

Pangolin Conservation Stakeholders Workshop

*To facilitate the effective conservation of pangolins in
Southwest Cambodia's conservation landscape*



Photo: CI-Cambodia

Hosted by the Forestry Administration of Cambodia and Conservation International-Cambodia, with support from the Pangolin Conservation Support Initiative

Thma Bang Field Station, Central Cardamoms Protected Forest, Koh Kong Province,
November 4th & 5th, 2008

Participant Handout



Acknowledgements

Funding and in-kind support provided by:

World Wildlife Fund-US Russell E. Train Education for Nature Program, SeaWorld Busch Gardens Conservation Fund, Emerging Wildlife Conservation Leaders, Conservation International, Pangolin Conservation Support Initiative, The Houston Zoo, Will Chatham of Asheville Technologies, Grant Wheeler of African Wildlife Foundation, Gregory Ferrand and private donors.



Contact Information

Conservation International-Cambodia (CI)

With questions regarding the Pangolin Conservation Stakeholders Workshop and Part 2 of the participant handout: Guidelines for the confiscation, Handling, and Release of Pangolins, please contact CI-Cambodia:

- Annette Olsson, +855-12-52-42-30, a.olsson@conservation.org
- David Emmett, +855-12-1873-100, d.emmett@conservation.org
- Peov Somanak, +855-17-46-46-63, Peovsomanak@gmail.com
- Heng Namyi, +855-59-06-69, n.heng@conservation.org

Pangolin Conservation Support Initiative (PCSI)

Please send comments regarding Part 1: Pangolin Biology, Natural History, and Conservation to the Pangolin Conservation Support Initiative:

- <http://www.SavePangolins.org>
- info@savepangolins.org.

Table of Contents

ACKNOWLEDGEMENTS	2
CONTACT INFORMATION.....	2
CONSERVATION INTERNATIONAL-CAMBODIA (CI).....	2
PANGOLIN CONSERVATION SUPPORT INITIATIVE (PCSI)	2
INTRODUCTION AND JUSTIFICATION.....	4
WORKSHOP GOALS AND OBJECTIVES.....	5
WORKSHOP VENUE	6
FORESTRY ADMINISTRATION/CONSERVATION INTERNATIONAL THMA BANG FIELD STATION	6
PART 1: PANGOLIN BIOLOGY, NATURAL HISTORY, AND CONSERVATION.....	8
OVERVIEW: WHAT IS A PANGOLIN?	8
<i>Taxonomy</i>	8
<i>Physical Characteristics and Behavior</i>	9
<i>Habitat</i>	9
<i>Diet</i>	9
<i>Benefits to Ecosystem</i>	10
<i>Predators</i>	10
<i>Offspring</i>	10
THREATS TO PANGOLINS	11
INTERNATIONAL CONSERVATION STATUS AND LAWS	12
<i>IUCN</i>	12
<i>CITES</i>	12
<i>ASEAN WEN</i>	13
CAMBODIAN LEGISLATION ON PROTECTION OF WILDLIFE	15
<i>National List of Protected Species</i>	15
CONSERVATION	17
<i>Conservation International (CI) Pangolin Research and Conservation Project</i>	17
<i>Rescue and Rehabilitation</i>	18
INSTRUCTIONS ON RESPONDING TO WILDLIFE CRIME	20
PART II: GUIDELINES FOR CONFISCATION, HANDLING, AND RELEASE OF PANGOLINS.....	21
CONFISCATION AND TRANSPORT:	22
HANDLING AND STORING:	22
INFORMATION TO RECORD:	23
ASSESSING INJURIES AND BASIC TREATMENTS:	24
<i>Basic treatment of injuries</i>	24
<i>Taking tissue samples</i>	24
RELEASE.....	25
LITERATURE CITED	26
APPENDIX: EXCERPTS FROM CAMBODIA’S LAW ON FORESTRY: RELEVANT ARTICLES, AND PENALTIES.....	29

Introduction and Justification

Four species of pangolins, or scaly ant-eaters, live in Asia. One species, the Malayan or Sunda pangolin (*Manis javanica*), is found in Cambodia. This medium sized (2-12 kg) terrestrial mammal lives in tropical forest and bush habitats, where it relies predominantly on ants and termites for its diet. The pangolin is nocturnal (like many other tropical forest species) and very secretive. Pangolins are in high demand for illegal wildlife trade throughout SE Asia. Their meat is considered a delicacy, the skin is used for shoes, belts and other accessories, and the scales and blood are believed to have healing powers and are therefore used in traditional medicine. For these reasons, pangolins are heavily exploited and in some countries and sites they are almost extinct in the wild. CI-Cambodia's pangolin research team recently conducted interviews in communities throughout Cambodia and learned that although the Malayan pangolin can still be found in most areas the population is much depleted compared to 10-20 years ago. The trend is cause for deep concern as it indicates a very high and increasing level of hunting and trade of pangolins across the country. Confiscation data shows that pangolins are now one of the most traded mammals in Cambodia (Personal communication with Annette Olsson, Research Manager, CI-Cambodia).

Workshop Goals and Objectives

The overall aim of the workshop is to raise awareness about pangolin conservation and to strengthen collaboration between government, local communities, and NGOs to improve effective conservation of pangolins in the Southwest Cambodia Conservation Landscape.

Goal 1: Increase communication and collaboration among law enforcement agents, pangolin rehabilitators, conservation experts, local communities, and other stakeholders in the Southwest Cambodia region.

Supporting Objectives:

Host and facilitate the following: a discussion between conservation NGOs and key enforcement agencies on effective collaboration practices to reduce illegal pangolin trade; a brainstorming session to stimulate fresh ideas/innovative approaches.

Goal 2: Increase awareness of Asian pangolins and international pangolin conservation efforts with a focus on the Cardamom Mountain region of Southwest Cambodia.

Supporting Objectives:

Present information on pangolin biology, natural history, and conservation to law enforcement agents, local authorities, community members, and other stakeholders.

Distribute outreach materials (factsheet, poster, coloring page) to communities adjacent to protected areas and other source areas of pangolins, and to communities where there are active markets for pangolins.

Goal 3: Support authorities responsible for seizing illegal wildlife shipments in the Cardamom Mountain region.

Supporting Objectives:

Provide training to rangers on health assessment, treatment of injuries, and handling of confiscated pangolins.

Provide training to rangers on the appropriate management of illegal trade cases after arrest, including submitting thorough court documents for more effective prosecution.

Distribute a simple reference guide that highlights relevant laws and policies, pangolin handling techniques, assessment and treatment protocols, and appropriate area contacts.

Goal 4: Support Conservation International's efforts to collect DNA samples from pangolins in Cambodia to improve the knowledge of trade flows in Asian pangolins.

Supporting Objective:

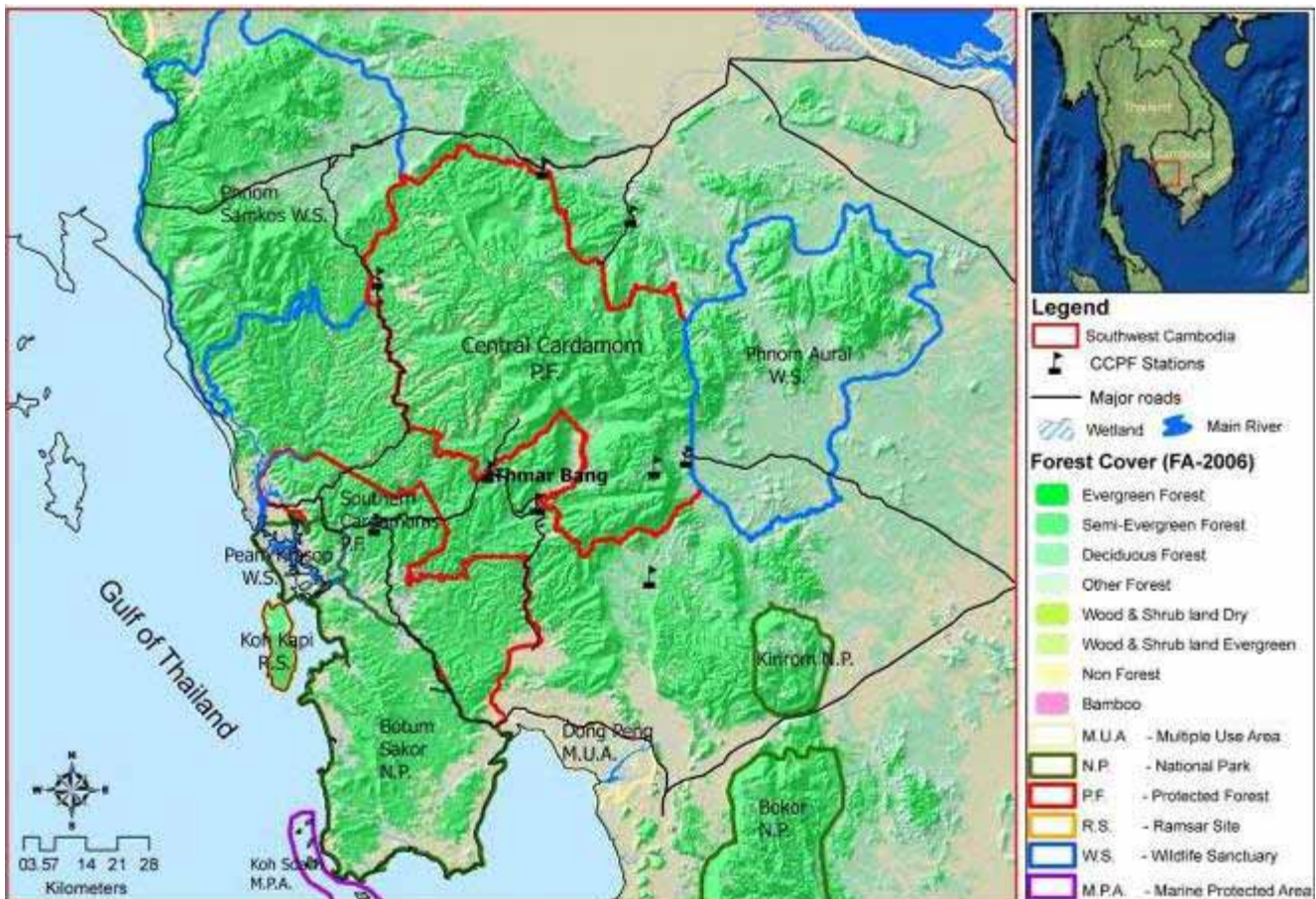
Train law enforcement agents responsible for handling confiscated Asian pangolins in correct tissue extraction procedures and follow-up reporting.

