numbers by box or pallet could be developed. Initially, a bar-coded, interlocking, tamper-proof button style tag could be considered for the first phase of a two-tier traceability system. The two-tier system encourages continued development and testing of RFID and other technologies and marking systems for those manufacturers and luxury

brands that preferred “end-to-end” marking to retail product.

Supply chain for snake skins and point of tagging

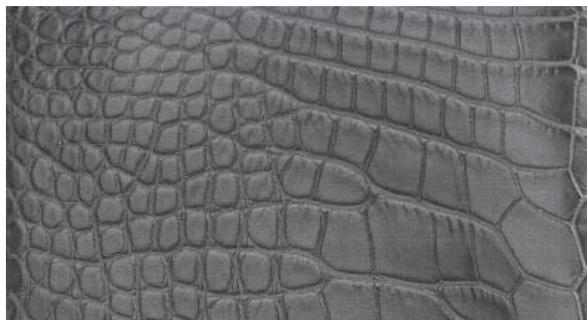
Discussions with stakeholders at various UNCTAD/CITES meetings concluded that the first point of tagging should not be at the hunting/capture level. The primary reason is most of the python harvest is conducted at the local community level, with some organized catchers, but it is mainly an opportunistic finding by local people of a large python. Money from the capture and sale of pythons is very important to subsistence, education and improving living conditions in remote areas.

In terms of the typical supply chain of pythons skins in oil palm plantations, Indonesian collectors (mostly slaughterhouses) may either catch snakes themselves or hire around 40 community catchers (local people) as workers to supply the collectors. For large pythons, at least two catchers are often required. Indonesia estimates at least 150,000 workers are involved in the harvest of pythons. It would therefore be impractical to require the marking system to be implemented at this level of the value chain.

Pythons are mostly brought in live, although a few may be dried skins processed by more experienced catchers. Slaughterhouses and collectors would be spaced about 3 to 5 kilometers apart to service local communities and about once a week a supplier (dealer or broker) would pick up and pay for the dried skins. The supplier would then resell the dried skins to one of the 15 tanneries currently licensed in Indonesia who are the only authorized exporters to international markets.

The logical first point of marking will vary by range State, with some opting for processing facilities (slaughterhouses), regional collectors, dealers, farmers or tanneries. They will all need to be licensed, sub-

Figure 18: General and simplified supply chain for wild snake skins

Figure 19: Grain surface of alligator leather

Source: Fuchs, 2010

ject to inspection, responsible for reporting and accountable for the marking system used.

In range States, there are thousands of catchers (community level) who supply substantially fewer collectors (slaughterhouses) that consolidate skins for suppliers (dealers) to a limited number of tanneries (15 in Indonesia and a similar number in the EU and Japan combined). In some countries, such as Indonesia, only the domestic tanners are authorized to export snake skins.

The viewpoint of some of the range States concerning the wild harvest of python quotas (Indonesia and Malaysia) is that the first point of tagging should not be community catchers. In Indonesia, the remaining options are the slaughterhouse, the supplier, the tanner or combination of the three. As long as each is licensed, required to report (accountability) and subject to inspection as well as validation of tag numbers linked to each CITES export permit, the slaughterhouse is the closest point to origin of the skin (although there are exceptions where live pythons may be transported considerable distances if a local slaughterhouse is not available). Indonesia allocates the wild skin quota among licensed tanners linked to a network of trade actors.

In Malaysia only one tannery is currently tanning python skins, making the slaughterhouse the closest point to origin of harvest. Compliance inspections and review of harvest reports would need to be increased to ensure adequate monitoring.

In Viet Nam, the primary snake farms are likely processing most of the skins for export, but satellite farms must also be considered in the tracking system, as well as transport permits similar to the Indonesian model that should be linked to tag number manifests.

Nevertheless, more information and discussions are

Figure 20: Grain surface of reticulated python leather

Source: Fuchs, 2010

needed with range States and the regional trade stakeholders to better recommend a first point of tagging for each country. It should be noted that the tagging of all python skins helps ensure the harvest quota closely matches the export and domestic use quotas.

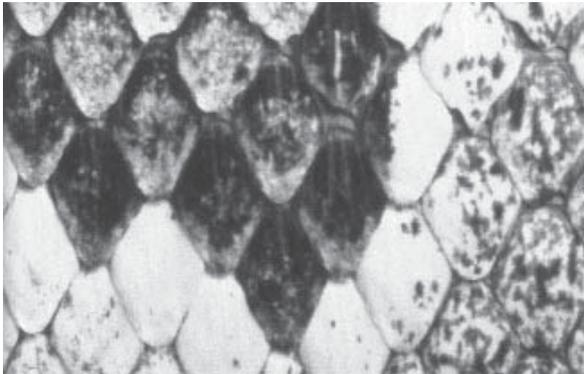
If the above was implemented, no legal skin would be then exported that had not been marked. Manufacturers, whether associated with tanners or future private sector investment in manufacturing, would also be required to maintain only tagged skins in inventory until cut into pieces to make finished products.

This serves the dual purpose of verifying legal origin and effectively helps limit quotas at the harvest level. Without any closed seasons at present in range States, the number of tags issued effectively limits a legal harvest and other compliance standards (reporting, inspecting, skinning instructions, etc.) provide a better basis for legal and sustainable trade.

Ideally, the first point of marking would need to occur in range States before domestic tanning. The important point is that all python skins in international trade are tagged, before export from range States and verified by the importing CITES Management Authority through tag manifests accompanying CITES permits with assistance from tanners that only tagged skins can be legally converted to leather.

Re-tagging

An important and unique aspect of the python supply chain is the need to remove tags during the tanning process (particularly finish tanning) to accommodate pressing, plating or millennium finishes (see figures 22, 23 and 24). Interviews with many tanners experienced in the required processes for snake skins as well as a site visit to a major python tannery in Italy, confirmed the required process for python (and other snakes) is to

Figure 21: Grain surface of Molurus leather

Source: Fuchs, 2010

press or plate the finished skin so that the uplifted, trailing edge of scales is compressed. If this process did not take place, the scales would not be durable enough for finished products and might be easily damaged through wear. For a visual explanation of this difference in the skins of different reptiles (see figures 19, 20 and 21).

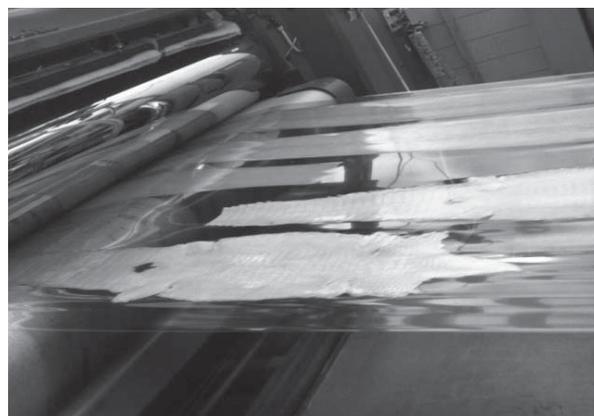
Machinery currently available to most tanners will cause problems for the tags of any traceability system as they pass through the pressing or plating mechanism and the process cannot be reversed (mechanically or without potential damage to the compression administered during the one-way process). It was also noted during the process of this Study that it is not only a matter of pressing or plating the skins, but also of making all the finishing operations (some even hand-crafted) that are necessary to produce the high quality leather (in terms of fashion style and design) – hence the justification for removal is not only for tag resistance reasons. Justification exists to allow the removal of tags at the tannery, provided a record is

Figure 22: Plating process in an Italian tannery

kept of all python skins received and verified by the Management Authority through reports or inspections.

In Italy, which is the major tanning centre for high-end python leather, the CITES Management Authority requires strict adherence to record keeping, inventory declaration and a detention record that must be updated every two weeks. This is a very rigorous system and explains why Italian tanners are concerned that additional tagging or traceability options considered by Parties to CITES may add more requirements to an already extensive accountability system of skins received, leather sold and bi-monthly inventory balance (Detention Register). The traceability system for python skins should be easy to manage and try to avoid adding more bureaucracy to the existing system.

The manufacturing of final products from python skin is important in Italy and also in several other European Union countries. Re-tagging of python skins for re-export (if required by CITES Parties) would thus concern relatively small quantities compared to the total trade.

Figure 23: Millennium finish machinery**Figure 24: Python & alligator skins after Millennium processing**

**Figure 25: Traditional Chinese musical instruments:
Burmese python preferred**



Again, there was less consensus on the need for re-tagging, with some tanners preferring not to re-tag and others considering the small quantities tolerable to maintain consistency with CITES precedents and requirements of other range States or re-exporting Parties. As stated earlier, the issue of re-tagging requires further discussion with the industry to achieve workable solutions.

Other traceability issues

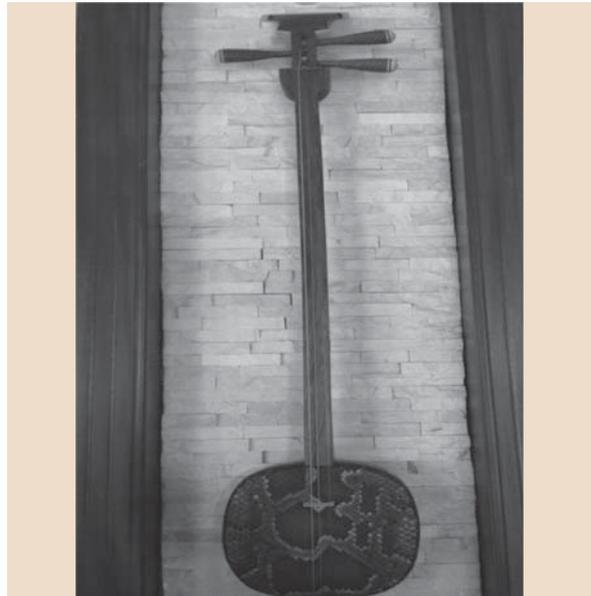
i) Stockpile inventories

Range States and re-exporting countries visited during the course of this Study agreed on the necessity to inventory and mark python skin stocks in South East

Figure 27: Viet Nam python stockpiles



Figure 26: Asian musical instrument



Asia in order to achieve a more transparent base for a marking and traceability system. Inventories should be conducted by the Management Authority who would maintain a confidential account-based system that would not compromise the business interests of private sector stakeholders.

