

Chinese Pangolin (*Manis pentadactyla*)

Species Action Plan

2019-2024



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Compiled by the Agriculture, Fisheries and Conservation Department



Acronyms and Abbreviations

AFC	Agriculture, Fisheries and Conservation Department
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EIA	Environmental Impact Assessment
IUCN	International Union for the Conservation of Nature
KFBG	Kadoorie Farm and Botanic Garden
NGO	Non-government Organisation

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1. Introduction

The Chinese Pangolin (中華穿山甲, *Manis pentadactyla* Linnaeus, 1758) is native to Hong Kong and is one of the eight living species of scaly anteaters residing in a single taxonomic family – the Manidae. It is only found in tropical Asia and is characterised by its scaly armour. Unfortunately, the ballooning demand for the animal's meat and scales, the former for wildlife cuisine and the latter for traditional medicine, predominantly in Vietnam and China (Challender, 2011) are driving the Chinese Pangolin and other pangolin species to the brink of extinction. The species has experienced a drastic population decline across its natural range over the past few decades. Its rarity and the direct human threats have contributed to its Critically Endangered status on the IUCN Red List and its listing in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Being secretive by nature, pangolins are difficult to census and study, and are considered to be one of the least understood groups of mammals on earth. Little is known about their populations, biology, ecology and conservation needs, making effective conservation management difficult.

AFCD camera trap surveys and occasional sighting records have suggested that the Chinese Pangolin has a scattered and patchy distribution in the Hong Kong SAR. Records exist from the country parks and other countryside/rural areas, but sightings of the pangolin are rare. The species is locally protected under the Wild Animals Protection Ordinance (Cap. 170) and the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586), and its habitat within country parks and special areas are protected under the Country Parks Ordinance (Cap. 208).

The species action plan, effective from 2019 to 2024, aims to propose and conduct scientific research to fill information gaps regarding the pangolin's ecology and conservation, and to lay out feasible protection measures and conservation actions to better conserve Chinese Pangolins within the local territory, as well as to contribute to the regional protection of the species.

2. Background information

2.1 Taxonomy

The ancestors of pangolins are thought to be under the suborder Palaeanodonta, the surviving successors of which, evolved into the order Pholidota. Nowadays, Pholidota contains only one family, the Manidae, with eight living species, among which four are found in Asia.

The Chinese Pangolin is placed under the following taxonomic hierarchy (Linnaeus, 1758):

Class MAMMALIA

Order PHOLIDOTA

Family MANIDAE

Genus *Manis*

Species *Manis pentadactyla* Linnaeus, 1758

Currently three subspecies have been identified (Ellerman and Morrison-Scott, 1951): *Manis pentadactyla aurita* in southern Mainland China, *M. p. pusilla* in Hainan, and *M. p. pentadactyla* (Formosan Pangolin) in Taiwan.

2.2 General description

Pangolins are a unique group of mammals that are characterised by having an armour of overlapping scales comprised of keratin. They have a conical-shaped head with a tapering and pointed snout, no teeth, a long and thick tail, and stout limbs with powerful long claws for digging and breaking apart ant nests or termite mounds (Pocock, 1924). When threatened, pangolins curl up into a ball, leaving only the dorsal scaly parts of the body exposed.

The Chinese Pangolin is covered with about 32-33 rows of overlapping scales along the dorsal side of its head and body, and about 16-19 rows of scales on its tail (Cota-Larson, 2017). Scales are greyish brown to grey, a much darker colour than its skin. There are hair bristles between the scales. The adult has an average snout-vent length of 45-60cm and tail length of 25-40cm, and weighs between 2-7kg (Zhang et al, 2016). Compared with other pangolin species, the Chinese Pangolin possesses relatively well-developed external earlobes, a shorter head length (neck to snout) and a thicker and shorter tail (Cota-Larson, 2017).



A young pangolin curling up into a ball.

2.3 Biology and ecology

The Chinese Pangolin prefers higher altitudes, especially in the southern and western parts of its range (see Section 2.5), though it also occurs at lower altitudes in the

northeast of its range, including Hong Kong. Its preference for humid woodlands with leaf litter and dead wood can be explained by its diet, which is composed predominantly of ants and termites. In Hong Kong, the Chinese Pangolin mainly inhabits woodlands but also frequents shrublands/shrubby grasslands on forest edge. Pangolin burrows can often be found on hillside embankments, sometimes close to man-made paths and roads. The Chinese Pangolin appears to be quite adaptable with individuals often venturing close to rural villages, where the habitat is quite fragmented and disturbed, with shrubland and scattered secondary forest.