Workshop Venue

Forestry Administration/Conservation International Thma Bang Field Station

The Thma Bang Field Station was constructed in 2001. It functions as a main base for Forestry Administration (FA)/Conservation International-Cambodia (CI) law enforcement rangers protecting the Central Cardamom Protected Forest (CCPF), and it also provides basic facilities for teaching and training activities. Staff from all project components including research, community engagement, and law enforcement/management regularly use these facilities. The field station is under development to become a research station of international standards. It will include visitor accommodations for sleeping and living in addition to laboratory, library, and training facilities. In the future this field station will welcome national and international researchers to work with local communities and protected area management and to undertake studies of flora and fauna.

The field station is located in the small village of Thma Bang, Russei Chrum Commune, Thma Bang District in the at the southern edge of the Central Cardamom Protected Forest. From here, there is access to nearby small villages within and on the edge of the protected forest.



Map of Southwest Cambodia showing the Central Cardamom Protected Forest and Thmar Bang Village and Field Station. *Map courtesy of CI-Cambodia.*



Thma Bang Field Station ranger sleeping quarters.



Training facility and dining area.



Indoor training and meeting room.



Outdoor training area.

Photos: CI-Cambodia

Part 1: Pangolin Biology, Natural History, and Conservation

Pangolin Conservation Support Initiative and Conservation International-Cambodia

Overview: What is a pangolin?

Pangolins, often called scaly anteaters, are nocturnal mammals that are covered in tough, overlapping scales. They eat ants and termites using an extraordinarily long, sticky tongue, and are able to quickly roll themselves up into a tight ball when threatened (Dickman & Richer 2001).

Eight different pangolin species can be found across Asia and sub-Saharan Africa (IUCN 2008a). Tropical Southeast Asia, including Cambodia, is home to the Malayan pangolin, *Manis javanica*. Poaching for illegal wildlife trade and habitat loss have made these incredible creatures one of the most endangered groups of mammals in the world (IUCN Pangolin Specialist Group, n.d.).



Left and right: Malayan pangolin, *Manis javanica*. Photos: CI-Cambodia.

Taxonomy

Four pangolin species occur across Asia: the Indian pangolin (*Manis crassicaudata*), the Palawan pangolin (*Manis culionensis*), the Chinese or Formosan pangolin (*Manis pentadactyla*), and the Malayan or Sunda pangolin (*Manis javanica*). Four species are found in Africa south of the Sahara Desert: the Cape or Temminck's ground pangolin (*Smutsia temminckii*), the tree or white-bellied pangolin (*Phataginus tricuspis*), the giant pangolin (*Smutsia gigantea*), and the long-tailed or black-bellied pangolin (*Uromanis tetradactyla*) (IUCN 2008a). The Asian pangolins are distinguished from the African species by the presence of hairs which emerge from between the scales (Dickman & Richer 2001).

Tropical Southeast Asia is home to the Malayan or Sunda pangolin, *Manis javanica*. The historic range of this species includes Vietnam, Lao PDR, Thailand, Cambodia, Myanmar, Malaysia, Brunei, Singapore, and Indonesia (Sumatra, Java, Borneo) (CITES 2000a). These solitary mammals are highly secretive, and many mysteries remain about their behavior and habits. There are no detailed studies on the population levels, ecology, or life history of this species (Lim & Ng 2007).

No official, comprehensive pangolin population assessment has been carried out in Cambodia; however, interview surveys at multiple sites throughout the country indicate that pangolin populations have

decreased dramatically over the last decade. At some sites, local people claim that pangolins are no longer present. Large areas of lowland forest habitat have been converted to rice fields and other agricultural areas that are unsuitable for pangolins. In theory, pangolins are able to live in plantations; however, these areas are frequently accessed by plantation workers, exposing wildlife to increased hunting pressure and leaving pangolins with little chance of survival. *See map of Cambodia showing forest cover and all protected areas on page 13.*

Physical Characteristics and Behavior

Adult *Manis javanica* weigh from 2 to 12 kg (Hogg 2003; Personal communication with Carnivore and Pangolin Conservation Program (CPCP), 9 October 2008). They are covered with protective, overlapping scales, which are made from the same proteins that form human hair and fingernails. The scales grow throughout the life of a pangolin just like hair, and are constantly filed down as pangolins dig burrows and forage for insects. Pangolin undersides do not have scales and are covered with sparse fur. Unlike African pangolins, Asian pangolins have thick hairs that emerge from between their scales (Dickman & Richer 2001). Pangolin species can be differentiated by the number of scales along their flanks and tails. Malayan pangolins have 15 to 19 rows of scales on their flanks, and between 21 and 29 scales on the ventral sides of their tails (Stocker 1986).

Pangolins are nocturnal. They sleep during the day in the hollows and forks of trees and logs, and they emerge in the evening to forage for ants and termites (CPCP pers comm.; Dickman & Richer 2001). They use their long, curved foreclaws to demolish ant and termite nests and to dig burrows. Pangolins shuffle on all fours, balancing on the outer edges of their forefeet and tucking their foreclaws underneath as they walk. They can run surprisingly fast, and will often rise on their hind limbs to sniff the air. Malayan pangolins can swim, and they are excellent climbers, using their claws and tails to grip bark and scale trees (Dickman & Richer 2001; CPCP pers comm.).

Habitat

Manis javanica can be found in a variety of habitats including forests, thick brush, grasslands, and cultivated areas such as gardens and rubber plantations (CITES 2000a).

Diet

Pangolins live predominantly on a diet of ants and termites. This specialized diet is a factor that makes pangolins extremely difficult to maintain in captivity, where they may reject unfamiliar insect species (Yang et al. 2007).

Pangolins have poor vision and locate ant and termite nests using a well developed sense of smell. With small conical heads and jaws lacking teeth, pangolins have amazingly long, muscular, and sticky tongues that are perfect for reaching and lapping up ants and termites in deep cavities (Dickman & Richer 2001). A pangolin's tongue is attached near its pelvis and last pair of ribs, and when fully extended is longer than the animal's head and body. At rest a pangolin's tongue retracts into a sheath in its chest cavity. A pangolin's stomach is muscular and has keratinous spines projecting into its interior. Usually containing small stones, the stomach mashes and grinds prey in much the same manner as a bird's gizzard. Pangolins have special muscles that seal their nostrils and ears shut, protecting them from attacking insects. They also have special muscles in their mouths which prevent ants and termites from escaping after capture (Heath 1992).

Benefits to Ecosystem

Pangolins' large appetite for insects gives them an important role within their ecosystems: pest control. Estimates indicate that one adult pangolin can consume more than 70 million insects annually (Chao 2002). Burrowing animals worldwide are ecologically important, as their actions create breeding habitat or shelter for many other animals and thus contribute to increased species diversity (Hansell 2003).