If all inventoried python skins were marked with a designation code "INV", companies would not be forced to push inventories too quickly into the market, potentially undermining current values. The inventoried skins exported would also not subtract from annual range State quotas provided the quantities of "INV" skins were verified on export manifests against the original account-based system for each licensed exporter.

Figure 28: Indonesia stockpiles



While there is considerable difference of opinion among industry players on exactly how long a dried skin can remain in inventory (estimates vary from a few years to more than ten), the issuance of any CITES permits or certificates for Pre-Convention python skins is generally a moot point since all pythons were listed by CITES in 1975 (although the date a country of origin joined the Convention must also be considered). The possible exception may be the use of primarily Burmese Python (*Python bivittatus ssp*) skins manufactured into traditional Chinese musical instruments sourced mainly from Viet Nam. Reportedly, the dried skins are treated and stretched to make the musical instruments (figures 25 and 26), but requested details on the process, longevity or possibility of inventories, were not available before finalizing this Study. This is an important point to follow up on.

The inventorying of stockpiles (figures 27 and 28) could be a way forward to combat illegal trade in skins. If this were combined with funding for capacity building best management practices, enforcement, compliance and trade monitoring it would constitute significant progress. Range countries and re-exporting hubs are interested in this process and are willing to inventory their stockpiles with certain conditions, as referenced earlier (e.g. CITES Management Authorities verify and maintain the confidential records and do not allow the identification of individual companies, including the size of the existing stockpiles by company to be recorded).

ii) Head skinning pattern

With some exceptions, boas and pythons exploited for trade are skinned discarding the skin of the

head, which is usually left attached to the snake carcass. This is particularly true for anacondas and pythons that in general exhibit large scales on the dorsum of the head probably complicating and rendering futile skinning it. At the other hand, there have been several hides of *Boa constrictor* traded from South America in the 1980s that did not follow this pattern. During that period, and for unknown reasons, the skin of both the low jaw and the skull was carefully separated and kept part of the hides (figure 29).

Taking advantage of this precedent, the Yellow Anaconda Management Program (YAMP) established the obligation, in alternate years, of skinning the snakes including the head. Traditionally, hunters discarded the skin of the head during the skinning process, however they adopted this innovative procedure without controversy, producing readily recognizable shapes in the skins thus obtained (figure 30). This rule was aimed at preventing illegally stockpiled skins from previous seasons, or from other sources, entering into the YAMP legal harvest.

While awaiting confirmation that South East Asian pythons are not being skinned with the head, this procedure may prove useful to apply as an innovation for recognizing newly produced skins from stockpiled ones, as well as to differentiate between harvest seasons, or different countries or alternate production systems (e.g. farmed versus wild harvested skins) (figure 31).

The main drawback would be that a “head” could be faked by cutting its shape on an old skin, however, this would be easily detected with minimum

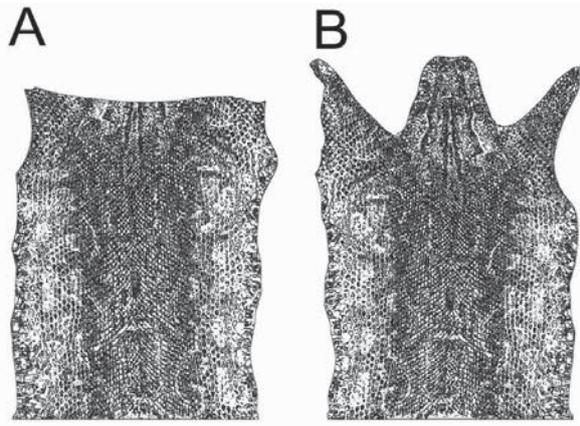
Figure 29: Front portion of an old *Boa constrictor occidentalis* finished skin, showing that both head and lower jaw has been meticulously skinned



Figure 30: Front portion of an *Eunectes notaeus* raw skin exhibiting the shape resulting from YAMP ruling for skinning anaconda's head



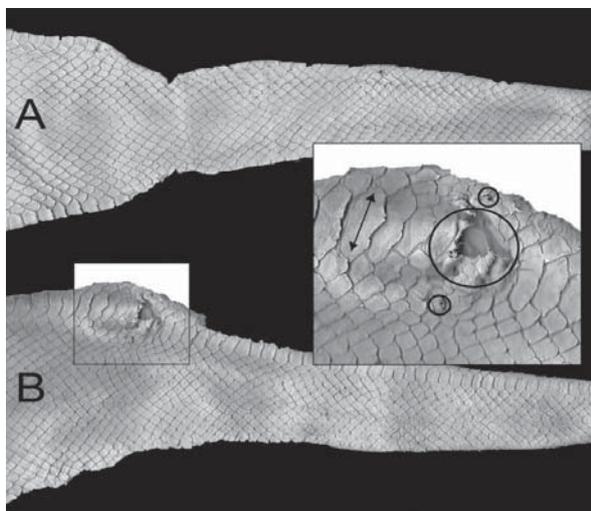
Figure 31: Front portion of two Boa skins exhibiting the difference between: (A) standard cut (beheaded snake) and (B) skinned head pattern



skills. In any case, provisions should be taken to ensure that the skin of the head is properly stretched during drying to facilitate its later recognition. For example, using a single nail in the tip of each portion of the head and jaw skin during drying will inevitably produce a very odd shape complicating differentiation from faked cuts.

Input received from UNIC (Italian tanners) representa-

Figure 32: Tail region of yellow anaconda skins: (A) traditional mid ventral cut exhibiting a symmetrical shape where mid ventral scales are divided in each side of the skin, and (B) skinning pattern where all the cloaca region including adjacent spurs (limb remnants), cloaca opening, and entire ventral scales, are left untouched at one side of the skin



tives at the October 17-18, 2013 meeting in Geneva recommended that python skins be tagged in the head rather than in the tail sections below the anal vent. This recommendation could facilitate the use of skinning instructions as a way to differentiate calendar year python skin production from stockpiles and potentially assist with some field ID of some skins in trade.

iii) Asymmetrical skinning pattern

Traditionally, anacondas and boas in South America were skinned longitudinally from the neck to the tail tip with a middle abdominal cut, dividing the wider ventral scales by half. For this operation, the snake was usually laid on its back on the floor or was tied by its head to a tree branch and skinned by the hunter in the field. After nail-stretched to the floor, a tree, or a wooden board for air-drying, the resulting skin exhibited an almost perfect symmetrical shape all over.

In order to control for harvest season and avoid out of season stockpiling of skins, an asymmetrical skinning pattern was also developed in YAMP at the level of the cloaca. This procedure was mainly aimed in generating a recognizable shape in the skin to allow its fast differentiation, but also to train hunters in ensuring that cloacal spurs (rear limb remnants) are kept attached to the skin, to allow the establishment of the sex ratio of the harvest based on spur size.

This skinning pattern implies that once the operator approaches the cloaca region the cut has to deviate 4-5 cm to one of the sides of the snake, in order to leave the entire cloaca region with its adjacent spurs and ventral scales at one side of the skin, in an asymmetrical characteristic pattern (figure 32). This pattern is not easy to fake as once the cut is

Figure 33: Skin mid-tail region with a simulated asymmetrical skinning pattern



done the shape of the hide changes simultaneously on both sides, while limb remnants (spurs and femur) are hard to imitate.

The procedure depicted could be easily applied to pythons as a standalone method or combined with head skinning, and eventually alternating them in different combinations. Furthermore, with some doses of ingenuity asymmetrical skinning patterns could be easily adapted to other types, as “back cuts” commonly used in pythons, or be applied in other less valued parts of the skins, like the mid-tail (see figure 33).

The problem of illegal stockpiling of snake skins has been addressed by the Yellow Anaconda Management Programme (YAMP) in Argentina. The practice of skinning the snake differently in alternate years so that there is either a standard cut (beheaded snake) or a skinned head pattern, helps to differentiate between harvest seasons. Likewise, YAMP developed an asymmetrical skinning pattern which provided a recognizable shape to the skin allowing quick differentiation of harvest year. Similar procedures could be envisaged in python range States in South East Asia using either one or the other procedure, or a combination of both.²¹

III. COMPLEMENTING CITES PERMITTING SYSTEMS

CITES has developed a permit system since 1973 that is based on intergovernmental certification of international trade backed by Management, Scientific, and Enforcement Authorities. The system authorizes international trade only if a number of conditions are met - the most important being trade that is legal and traceable and is not detrimental to species survival in the wild. CITES provides limited, but focused, enforcement support to Parties who must shoulder the front line responsibilities of compliance.

The range States visited for the purpose of this Study (Viet Nam, Malaysia and Indonesia), as well as Singapore (the primary re-exporter in South East Asia) provided extensive documentation of legislation, regulations and decrees governing the trade in python skins.

The recurrence of CITES permits or certificates for specimens of incorrect origin, type of production (i.e., captive bred versus wild) or in contravention of another range State's requirements (i.e., dried skins versus crust leather exports), compromises the credibility of the CITES system for sustainable trade. Many stakeholders provided input emphasizing that the correct origin, correct source codes (captive bred or wild) and compliance with national laws and quotas were essential for any tagging and traceability system to work.

