**Progress on implementation of IUCN Recommendation 5.0139 “Bear farming in Asia”: a joint report by the IUCN Species Survival Commission and the State Forestry Administration of the People’s Republic of China**

23 August 2016

*Background*

IUCN and China’s State Forestry Administration (SFA) have jointly agreed to collaborate on implementation of IUCN Recommendation 139 “Bear farming in Asia”, adopted by IUCN Members at the 5th World Conservation Congress in Jeju, Republic of Korea, in 2012, specifically in support of delivery of Operative Paragraphs 2g and 2h. China agreed to collaborate because of its importance as a major range state for the Asiatic Black Bear; it comprises more than half the range of the species, has many bear farms and is also concerned over the wild status of bears. The study, called for in OP 2g and 2h, is complex, as it requires an understanding of the dynamics and relationship between the market for wild and farmed bear bile as well as the status of wild black bear populations.

IUCN and SFA have met three times in person in the preceding IUCN quadrennium: 21-22 November 2013, 26-27 March 2015 and, most recently, 19-20 July 2016. These meetings were to determine the nature of the study, who would be involved, how decisions would be made, and how funding would be acquired. At their most recent meeting, IUCN and SFA reviewed progress in the past four years and agreed on a way forward for the next 4 years to ensure the delivery of OP 2h in time for the 7th World Conservation Congress in 2020, which coincides with the conclusion of the current Convention on Biological Diversity Strategic plan.

*Report on the period 2013-2016*

IUCN and SFA both acknowledged that progress on the implementation of OP 2g and 2h of Recommendation 139 had been slower than hoped. IUCN has not been involved in OP 2a-2f, and defers discussion of those points to respective state governments.

With reference to OP 2g, IUCN and SFA have divided the analysis into two main components: (1) a survey to assess status, trends and drivers of wild populations of black bears, and (2) a market survey to understand demand for farmed and wild bile, and interactions between these two markets (i.e., potential motivations for poaching of wild bears).

In terms of the assessment of wild bear populations, SFA initiated a repeat of a survey of black bears in Sichuan Province that was conducted in 2005-2007 (Liu et al. 2009, 2011). In January 2016, interviews of local villagers were conducted to assess bear presence and their perception of population trend in 48 of the original 494 15x15-km survey cells (see Annex 1 for results). Funds were not sufficient to verify bear presence through sign (as was done in the 2005-2007 survey), nor to complete all 200 planned sampling cells. A second survey (Oct-Nov 2015, and Jan 2016) was initiated in Jilin Province in north-eastern China with the intention of obtaining trend information from social interviews; 8 of 112 selected sampling cells were surveyed through interviews and searches for sign, but the remainder could not be completed due to time and budgetary constraints (see Annex 2).

The main activity undertaken in support of understanding the markets for bile were Key Informant Interviews. These interviews involved bear-farms, pharmaceutical factories, Traditional Chinese Medicine (TCM) doctors at hospitals, clinics and pharmacies, and shop sales-staff and were conducted jointly by IUCN and SFA in December 2015. Interviews were conducted in four representative locations: Mudanjiang in Heilongjiang, Yushu in Jilin, and Kunming and Pu'er in Yunnan. Although no definitive results can be drawn from these activities (see Annex 3 for a report summarizing the findings), it was agreed that they all provide a critical basis for the work forthcoming in the next quadrennium. The KI interviews confirmed that the problem was complex and many issues had to be carefully addressed first.

It was acknowledged that there were several reasons for making slower progress than expected since the Recommendation was adopted. First, the inception meeting between IUCN and SFA took place at the end of 2013, more than a full year after the adoption of the Recommendation. Second, the study is considerably more complex than either of the proponents had imagined when the idea for the study was proposed during the discussion on the motion text in Jeju. Third, the study is resource intensive, not just financial, but also in terms of personnel time and required expertise, with heavy demands on both the IUCN and SFA side, and neither IUCN nor SFA have dedicated staff who can manage the study full-time. Fourth, personnel changes on both sides have hindered progress and made it difficult to build relationships. Fifth, communication has not always been easy due to differences in time-zones, language, and the infrequency and difficulties of meeting in person due to the costs of doing so. Finally, we have found it difficult to raise the funds necessary to conduct the work at the scope and scale necessary to accomplish the task.