Predators

Pangolin scales provide good defense against most predators. When threatened, pangolins can quickly curl into a ball, protecting their vulnerable undersides. They also deter predators by hissing and puffing, and lashing their sharp edged tails (Myers 2000). Pangolins mark their territories by scent marking with urine and secretions from a special gland and by scattering feces. Scientists suspect that these odors advertise dominance and sexual status and may also help individuals recognize each other (Dickman & Richer 2001). Humans, tigers, leopards, clouded leopards, wild dogs and pythons are some of the known predators of *Manis javanica* (Wildlife Alliance, n.d.).



Left: Tiger preying on a pangolin. *Photo: Jeremy Holden.* Right: Pangolin killed and partly eaten by dholes. *Photo: CI-Cambodia.*

Offspring

A female Malayan pangolin will give birth to one young. At birth, pangolins are about 15 cm long and weigh about 120 grams. Their scales are soft and pale, and begin to harden by the second day. Pangolin mothers nurture their young in hollow trees or burrows. A mother will protectively roll around her infant when sleeping or if threatened. Infants nurse for 3 to 4 months, but may begin eating termites and ants at one month. At that time the infant begins to accompany the mother outside of the burrow, riding on the base of her tail as she forages for insects (CPCP pers comm; Dickman & Richer 2001).



Left: Newly born pangolin. *Photo: Unknown.*



Right: Mother and juvenile pangolins sleeping. *Photo: CPCP.*

Threats to Pangolins

Historically pangolins were used at a local subsistence level for food, spiritual protection, and as a component of traditional medicine. However, an increasing international market demand for luxury restaurant food, fashion accessories, and traditional medicine has led to a rampant illegal international trade in scales, skins, and meat. The main markets for pangolin products are in China and Vietnam. The large-scale illegal trade in Asian pangolins is drastically driving down numbers throughout Southeast Asia. Rapid loss and deterioration of available habitat places added pressure on the dwindling numbers of remaining pangolins (TRAFFIC Southeast Asia 2004).

The alarming scale of the illegal trade in Asian pangolins is evidenced by the thousands of pangolins seized and confiscated from the black market. These confiscations are thought to represent only a fraction of the total amounts traded each year. As pangolins are so difficult to keep in captivity, all confiscated individuals are hunted from the wild. The Malayan and Chinese pangolins (*Manis Javanica/Manis pentadactyla*) are considered the most-traded mammals in Asia, with thousands being illegally hunted and traded across international borders each year (TRAFFIC Southeast Asia 2004, TRAFFIC 2008). The lack of detailed information about the trade makes combating it that much more challenging.

Recent examples of seizures include (Asian Pangolin Conservation Workshop 2008):

- 68,000 kg of pangolin meat, 900 kg of scales, and 2,849 pangolins seized in November 2007. Five people were charged in the Fujian Province of China.
- 275 live pangolins were seized near the Laos border in January 2008.
- 23 tons (about 8000 pangolins) were seized in Vietnam in February 2008.
- 98 live pangolins seized in Penang, Malaysia in April 2008.
- 14 tons of pangolins were seized in Sumatra, Indonesia in July 2008.

The exact origin of most confiscated pangolins is unknown. Pangolins are hunted throughout the region and sold to middlemen who store, pack, and ship large quantities of the animals. To address the illegal wildlife trade of pangolins, detailed data on trade routes must be collected, including where the pangolins are coming from and where they end up. Immediately halting this illegal trade and broadening conservation efforts is critical to the survival of this remarkable group of mammals (Personal communication with Chantal Elkin, Director, Conservation International IndoBurma Wildlife Trade Program, October 2007).



Left: Illegally hunted pangolins cleaned for packing in Indonesia. Right: Illegally hunted pangolins packed and ready for transport in Indonesia. Photos: Unknown.

International Conservation Status and Laws

Several international agreements and organizations deal directly with wildlife trade and wildlife conservation issues across the globe. Two of the most influential are the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the International Union for the Conservation of Nature (IUCN). Nearly every country including Cambodia participates in these two agreements, which work to ensure the protection of flora and fauna worldwide.

IUCN

Founded in 1948, the International Union for the Conservation of Nature (IUCN) is a unique network of governments, non-governmental organizations, the United Nations, international conventions, and companies working to address and implement environmental and sustainable development policies, laws and practices (IUCN 2008b). The IUCN Species Survival Commission (SSC) is a subset of the IUCN and includes experts who advise the IUCN and its members about technical and scientific aspects of species conservation. Thousands of scientific experts around the world collaborate and contribute their knowledge, research, and survey data to help decide which species are in danger of extinction (IUCN 2008c). The SSC works closely with the IUCN's Species Programme, which produces, maintains, and manages The IUCN Red List of Threatened Species. Published every four years, The IUCN Red List helps to convince governments to make laws and take other measures to help protect imperiled species from threats such as logging or commercial trade (IUCN 2008d).

The IUCN Red List divides species that are seen as globally threatened into three categories: Vulnerable (VU), Endangered (EN), and Critically Endangered (CR). To put this into a Cambodian context, species such as the Kouprey and Siamese crocodile are CR, whereas tigers and elephants are EN. Both the Malayan pangolin, *Manis Javanica*, and the Chinese pangolin, *Manis pentadactyla*, are listed as Endangered (EN) and are therefore considered to be facing a very high risk of extinction in the wild (IUCN 2008e).

CITES

The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international treaty. CITES provides a framework for the international trade of plants and animals, especially those that have become endangered or are at risk of extinction. Many plants and animals on The IUCN Red List are also included in CITES, as trade in these species needs to be carefully monitored, if permitted at all. Countries that have joined CITES are legally bound to implement the Convention, but it does not take the place of national laws. Rather, a participating country must adopt its own domestic legislation to implement the rules set forth in the treaty. 173 countries, including Cambodia, are parties to the agreement (CITES n.d.a).

Imperiled animals and plants listed under CITES are divided into three categories that outline levels of trade developed to not further threaten their survival (CITES n.d.b):

- Appendix I includes species threatened with extinction. Trade is permitted only in exceptional circumstances.
- Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled to prevent overuse that will threaten their survival.
- Appendix III includes species that are protected in at least one country, which has asked other countries participating in CITES for assistance in controlling the trade.

Because CITES is an international agreement, it requires international cooperation. The CITES agreement gives governments, wildlife rangers, customs agents and other wildlife conservation stakeholders a framework to share information and work together. To legally trade CITES listed fauna and flora, exchanges must first be authorized by member countries' CITES Management and Scientific Authorities, and shipments must be accompanied by appropriate permits or certificates (CITES n.d.b).

Asian pangolin species were listed under CITES Appendix II on January 7, 1975 (CITES 2000a). However, due to concern over continued declines in the species, CITES member countries India, Nepal, Sri Lanka, and the United States proposed a transfer of the Asian pangolin species to Appendix I at the 11th meeting of the CITES Conference of the Parties (CoP 11) in Gigiri, Kenya in April 2000. Delegations from China, Japan, Pakistan, Portugal (on behalf of the European Union), Switzerland, and observers from TRAFFIC (also speaking on behalf of IUCN), opposed this transfer as Asian pangolins were under review by the CITES Animals Committee as part of a Significant Trade Process, and recommendations had not yet been formulated.

An excerpt of the CoP11 Summary Report outlining the decision (CITES 2000b) follows:

The proposal was opposed by the delegations of China, Japan, Pakistan, Portugal, on behalf of the Member States of the European Union, and Switzerland and the observer from TRAFFIC, also speaking on behalf of IUCN – the World Conservation Union. The main reason for their opposition was that these species were currently subject to review by the Animals Committee as part of the Significant Trade Process and the recommendations had not yet been formulated. In response to comments made by the International Wildlife Coalition and TRAFFIC regarding illegal trade in these species, the Secretariat noted that inclusion in Appendix I was not necessarily the best mechanism to curtail this, and recommended maintenance of the species in Appendix II until the completion of the Significant Trade Review, with the suspension of all trade in the meantime. The delegation of the United States of America responded that they would like the opportunity to form a small working group with the Chairman of the Animals Committee to amend the proposal and present it later. They stressed that this would not undermine the work of the Animals Committee. The Chairman agreed to this request.

With the passage of the resulting zero export quota in 2000, all commercial trade in Asian pangolin species was prohibited (Personal communication with Bruce Weissgold, United States CITES Division of Management Authority, 19 October 2007). Any trade for scientific or conservation purposes must be conducted through the auspices of the CITES authorities. A 2004 report from the CITES Animals Committee indicated that since the zero export quota was established, no legal trade had been reported in Asian pangolins. “However, market surveys and confiscations indicate that unreported trade in these species is significant and merits further attention” (TRAFFIC 2004).