A marking system alone will not correct the problem. While improved institutional frameworks will help, the most important ingredient for success is for CITES Parties and the industry to place python skins traceability and the sustainability of pythons in the wild as a very high priority with increased penalties for non-compliance.

Viet Nam provided copies of Decrees and Ministerial Standards 04-TCN86-2006 on Technical Regulations on Breeding the Burmese and Reticulated Pythons as well as additional references like the "Operational Manual for Inspections of Closed-Cycle Captive Breeding Operations of Crocodiles and Pythons".

Malaysia provided information on the regulatory frameworks of python management and harvest programs but a summary of the non-detriment findings (NDF's) in preparation during this Study has not been received. Malaysian processing facilities (slaughterhouses) are required to maintain a logbook of all pythons received including body mass, total length and

snout-vent length (SVL). Compilation and analysis of this historical data, even if incomplete, might assist with a more comprehensive NDF.

Indonesia provided references to more than a half dozen official Acts, Government Regulations and Decrees relating to conservation, utilization, harvest and trade management of wildlife, including pythons. An updated submission (May, 2013) of information pertaining to the current non-detriment finding was also provided. Indonesia, in particular, has detailed regulations requiring licensing, reporting, transport documentation and serially numbered export stickers to validate python skins before export. Other range countries could consider some of these enhanced regulatory requirements along with other options to improve traceability systems. For example:

- Transport or transfer documents should be required for some intra-country movement of skins and should have a manifest of tag numbers documented for the shipment; and
- Electronic copies of transport or transfer documents could be provided from the origin (Province) to destination (Dealer, Broker or Tanner) to confirm shipment and receipt. An electronic copy of these internal transactions could be part of permit clearinghouse reviews by the Management Authority, if deemed necessary.

Beyond the potential impacts of illegal trade on the species or credibility of sustainable use programs, the loss of potential revenue to range countries is considerable. This is lost funding that is needed to help support research, management, enforcement, compliance, trade monitoring and conservation education as well as benefit communities.

The absence of accurate volumes or skin sizes from illegal trade activities undermines the opportunity to use adaptive management practices based on size class trends. Moreover, the core responsibilities of CITES to ensure only legal trade not detrimental to the survival of a species (NDF's) are compromised. The May 2013 report from Indonesia, as part of their current non-detriment finding, provides a very good template for more comprehensive assessments and evaluations by other range countries.

Singapore, as the primary regional re-exporter of python skins, provided extensive background on CITES and regulatory requirements administered through the Agri-food and Veterinary Authority of Singapore (AVA). Of particular importance was the stockcard system

that maintains account-based reporting of imports and exports which could provide an excellent basis for a stockpile inventory to initiate the marking of all python skins in trade. Also the increase in penalties for violations from SGD5,000 to SGD50,000 per specimen is a significant deterrent to illegal wildlife trade. The stockcard is updated daily since import or re-export permits are issued every day. The system is currently manual but Singapore is updating the process to an electronic system. The format of Singapore's stockcard system could be useful to other range States until a tag issuance and verification system is in place.

Shipment declarations

A system of shipment declarations for both export, re-export and import of python skins in South East Asia would provide advance notice to port inspectors and wildlife enforcement authorities concerning actual shipments. As important, the advance notice through filing a Shipment Declaration provides enforcement the notice necessary to inspect those selected for spot or regular checks. The United States utilizes a similar approach called a "3-177 form" which is included in Annex 5 and must be validated along with the CITES Permit at the time of export and import through a Designated Port. The filing of shipment declarations (particularly as part of electronic reporting requirements) also provides more precise export and import quantities which is preferable to some current systems that report trade on the basis of permits issued.

Trade monitoring

For the purposes of this Study, Mr. John Caldwell²² updated the trade data on "World Trade in Skins of Large CITES-Listed Snake Species (see Annex 6)." In order to cover at least a 17 year period of best available historical data, the report covers the period from 1995 to 2011.²³

The analysis and amount of cross-checking²⁴ was sufficient to provide a "best available" historical analysis of the python trade through 2011. The increases of trade volumes from 2010 to 2011 were very significant and overall represented a 38% increase in one year, that is, an increase from 580,825 skins in 2010 to 804,920 skins in 2011 (see Table 2). Whether this significant increase in export was partly due to increases of permits issued, was a market-driven response, or inventory reactions related to uncertainty of future supplies due to regulatory focus by CITES

and range States or a combination of all these factors remains to be seen. Indonesia's export of python skins has been stable.

The most dramatic trade increase in 2011 was for the Burmese Python (*P. bivittatus*) which, in a year, more than doubled its trade figures, with a total of 228,837 skins in 2011. The Reticulated Python (*P. reticulatus*) increased from 410,515 to 501,941 or about 23% over the same period. From 2010 to 2011, the Short-Tail python species²⁵ also increased by 12,000 skins approximately. In 2011, there was a significant increase of global trade in skins of large CITES-listed snakes, of at least 35%.²⁶

The breakdowns of the *Python curtus* group are presented in figures 34, 35, and 36 with the most significant increase noted for *P. breitensteini* from Malaysia (4,010 in 2010 to 11,000 in 2011), *P. brongersmai* from Lao P.D.R. with no exports prior to 2008, but with 25,000 exports in 2009 and 10,000 in 2010. The export numbers of *P. curtus* declined dramatically after the nomenclature changes in 2004, going from 21,167 skins to an average of 1,840 skins in the subsequent 6 years.

The significant increases of exports for the Burmese Python (*P. bivittatus*) were due to a sudden appearance of 29,500 skins from Lao P.D.R. in 2011, a dramatic increase of almost 100,000 from Viet Nam (192,964 skins) and a significant percentage increase from Thailand to 6,373 skins.

The commercial case for these quantities of Burmese Python (*P. bivittatus*) from Viet Nam and Lao P.D.R. still needs to be made. Moreover, all captive breeding and rearing operations should be licensed (including satellite farms), subject to regular inspection and accountability for export volumes. The previously documented discrepancies (Kasterine et al. 2012) of export data from Viet Nam requires further clarification.

Perhaps the most significant single increase of all reported python skin export data was the Reticulated Python (*P. reticulatus*) from Lao P.D.R., which grew from 5,000 skins in 2009 to 20,000 skins in 2010 and 88,000 skins in 2011. Since these figures were all derived from import data, the uncertainty sometimes caused by "permits issued" rather than "actual shipments" in trade does not exist.

More analysis of historical python trade data should be undertaken.

Table 2: Reported global trade in skins of large CITES-listed snakes 1995-2011

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<i>Boa constrictor</i>	38	2		10				40									
<i>Eunectes notaeus</i>	334	68,726	13,000	19,301	6,144	5,359	1,783	2,965	5,954	5,469	5,390	4,196	8,000	1,836	3,983	9,828	211
<i>Python curtus*</i>	57,831	63,629	154,704	115,785	106,865	200,208	161,428	100,684	93,685	122,986	130,587	131,014	85,597	54,664	77,628	61,391	73,931
<i>Python molurus bivittatus</i>	40,920	25,620	47,187	31,432	97,099	120,913	80,778	61,353	82,128	87,982	119,078	156,919	107,012	108,176	68,451	98,143	228,837
<i>Python reticulatus</i>	242,225	358,424	476,637	297,027	373,416	466,829	372,322	357,365	270,763	307,810	347,609	394,934	367,134	416,690	379,580	410,515	501,941
<i>Python sebae</i>	10,289	17,356	17,851	23,910	10,211	22,369	13,586	11,749	1,809	3,086	7,846	9,957	5,814	2,091	2,007	948	
Total	351,637	533,757	709,379	487,465	593,735	815,678	629,897	634,156	454,339	527,333	610,510	697,020	573,557	583,457	531,649	580,825	804,920

Note: *includes *P. breitensteini* and *P. brongersmai*

Table 3: Reported trade in *Python bivittatus* skins, 1995-2011

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cambodia						2,000	20,000*		10,000*								
Indonesia			320			200*		2,671									29,500*
Lao P.D.R.		196	363														
Malaysia	10,500		1	800					94								
Thailand	8,042		15,605*									803	330	110	1,600	1,600	6,373*
Viet Nam	22,378*	25,424*	30,898*	30,632*	97,099	118,713	60,778	58,682	72,034	87,982	119,078	156,116	106,682	108,066	68,451	96,543	192,964
Total	40,920	25,620	47,187	31,432	97,099	120,913	80,778	61,353	82,128	87,982	119,078	156,919	107,012	108,176	68,541	98,143	228,837

Note: *Figure derived from import data

Figure 34: Reported global trade in skins of the *Python curtus* complex 2004-2011

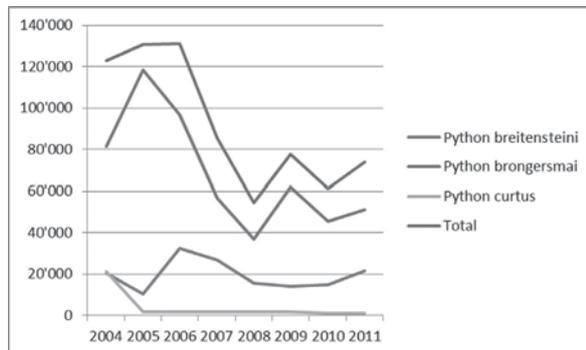


Figure 35: Reported trade in *Python breitensteini* skins, 2004-2011

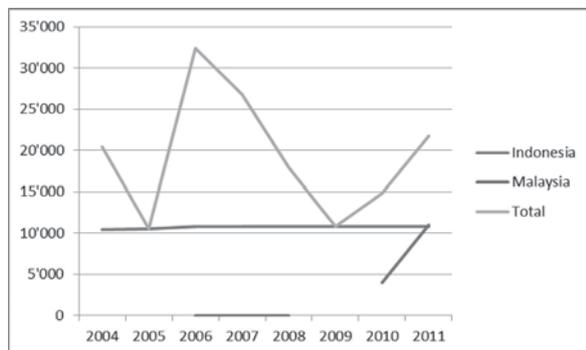
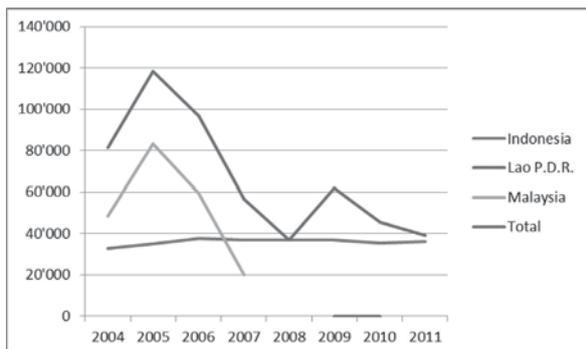