This species is elusive and thought to be essentially nocturnal in Hong Kong based on sightings and AFCD camera trap records (Shek et al, 2007), and rests inside its burrows during the day. According to a burrow study at Dawuling Nature Reserve (Wu et al, 2003), Chinese Pangolins excavate burrows at sites which have minimal human disturbance, and on steep slopes from 30°~60°, that are half sunny and half shady, and have full or partial vegetation cover at the entrance. In winter, they usually dig deeper burrows as dens in order to avoid the cold weather, and to prey on termites underground (Wu et al, 2003).

Being myrmecophagous (i.e. predominantly feeding on ants and termites), they possess a long, thin and sticky tongue that can measure up to 40 cm in length used for scooping up ants and termites. Although primarily ground dwelling, Chinese Pangolins are perfectly capable of climbing trees (Chao, 1989). A recent analysis of gut contents removed from the carcass of a local pangolin has shed some light on its foraging preference for arboreal and epigeic ants inside secondary forest and shrubland habitats (Lee et al, 2017).

The Chinese Pangolin is believed to be solitary except during mating season. Females may reach sexual maturity before one year, even as early as six month or when the body weight is above two kilograms (Zhang et al, 2016). Mating season of the Chinese Pangolin generally occurs between February and July with a gestation period of about 200 days (Zhang et al, 2016). Pangolins give birth in late summer / early autumn. Litter size is usually one and the infant is carried on its mother's tail when she is foraging outside the burrow. Chinese Pangolins have been thought to be polygynous with usually one male mating with several females. However a recent study by National Pingtung University of Science and Technology suggests that female individuals establish temporary pair bonds with different males during different seasons (Sun, 2019, pers comm).

It is unknown how long the Chinese Pangolin can live in the wild, though one specimen was reported to have lived for over 15 years in captivity (Weigl, 2005).

2.4 Population status

Globally, due to high levels of exploitation, the Chinese Pangolin has been reduced to remnant populations or even extirpated from parts of its current natural range. In general, the records of the species are so sparse that its existing population size and distribution are unclear. In Taiwan, the pangolin density of a stable wild population was estimated to be 12.8 individuals per 100ha in Taitung (Pei, 2010).

Locally, because it is rarely recorded or sighted, the abundance and population status

remains largely unknown. However, the species is generally believed to be rare with a scattered and patchy distribution throughout Hong Kong. Young pangolins have been recorded and rescued, implying a reproducing population, yet its long-term viability remains uncertain. There is little information available on population size and home range in Hong Kong.



Releasing a rescued pangolin after rehabilitation.

2.5 Distribution

The global distribution includes southern China (surveys in Southern China in 1990's and 2000's have however failed to uncover any records in the region but only fresh burrows in Jiangxi (KFBG, 2003)), Hainan, Taiwan, Hong Kong SAR, Bhutan, northern Vietnam, Laos PDR, Thailand, Myanmar, Bangladesh, India, and eastern Nepal. Locally, Chinese Pangolins have been documented from AFCD camera trap surveys, reports by the public and NGOs, and from individuals recorded from the local rescue centre. The records have been made throughout the territory, ranging from protected country parks to rural villages.

As pangolins are exceptionally vulnerable to illegal poaching, for the sake of prudence, all locality information for pangolins in Hong Kong, including records from camera trap surveys, as well as capture and release sites, will not be disclosed in any detail, e.g. in publications or reports, regardless of whether or not some information was already disclosed by local media or through other channels.

2.6 Conservation

Due to high levels of poaching for meat and scales throughout its range, and as a result of habitat loss, the Chinese Pangolin has been listed as 'Critically Endangered' by

IUCN Red List since 2014 (Challender et al, 2014). In light of the scale of the illegal trade in pangolin products, all pangolin species were up-listed to Appendix I by CITES in 2016. International trade in wild-caught pangolins for commercial purposes has been prohibited.

Nationally, the Chinese Pangolin is listed as a ‘Class 2 National Protected Species’ in the List of Wildlife under National Key Protection according to the Wildlife Protection Law of the People’s Republic of China. The Red List of China’s Vertebrates published in 2016 also rated the animal as ‘Critically Endangered’ (Jiang et al, 2016).