*Workplan for 2017-2020*

At their meeting in Beijing, 19-20 July 2016, IUCN and SFA proposed:

SFA lead the preparation of a revised proposal, comprising a “minimum” and “recommended” solution, and associated budget for each, for field surveys to be undertaken in the next 2-3 years. The field surveys are intended to understand whether wild bear populations are increasing, decreasing or stable, and whether trafficking in bear bile plays a significant role. Although there may be merit in expanding the work to four provinces, an argument can be made for ensuring rather that field surveys in the current two provinces, Sichuan and Jilin, be undertaken to the highest standard possible. In Sichuan, the minimum solution would involve repeating the surveys using the same methodology as in 2005-2007 in a sample of 200 grid cells (mainly where changes in cell occupancy would be most likely to occur). This would be combined with fine-scale work, including population estimates based mainly on DNA in scats, in a selected number of nature reserves. For Jilin, since there is no baseline survey (as for Sichuan), the minimum solution would be to conduct interview surveys to assess perceived trend in a sample of grid squares across the province (~100).

IUCN lead preparation of a proposal focused on the markets side of the study. As with the field surveys, this proposal will include a minimum and recommended solution, with an associated budget for each. This part of the study is necessary to understand the demand for farmed vs wild bile, and specifically how the availability of farmed bile affects demand for wild bile. The minimum solution would include a combination of at least several different methodological approaches, including the use of carefully designed choice experiments of bile users, market-based surveys of sellers (employing a reputable in-country company), and data from the Forest Police as a potential gauge of trends in bear poaching. Because we also need to understand the supply side of the market chain, the minimum proposal would also include a basic outline for how information from bear farms might be obtained.

The proposals for both field surveys and for the market surveys will be approved by both IUCN and SFA to ensure that they are scientifically rigorous and feasible (based on available budgets and human resources to both IUCN and SFA). SFA will take the lead on the field survey work, and will be primarily responsible for securing resources for activities in the proposal. IUCN would be invited to participate in all stages of the work, noting that IUCN could especially contribute to providing advice on the study design, review and analysis of the results, sourcing funds for participation of IUCN collaborators in surveys, and (if necessary) obtaining camera-trap data from NGO data holders. IUCN will take the lead on the market surveys side of the work, and will be responsible for securing resources for the activities in the proposal. SFA staff would be invited to participate in all stages of the work, and specifically would be responsible for securing records from the Forest Police. SFA agreed that it could provide letters of collaboration or support for the purposes of funding applications.

SFA designated Ruan Xiangdong (Rick) as its institutional focal point for all communications, subject to further notice, while IUCN designated Mike Hoffmann, in the office of the Chair of the Species Survival Commission, as its focal point. Both would be expected to communicate internally with individuals on their ends. Although email would serve as the immediate means of communication, it was agreed that web-based chat platforms (such as WeChat) would be used to resolve complicated disagreements, in the event that in-person meetings would not be possible. Both sides committed to timely responses to electronic communications. Although not discussed, it seems reasonable that IUCN and SFA should strive to meet at least annually, with the understanding that SFA officials would require financial support for any meetings outside China.

Both IUCN and SFA recognized that, although 2020 seemed like an adequate time to accomplish the studies, in reality much of the work needed to be done in the years 2017 and 2018 given requirements for analysis, report writing and so on.

*Conclusion*

IUCN and SFA have reasserted their joint commitment to the Recommendation and to the study and to act in good faith with each other. This report serves as a joint affirmation of that commitment to IUCN Members who adopted Recommendation 139 and our intention to report back to the 7th World Conservation Congress in 2020 in accordance with Operative Paragraph 2h. We understand that range state Governments involved in bear farming will report separately on Operative Paragraphs 2a-2f in accordance with the stipulations of OP2h.

Annex 1

**Survey of Wild Black Bear (*Ursus thibetanus*) in Sichuan Province**

**Abstract**

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The survival and conservation of wild black bears has been attracting public concern, and some international organizations, non-governmental conservation organizations and researchers doubt about the Black bear farming might be a threat for the wild populations. Therefore, it is necessary to conduct the investigation and monitoring of wild black bears, to find out the dynamics of the species by which to impel the conservation and to reply the public concern about Black bear.