ASEAN WEN

In 2005, the Association of Southeast Asian Nations (ASEAN) launched its Wildlife Enforcement Network, referred to as ASEAN-WEN. ASEAN-WEN is the world's largest wildlife law enforcement network. Law enforcement agencies of the ten ASEAN Member Countries (including Cambodia) facilitate cross-border collaboration to combat the region's extensive illegal wildlife trade. In addition to the law-enforcement networks of Cambodia, Indonesia, Brunei Darussalam, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, the United States and China are also cooperating with ASEAN-WEN (ASEAN-WEN 2007).

The illegal wildlife trade has already led to destruction on a massive scale, and threatens to irrevocably damage Southeast Asia's ecosystems. Part of the problem lies in inadequate law enforcement and coordination between government agencies. In order to effectively combat organized illegal wildlife trade, law enforcement agencies need to form an organized response. Under ASEAN-WEN, Police, Customs, and environmental management agencies are establishing National Task Forces and cross-border intelligence sharing links to successfully curtail the illegal wildlife trade. ASEAN-WEN functions on a national and regional level, employing concepts that deal with other trans-national crime like drug smuggling (ASEAN-WEN 2007).

The official Program Coordination Unit (PCU) for ASEAN-WEN has been set up in Thailand. The PCU facilitates and coordinates technical support for ASEAN-WEN at the national and regional levels.

How to contact ASEAN-WEN Task Forces and PCU:

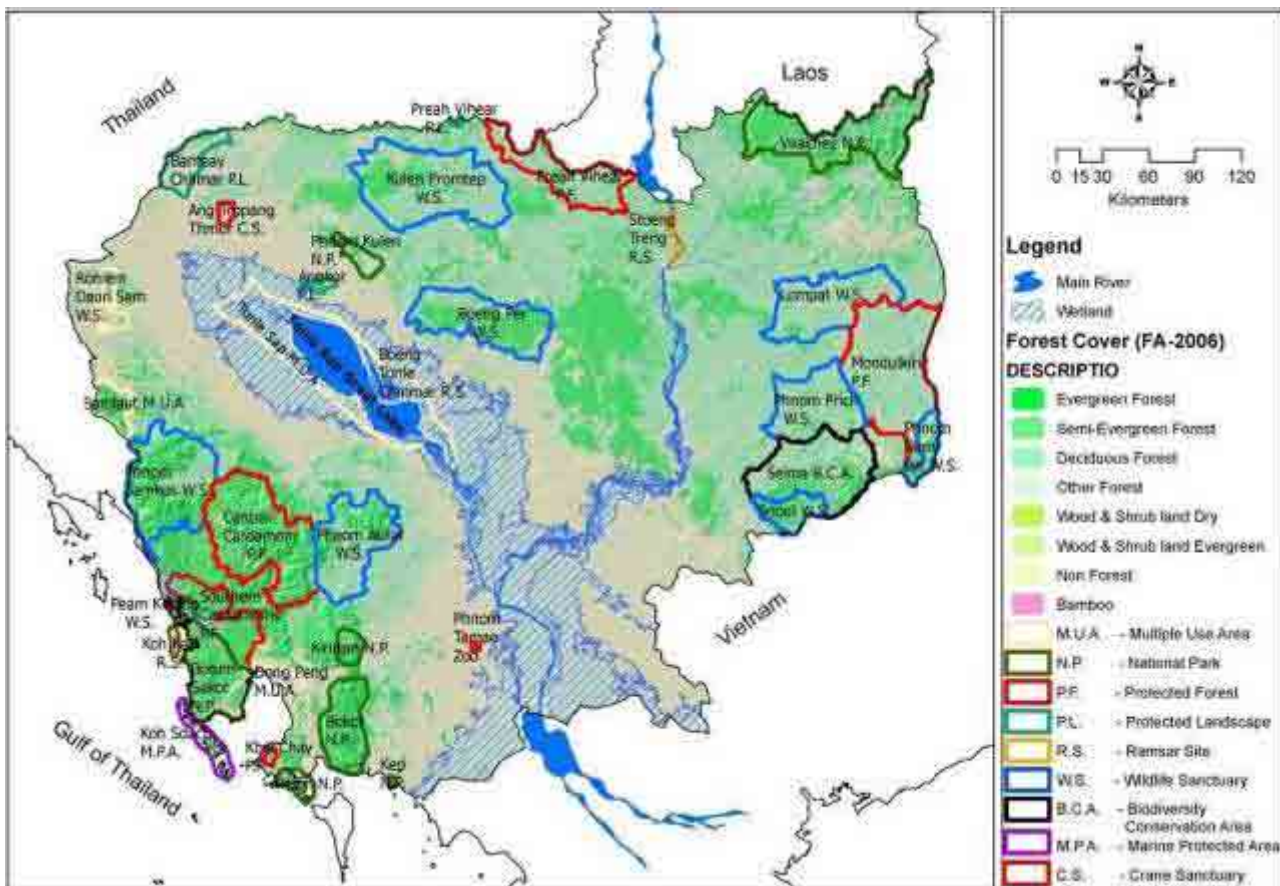
ASEAN-WEN Program Coordination Unit
Law Enforcement Extension Office
c/o Natural Resources and Environmental Crimes Suppression Division
Phaholyothin Road, Ladyao, Chatuchak
Bangkok 10900, Thailand
Tel/Fax +662 940 6286
email: pcu@asean-wen.org
website: <http://www.asean-wen.org/>

Cambodian Legislation on Protection of Wildlife

All Cambodian wildlife is considered property of the state. The Forestry Law, adopted by Parliament in 2002, defines the framework for managing forests and sustaining Cambodia’s biological diversity and cultural heritage. Two government agencies are charged with implementing law enforcement against forest and wildlife crime: the Forest Administration (FA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF), and the General Department of Nature Conservation and Protection (GDNCP) within the Ministry of the Environment (MoE). Protected Forest is the responsibility of FA, National Parks and Wildlife Sanctuaries are under responsibility of the MoE (Forestry Administration 2002). *See map of Cambodia showing forest cover and all protected areas, below.*

National List of Protected Species

Article 49 of the Forestry Law calls for all wildlife to be classified within the following three categories: 1) endangered species, 2) rare species, or 3) common species. The Forestry Law includes recommendations that MAFF issue regulations, called Prakas, to determine the criteria for each category. In February 2007, the species prakas was finalized and published. All terrestrial wildlife species have been divided into the three categories. The pangolin is listed as ‘rare’ in this prakas. According to the Forestry Law, hunting and trade of ‘rare’ and ‘endangered’ species is strictly prohibited. The offender shall be subject to arrest, fine, send to court and prison (Forestry Administration 2002). Article 49 of the Forestry Law prohibits the hunting, harming or harassing of all wildlife “1) by use of dangerous methods, 2) during the closed season; and 3) in protected zones and special public areas” (Forestry Administration 2002).



Map of Cambodia showing forest cover and all protected areas. *Map courtesy of CI-Cambodia.*

Further, the Article prohibits the harming, hunting, netting, trapping, poisoning, possessing, transporting, trading and importing or exporting of rare and endangered wildlife. Permits may be issued by the Forest Administration for educational and scientific research, captive breeding programs and in cases where international cooperation agreements have authorized the exchange of wildlife. In the case of common species, Article 50 prohibits the stocking or maintenance of private zoos and the transport or trade of common wildlife in any amount that exceeds traditional use (permits may be issued by the Forestry Administration) (Forestry Administration 2002).

Article 90 of the Forestry Law lists eight types of penalties that can be applied for forestry offences, including: imprisonment, confiscation of evidence, Court fines, transactional fines, repairing damage, warning, and revocation or suspension of agreements or permits (Forestry Administration 2002).

Article 93 of the Forestry Law lists the types of penalties. A class II Forestry Offenses (which includes crimes involving 'rare' species such as the pangolin the penalty is: one to five years in prison and/or fine of ten million (10,000,000) Riels to one hundred million (100,000,000) Riels and confiscation of all evidence as state property (Forestry Administration 2002).

See Appendix for excerpts of the Cambodian Forestry Law.

Conservation

Several organizations are working with governments, wildlife authorities, and local communities to address pangolin conservation in key areas throughout the region. In Cambodia, Conservation International (CI) is gathering information about pangolin biology and the illegal trade. It is training park rangers to identify pangolin hunters and traders, which relevant laws and policies are in place for the protection of wildlife, and is designing ways to crack down on illegal wildlife trade in the Cardamom Mountains. CI Cambodia is working with husbandry experts from the Carnivore and Pangolin Conservation Program to develop a simple reference guide that highlights what is currently known about pangolin handling techniques, assessment and treatment protocols. Furthermore, CI is monitoring confiscated released pangolins to assess survival rates and behavior. This is essential in order to guide the most effective handling and release.