Figure 36: Reported trade in *Python brongersmai* skins, 2004-2011



Timeliness of annual reports submission and the accuracy of the data therein, are paramount in completing realistic estimates of the global trade in skins of the large snakes. Currently, the deadline for annual report submission is 31st October of the year following that in which the trade occurred, but the member States of the European Union are asked to report earlier, by mid-June. Bringing forward the deadline for all Parties should make the data available for analysis much ear-

lier. Parties should be encouraged to report on actual trade rather than simply on the basis of the permits that have been issued as traders often request far more skins than the exporter may have available. If it is not done so already, the CITES Secretariat should be encouraged to advise Parties in June, on behalf of the Standing Committee, that annual reports will be due at the end of October.²⁷

Whether further improvements can be made in the process for CITES Annual Reports should also be considered by the Animals and Standing Committees. An annual trade Study for crocodylians in world trade (IACS initiated in 1982), with independent analysis through UNEP-WCMC and experienced trade data experts, could be a model to be considered. While the funding for IACS is derived from the private sector, the collection, review and analysis is all independently conducted. This is an important point for increased transparency, diversion of trade to legal sources and long term engagement of industry in sustainable sourcing strategies for all reptiles in trade.

Sustainable sourcing strategies

As a complement to improvements in tagging, traceability and CITES Permit and Compliance Systems, the upstream supply chain from high-end tanners, manufacturers and luxury brands could help develop a more pro-active sustainable sourcing agenda that seeks to reduce further losses of biodiversity, mitigate reputational risks and better focus economic incentives to benefit conservation and communities.

A good starting point would be to facilitate an implementation phase, outlined in this Study²⁸ to expeditiously test the implementation of tagging and improve traceability systems as well as expedite implementation of better animal welfare standards and humane killing guidelines. The best ways to advance these priorities are to increase efforts and funding to assist with capacity building and adoption of Best Management Practices (BMP's).

During several high level meetings with industry, UNCTAD, CITES Secretariat and UNEP-WCMC in 2011, a sustainable sourcing strategy was recognized as an essential building block to ...“tackle the loss of biodiversity, create database and reviews of reptile species in trade and develop a Traffic Light System as a simple way to rate and communicate the status of species in trade”. These initiatives, largely developed by UNEP-WCMC also emphasized “...the importance of more

effective engagement of the private sector to tackle the loss of biodiversity and build awareness and educate on its importance.”²⁹

Some of the Chain of Custody Standards and Due Diligence Guidelines recommended by the Responsible Jewellery Council (RJC) could also help provide guidance for improved sustainable sourcing frameworks. But the RJC process is much more complicated, particularly to identify and verify conflict-free minerals, so the guidance may be more conceptual than specific.

Table 4: Reported trade in *Python reticulatus* skins, 1995-2011

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Indonesia	136,241	168,509	188,197	134,090	155,478	156,157	155,330	161,738	153,062	151,479	152,180	151,425	154,703	154,655	154,955	152,997	151,720
Lao P.D.R.	1,020*	294*	294*	59*	351*	100*	2*								5,000*	20,000*	88,000*
Malaysia	79,365	157,115	235,246	137,038	170,016	281,972	189,691	170,127	72,842	121,270	147,472	166,508	113,721	168,787	120,761	105,874	128,639
Thailand	4,387	2,197	10,166*									1,819	756		10	1,176	1,000
Viet Nam	22,232*	29,583*	42,734*	25,840*	47,571	28,600	27,299	25,500	44,859	35,061	47,957	75,182	97,954	93,248	98,854	111,958	124,582
Total	242,225	358,424	476,637	297,027	373,416	466,829	372,322	357,365	270,763	307,810	347,609	394,934	367,134	416,690	379,580	392,005	493,941

Note: *Figure derived from import data

IV. IMPROVE CONSERVATION AND SUSTAINABLE USE FRAMEWORKS

Determining the sustainable level of python harvests will require the collection of trade data (skin size and gender) with more certainty of origin to develop better “adaptive management” frameworks. Most scientists believe a circumstantial case can be made that current python harvest levels (excepting cases of risks to isolated island populations of subspecies) are probably sustainable based on about six decades of harvests with overall average skin size reported by trade at or above 3 meters in length. There is a difference in sustainable python populations and maximum sustained yield (MSY), which requires much more extensive management and scientific basis, but would require much longer term harvest trend data supported by more density, harvest effort analysis and ecological parameters for the diversity of habitats occupied by pythons in South East Asia.

Some low cost and easily implemented assessments could be considered, particularly the mapping and ranking of python habitats. Since the second tier marking of manufactured products could be optional or compulsory it is up to the CITES Parties to decide the issue. This is particularly important to denote protected areas that can serve as reproductive reservoirs, management units (even if only to Provincial areas) which can help determine quota allocations and harvest limitations.

Rather than duplicate an overview of all sustainability issues best documented for the Reticulated Python in Indonesia, the major points are summarized in Annex 7, which is the range State summary of information provided in May 2013 to the Scientific Review Group of EU member States in accordance with their CITES implementation regulations.

Non-detriment findings

Regular forums and stakeholder interactions will improve the frameworks of non-detriment findings in the future. At present, the template from Indonesia³⁰ is a good starting point as an outline for other range States in the region to consider. In addition, further assessment in the following areas would add to more comprehensive analysis of regional python populations, harvest and sustainability:

1. Habitat assessments, particularly of agricultural production areas like oil palm, rubber, coconut and rice culture;
2. Protected areas as important breeding stock reservoirs, particularly those in close proximity to intensive harvest areas;
3. Better understanding of the trend towards more organized catchers (although local households remain a significant part of opportunistic harvest) and the increased use of nets and snares to harvest mostly medium size pythons³¹;
4. A review of concerns that some very large specimens of Reticulated Pythons (*P. reticulatus*) might originate from protected areas as well as the diligent and timely release of specimens under 2.5 meters back to the areas originally collected if feasible;
5. Further research into estimated densities of python populations by habitat type and corresponding annual harvest regimes; and
6. More analysis of size class and gender ratio data available from some stakeholders, even if incomplete as indicators of potential sustainability. A live weight to skin length ratio for each python species also needs to be researched to convert and standardize size data collected from required tagging and reporting systems. The issues of stretching and, in some cases, over-stretching of skins must also be addressed to reasonably harmonize size data for trend analysis and adaptive management size class basis. A morphometric study on the relationship between live snake size and skin size at different stages of processing, taking into account different levels of “stretching” would be a useful tool to assist monitoring.

Annual quotas

The setting of annual quotas is a particularly sensitive and complex issue that cannot be addressed by this Study. A quota is voluntary and not an obligation for Appendix II species and this may result in a difference in the management of species between countries. Some stakeholder input suggested that quotas may need to be mandatory. A quota for Viet Nam similar to the one required for captive bred caimans from Colombia may need to be considered. It is therefore essential to monitor populations to ensure the sustainability of the species and, if a risk is identified, measures need to be quickly implemented. The effective use of quotas must be more thoroughly

Figure 37: Stretched skins drying**Figure 38: Crust skins**

considered. Some experts believe the national quotas are better removed with incentives to report the total harvest (including essential size and gender structure) since anecdotal analysis suggests harvests levels (legal and illegal) may be sustainable. Another point of view is quotas are precautionary restrictions that are necessary to help ensure that harvests do not exceed “sustainability” until better science can help sort out the issue. In between these two points of view are those who consider the complete removal of quotas is unlikely to happen, but some re-evaluation of numbers is justified. From the regional trade perspective any serious discussion of quotas always seems to result in further reductions, which inadvertently increases illegal trade.

Quota proposal discussions begin each August in range States to gather as much stakeholder and scientific input as possible and make recommendations by December at the latest, to establish harvest and export levels for the next year. The next phase of python initiatives should open quota discussions with range States to collectively try to achieve a more workable system that actually delivers the intended results - sustainability confirmation with adequate scientific data on which to base adaptive management options.

It is essential to ensure the involvement of the local communities where their livelihoods are involved and strengthen their organization, support efforts in defining the quotas for all actors, establish prices that involve all the associated costs in the organization of the supply chain and address other issues which could include gender issues.

It must also be mentioned at this point, there is a significant disincentive in range States to accurately report origin, particularly of the Reticulated Python (*P. reticulatus*), within the industry. The demand for raw (dried skins), particularly by high-end tanners who provide of higher quality finishes to exclusive manufacturers, exceeds supply.

Value-added strategies in Indonesia for crust tanning (figure 38) before export are a justifiable strategy to capture more value. However, the reality is not all of the 15 approved regional tanners can consistently provide crust leather to meet the high-end quality demand. Although several European tanners acknowledged the quality of Indonesian crust was generally acceptable, it often required additional special processes that European tanners would have incorporated into the original crust tanning process.

Further consultations with range States, industry representatives and conservation organizations concerned with the administration of quotas and more certainty of sustainability are required. The recommended regional workshops in early 2014 would provide this opportunity.