From 2015, Beijing Forestry University and Chinese Academy of Forestry jointly undertook the survey of wild black bears in Sichuan Province according to the Department of Wildlife Conservation and Nature Reserve Management, SFA. The grids were selected as the survey unit (15×15km), and the social interview and field confirmation were adopted as the survey methods based on previous survey (Liu et al. 2009). The survey aimed to identify the changes of distribution of the Wild black bear compared to the previous survey conducted in 2005 in Sichuan, to identify the main factors affecting the distribution of the species, and to assess the outcome of conservation efforts on this species. The results of this survey are as follows:

1. Distribution of Black bear

Among the 48 surveyed grids, in 39 grids bear presence were recorded, accounting for 81.25% of total surveyed ones. And bears were not found in the other 9 grids which mainly located in northern Sichuan. Compared with the survey in 2005, 21 grids show the same results, 9 grids were different. Besides, 18 grids of this investigation were not surveyed in 2005. Among the 9 grids with different results of bear occurrence, in 8 grids bears were found to newly occupy the grids in 2016 compared to survey in 2005; bears were found to disappear from the other 1 grid.

2. Analysis of interview information

In order to understand the current status and the population trends of the species, 119 local villagers were interviewed. Among them, 86 villagers thought that black bears occur locally, with 40 villagers thought that the bear population was increasing (46.5%), 2 thought that the bear population was stable (2.3%), 18 thought that the bear population was decreasing (20.9%), and 26 were not clear about the population trends (30.2%). Moreover, the local people believed that the main reasons for the increase in bear population during last ten years were the enhancement of the protection and the implementation of the gun control policy.

3. Problems

The survey was conducted in January when black bears were in hibernation in Sichuan, so we couldn’t collect any samples for bears.

Annex 2

**Periodical Survey of Wild Black Bear (*Ursus thibetanus*)Population in Wangqing Area, Jilin Province, China**

**Abstract**

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In order to make a thorough investigation of wild Asiatic black bear population in areas with bear farming and assess principal driver(s) for changes in habitat and population of the species, a periodical survey was conducted on wild Asiatic black bear population at different management level in Wangqing National Nature Reserve and Wangqing Forestry Bureau of Yanbian Korean Autonomous Prefecture in October. – November, 2015 and January, 2016. The following results were obtained:

1. 112 cells (15×15km) were stratified for survey sampling in Jilin Province. Among which, 20 grids were located in Wangqing area. 8 cells were randomly sampled to conduct the field survey, and 34 transects were set in the 8 cells, with total length of 258.31km. The traces of black bears were searched, including platforms, dens, paw prints and claw marks of the species in 100m of each side of every transect, thus the total survey area is 51.662km2.

2. The questionnaire survey shows that there is a growing trend in the number of black bears in the past 5-10 years in Wangqing area. The findings need to be further verified through the field investigation in the future.

3. Neither bear individuals nor dens were found during the 15-day winter transect survey, which covers 32 transects with a total length of 162.8km. However, it was found that 128 platforms, and 40 trees with bear claw marks and 5 traces of eating ants in 8 cells.

4. After a survey of 21 days on hibernation dens, 17 dens were found in 4 cells (15×15km), although one of them was abandoned. This showed that the rate of den witness is high.

5. The information on 120 habitat quadrats was recorded that including habitat types, and disturbance source types, and distance to disturbance sources, and distance to water sources, and cover degree and canopy density. Data analysis should be done before showing habitat selection results.

In addition, we failed to gather any fecal samples of Asiatic black bear during the survey, which may be attributed to the following reasons:

1. As the land was covered with a thick layer of deciduous leaves in the fall, it was difficult to find any samples.
2. It was quite difficult to distinguish feces from dampened and molded leaves which appeared with almost the same color on the land.

It was possible that the settings of quadrats or the synchronized ways adopted this time were not conductive to feces discovery and collection.

Annex 3

BEAR FARMING AND BILE TRADE IN CHINA

KEY INFORMANT INTERVIEWS

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Introduction

Three species of bear occur naturally in China. Only one species however, the Asiatic Black Bear (*Ursus thibetanus*), is farmed for the production of bile. This species is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Domestically, it is classified as a Class II Protected Species under China’s national wildlife protection law.

Bear farming in China and neighbouring South East Asian countries for the extraction of bile for use in traditional medicines is widely criticized by some western conservation and animal welfare organizations as a cruel practice that does not benefit the conservation of populations of the species in the wild.