Locally, the Chinese Pangolin is protected under the Wild Animals Protection Ordinance (Cap. 170). Under the Ordinance, it is an offence to hunt or wilfully disturb, sell, export, or possess the Chinese Pangolin. It is also a scheduled species under the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586), which gives effect to CITES. Any commercial trading of the Chinese Pangolin, or its body parts, has been banned. Within Country Parks, the species is protected under the Country Parks Ordinance (Cap. 208), which also prohibits the possession and carrying of hunting appliances.

2.7 Threats and challenges

DOG ATTACK

Pangolins are particularly vulnerable to attack and predation by feral dogs due to their inability to fully protect themselves from this pack predator (Liu and Xu, 1981). Feral dogs are opportunistic predators and scavengers, and are known to hunt a variety of animals including wild birds, porcupines, barking deer, and masked palm civets. Although pangolins will curl up when threatened, feral dogs can pursue the pangolins for an extended time and are known to cause injury or death, particularly to younger ones, which are more vulnerable to injuries (Sun et al, 2019). Since 2000, over one-third of pangolin individuals admitted to KFBG Wild Animal Rescue Centre had been identified as victims of dog attacks.

HUNTING PRESSURE

In Hong Kong, anecdotal evidence suggests that there may be real but very low poaching pressure affecting local pangolins. Many Chinese Pangolin populations have been seriously impacted by poaching across their native range. While poaching is not known to be a pressing issue in Hong Kong, its impact on the global population is alarming. The depletion of pangolins in neighbouring regions may imply a future potential shift of hunting pressure to our local population, as there are no barriers to such a shift in poaching patterns. This could put the Hong Kong population at significant risk in the future.

HABITAT FRAGMENTATION

Like many other medium-sized mammals, the Chinese Pangolin is sensitive to habitat fragmentation as it requires a large home range and has difficulty in crossing barriers such as roads, highways, railways and river channels. Habitat fragmentation is believed to be a potential problem in areas with higher pangolin activities, and may intensify if

these areas are also prone to hill fires. Insufficient connectivity between habitats may deter pangolin movement and lower mating success rate, reduce gene flow and prevent recolonisation should a subpopulation disappear due to a stochastic event, subsequently hindering their resilience and long-term survival.

KNOWLEDGE GAP

Knowledge gaps limit the efficacy of conservation efforts and pose challenges in mitigating the threats identified. So far our knowledge and understanding of local Chinese Pangolin populations, including their diet, habitat use, population size and range, metapopulations and demographic parameters, are still very limited due to the cryptic behaviour of pangolins and their low density within the territory, as well as the lack of comprehensive studies. While neighbouring regions, such as Thailand, Vietnam and Taiwan, have started developing *ex situ* husbandry protocols (Hua et al, 2015), still little is known about the pangolin's husbandry requirements in captivity, including diet and nutrition, and enclosure design in the local context. The very low success rate in many captive breeding programmes has ruled out ex-situ conservation as an option for most countries (Zhang et al, 2016).



A camera trap image of the Chinese Pangolin taken in Hong Kong.

2.8 Climate change

Like many terrestrial animals, pangolins could be impacted by abiotic factors, such as changes in ambient temperature, frequency and severity of extreme weather events, and availability of water source. Besides, they could also be influenced indirectly by biotic factors resulting from climate change, such as distribution and abundance of food sources (i.e. certain species of ants and termites), predators and competitors. Extreme weather conditions also increase the risks of catastrophic events such as landslides and hill fire, which may also pose an impact on the ant and termite communities. While climate change is recognised as having potential impact on the local pangolin

population by altering the food source composition and habitat, the threat is currently deemed remote, indirect and insignificant.

3. Action Plan

3.1 Aim

The purpose of this action plan is to provide a framework of conservation actions that will ensure the long-term viability of Chinese Pangolins in Hong Kong, raise wider awareness about pangolins and their protection needs, and contribute to the regional and global protection of the Chinese Pangolin.

3.2 Objectives

The consolidated actions laid out in this plan are to be implemented through collaborations between the government conservation authority and other environmental organisations and institutes. The major objectives are:

- (i) To safeguard local Chinese Pangolin populations and enhance in situ conservation through habitat management and enhanced protection.
- (ii) To fill knowledge and data gaps in the biology, ecology and population status of Chinese Pangolins through research and new initiatives to guide conservation actions.
- (iv) To maximise conservation gains from rescue, rehabilitation and release of Chinese Pangolins.
- (v) To raise wider awareness about pangolins that will help to support their conservation.

3.3 Timeframe

This action plan covers a period of 5 years from 2019 to 2024. Review of the plan should be conducted towards the end of the 5-year period.