Pangolins are secretive, solitary, and nocturnal, and many mysteries remain about their natural history and behavior (see page 6). Meanwhile, little is known about the current distribution and range of the various pangolin species (Lim & Ng 2007). CI Cambodia is participating in a project led by the National Cancer Institute at the U.S. National Institutes of Health to build a database of DNA samples from various pangolin species across Asia. Because the vast majority of pangolins die in captivity, the rapid return of seized animals to their original habitat represents their best hope for survival, and accurate determination of their origin makes this possible. Furthermore, this will allow governments and conservationists to identify the trade flow and routes of trade in pangolins, and thereby enable effective protection at the right locations.

Conservation International (CI) Pangolin Research and Conservation Project

The CI pangolin research team was established in September 2006. This team is comprised of two Cambodian graduate field researchers and a Cambodian CI research coordinator. The team is managed by CI's Forestry Administration research counterpart and CI's research manager. The overall aim of the pangolin research project is to collect data which will enable us to better understand the status of and threats to pangolins in Cambodia.

Objectives:

- 1) Through interview surveys, assess the presence and status of pangolins at selected sites throughout Cambodia;
- 2) Identify key sites with healthy wild populations of pangolins in Cambodia;
- 3) Through interview surveys, improve our knowledge of use and trade of pangolins in Cambodia;
- 4) By using radio-tracking studies of released confiscated pangolins, gain better understanding of survival rates and behavior of released pangolins;
- 5) Work with pangolin hunters and ex-hunters to learn about pangolin biology and ecology and develop methods to survey wild pangolins;
- 6) Raise the awareness of pangolin status and conservation in Cambodia.

Through consultation with other NGOs and relevant government departments we will identify sites throughout Cambodia with confirmed or tentative records of pangolins. A proportion of these sites will be selected for field studies of pangolins in the wild. We will employ ex-hunters with good local knowledge of pangolin ecology as guides, who can teach the team where and when to look for pangolins, and how to capture pangolins without harming them.

The team will survey pangolin populations across Cambodia in order to understand both the threat levels to pangolins in different provinces and the behaviour of the species in different habitats. The team will collect data on activity patterns, foraging behaviour, breeding behavior, home ranges (using mark-recapture and thread spooling), habitat preference, and other ecological information. Captured pangolins will be weighed, measured, sexed, photographed. DNA samples will be taken, and then they will be released at the point of capture.

Using structured questionnaires, the team will interview people from rural communities around the research sites to assess the trend in pangolin presence and temporal and spatial population trends. We will also assess threat levels of hunting and identify small-scale local use of pangolins and pangolin parts. Village and town markets and local pharmacies will be surveyed to identify larger-scale uses for pangolin parts.

Live pangolins are regularly confiscated from hunters and traders in Cambodia, then released at selected sites quickly after confiscation. Many of the confiscated pangolins have injuries of varying degrees. Injuries range in severity from small scratches to large wounds or missing limbs. There is no follow-up on the released animals to assess the survival rate, and hence no evaluation of the success of releasing captive individuals. By following released pangolins through radio-tracking we can monitor the movements, behaviour, recovery and survival of released pangolins. These data are very useful in order to guide the development of future protocols for pangolin confiscation and release and will help improve the survival rates of confiscated pangolins.

Large quantities of pangolins are smuggled through the region on their way to receiver markets. It is often difficult to determine the origin country or area of confiscated pangolins. As much as possible, live confiscated pangolins should be released at the point of origin. By establishing DNA reference material of pangolins with known origins, confiscated pangolins can be assessed and their origin determined. CI is contributing to a project led by the National Cancer Institute at the National Institutes of Health (USA) to collect DNA samples from pangolins across Asia, which will feed into a regional database of DNA from the various populations. Thus, when pangolin shipments are confiscated by law enforcement, their source population and country can be identified. The vast majority of pangolins die in captivity. The goal is to repatriate seized animals to their original habitat almost immediately after confiscation.

Rescue and Rehabilitation

Carnivore and Pangolin Conservation Program (CPCP)

Pangolins are difficult to maintain in captivity, and most die within a short period after capture (Yang et al. 2007). Techniques and facilities to care for injured and stressed pangolins confiscated from the illegal market are still being developed. The Carnivore and Pangolin Conservation Program (CPCP), located in the Cuc Phuong National Park of Ninh Binh Province, Vietnam, is pioneering husbandry techniques for rescuing and caring for injured and stressed live pangolins seized from the illegal wildlife trade. Furthermore, most countries where pangolins are found, including Cambodia, lack the capacity and

infrastructure to rehabilitate injured pangolins before re-release into the wild. Conservation efforts must emphasize stopping the removal of pangolins from the wild, but wildlife authorities are constantly seizing live pangolins from illegal traders, so it is key to develop ways pangolins can be treated and rehabilitated in captivity so that they can be returned to their native habitats with high chances of survival.

Angkor Centre for Conservation of Biodiversity (ACCB)

A nature conservation and endangered wildlife rescue and breeding centre

The ACCB is a wildlife rescue and conservation centre located in Kbal Spean, Siem Reap Province, Cambodia. The centre's cornerstone was laid during an official ceremony on the 4th of April, 2003. ACCB works under Memoranda of Understanding with the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the General Department of Administration for Nature Conservation and Protection (GDANCP) of the Ministry of Environment (MoE) of the Royal Government of Cambodia. ACCB's umbrella organizations are the Allwetterzoo Münster, a zoo in central Germany with long-standing and strong involvement in international conservation, especially in Indochina, and the Zoological Society for the Conservation of Species and Populations (ZGAP), which ranks among the world's top international conservation organizations.

The goals of the ACCB are:

- To promote the rescue of selected native Cambodian wildlife, and to provide adequate rehabilitation and release facilities while ensuring the maintenance of internationally recognized standards.
- To provide facilities and technical expertise for the conservation breeding of selected globally threatened species, and to initiate and carry out appropriate reintroduction and restocking programs.
- To serve as an education and training centre in order to increase awareness of and build capacity for conservation and environmental protection and management, and to promote the sustainable use of natural resources.
- To initiate and participate in wildlife conservation and research activities in Cambodia, including in-situ conservation activities, species recovery efforts, biodiversity inventories and natural resource-use assessments, and to provide information to support management recommendations for protected areas.

ACCB's Pangolin Program

The ACCB's Pangolin Program started in 2004 when a special pangolin holding and breeding facility was built. In 2005, a female Sunda Pangolin was hand-reared and has successfully remained at the facility. Currently at 3 ½ years of age, the animal holds the longevity record for this species in captivity. The pangolin has reached sexual maturity and ACCB is hoping to obtain a suitable male to attempt captive breeding. Pangolins and their conservation are also highlighted in various components of the ACCB's Environmental Education Program.

Instructions on Responding to Wildlife Crime

If you see or hear about a wildlife crime (hunting, selling, keeping, using) involving pangolins or other threatened wildlife you should:

- Contact your nearest Forestry Administration station or law enforcement institution. Please inform representatives of the type, location, and time of crime. If possible, also provide information about who is involved in the crime.
- You can contact FA and law enforcement representatives directly by telephone or by sending a written message. It is important that you react to and report wildlife crime as soon as possible!
- You can report wildlife crime without having your personal name and information listed. Please just say that you would prefer not to be listed or mentioned.
- You can always contact the Cambodia Wildlife Crime Hotline by phone:
012 976 947 / 023 224 758

Part II: Guidelines for Confiscation, Handling, and Release of Pangolins

Conservation International-Cambodia



Manis javanica. Photo: CI-Cambodia.

Wild animals, especially pangolins, are very sensitive to disturbance; they are often shy and are not accustomed to human contact. Many pangolins are injured during capture (for example, leg wounds from being trapped in snares) and transport. Being captured and in close proximity to humans is a very stressful experience for them. If this stress continues for some time it can have very negative effects on the animal's health, such as serious damage to internal organs, or even death.

If captured, the stress can cause an animal to refuse to eat or drink and it may become dehydrated, weak or even starve to death.

It is therefore very important that confiscated wild animals are handled as carefully as possible, as this will increase their chance of survival both in captivity and once they are released. By following the guidelines listed below, we can keep stress levels to a minimum, treat injuries, and dramatically increase the chances of survival for confiscated pangolins.

Unfortunately, relatively little is known about pangolin ecology and behavior. By increasing our knowledge of pangolins, it will be easier for us to understand how we can best contribute to effective conservation of this animal. Pangolins are traded all over Southeast Asia, despite their trade being forbidden in every country. If authorities are fortunate enough to confiscate live pangolins from the illegal trade, they are often released back in the wild. We do not know how these released animals fare in their new habitat.