In December 2015 interviews were conducted by a China-IUCN team to collect important information about the trade and management of Asiatic black bears in China. Trade in this sense, includes the legal and illegal trade. It also includes trade in live animals as well as their parts (bear-bile and bear paws). Interviews were conducted in a qualitative format, and are intended to guide future research and analysis.

Four locations were selected to capture a cross-section of parameters. These were Mudanjiang in Heilongjiang, Yushu in Jilin, and Kunming and Pu'er in Yunnan. In two locations (Mudanjiang, Pu'er) there were proximate, wild populations of black-bears. In two locations (Mudanjiang, Yushu) there were bear farms albeit only the farm in Mudanjiang was producing bile. In two locations (Mudanjiang, Kunming) there were pharmaceutical factories employing bear-bile as an input. Two locations (Mudanjiang, Pu'er) were proximate to foreign borders. Mudanjiang was accessible with Russia. Pu'er was accessible with Burma, Laos and Vietnam. In all locations there were TCM hospitals and clinics, and pharmacies that sold TCM medicines.

The interviews moved down the supply chain for bear-bile. This included bear-farms, pharmaceutical factories, TCM doctors at hospitals, clinics and pharmacies, and shop sales-staff. Information on the illegal trade in black bears (and their parts) was gathered by interviews with Chinese law enforcement (Forest Police). The report is divided into three sections. Section A relates to the production of bear bile and regulation of the farming industry. Section B relates to the economics of the legal and illegal markets. Section C contains a brief commentary on conservation considerations as well as some initial conclusions and inferences.

Section A

Background to Bear Farming in China

The technology for extracting bile without killing the bear was first developed in North Korea in the 1980s, thereby removing the need to kill bears in order to obtain gall bladders. This technology has gradually spread to the adjacent areas of Yanbian, Jilin Province. In 1983, the first farm in China became established in northeast China (Yanbian Korean Autonomous Prefecture, Jilin Province). Shortly thereafter in 1985, Hei Bao Bear Farm commenced operation near Mudanjiang (Heilongjiang Province). By the following year, bear farming had expanded further south, extending into Liaoning Province.

The *Law of Wildlife Protection of the People's Republic of China* was enacted in 1988, and the *List of National Key Protected Wildlife of 1989* listed the Asiatic Black Bear as a *Class 2 Protected Species*. This law required all bear farms to obtain permission to operate from the provincial forestry department under whose jurisdiction they were located.

In 1997, the former Ministry of Forestry, now the State Forestry Administration (SFA), issued an interim set of standards for farming the Asiatic black bear (*Interim Provisions of Black Bear Captive Breeding and Utilization Management of 1997*). By this time, bear farming had increased substantially, reaching a peak of more than 140 farms distributed throughout a large part of China. Farms ranged from small family-owned operations comprising 1-2 animals, where there was no emphasis on captive husbandry, to large professionally-managed operations involving many hundreds of bears with a focus on captive breeding.

The interim standards were replaced in 2008 when the State Forestry Administration (SFA) formally approved husbandry standards (*Feeding Technical rules of Asiatic Black Bear, LY/T 1783 - 2008*). These standards were formulated by a group of specialists, and prescribe the conditions under which the bear farming industry in mainland China should operate. A revised edition of the Bear Farming Standards is scheduled to be published in 2016.

Many small, privately-owned bear farms lacked adequate husbandry skills and did not employ, or have access to, a professional veterinarian. In an effort to reduce the number of small, poorly-managed operations, in 1997 the former Ministry of Forestry requested provincial forestry authorities apply the criterion that each farm must possess >50 bears. In 2012 the industry recommended that provincial forestry authorities adopt the criterion of >200 bears for all bile-producing bear farms and that qualified veterinarian is employed by each farm. Provincial forestry departments appear to have embraced this recommendation; however effective reduction in the numbers of small farms is yet to be achieved. Although some provincial authorities are 'brokering' sale of some stock to larger farms, the lack of funds to compensate owners is a major obstacle delaying the closure of small farms.