Some conservative and incremental increases to quotas (particularly in Indonesia) could be considered if linked to improved traceability, enhanced legal trade and dedicated funding to improve python research, management, enforcement, compliance, trade monitoring and conservation education. From the industry side, more technical expertise to help improve consistency of crust leather from regional tanneries could be part of a progressive strategy to support a balance

between dried skin (figure 37) and crust leather exports. The goal would be to remove some of the illegal incentive for dried skins while balancing and respecting range State initiatives for value-added incentives to benefit conservation and enhance the livelihoods of communities.

IUCN/SSC Boa & Python Specialist Group

In addition to follow-up stakeholder meetings to complement CITES, UNCTAD and range States as well as other initiatives, an important forum for discussions could be the IUCN/SSC Boa & Python Specialist Group (BPSG). BPSG could become a regular forum

for dialogue, discussions and balanced collaboration between scientists, range States and industry to ensure better protection, develop strategies on sustainable use and economic incentives to benefit conservation and communities. This initiative might begin with a first working meeting (perhaps Argentina with the model Yellow Anaconda Management Program might provide a suitable venue) with a strategic plan to hold similar conferences in other global venues, particularly in South East Asia. Assistance from dedicated funding is a key to establishing and sustaining such pro-active efforts to better protect and, when justified, sustainably manage snakes as well as other reptiles in the future.

V. ENHANCE COMPLIANCE AND ENFORCEMENT

Marking and improved traceability systems are the most important ways to enhance compliance and enforcement. Suggested improvements for shipment declarations and marking manifests for all transport of skins within a range State, as well as the point of export can effectively limit the smuggling of some illegal skins in shipments of legal exports. However, direct illegal shipments are more likely to be the larger problem.

Estimated illegal trade is significant (based on Kasterine et al. 2012, of up to 50%) and efforts are needed to combat it, including enhanced **monitoring and enforcement**, as well as collaboration among industry actors. For example, if major tanneries collaborate to help ensure no untagged skins are converted to leather then range State tagging requirements are substantially supported and additionally verified in importing countries. Also, cooperation and participation from traders as well as feedback on how to overcome illegal trade is essential. Options to address illegal trade include stronger enforcement measures and the adoption by the legal trade of a strong system of marking. The marking of all python skins in trade establishes a better foundation to distinguish a legal from an illegal skin at all points in the supply chain.

The use of Designated Ports to help centralize shipment verification and inspection duties of wildlife enforcement personnel are widely used in importing countries to help concentrate compliance resources. Indonesia has a Designated Port framework since only 15 licensed tanners are authorized to export. Malaysia

has only three peninsular ports (Kuala Lumpur, Johor and Penang), as well as Sabah as primary exporting or importing ports. Singapore, as the primary re-exporting country, is a major Designated Port with only two primary border crossings from the Malaysian Peninsula. Viet Nam exports all python skins from Ho Chi Minh City in the south and Hanoi in the north.

In general, more concentrated inspections are needed, particularly based on enforcement intelligence that helps maximize limited resources. Regional enforcement strategies that better collect information on illegal trade from a variety of sources (public sector, private sector, uniformed and undercover personnel) are needed. This information could be shared and exchanged through a two-way clearinghouse approach which would complement the enhanced range State enforcement efforts.

The ASEAN-WEN (Wildlife Enforcement Network) system is tailor-made to assist with a more focused regional python compliance effort. The CITES Secretariat Enforcement Unit could help coordinate enforcement efforts. Additional ideas like the “Flying Squad” concept from Malaysia, which utilizes experienced enforcement officers with more expertise in complex investigations to support local officers who may initially find an illegal trail, but lack time, resources and expertise to follow-up on extended investigations could be taken into account. Again, Dedicated Funding and Capacity Building to support these kinds of enhanced compliance techniques are necessary, along with ongoing in-service training, necessary tools (ID manuals and new forensic techniques, among others) and support from the judicial system (prosecutors, judges and others) to better understand both the international implications of non-compliance as well as loss of range

Figure 39: Burmese python with clutch



Figure 40: Retained egg shells from Viet Nam snake farm



State revenue and broader benefits to livelihoods of local people.

In particular, the licensing and regular inspections of those authorized to receive tags and be accountable for implementing improved traceability systems is crucial. When each range State determines which step in the value chain for the first marking of the snake skin will take place, better recommendations on the specific requirements for reporting and verification may be made. In Indonesia and Malaysia, processing facilities (slaughterhouses), collectors (dealers and brokers) and tanneries must all be subject to these requirements (and largely are now). In Viet Nam, the satellite farms should be registered and inspected, and the supply chain confirmed to the “Parent” farm they supply. For instance, the collection of empty egg shells (figures 39 and 40) that is taking place now in 2013 to help confirm stocking levels is a step in the right direction. Nevertheless, a more intensive review of the commercial case for the volumes and sizes of python skin exports needs to be undertaken. The “Captive Breeding Assessment Report” now in draft by the BPSG will be in a better position to make more specific recommendations on these issues.

The use of scale clipping or other systems (morphometric diagnostics) have been used to help differentiate other captive-reared reptiles from wild stocks.

However, the most practical method to mitigate the effects of laundering on wild populations may be a limitation on skin size exports.³² Since one year grow-out python skin sizes range from 1.6 to 2.2 meters (average 2 meters), with approximately one meter per year growth in subsequent years,³³ a reliable range of sizes by year class is possible. A nominal percentage for expired breeding size adults ensures farms can justify some larger size skins, provided the breeding stock register is also reduced accordingly.

An assessment of captive-breeding farms and related subjects could be ably addressed by members of the IUCN/SSC BPSG. But the significant increase in total trade of Reticulated (*P. reticulatus*) and Burmese (*P. bivittatus*) pythons from 2010 to 2011 raises further questions about the source of these skins, the reliability of their origins, the level of captive breeding, laundering concerns and use of false declarations on CITES permits. These issues should be promptly and directly addressed in concert with marking and improved traceability options (including stockpile inventories).

Again, marking and improved traceability options cannot be fully effective and efficient if those involved in mis-declarations of origin or laundering of wild skins through captive breeding or smuggling operations are not interdicted and isolated from the core legal trade.

VI. ENHANCE CAPACITY BUILDING

One of the best ways to improve capacity building for research and management is for international researchers to include local biologists and scientists in the development of their studies on population, densities and ecological dynamics of python populations. In both Indonesia and Malaysia, there were administrative and field representatives of the Management Authority and Scientific Authorities who expressed a specific interest during this Study to focus their continuing education on pythons and other reptiles. A combination of dedicated funding and matching industry funding could help provide reasonable grants to help underwrite local participation between the international community and range States. This also encourages

“local champions” to further the case of sustainable use and strategies necessary to ensure subsequent generations also benefit from renewable natural resources. The best and most effective conservation is community-based.

Suggestions for enforcement and compliance capacity building as well as CITES Annual Reports and trade monitoring improvements were previously summarized. The need is not so much for more ideas to enhance capacity building, but to actually start developing and implementing Best Management Practices, which covers a wide range of improvements to research, management, enforcement, compliance, trade monitoring and animal welfare standards. Parties to CITES consulted for this Study consider that this will improve, help sustain and provide real benefits to conservation and communities.

VII. ENCOURAGE STAKEHOLDER ENGAGEMENT

The CITES Standing Committee established a snake trade and conservation management Working Group following the 15th meeting of the Conference of the Parties (CoP15, Doha, 2010) to implement a number of decisions relating to snakes. Following the Standing Committee's reporting at the 16th meeting of the Conference of the Parties (CoP16, Bangkok, 2013), the Parties adopted a range of new decisions, including calls to the Animals and Standing Committees for the development and implementation of a traceability and marking system for snake skins. The Standing Committee decided to renew its working group on snakes after CoP16 with the same membership (including Governments, IGOs, NGOs and the private industry) and Chair (Switzerland) as before. The Standing Committee's Snake Working Group is to support the implementation of the CoP16 decisions relating to snakes. The Standing Committee will examine and make recommendations on traceability issues on the basis of scientific work and analysis conducted by the Animals Committee. The CITES Snakes Working Group should serve as a regular forum, with the support of UNCTAD and CITES Secretariats and in coordination with others (IUCN/SSC BPSG, RESP, BSR, etc.), for dialogue, discussions and balanced collaboration between scientists, range States and industry as an integral part of developing better protection, management, sustainable strategies and conservation education of large CITES Appendix II-listed snakes.

This UNCTAD/CITES Study endeavoured to constructively engage as many stakeholders as possible in issues facing the python and other reptile trades. The Study was intended to be the beginning, not the end, of a more focused and on-going effort. Specific suggestions for improved stakeholder engagement include:

1. UNCTAD, CITES and industry sponsored regional workshops to continue the dialogue and discussions on ways to enhance the traceability, sustainability and animal welfare concerns of the python and reptile trades;
2. Continuation of an Annual Trade Monitoring Study of large CITES-listed Snakes in Trade, as well as reconsider the Sustainable Sourcing Recommendations outlined by UNEP-WCMC;
3. Development of the IUCN/SSC Boa & Python Specialist Group (BPSG) into a regular forum for scien-

tists, range States, regulators and trade interests to complement the work of UNCTAD, the CITES Secretariat and Snake Working Group for continuing dialogue, discussion and collaboration on conservation as well as sustainable use issues;

4. A constructive industry forum for the exchange of ideas throughout the supply chain is needed. It should include all actors from range States, regional trade, manufacturers, luxury brands and retail;
5. Regular meetings and consultations with tanners and trade group representatives like UNIC (Unione Nazionale Industria Conciaria or National Union of the Tanning Industry), Italy; JLIA (Japan Leather Industries Association); and other groups in Spain, China, Mexico and other python importing and range States. Regional regular meetings with IRATA (Indonesian Reptile and Amphibian Trade Association), SRSTA (Singapore Reptile Skin Trade Association) and other trade associations would help maintain continuing engagement of stakeholders;
6. Continued research and engagement with experts in the animal welfare field, particularly the Expert Panel on Humane Killing of Reptiles convened by Switzerland which has submitted its report to the OIE (World Organization for Animal Health) as an international standard on the subject.