3.4 Actions

RESEARCH AND MONITORING

Action (1): To identify the key occurrence sites for the Chinese Pangolin in Hong Kong

- Description: Key sites supporting viable populations of Chinese Pangolins will be identified through analysing existing records from AFCD camera trap surveys and burrow surveys, sighting reports of pangolins from reliable sources (e.g. EIA consultants, public reports with photo evidence), and rescue cases. Key sites will be identified based on intensity and range of pangolin activities, taking into account species occurrence and distribution of burrows.
- Agency(-ies): AFCD
- Timeline: 2020 to 2021

Action (2): To study local habitat preference and burrowing behaviour of local Chinese Pangolins

- Description: A field-based burrow study will be contracted out by AFCD to review the distribution of pangolin burrows and conditions at the key sites (identified from Action (1)) and any other locations of interest. Biotic and abiotic parameters will be measured at each burrow with the aim of understanding the major factors influencing pangolin choice and occurrence, and hence deriving species' habitat preference and ecology. Dedicated camera traps and other methods will be used at selected burrows to confirm activity and analyse use of burrows and burrowing habits. Findings of this burrow study may reveal new occurrence locations for Chinese Pangolins, and help identify additional key sites. Signs of human disturbance and hunting activities will also be recorded during the field studies, enabling increased efforts to monitor the key sites for detection of illegal hunting activities and the carrying out of any appropriate protection measures.
- Agency(-ies): AFCD (contracted project)
- Timeline: 2020 to 2022

Action (3): To strengthen ecological monitoring methods for Chinese Pangolins in Hong Kong

- Description: Desktop study and special projects will be conducted by AFCD or through collaboration with relevant parties to review the available information from radio telemetry, camera trapping and other survey techniques to build capacity to develop a more consistent and effective strategic monitoring programme for local pangolins. This action also aims at identifying best-practice or innovative survey techniques and statistical methods for detecting and monitoring pangolin population status and trends in the wild. Reference will be made to various detection and monitoring methods adopted internationally, including established techniques for other similar elusive and rare species to facilitate the development of efficient, targeted field research studies of local pangolins.
- Agency(-ies): AFCD, Chinese Pangolin SAP Advisory Group, interested parties
- Timeline: 2020-23

Action (4): To understand home range and movement patterns of local Chinese Pangolins

- Description: Radio-tracking of wild pangolins will be conducted, whenever feasible, in order to gain improved understanding of movement patterns in Hong Kong. A tracking device will be attached to rescued individuals or captures from active trapping. The individuals will be released to the rescue/capture site or the closest suitable site, where regular tracking can be conducted. If the situation permits, ground searching for the individuals will be performed to ensure that the target individuals are in good health condition. The location points collated can provide information on the home range and movement patterns of individuals, using spatial modelling. The results may also provide insights regarding the identification of more effective monitoring methods for local pangolins, such as required sampling effort for camera traps.
- Agency(-ies): AFCD (radio-tracking of pangolins), KFBG (handling, care and rehabilitation of rescued individuals)
- Timeline: 2019 onwards (subject to when pangolins occur)

Action (5): To study the feeding ecology of wild Chinese Pangolins

- Description: To gain knowledge of pangolin's diet and foraging behaviour in the wild, stomach contents and fecal samples of pangolins collected from rescue cases or in the field, whenever available, will be examined and analysed. The identification of prey species and their relative abundance will give information on the feeding preference and behaviour of the local pangolins. The result may also facilitate the further development of rescue, rehabilitation and release protocol in Actions (6).
- Agency(-ies): KFBG, local university (prey identification/analysis)
- Timeline: 2019 onwards (subject to when pangolins occur)

SPECIES PROTECTION

Action (6): To develop a rescue, rehabilitation, release and post-release monitoring protocol

- Description: A protocol will be produced to provide guidance regarding the captive care and rehabilitation of rescued pangolins. The protocol will aim at enhancing long-term survival prospects for rescued pangolins and follow best practice developed by other organisations where information is available. Under the protocol, the workflow between collaborating parties will be developed to allow a quick and effective response in case of an emergency, such as animal injury and live confiscation, and facilitate information exchange. The protocol should provide clear guidance regarding the handling, rescue and temporary care (both veterinary and husbandry) of injured, diseased and displaced pangolins, as well as subsequent treatments of the animals including release to appropriate habitats in the wild. Strategic translocation and reintroduction of pangolins will be covered in the protocol, taking into account the key occurrence sites identified in Action (1). As an important part of the protocol, post-release research and monitoring should be encouraged to allow evaluation of the effectiveness of rescue and rehabilitation, as well as collect important data on the animal's survival and behaviour, contributing to Action (4). The protocol will be reviewed and updated on a regular basis.
- Agency(-ies): KFBG (rescue and rehabilitation), AFCD (release and post-release monitoring)
- Timeline: 2020-2022