In 2004, the SFA, the Ministry of Health (MH), the State Administration for Industry & Commerce (SAIC), the State Food and Drug Administration (SFDA), and the State Administration of Traditional Chinese Medicine (SATCM) decreed that use of bear bile be restricted to the manufacture of traditional medicines (*Notice 252 of 2004 on the Further Strengthening Of Musk Deer, Bear Resources Protection and Their Medicine Product Management*). In 2005, the SFDA issued a further notice to restrict the use of bear bile on the basis of the former notice (*Notice 110 of 2005 on the problem of natural musk, bear bile powder utilization*). At present there are >100 TCM factories producing >70 pharmaceutical products containing bear bile. Less than 20 factories are owned by companies that also own a bear farm.

By 2012, the number of farms had declined to less than seventy (70) facilities. At present, bear farming is being conducted in the following 10 provinces: Heilongjiang, Jilin, Liaoning, Zhejiang, Fujian, Guangxi, Sichuan, Yunnan, Shanxi, and Guangdong.

The decline in the number of bear farms has been attributed to the introduction of additional controls on bear farming and the production of bile-based medicines by the Notice 252 of 2004 issued by SFA, MH, SAIC, SFDA and SATCM, and the Notice 110 of 2005 issued by the SFDA. The SFDA, renamed in 2013 to the China Food and Drug Administration (CFDA), became responsible for overseeing the production and quality of medicines containing bear bile. Bear farms complying with a set minimum requirement are issued with a certificate to produce medicine. Those not been able to meet these requirements have been prohibited from producing bear bile. Consequently, all legitimate bear farms are required to obtain two permits; viz.

i) the CDFA permit (issued in accordance with the Medicine Administration Law), and

ii) a permit, issued by the relevant provincial forestry department, in accordance with the 1988 wildlife protection law.

Captive Husbandry

Bear captive breeding facilities include all facilities that possess and exhibit bears zoological collections, safari parks, circuses, and bear farms. The term ‘bear farm’ in China, is restricted to facilities that produce bear bile and operations focused only on breeding bears in captivity. Captive populations on bile-producing bear farms are classed into four groups: i) bile producing adults; ii) breeding adults; iii) juvenile animals <3-year old juvenile animals; and iv) retired animals >20 years old(normally). Numbered, plastic ear-tags are used to give each captive bears a unique identity. Tags are applied to captive-bred offspring when the animal is 3-years old. On-farm mortality is reported to be approximately one percent per annum.

Farms house bears in elevated indoor steel cages that feature access to larger outside elevated steel cages or outdoor enclosures. The combined area of the two cages (indoor and outdoor) is required to exceed the minimum 18m2 area specified by the SFA.

The four farms visited during the mission are all located in north-eastern China where winters are characterised by extensive snow and prolonged periods of extreme sub-zero ambient temperatures. During this time (November-April), which coincides with the natural hibernation period of the species, captive bears are kept indoors, in individual cages, where the ambient temperature is maintained at 10-15oC. During the warmer months, bears have access to connected outdoors enclosures.

Animals are fed a varied diet of animal- and vegetable-based foods (fresh and processed), supplemented by a range of recommended vitamins and minerals, as specified in the 2008 government-produced bear husbandry standards. The 2008 document prescribes diets and feeding frequencies for pregnant and nursing females, young and growing bears as well as maintenance of the general population of adult animals.

Captive Production

There is little doubt that the large, well-managed, bear farms in China have regularly produced multiple generations of Asiatic black bears in captivity - and continue to do so. The pedigree of captive-bred progeny is managed by joining known males to mate with a group of known females.

Pregnant females stop feeding or eat very little, for about one month. After one month the nipples and vagina become swollen. When these features are detected, an on-staff veterinarian will do an urine test, or sedate the animal with a mild narcotic such as Ketamine and conduct a type-B ultrasound to verify whether or not the animal is pregnant.

The mating period of black bears in northeast China extends from early June to early August, while that of black bears from Sichuan Province in southwest China is somewhat longer (early April to early August). In the northeast, the gestation period is August to February, although births can occur in late December and January. The maternal female breast feeds for 4-5 months until the young cub is weaned and able to eat a formulated diet. At this time, the cub is separated from its mother and maintained in a communal 'nursery' for a period of time before being placed in an individual cage.

Extraction of Bile

Animals used for the extraction of bile are 'milked' twice-daily. Individuals selected for bile production are used, on average, for 20± years before being 'retired'. During the extraction procedure, which takes 15-20 seconds, animals are distracted by high protein food or honey water that is consumed before, during and after the experience.