By collecting information on pangolins that have been confiscated and monitoring them after their release, we can learn more about wild pangolins and how they are affected by the stressful experience of being captured and released.

Confiscation and transport:

Most illegally traded pangolins are held in rice sacks or nets. The pangolins coil up into a tight ball to protect themselves. Never try to unroll a pangolin with force! This will cause extreme stress and could easily injure the pangolin.

While transporting pangolins it is best to keep them in the sack or net, while ensuring that they are constrained from rolling around and getting injured. It is very important that the sack or net is breathable and allows for adequate ventilation. Do not use plastic bags! Handle the pangolins gently and do not throw them around.

Transport the pangolins carefully and keep them in the shade at all times, even while you are dealing with the arrest or confiscation of the animals. If you leave them in the sun, they will get dehydrated, they might overheat and die. Do not handle the animals unless it is necessary!

Move the pangolins away from noisy areas, or keep as quiet as possible when around the pangolins. Keep people and domestic animals such as dogs away from the pangolins, as this will only stress them further.

Handling and storing:

- If the pangolins must be taken to a ranger station or other place before release, keep this transport time to a minimum.
- If keeping the pangolin for less than a day, leave it in the sack or net in the shade. If the pangolins must be kept for more than one day (maximum two days!), keep it in a large, strong container with a good air supply. Make sure that they have enough space to fully unroll and move around.
- Keep the container in the shade and protect it from rain.
- Keep the animals on dry ground, if possible with some soil, grass, or leaves.
- Ensure the animals have access to clean water so that they can drink, as they may have been without water for many days during capture and transport, and could easily die of dehydration.
- Don't feed the pangolins anything other than ants and termites. It is likely that they will be too stressed to eat under captive conditions anyway. Do not attempt to feed them rice or any other human food, as this is not suitable for pangolins.
- Keep the pangolins in a quiet place and avoid noise in their immediate environment. When you have to handle the animals, be careful and gentle.
- Keep the number of people around the animals to an absolute minimum. Don't invite people over to see the pangolins, and don't take them out of the container and show them around.
- Keep domestic animals, such as dogs, away from the pangolins, because it will only stress them further and could even introduce diseases to the pangolins.

Information to record:

If possible, find out from the hunter/trader where the pangolin came from (e.g. which part of the forest, was it near a village or far away such as another country, etc.). Find out how and when he caught it.

Sex, length and weight of the confiscated pangolins are easily recorded and very useful information to collect. Note any peculiarities of the animals, including injuries or scars.



Sexual organs of male.



Sexual organs of female.

In order to determine the sex of the pangolin, hold it by the tail and very gently shake it. This will normally make the pangolin uncoil and it is possible to view the sexual organs on the lower abdomen. Males show a penis located in front of the anus. Testes are held inside the abdomen on pangolins and not very obvious. Females, of course, lack the penis. Adult females and males both show nipples along the side of the abdomen. See photos.

Weigh the pangolin either directly on a standing scale or while in a bag or net from a hanging hook-scale. See photo below.

Make sure to record if a female pangolin with a juvenile has been confiscated. The juveniles hang on to the back of their mother, where they will be carried around until they reach a size where they can walk and feed themselves. Take records of both the mother and the juvenile. Determining the sex of a juvenile may not be easy or even possible as the sexual organs are not well developed at this stage. Do not separate a juvenile pangolin from its mother.



Weighing a pangolin on a standing scale.



Mother pangolin with juvenile on her back.

All photos this page: CI-Cambodia.

Assessing injuries and basic treatments:

During capture and transport, pangolins are sometimes injured. It can be difficult to assess the seriousness of the injury since the animal will spend most of its time coiled up. When holding it by the tail to sex and measure the animal, use this opportunity to also assess and record all health problems. This information is important for future studies that aim to assess the survival rates after release.

Conduct a thorough and systematic health check on the animal.

1. Start with the head: nostrils, mouth, ears, eyes.
2. Continue with the body and abdomen: scratches, cuts, swellings, hair loss, skin condition.
3. Examine the legs: form, mobility, claws.
4. Check the tail: injuries, flexibility, swellings.
5. Carefully check between the scales: injuries, parasites.

Basic treatment of injuries

All old dirt and dead tissue should be removed carefully from the wound with cotton soaked in a 10% iodine solution. Then carefully clean the wound with 10% iodine solution. Apply antibiotic cream to all wounds but only after cleaning.

Taking tissue samples

As part of a large regional project we need to collect tissue samples of Cambodian pangolins for DNA analysis. The objective is to create a database of DNA from the various populations of pangolins, so that when illegally traded pangolins are confiscated by law enforcement officials throughout the region, their source population and country can be identified through a DNA test.

When dead pangolins are encountered, a sample of muscle tissue should be cut out with a clean (cleaned with alcohol and sterilized by holding over a flame for 5-10 seconds), sharp knife and preserved in a tube with 70% alcohol. When live pangolins are being confiscated, the sample should consist of hairs, including the follicles, which grow between the scales throughout the body and on the belly. The hairs should be pulled out using clean forceps. A minimum of 10 hairs should be taken from each pangolin. It is relatively easy to pull out hairs, and this does not harm the pangolin. The hairs should be stored in a tube. All samples should be labeled clearly:

1. Origin of pangolin
2. Date
3. Sex
4. Measurements
5. Name of collector

Always take photographs of the confiscated pangolins. If possible, label the photos of the individual pangolin so that it can be linked to records and DNA sample for the specific individual.

If a tick is present on the pangolin, remove and store the tick in a container with 70% alcohol and label the container clearly with the information on the animal it has been taken from. The blood inside a tick can be used to identify and study the DNA of the pangolin.

Release

Pangolins prefer evergreen and dry evergreen forest with the presence of ants and termites (their food sources). If possible, the pangolins should be released at the place where they were caught by the hunter, as this is where it has its home range. If this location is not known, find a safe site far from villages where you can release the animals and where they are not likely to be caught again (a well-protected site).

Pangolins are mostly solitary animals. They are normally distributed in low densities in forest areas, probably because of their specific food source. Therefore, only few individuals should be released at the same spot. If many individuals are to be released, chose a few different sites, and release only 1-2 individuals at each site. Transport the pangolins to the release site in a careful and safe way; if possible keep them in the shade. Pangolins are nocturnal animals (active at night), and it is best to release pangolins in the early morning before dawn or late afternoon. The pangolins have been highly stressed and if they are not returned to their original home area, they will need time to recover and find somewhere to hide. Therefore, do not release them during the middle of the day if possible. Make sure there are no people or dogs around when the animal is released.



Pangolin released at night.



Released pangolin climbing a tree.

Photos: CI-Cambodia.

Literature Cited

- Asian Pangolin Conservation Workshop. 2008. Armored anteater. Available from <http://www.traffic.org/home/2008/6/29/final-call-for-pangolins.html> (accessed 23 July 2008).
- Association of Southeast Asian Nations' Wildlife Enforcement Network (ASEAN-WEN). 2007. ASEAN-WEN Wildlife Enforcement Network. Available from [http://61.47.40.15/\\$sitepreview/asean-wen.org/index.php](http://61.47.40.15/$sitepreview/asean-wen.org/index.php) (accessed 18 July 2008)
- Chao, Jung-Tai. 2002. General Status of Formosan Pangolin *Manis pentadactyla* pentadactyla. Taiwan Forestry Research Institute, Taipei, Taiwan. Available from http://protect.tfri.gov.tw/animal/html/essay.asp?essayfile_id=1 (accessed 14 March 2008).
- Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES). n.d.a. What is CITES? CITES, Geneva, Switzerland. Available from <http://www.cites.org/eng/disc/what.shtml> (accessed 14 March 2008).
- CITES. n.d.b. How CITES works. CITES, Geneva, Switzerland. Available from <http://www.cites.org/eng/disc/how.shtml> (accessed 14 March 2008).
- CITES. 2000a. Proposal 11.13: Transfer of *Manis crassicaudata*, *M. pentadactyla*, *M. javanica* from Appendix II to Appendix I. Draft report to the CITES Animals Committee. Eleventh Meeting of the Conference of the Parties, CITES, Gigiri, Kenya. Available from <http://www.cites.org/eng/cop/11/prop/13.pdf> (accessed 14 March 2008).
- CITES. 2000b. CoP11 Summary Report Committee I. Eleventh Meeting of the Conference of the Parties, CITES, Gigiri, Kenya. Available from http://www.cites.org/eng/cop/11/other/Com_I.pdf (accessed 16 July 2008).
- CITES. 2000c. CoP11 Decisions on Amendment Proposals. Eleventh Meeting of the Conference of the Parties, CITES, Gigiri, Kenya. <http://www.cites.org/eng/cop/11/decisions.shtml> (accessed 14 March 2008).
- CITES. 2000d. Amendments to Appendices I and II of the Convention. Eleventh Meeting of the Conference of the Parties. CITES, Gigiri, Kenya. http://www.cites.org/eng/cop/11/other/Com_I.pdf (accessed 14 March 2008).
- Claridge, G, Veasna C.L., and I.V. Chhoan. 2005. The Effectiveness of Law Enforcement Against Forest And Wildlife Crime: A Study of Enforcement Disincentives and Other Relevant Factors in Southwestern Cambodia. Conservation International, Phnom Penh.
- Dickman, C. R. and Richer, R. A. 2001. Pangolins. Pages 800-801 in D. W. Macdonald, editor. *The Encyclopedia of Mammals*. Facts on File, New York.
- Forestry Administration. 2002. Law on Forestry. Forestry Administration, Cambodia. http://www.forestry.gov.kh/Documents/Forestry%20Law_Eng.pdf (accessed 24 July 2008).