Industry stakeholder initiatives

Collaboration between the private sector, NGO's and INGO's would be an important step forward for stakeholders to explore different ways of overcoming concerns linked to sustainability, illegal trade and animal welfare.

An example of such an initiative is the one that Kering (along with one of its largest luxury brands, Gucci) is launching with key international experts. Kering, ITC and IUCN BPSG are collaborating in a pioneering partnership to develop a program of research (known as the Python Conservation Partnership) that will contribute data and recommendations to improve the trade along four main themes:

- Monitoring wild harvest and improving NDFs;
- Differentiating between captive-bred and wild animals;
- Developing the highest standards of animal health and welfare (through input from experts at the EcoHealth Alliance); and
- Better understanding the impacts of the python trade on local livelihoods.

Goals of this program include contributing to the

CITES process and making data and research findings available to all stakeholders to improve management across the trade.

Information gathered from these projects would assist Parties to CITES, range States, conservation groups, industry and other interested stakeholders, in the im-

plementation of several recent Decisions by the Parties to CITES concerning the snake trade at the 16th Meeting of the Conference of the Parties in March 2013 and make an important contribution to ensuring a sustainable, legal and traceable international trade in python skins.

VIII. DEDICATED FUNDING

Dedicated funding is a key element that will enable and sustain most future initiatives on traceability and sustainability issues related to python and python skins. Considering the scope and complexity of priorities needed to enhance the marking, traceability, sustainability, conservation education and humane treatment of pythons in trade, downstream industries should consider contributing dedicated funding levels equal to those collected at the range State level to establish a “Python Resource Fund” (PRF).

An assessment per skin could be proportional to participation and related to the benefit received for each stakeholder. The structure, oversight and administration of the PRF could be part of a wider Public-Private Partnership (PPP) or an integral part of a broader sustainable sourcing initiative intended to provide further support to the CITES government to government certification process. Follow-up discussions on these options among the private sector and governments would be useful to support the next phases of python initiatives, as well as directly enhance traceability, sustainability and other options presented in this Study.

It must be noted, most of the original efforts to downlist and sustainably manage crocodilian programs were reasonably funded to meet non-detriment findings (NDF's), ranching or quota criteria. But only two of those crocodilian programs maintained the dedicated funding sources over time to ensure monitoring programs, research, management, enforcement and trade data were maintained. The Louisiana Alligator Program has been the most consistent, with annual inputs to monitoring priorities enabled through a US\$4 per skin assessment at export to fund the programs. The involvement of the local community is essential to ensure sustainable use of the species, which is part of their culture as well as important source of local revenue.

Another example of a long term dedicated funding programme is that of crocodilians in Papua New Guinea (PNG), with a dedicated funding source based on 5% of a skin's export value and part of the proceeds committed to monitoring populations, management and enforcement efforts. “...Papua New Guinea developed ranching as a standard management option for their crocodiles (*Crocodylus porosus* and *C. novaeguineae*) before CITES came into force in 1975. When Papua New Guinea joined CITES (1976) and

the two species were listed on Appendix II, the ranching program continued without change.”³⁵ Sometimes the challenge in Papua New Guinea is to annually finance some of the crocodilian monitoring activities when other priorities like education, infrastructure and healthcare needs stretch all available resources.

Wildlife (species or habitats) conservation and environmental concerns have a very difficult time worldwide competing with all other sovereign interests for essential funding. Too often the extraction of natural resource values is not adequately underwritten to ensure control, management and sustainability. That is one reason the PNG dedicated funding of 5% was allocated as 2% for general revenue duty and 3% for monitoring. Still the competition remains for scarce financial resources, but the concept of “annual inputs and investment into the sustainable use of natural resource” is a valuable component of long term sustainability.

While all three python range States visited collected some form of revenue based on skin exports, the proceeds went into general revenue funds, either at the national or province level, and were then subject to annual legislative budget appropriation priorities. This is understandable from the perspective of local and national Government, which see the allocation of limited resource as a provincial or national function, that is, while the resources are derived from a particular community they are considered a shared national or provincial resource.

Both Malaysia and Indonesia are currently considering further increases or reallocation of income from the python trade. Serious consideration should be given to achievable earmarked funds for annual inputs to monitoring activities. Viet Nam had a 5% export assessment on python skins during this Study, but it was repealed on October 4, 2013 according to the Ministry of Finance Circular 116/2013. Considering the need for licensing, inspecting and reporting of the Vietnamese supply chain (including satellite farms), it might be worth reconsidering the repeal in favour of a similar split between import duties (general revenue) and monitoring activities (earmarked for annual inputs previously listed). A similar approach by Indonesia, Malaysia and other python range States could help establish and better fund a regional network for improved traceability and sustainability in South East Asia.

The Yellow Anaconda (*E. notaeus*) from Argentina provides a similar model for dedicated funding. This

Table 7: Anaconda Program benefits partitioning on a US\$ 50 skin price basis

Program actor	US\$	%
Provincial and export taxes	2.1	4.2
Program running costs (NGO)	7.4	14.8
Hunters and local buyers	6.7	13.3
Stockpiling logistic expenses	3.1	6.2
Total expenses per skin	19.3	38.5
Exporters income	30.8	61.5

Source: Information provided by Mr. T. Waller, Director of Conservation, Fundación Biodiversidad, Argentina, on 3 June 2013.

model is economically structured by Government, exporters, hunters, local buyers and the NGO in charge of the technical/scientific programme. The benefits are distributed among these mentioned actors. The gov-

ernmental sector receives 4.2% of the benefits, while Programme technical activities receive 14.8% and local buyers and hunters 13.3%. Externality compensation and community devolution by the private sector accounts for approximately one third of the international value of a skin.

From the industry side, the development of a “Python Resource Fund” could provide increased annual funding on a proportional basis from the downstream supply side chain of manufacturers, luxury brands and retail. Some of those funds could be allocated as “matching funds” to range States for specific projects (research, management or enforcement grants) that could improve the traceability and sustainability of pythons and eventually other reptiles in trade. The use of matching funds by industry could help encourage range State priorities for python research, management, enforcement, compliance, trade monitoring and conservation education.

IX. EQUITABLE COST AND BENEFIT SHARING

An important benefit for python stakeholders would be the adoption of suitable dedicated funding levels from range State and the private sector matching fund previously mentioned in this Study. In addition, the balance between dried skin availability and value-added crust tanning (currently about 10% more value) should be evaluated.

A direct incentive for more legal trade could be a premium to South East Asian suppliers who abided by a supply chain code of conduct (perhaps administered through regional trade associations) to help ensure transparency, compliance, accurate reporting and co-operation with CITES Management Authority to deter illegal trade in favor of more value for legal skins. Importing stakeholders could complement those range State efforts through increased diligence to confirm origins and help further deter false declarations.

Figure 42: Python meat processing operation



Figure 43: Dried python meat



Figure 44: Drying kiln for python meat



Figure 45: Weighing and packing python meat for export



The distribution of values through a supply chain typically favors those who consolidate the resource (volume) which increases negotiating leverage for fair market value. For instance, in the trade of other reptile skins such as crocodilians, this is accomplished by large production farms, associations of smaller producers or cooperative sales of either farm, wild or both productions. Developing long term relationships with upstream stakeholders will ultimately help guarantee reasonable fair market prices throughout the supply chains.

The value-added benefits of local and regional manufacturing operations in South East Asia were previously noted in this Study. This strategy not only adds value to the resource but directly enhances the livelihoods of participants whether they are involved in the tanning, manufacturing or retail segments of the value chain. The creation of skilled labour jobs and commensurate wage increases are important socio-economic factors in South East Asia. For instance, the important link between reptile skin or leather values between range States and importing countries should be better recognized, particularly in relation to local livelihoods and benefit sharing.

The market for python gallbladders used in traditional medicine was noted across the region for both domestic use and export. The production of dried meat (figures 42, 43, 44 and 45) for export was more advanced in Malaysia and significant local use of python

meat in the Sabah Province was reported. Malaysian slaughterhouses reported receiving about US\$0.20/kg for carcass meat, but the drying and packing facility visited declined to offer export values which were primarily destined for Chinese markets. However, they did confirm that a 3m carcass would yield about 50% meat to thinly slice and smoke (drying in charcoal fire kilns) and that dried gall bladders could bring US\$400 to US\$450/kg. Viet Nam snake farms reported from US\$20 to US\$30 additional revenue (per carcass) could be produced from the values of meat and gallbladders. This is significant additional value, considering current crust tanning only adds 10% to raw skin value.

The applicability of this Study to the trade of other reptiles is direct if applied to other large snakes such as the African rock python (*P. sebae.*), the Boas constrictors (*Boa constrictors spp*) or the Anacondas (*Eunectes spp.*). For smaller, less valuable reptiles like lizards and medium size snakes (whips, water and others) the cost/benefit of direct marking is questionable. But the development of standardized methods of monitoring and collecting data on other reptile skins (Adaptive Management Options), annual trade monitoring of volumes, origins, exporters and importers, and refinement of sustainable sourcing guidelines (including species reviews) and a traffic light system to denote relative risk of trade in various species) offers significant opportunities to sustainably manage trade issues of other reptiles.³⁶

X. ANIMAL WELFARE AND HUMANE KILLING GUIDELINES

The report coordinated by Switzerland from an Expert Panel on the Humane Killing of Reptiles³⁷ could be the basis for improving harvest methods used in the python trade. Specifically, the use of decapitation (without pithing) or suffocation should be replaced with a more humane recommended method, such as “A blow to the head with a hard implement (...)” particularly if administered through an improved system illustrated in Kasterine et al. 2012. A more immediate and complete destruction of the brain is achievable, even

in the field, if those who administer the blow know the python brain is centered between the eyes, rather than located toward the back of the head.³⁸ This is an important topic to include in the priority regional workshops suggested in this Study.