HABITAT PROTECTION

Action (7): To identify and manage areas with high threat of feral dogs

- Description: Based on camera trap records, overlapping areas of high activity of feral dogs and pangolins will be identified. The result will help draw up a map of 'high risk areas' coinciding with pangolin occurrence, and assess any feasible strategic planning of feral dog control in the identified high threat areas. Relevant parties should be engaged in launching feral dog control methods in the identified high threat areas where appropriate.
- Agency(-ies): AFCD
- Timeline: 2020-2024

Action (8): To identify and promote connectivity between pangolin hotspots

- Description: The status of the habitats between key sites (identified in Action (1)) will be reviewed in order to assess the level of habitat connectivity between pangolin hotspots and identify potential areas of pangolin corridors. Besides, in

order to encourage general habitat connectivity and mitigate potential impacts arising from habitat fragmentation between key sites, the Nature Conservation Practice Note on the ‘Design of Terrestrial Wildlife Crossing System’ published by AFCD in 2019 will be circulated to stakeholders, including government departments and consultants.

- Agency(-ies): Michael Lau (connectivity assessment), AFCD (practice note circulation)
- Timeline: 2021-2023

CAPACITY BUILDING

Action (9): To enhance capacity and skills through exchange with experts in the region

- Description: Visits to pangolin holding facilities and research institutes in the regions will be arranged to better equip local officials, researchers and biologists with knowledge and skills needed in pangolin research, monitoring, rescue and rehabilitation, and conservation planning. In addition, opportunities should be taken to attend overseas/regional workshops and conferences in relation to pangolin conservation by the advisory group, and regular exchange with pangolin experts should be undertaken where appropriate.
- Agencies: AFCD, Chinese Pangolin SAP Advisory Group
- Timeline: 2019 onwards

COMMUNITY AND PUBLICITY

Action (10): To promote pangolin conservation through awareness raising

- Description: Public awareness and efforts to conserve the remaining pangolin populations will be raised through information sharing and educational/public awareness events, including the promotion of the World Pangolin Day. Communications between parties working on the awareness raising and/or conservation of pangolins should also be enhanced to create synergy effects. In addition, a channel for public reporting of pangolin sightings will be created and promoted to encourage information gathering.
- Agency(-ies): KFBG, interested parties (awareness raising); AFCD (public-reporting platform)
- Timeline: 2019 onwards

3.5 Action timetable

Actions		Agency(-ies)	Timeframe
Research and monitoring			
(1)	To identify the key occurrence sites for the Chinese Pangolin in Hong Kong	AFCD	2020-2021
(2)	To study local habitat preference and burrowing behaviour of local Chinese Pangolins	AFCD	2020-2022
(3)	To strengthen ecological monitoring methods for Chinese Pangolins in Hong Kong	AFCD, SAP Advisory Group, interested parties	2020-2023

(4)	To understand home range and movement patterns of local Chinese Pangolins	AFCD, KFBG	2019 onwards
(5)	To study the feeding ecology of wild Chinese Pangolins	KFBG, local university	2019 onwards
Species protection			
(6)	To develop a rescue, rehabilitation, release and post-release monitoring protocol	KFBG, AFCD	2020-2022
Habitat protection			
(7)	To identify and manage areas with high threat of feral dogs	AFCD	2020-2024
(8)	To identify and promote connectivity between pangolin hotspots	Michael Lau, AFCD	2021-2023
Capacity building			
(9)	To enhance capacity and skills through exchange with experts in the region	AFCD, SAP Advisory Group	2019 onwards
Community and publicity			
(10)	To promote pangolin conservation through awareness raising	KFBG, AFCD, interested parties	2019 onwards

4. Implementation and Reviews

Actions laid out in this action plan will be carried out by the corresponding agencies according to the set timelines, under the coordination of AFCD. Funding for the implementation of actions will be sought by the responsible agencies. Parties who are interested in taking part in Action 3 and 10 are welcome to contact AFCD for more information about how to participate in this SAP.

All actions will be reviewed in late 2023. An interim review of the plan may also be undertaken if necessary. Set indicators will be used to evaluate the success and progress of this SAP.

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