- Gaubert P. and A. Antunes. 2005. Assessing the taxonomic status of the Palawan pangolin *Manis culionensis* (Pholidota) using discrete morphological characters. *Journal of Mammalogy* 86: 1068–1074.
- Hansell, M. H. 1993. The ecological importance of animal nests and burrows. *Functional Ecology* 7(1): 5-12.
- Heath, M. E. 1992. *Manis pentadactyla*. *Mammalian Species* 414: 1-6.
- Hogg, S. 2003. Where are the pangolins? *Malayan Naturalist* 56(4): 38-41.
- International Union for the Conservation of Nature (IUCN). 2008a. *Manis javanica*. IUCN Red List of Threatened Species. IUCN, Gland, Switzerland. Available from www.iucnredlist.org (accessed 6 October 2008).
- IUCN. 2008b. About IUCN. IUCN, Gland, Switzerland. Available from <http://www.iucn.org/about/index.cfm> (accessed 8 October 2008).
- IUCN. 2008c. About the Species Survival Commission. IUCN, Gland, Switzerland. Available from http://www.iucn.org/about/work/programmes/species/about_ssc/index.cfm. Accessed 8 October 2008.
- IUCN. 2008d. What is the IUCN Species Programme? IUCN, Gland, Switzerland. Available from http://www.iucn.org/about/work/programmes/species/species_programme/index.cfm (accessed 8 October 2008).
- IUCN. 2008e. About the IUCN Red List. IUCN, Gland, Switzerland. Available from http://www.iucn.org/about/work/programmes/species/red_list/about_the_red_list/index.cfm (accessed 8 October 2008).
- IUCN Pangolin Specialist Group. n.d. Pangolin Introduction: Taxonomy. Taiwan Forestry Research Institute, Taipei, Taiwan. Available from http://protect.tfri.gov.tw/animal/pangolin/iucn_002_01.asp (accessed 26 March 2008).
- Lim, N. and P. K. L. Ng. 2007. Home range, activity cycle and natal den usage of a female Sunda pangolin *Manis javanica* (Mammalia:Pholidota) in Singapore. *Endangered Species Research*. Vol. 3: Preprint, Published online June 20, 2007.
- Luo, S.-J., Cai, Q. X., David, V. A., Zhang, L., Martelli, P., Lim, T.-L., Chin, S.-C., Gaubert, P., Ramos, M. J., O'Brien, S. J. O., Antunes, A. and Johnson, W. E. 2007. Isolation and characterization of microsatellite markers in pangolins (Mammalia, Pholidota, *Manis* spp.). *Molecular Ecology Notes* 7: 269-272.
- Myers, P. 2000. "Pholidota" (On-line), Animal Diversity Web. University of Michigan. Available from <http://animaldiversity.ummz.umich.edu/site/accounts/information/Pholidota.html> (accessed March 08, 2008).

- Newton P, Nguyen TV, Robertson S, and Bell D. 2008. Pangolins in peril: using local hunters' knowledge to conserve elusive species in Vietnam. *Endangered Species Research* 6:41-53. Available from <http://www.intres.com/articles/esr2008/6/n006p041.pdf> (accessed 9 October 2008).
- Stocker, Gerold. 1986. *Manis javanica*. CITES Management Authority of Switzerland. Available from http://www.cites.org/eng/resources/ID/fauna/Volume1/A-108.001.001.003%20Manis%20javanica_E.pdf (accessed 08 March 2008).
- Misra, M. and F. Hanfee. 2000. Pangolin distribution and trade in East and Northeast India. *TRAFFIC Dispatches* 14: 4-5. Available from www.traffic.org/traffic-dispatches/traffic_pub_dispatches14.pdf (accessed 16 July 2008).
- TRAFFIC Southeast Asia. 2004. Armored but endangered. *Asian Geographic*, 4, 64–71.
- TRAFFIC and IUCN/SSC Wildlife Trade Program. 2004. Taxa identified as possible candidates for inclusion in the review of significant trade in specimens of Appendix II species, prepared for the twentieth meeting of the CITES Animals Committee. Available from <http://www.cites.org/common/com/ac/20/E20-inf-12.pdf> (accessed 16 July 2008).
- TRAFFIC. 2008. Final Call for Pangolins. TRAFFIC, Cambridge, UK. Available from <http://www.traffic.org/home/2008/6/29/final-call-for-pangolins.html> (accessed 23 July 2008).
- Wildlife Alliance. n.d. Sunda pangolin. Wildlife Alliance, Washington, D.C. Available from <http://www.wildlifealliance.org/conserving-wildlife/protecting-animals/sunda-pangolin.html> (accessed 23 July 2008).
- Wildlife at Risk. n.d. *Manis javanica*. Wildlife at Risk, Ho Chi Minh City, Vietnam. Available from <http://wildlifeatrisk.org/UserFiles/File/species%20at%20risk-jpangolin.pdf> (accessed 7 June 2008).
- Yang, C. W., S. Chen, C.-Y. Chang, M. F. Lin, E. Block, R. Lorentsen, J. S. C. Chin, and E. S. Dierenfeld. 2007. History and dietary husbandry of pangolins in captivity. *Zoo Biol* 26:223–230.

Appendix: Excerpts from Cambodia's LAW ON FORESTRY: Relevant Articles, and Penalties

(Full text available from http://www.forestry.gov.kh/Documents/Forestry%20Law_Eng.pdf)

CHAPTER 10

CONSERVATION OF WILDLIFE

Article 48-

All kinds of wildlife species in the Kingdom of Cambodia are State property and the component of forest resources, including all species of mammals, birds, reptiles, amphibians, insects, other invertebrates, and their eggs or offspring. Such wildlife is under the management, research and conservation of the Forestry Administration, except for fish and animals that breed in water.

Wildlife specimens are dead wildlife, including the whole body, internal or external organs, the skeleton and processing products, and shall be under the management jurisdiction of the Forestry Administration.

All wildlife shall be divided into the following three categories:

- 1- Endangered species;
- 2- Rare species; and
- 3- Common species.

Ministry of Agriculture, Forestry and Fisheries, through the proposal of the Forestry Administration, shall issue a Prakas to determine the criteria for each category and establish a separate list for endangered and rare species, which may vary between regions in Cambodia, with consultation with Ministry of Environment.

Article 49-

It is strictly prohibited to hunt, harm or harass all wildlife:

- 1- Using all types of dangerous means;
- 2- Hunting during the prohibited season; and
- 3- Hunting in protected zones and special public areas.

The Forestry Administration, upon the agreement from Ministry of Agriculture, Forestry and Fisheries, has the authority to issue a permit involving rare and endangered species for the following purposes:

- 1- For educational or scientific research;
- 2- In support of a Captive Breeding Program;
- 3- To exchange wildlife species pursuant to international cooperation agreements;

It shall be prohibited to commit the following activities against rare and endangered wildlife species.

- 1- Harass or harm any such species above or its habitat;
- 2- Hunt, net, trap or poison;
- 3- Possess, stock or maintain as a zoo or in a family house;
- 4- Transport;
- 5- Trade; and
- 6- Export-Import.

Rules on the activities related to all types of wildlife species shall be determined by Joint Prakas between the Ministry of Agriculture, Forestry and Fisheries and Ministry of Environment.

Article 50-

It is prohibited to commit the following activities against common wildlife species, except by a permit issued by the Forestry Administration:

- 1- Stock or maintain as a zoo or in a family house;
- 2- Transport and Trade an amount exceeding that necessary for customary use.

The export-import of any common wildlife species shall be accompanied by a permit issued by the Forestry Administration, upon the approval of Ministry of Agriculture, Forestry and Fisheries.