The Viet Nam CITES Management Authority conducted a meeting with slaughterhouses on September 13, 2013 and encouraged them to use brain destruction (with a blow, captive bolt or electrical stunning device), although it may take time to reach a consensus and change the use of the current method.

This Humane Killing Report has been submitted to the OIE (World Organization for Animal Health) for consideration as an international standard for the humane killing of reptiles.

XI. CONCLUSIONS

The challenges facing the trade in python skins may or may not be a watershed moment for the international community to better understand that people conserve what they care about and benefit from, particularly if it becomes a part of their community culture and generational heritage. The leaders, policymakers, industry and other stakeholders must eventually better understand, and are increasingly doing so, that the capital value of natural resources and ecosystems cannot be continually extracted without re-investing some part of it into the protection and management of renewable natural resources. At least not without a future massive loss of biodiversity, the habitats species depend upon to survive and the often neglected recognition of natural values to communities and civil society.

The other side of the conservation conundrum is the point of view that "...only a reptile should wear a reptile skin..." or that trade in wildlife products is "...morally wrong and offensive." The sentiment of wildlife appreciation for its own sake rather than usefulness to others is a valid viewpoint. So is the sustainable use viewpoint that economic incentives can be leveraged to benefit conservation (ecosystems) and communities (local people and cultures). The unfortunate truth arising from decades of experiences in the wildlife field is that "...the only problem with Mother Nature is Human Nature..." so the greater challenge is to find the right balance between commerce, conservation and communities.

Taking the above into account, pythons and other large snakes may share the same opportunity as the alligator's "Marsh to Market" story to bring more public understanding of economic incentives to commerce, conservation (ecosystems) and communities (local people and cultures). It was interesting that Indonesia has Provincial policies to protect at least 30% of

Figure 46: Secondary forest oil palm plantation in Indonesia



forested land and buffer as much of the surrounding land as possible into secondary forests. If an analysis is available on remaining natural lands in the European Union or United States, it would be interesting to know just how much conservation of habitats in developed countries compares to some of the developing countries who are facing the challenges of population growth, rapid economic development, infrastructure, education and health care needs.

The python skin trade will not solve these problems but it can help illustrate the balance and reinvestment necessary to be better stewards of wildlife and habitats they need to survive. The key to maintaining the python and habitats is to ensure the trade is legal, sustainable and verifiable (traceable and independently monitored) with benefits to commerce (economic incentives), conservation (ecosystems) and communities (local people and cultures). The most important task for the python range States and actors in the supply chain is to better implement marking and traceability options as soon as possible, including those offered in this Study.

XII. KEY FINDINGS AND NEXT STEPS

Marking and traceability system

Two-tier system

There is emerging consensus among South East Asian range States of *python* spp., the representatives of the private sector that were contacted in the course of the Study, as well as in discussions held on the Study, for the need to mark all python skins that are commercialized.

Amongst the same stakeholders, consensus also emerged on the establishment of a two-tier marking system with a first marking phase from dried skins to finished leather, whether intended for the national or international market (i.e. from range States and exporting countries to countries where the skins are tanned and finished); and a second marking phase from the importing countries with tanneries to manufacturers where the skins are made into leather products and retailed. This marking system in this second phase would involve the tanned leather and resulting leather products. The marking technology applied to tag skins in the first phase, and the marking tools used in the second phase could be different, but would need to be compatible and able to merge into a seamless skin-to-leather goods traceability system. From a regulatory perspective, the first tier would be mandatory for all the countries involved, while the second tier could be either optional or compulsory, depending on the decision by Parties to CITES.

The preference for a two-tier marking system was also based on the development of local manufacturing operations in South East Asia as a further value-added strategy resulting in increased wages for both apprentices and craftsmen.

There were different views on workable techniques and solutions to mark leather and manufactured products in the second phase amongst the stakeholders that were consulted. Italian tannery representatives, for example, were concerned about additional administrative and practical burdens of new traceability requirements.

Marking systems for phases one and two

Several initiatives are being undertaken to enhance the traceability of python skins and their derivatives in

international trade. Those examined for the purpose of this Study are the following:

- Barcoded or serially numbered tags
 1. Button style
 2. Loop style
- RFID tags
 1. All4Retail
 2. VCC

Considering the information available, a barcode button style tag might be preferable.

If the suggested barcode button style tag were not currently available, consideration should be given by range States, Singapore and CITES Animals Committee and Standing Committee to a serially numbered tag that is readily available, similar to the crocodilian skin tag used in Colombia. Most of the tags currently used on other reptile skins, such as crocodilian skins, are serially numbered rather than barcoded (about 1 million out of 1.3 million crocodilian skins per year are marked with serially numbered tags). This could be useful if all python skin stockpiles in South East Asia are inventoried by the end of 2014. An export sticker similar to the one currently used in Indonesia could be formatted with a sticker barcode similar to those currently applied to *Caiman fuscus*. The combination of a serially numbered button style tag and barcoded export sticker could provide a reasonable bridge to expedite stockpile inventories as soon as possible as well as maintain a secure traceability system.

Supply chain and points of marking

Along the supply chain, a first tier marking would apply from the supplier or domestic tannery in the country of origin to the tannery in the importing country. The first tier tagging would be overseen by CITES Management Authorities.

The second tier marking would be applied from the level of the importing country tanneries to the retail outlet. The technology would be applied to tanned skins and the finished products made from them, and be implemented voluntarily at the requirement of the private sector or compulsory if required by Parties to CITES.

Other traceability issues

Stockpile inventories

Considerable stockpiles of python skins are being held in several South East Asian countries. For a traceability system to work correctly, it will be important to inventory and mark all these skins.

The representatives of the private sector in Asia that were consulted during this Study agreed that all stockpiles of python skins in South East Asia could be inventoried. The inventories should be conducted by the relevant national CITES Management Authorities with the results kept confidential and maintained as an account based system of stockpiles.

Skinning instructions

Skinning instructions to deter stockpiling have been successfully used in Argentina for a model management programme for yellow anaconda. The Yellow Anaconda Management Program (YAMP) also requires tagging, licensing, reporting and enhanced accountability. If the above stockpile inventories could be completed and all python skins marked in 2014, skinning instructions may not be required as part of the management and compliance program.

Complementing the CITES permitting systems

Improved traceability and diversion of trade to legal sources are essential to support and underscore the credibility of the CITES permitting system. In general, CITES export permits should be issued by the Management Authority closest to the origin of python skins. A regular protocol for facility inspections, reviews of inventory reports and other compliance requirements should be a part of best management practices.

The issues and options of setting national quotas should be carefully reviewed to consider ways to more effectively monitor harvest (origins), collect scientific data (skin sizes and gender) and provide more incentives for legal trade and enhanced values for local communities (livelihoods).

Improve conservation and sustainable use frameworks

Non-Detriment Findings

For international trade in specimens of *python* spp. to take place in compliance with CITES provisions, the specimens should be legally sourced; exports should not be detrimental to wild populations of the species concerned – i.e. should be sustainable –; and international trade should be traceable and enforceable (inspections and stockpile inventories) through a system of permits and certificates, and associated reporting. The Preamble to CITES Resolution 12.3 recognizes that the issuance of CITES permits and certificates

serves as a certification scheme for assuring that trade is not detrimental to the survival of species included in the Appendices.

Research that would provide robust Non-Detriment Findings (NDF's), allowing exporting range States to ascertain sustainable levels of off-take and export, as well as the implementation of associated Adaptive Management Strategies (AMS), would be enhanced through the collection of skin size and gender data as part of the improved traceability system.

Enhance compliance and enforcement

All stakeholders consulted, from Governments to private business, IGOs and NGOs agreed that the shared goal should be trade in python skins that is legal, sustainable and verifiable (traceable and independently monitored) with benefits to commerce (economic incentives), conservation (ecosystems) and communities (local people and cultures).

Compliance could be further improved through the use of transport documents (with tag number manifests), shipping declarations, electronic reporting, designated port inspections, enhanced enforcement techniques, specialized enforcement training, equipment and the development of inspections and investigations units to conduct task force priorities to interdict and mitigate illegal trade. Outreach and awareness of the judicial system, prosecutors and other enforcement agencies should emphasize the loss of revenue to range States and reduced value to local livelihoods and communities. The most important ingredient for success is for the Parties to CITES and the private sector to put a high priority on traceability and sustainability issues with timely consequences for non-compliance.

Illegal trade impacts

Improved tagging and traceability systems can assist but not overcome false declarations of origin, laundering of wild skins or direct smuggling if enabled by entrenched interests. Range State compliance issues had less to do with regulatory frameworks (which were generally comprehensive) but related more to compliance monitoring and interdiction of illegal trade. It is important to be clear that a good marking and sound traceability system can only provide the foundation for compliance. The management, enforcement and institutional frameworks to ensure legal trade is not detrimental to the survival of the species requires a combination of capacity building, best management practices and dedicated funding to be successful.

The ASEAN-WEN could greatly assist range State's enforcement efforts and a regional task force approach should be considered to interdict illegal trade.

Enhance capacity building

Capacity building and best management practices are essential building blocks to enhance research, management, enforcement, compliance, trade monitoring and conservation education. Engaging local biologists and scientists in research questions related to sustainable production systems is an important step to encourage managers and local communities to engage in sustained use strategies. Dedicated funding to ensure annual inputs for research (scientists and biologists), management (Management and Scientific Authorities), enforcement (port inspectors and task force investigations), compliance (facility inspections and report reviews), trade monitoring (CITES trade database annual report studies) and conservation education, as well as a marsh to market story explaining sustainable trade benefits to commerce (economic incentives), conservation (ecosystems) and communities (local people and cultures). A combination of range State revenue (up to 5% of skin export value) and a matching program, for example, a python resource fund, would expedite both capacity building and the development of best management practices.