Article 51-

The Forestry Administration shall collect the following Wildlife Conservation Fee and Wildlife Royalty:

- 1- A Wildlife Conservation Fee shall be paid to the Forest Development Fund; and
- 2- A Wildlife Royalty shall be paid to the National Budget.

The amount of a Wildlife Conservation Fee and Wildlife Royalty shall be determined by Joint-Prakas between the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Economy and Finance.

CHAPTER 15 FORESTRY OFFENSES AND LEGAL PENALTIES

Article 90-

Punishments for forestry offenses consist of: imprisonment, confiscation of evidence, court fines, transactional fines, repairing damage, warning and revocation or suspension of agreements or permits.

Transactional fines for forestry offenses, repairing damage and warnings shall be the responsibility of the Forestry Administration. If the offender refuses to pay the transactional fine or repair damage, then the Forestry Administration may forward the file on the forestry offense to the Court.

Any government official who commits a forestry offense shall be subject to administrative punishment in addition to penalties stated in this law.

Article 93-

Any person or legal entity that violates a provision of this law shall be subject to the penalties as follow:

- 1- Class I Forestry Offenses –five (5) to ten (10) years in prison and confiscate all evidence as state property;
- 2- Class II Forestry Offenses –one (1) to five (5) years in prison and/or a fine of ten millions (10.000.000) Riels to one hundred millions (100.000.000) Riels and confiscate all evidence as State property;
- 3- Class III Forestry offenses –one (1) month to one (1) year in prison or fine of one million (1.000.000) Riels to ten millions (10.000.000) Riels and confiscate all evidence as State property.
- 4- Warning, repairing damage, transactional fines, revocation or suspension of agreements or permits.

The basic market value for Forest Products& By-products shall be determined by the Prakas of Ministry of Agriculture, Forestry and Fisheries for uniform implementation in the country.

Article 96-

An individual who has committed the following forestry offenses shall be subject to a transactional fine from the Forestry Administration for two (2) to three (3) times the market value of real evidence:

- 1- Fell tree without mark authorizing the felling;
- 2- Transport Forest Products& By-products without a permit;
- 3- Stock Forest Products& By-products without a permit;
- 4- Transport Forest Products& By-products contrary to the destination or exceeding the quantity authorized in the permit;
- 5- Use an expired transport permit for Forest Products& By-products;
- 6- Actual specifications of Forest Products& By-products contrary to those described in a transport permit;
- 7- Stock Forest Products& By-products exceeding the quantity authorized in a permit;

- 8- Export Forest Products& By-products, forest seed and vegetation species exceeding the amount in the applicable license;
- 9- Fell, saw, split and chop logs within the Permanent Forest Reserve, or use chain saw as a means to harvest forest products without permit or tag;
- 10- Harvest Forest Products& By-products during unauthorized hours;
- 11- Transport Forest Products& By-products that were obtained from felling or harvesting contrary to the provision of this law;
- 12- Forest Products& By-products for processing obtained from felling or harvesting contrary to the provision of this law;
- 13- Sell/buy or distribute Forest Products& By-products that were obtained from felling, finding, transporting or processing contrary to the provisions of this law;
- 14- Forest Products& By-products that were obtained from harvesting, transporting and processing contrary to the provision of this law;
- 15- Export Forest Products& By-products without a Visa approved by the director of the Forestry Administration;
- 16- Raise or breed any endangered wildlife species;
- 17- Possess, process, stock, transport or import rare wildlife species or specimens;
- 18- Raise or breed any rare wildlife species;
- 19- Transport, trade, stock, process or import common species or specimen without permit;
- 20- Hunting in public area.

Any individual who has violated the provision of the 1st paragraph of this Article multiple times within a month shall be fined two (2) to four (4) times the market value of evidence by the Forestry Administration.

All real evidence of forestry offenses shall be confiscated as state property consistent with the provisions of this law. Other evidence of the offenses stated in this article 96, other than Forest Products& By-products, may be returned to the owner.

Article 97-

Any individual who has committed the following forestry offenses shall be punished under a Class I forestry offense subject to five (5) to ten (10) years in prison and confiscation of all evidence as state property, revocation of applicable agreements, licenses or permits, and destruction of false real evidence.

1. Forge or use fake hammer-Stamp, or destroying the mark of the Forestry Administration affixed on logs;
2. Falsification or unauthorized use of the uniform, insignia, hierarchical ranking badge of the Forestry Administration Officer;
3. Falsify public documents related to forestry or wildlife domain;
4. Destroy, hide, sell, or steal forest evidence;
5. Destroy, alter, or damage the boundary posts of the forest areas;
6. Clear forestland and enclose it to claim for ownership;
7. Set forest fires intentionally;
8. Gird bark, poison, destroy, fell or uproot trees to collect stumps;
9. Establish processing base for yellow vine or craft base of other Forest By-products that leads to the destruction of forest or forest ecology;
10. Hunt, kill, trade or export endangered wildlife species.

Any individual who has committed the forestry offenses under class I multiple times shall be penalized double the punishment stated for class I forestry offense of this law.

Article 98-

Any individual who has committed the following forestry offenses shall be punished under class II forestry offenses subject to one (1) to five (5) years in prison and/or court fines of ten (10) million to one hundred (100) million Riel, and confiscation of all evidence as state property:

- 1- Non-compliance with the technical regulation defined in the Code of Practice for Forest Management in Cambodia;
- 2- Non-compliance with management plan and annual Forest Products& By-products harvest plan;
- 3- Misuse of a forest use permit to harvest Forest Products & By-products;
- 4- Use machinery or vehicle with the purpose of Forest Products& By-products harvesting without permit or tags;
- 5- Quarry, excavate stone or sand, or mine within the Permanent Forest Reserve;
- 6- Use forest land exceeding the size of the area authorized in the permit or without permit to construct public road, forest road or all types of building or residence along the road with in the Permanent Forest Reserve;

- 7- Establish a forest industry base, sawmill, Forest Products& By-products processing facility at large and medium scale without a Prakas issued by Ministry of Agriculture, Forestry and Fisheries;
- 8- Establishing all types of kilns that use Forest Products& By-products as raw material without permit;
- 9- Hunt wildlife in closed season or in protected zones;
- 10- Hunt, kill, trade, or export rare species;
- 11- Hunt wildlife by dangerous means that harm to animal biology; and
- 12- Posses, process, stock, transport or import endangered wildlife species or specimens.

Any individual who has committed the following activities shall be punished under a class II forestry offense subject to one (1) to five (5) years in prison and a fine of ten (10) million to one hundred (100) million Riel, and confiscation of all evidence as state property:

- 1- Harvest Forest Products& By-products without a permit;
- 2- Harvest Forest Products& By-products outside a coupe area as stated in a permit or outside the location set forth in the annual operational plan;
- 3- Transfer a right or sell a license or permit without permission;
- 4- Fell trees within a State Forest plantation;
- 5- Fell trees with a classified diameter smaller than allowed, that are rare species, that local people tap for resin or that yield high-value resin;
- 6- Import seeds of forest vegetation species without a visa from the scientific authorities from the exporting country and without permission from Ministry of Agriculture, Forestry and Fisheries;
- 7- Export Forest Products& By-products without license;

Any individual who has committed class II forestry offense multiple times shall be penalized as stated for a class I forestry offence in this law.

Article 99-

Any individual who has committed the following offenses shall be punished under class III forestry offense subject to one (1) month to one (1) year in prison or fine of one (1) million to ten (10) million Riel. All evidence shall be confiscated as state property:

- 1- Use any type of chainsaw to harvest Forest Products& By-products without permission from the Head of Forestry Administration;
- 2- Import all types of machinery, vehicles and chainsaws to harvest Forest Products& By-products without an appropriate evaluation by the Ministry of Agriculture, Forestry and Fisheries;
- 3- Export Forest Products& By-products in a container without a seal from the Forestry Administration;
- 4- Harass, harm, or collect egg or offspring of, an endangered or rare wildlife species or destroy its habitat;
- 5- Establish stock place, wholesale and retail depot for Forest Products& By-products or small scale of Forest Products& By-products processing facilities without permit or contrary to permission.
- 6- Establish industrial forest factory, sawmill, Forest Products& By-products processing facilities or any type of kiln that use Forest Products& By-products as raw material or as an energy source contrary to permission of the Forestry Administration.

Any individual who commits a class III of forestry offense multiple times shall be penalized as stated for class II of forestry offense in this law.

Article 100-

Any activities carried out by the official of local authority, the police officer, Royal armed forces or other authorities that directly or indirectly allow forest exploitation or other activities contrary to the provisions of this law, or to threaten a Forestry Administration officer, or to obstruct the performance of duties and operations of a Forestry Administration officer, shall be subject to one (1) to five (5) years in prison and fines of ten (10) million to one hundred (100) million Riel.