Encourage stakeholder engagement

The CITES Snakes Working Group should serve as a regular forum, with the support of UNCTAD and CITES Secretariat and in coordination with others (IUCN/SSC BPSG, RESP, BSR, etc.), for dialogue, discussions and balanced collaboration between scientists, range States, conservationists and industry as an integral part of developing better protection, management, sustainable strategies and conservation education of large CITES Appendix II-listed snakes. The range State workshops recommended for early 2014 (before CITES Animal Committee meeting in April) and a proposed working meeting of the BPSG later in 2014 would help ensure that dialogue and collaboration by all stakeholders would continue.

Dedicated funding

Dedicated funding options are essential to better finance sustainability and traceability options. The Louisiana alligator and Papua New Guinea crocodile program approaches for duties and monitoring revenue

are examples to be considered. Industry should also consider the creation of a python resource fund to proportionally support and partially match range State efforts for enhanced traceability and sustainability. A starting point for discussions on funds needed from both range State revenue and industry matching programs was previously presented in the capacity building section above.

Recommend equitable cost and benefit sharing

Economic incentives for legal trade, value-added tanning and manufacturing options, more development of meat and by-product markets, as well as recognition of "skin and leather values" in order to promote an equitable sharing of benefits are important ways to enhance equitable cost and access benefit sharing. An industry matching fund program with range States to expedite capacity building and development of best management practices should be an immediate priority. Economic incentives to encourage legal trade should be implemented and the current disincentives for legal trade represented by the imbalance between demand for dried skins and crust leather should be addressed.

Animal welfare and humane killing guidelines

Humane Killing Guidelines from the Swiss led Expert Panel Report should be implemented as soon as possible. The OIE should be encouraged to consider these guidelines as an international standard as soon as possible and range States should incorporate guidelines into their best management practices. Industry and governments could help expedite this process by providing funding assistance.

Next steps

- Continue testing the available traceability systems to gather more data and to inform the CITES process.
- Explore collaboration options with all stakeholders, such as public-private partnerships, in order to implement initiatives addressing issues such as tagging, stockpiling, sustainable sourcing, monitoring, animal welfare and dedicated funding issues.
- The option for range States to initiate national legislation or regulations to require all python skins in trade to be tagged by 2015 and for all stockpiles of

python skins be inventoried and tagged by the end of 2014 should be promoted and considered.

- A series of workshops should begin as early as possible in 2014 for the next phase of python skin initiatives to further address tagging and traceability frameworks, stockpile inventories, sustainable sourcing guidelines, enforcement, compliance, trade monitoring, dedicated funding, capacity building, best management practices and animal welfare issues, particularly the findings of the Expert Panel on Humane Killing of Reptiles Report. These workshops should target all interested stakeholders, including governments of range States, CITES Management Authorities and interested representatives of the private sector. The workshop reports should be submitted to the CITES Secretariat for submission to the Animal Committee in April 2014, to complement other studies and reports being considered.
 - A report on World Trade in Skins of Large CITES-Listed Snake Species 1995-2011 was completed as part of this Study. It should be continued at least through CoP17, 2016 to provide the best historical trade data for the previous 20 years (1995-2015). Consideration should be given to expand this trade Study to a “Global Reptile Trade Study” in the future.
 - The Sustainable Sourcing program developed by UNEP-WCMC in 2011 should be reconsidered, particularly the concept of species reviews and a “Traffic Light” system to simply communicate the status of species in trade to industry participants and others. UNEP-WCMC should be encouraged to consider simple ways to communicate information derived from the CITES trade and species database that it maintains on behalf of the CITES Secretariat to the industry and other stakeholders. The development of a data portal with species reviews has been suggested. Also a further review of options to expedite electronic reporting of tagging and traceability data should be considered to move towards a real-time exchange of data between exporting and importing countries. Options for electronic permitting should also be considered.
 - A “Marsh to Market” story to better educate consumers and the public about sustainable benefits to commerce (economic incentives), conservation (ecosystems) and communities (local people and cultures) is needed.
 - A more comprehensive commercial case for the levels of captive-bred python skins reported in trade needs to be made, particularly in Lao PDR and Viet Nam. This would warrant surveys and monitoring of the python breeding operations in South East Asia. A CITES mission to South East Asia should be considered to address all issues that affect the issuance of permits and certificates which serve as the basis of the intergovernmental certification process.
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ANNEXES

Note: The Annexes, as listed below, can be downloaded at: <http://www.biotrade.org/Resources/Publications/Annex%20to%20Study.pdf>.

1. UNCTAD Briefing Report June, 2013 in Geneva.
 2. Analysis on humane killing methods for reptiles in the skin trade, Switzerland 2013.
 3. CITES List of Approved Tag Manufacturers.
 4. Soft Tag RFID.
 5. USFWS 3-177 form.
 6. J. Caldwell Python; *World Trade of Large CITES Listed Snake Species*.
 7. Executive Summary from Indonesia, May 2013.
 8. UNEP-WCMC List of Reptile Species In Trade.
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Notes

- 1 Consensus was reached amongst the stakeholders present in the meetings carried out during the course of this Study.
 - 2 Prepared for UNCTAD by Webb, Manolis and Jenkins (2012).
 - 3 Prepared for the International Trade Center (ITC) by Kasterine (ITC), Arbeid (Consultant), Caillabet (TRAFFIC) and Natusch (IUCN/SSC BPSG) (2012).
 - 4 Indonesia, Italy, Malaysia, Singapore, Sri Lanka, Switzerland, the United States and Viet Nam.
 - 5 Direct contributors included: Gordon Choisy, Cartier, Kering/Gucci, Vertu, the Swiss Federation Horlogère and Responsible Ecosystems Sourcing Platform.
 - 6 See Annex 1, published on-line only at <http://www.biotrade.org>.
 - 7 Kasterine, A., Arbeid, R., Caillabet, O. and Natusch, D.; (2012) *The Trade in South-East Asian Python Skins*, International Trade Centre, Geneva.
 - 8 See Annex 2, published on-line only at <http://www.biotrade.org>.
 - 9 The CITES principle of sustainability entails ensuring that the exploitation of a species in international trade is not detrimental to its survival in the wild.
 - 10 The CITES principle of legality entails that the species is in conformity with the non-detriment findings (NDF's) of the scientific authority of the state of export and satisfies the management authority of the state of export that the specimen was not obtained in contravention of the laws of the state for the protection of fauna and flora.
 - 11 With this principle, CITES seeks to ensure that products originating from biodiversity can be easily traced back to their origins.
 - 12 Based on presentation by Mr. Ralph Arbeid at the UNCTAD/CITES Round Table on Traceability Systems at CITES COP 16 on 12 March 2013.
 - 13 See Chapter II.
 - 14 This was expressed at UNCTAD/CITES Round Table on Traceability Systems at CITES CoP 16 and consultations conducted with range States and other stakeholders at CoP 16, and subsequently during the course of the preparation of the Scoping Study.
 - 15 Indonesia established a harvest quota of 90% for export and 10% for domestic purposes. See Annex 7: Indonesia Scientific Authority and Management Authority, May, 2013 report.
 - 16 See Kasterine et al. 2012.
 - 17 Point expressed by Dr. Nandang Prihadi, CITES Management Authority, Indonesia, during the UNCTAD/CITES Round Table on Traceability Systems at CITES CoP 16 on 12 March 2013.
 - 18 The risk of counterfeit tags was discussed. CITES has a mechanism to handle this and the tag manufacturer should be taken from a list of CITES approved tag manufacturing companies that report to CITES on tags used and by whom. Reporting can also provide information to identify illegal trade as for example if two tags are used twice.
 - 19 Source: All4Retail.
 - 20 Near field communication, a technology allowing the short-range wireless intercommunication of mobile phones and other electronic devices. Source: <http://oxforddictionaries.com/definition/english/NFC>.
 - 21 This entire section on skinning patterns was provided by Mr. Tomás Waller on 3 June 2013 as a contribution to this Study. Mr. Waller is the Director of Conservación, Fundación Biodiversidad, Argentina.
 - 22 Formerly with UNEP-WCMC and primary author of the annual International Alligator Crocodile Trade Study (IACTS).
 - 23 2011 is the most recent year where adequate CITES Annual Reports are available for analysis.
 - 24 Export data directly compared with import data.
 - 25 In Table 2, the Short-Tail python species is combined under *Python curtus*.
 - 26 See section on stockpile inventories and Annex 6: Python; *World Trade of Large CITES Listed Snake Species*.
 - 27 Recommendations provided by Mr. John Caldwell as input to the Study.
 - 28 See "Key findings and next steps" of this Study.
 - 29 Jon Hutton, pers. Comm., Director UNEP-WCMC July, 2013.
 - 30 See Annex 7, published on-line only at <http://www.biotrade.org>.
 - 31 A few stakeholders estimated up to 60% of harvest in some areas, while others maintained that hand capture still accounted for the majority of the harvest.
 - 32 Grahame Webb, pers. Comm.
 - 33 Daniel Natusch, pers. Comm.
 - 34 Further information regarding the passport system as it may apply to leather from python skins is awaited from GUCCI.
 - 35 CSG (2004).
 - 36 See UNEP-WCMC Annex 8 list of reptiles species in trade. Sustainable Sourcing programme, published on-line at <http://www.biotrade.org>.
 - 37 See Annex 2, published on-line only at <http://www.biotrade.org>.
 - 38 Daniel Natusch, pers. Comm.
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