The method for extracting bile has evolved considerably since the early days of bear farming. In 1996, the SFA introduced new regulations that prohibited the use of stainless steel catheter implants and specified minimum cage sizes. Following these new regulations, the "free-dripping" technique is now the only permitted method of bile extraction. This method involves surgery to create an open hole or fistula in the abdomen through which bile is extracted. The surgery is performed by qualified veterinarians on bears selected for bile production when they are 3-year old animals.

Candidate bears are immobilized, using a general anaesthetic, in a sterile operating room. An incision is made in the abdomen wall and, using surgical forceps, the connective tissue surrounding and supporting the gall bladder is stretched through the fistula. An incision is made in the wall of the gall bladder that has been extruded through the original abdominal incision. Using surgical stitches, the gall bladder is secured to the external surface of the abdomen. A broad spectrum anti-bacterial cream is applied to the wound to minimize the risk of infection. The operation is performed by qualified veterinarians and takes approximately 30-40 minutes. Healing is facilitated by resting the bear and providing a protein rich diet comprising a variety of fresh foods and vitamin supplements. Average recovery time is two weeks, after which time the musculature of the abdominal wall has healed forming a ‘natural’ sphincter that effectively prevents any leakage of bile.

While the animal is fully occupied in eating, technicians insert a sterilized, blunt, hollow stainless steel probe through the fistula and collect 60-100ml of bile. Thus, on a daily basis, an individual bear is capable of surrendering 120-150ml of bile. Only 10-15 percent of the contents of the gall bladder are drained, thereby ensuring that the functionality of the gall bladder is retained and the bear does not experience any ill-effects from the process. During demonstrations of the extraction process, no bear exhibited any obvious, overt sign of stress or disturbance.

Accumulated quantities of liquid bile are dried (crystallized) in ovens or freeze-dried before being transported to pharmaceutical factory for purification and further processing. The conversion factor of liquid bile to its crystallized form is approximately 12:1. An individual bear is capable of producing 4Kg of crystallized bile annually for use in traditional medicines. The 1,200 bile-producing bears present on Hei Bao Bear Farm produce approximately 4 tonnes of crystallized bile per annum.

Section B

Economics of the Legal and Illegal Markets

There are several economic issues that were addressed in the interviews. The first of these concerns the structure and organisation of bear-farms. Bear-farms are the first point in the supply chain. First, it is immediately obvious that bear-farms vary greatly in size. The Hei Bao farm in Mudanjiang had 2802 bears. The three smaller farms at Qing Shan near Yushu (Jilin) had between 352 and 470 bears. Interviews established that many bear-farms have less than 200 bears. Farm size is thus skewed towards smaller farms.

Nonetheless, many small farms do not produce bear bile. In some cases they do not meet the regulatory standards for approval. In Heilongjiang Province there are 14 bear farms producing bile. These are the farms in Mudanjiang and Mishan City. Note that none of the three farms at Qing Shan (near Yushu) were producing bile. In addition, a significant number of bears in each farm are not used for bear bile production (see Section A).

Most bile therefore, appears to come from a small number of very large farms. Such farms are geographically separate from each other. The bile from these farms is either:

* sold direct to TCM pharmaceutical companies as a raw input, or;
* used in factories owned by the farm to make their own pharmaceuticals.

The large farms also promote their brand to the market. One outcome is that bear bile crystals, sold in retail stores, exhibit **price dispersal**. The price is not uniform in TCM pharmacies. For example:

* 2g of crystals in Kunming (Rui Hua Farm) was 68 Yuan
* 0.6g of crystals in Pu’er (Fujian Guizhentang Pharmaceutical Company) was 139 yuan.

The structure of the bear-farming is thus, not a competitive market. Large farms have a degree of market power. They however, are not able to operate as local monopolies. For example, the Yunnan Xitao Pharmaceutical Factory in Kunming, used to get its bile from Rui Hua farm in Dali (Yunnan) but switched to buying from other farms in Yunnan and Sichuan.

Nonetheless, the geographic separation of farms has an economic effect. A geographic gradient is noticeable. For instance, you are more **likely** to find a farm’s bear-bile products available for sale, the more proximate the farm is. In Mudanjiang therefore, Hei Bao products are more commonly seen for sale. In Yunnan however, no Hei Bao products were seen. On the other hand, products from Yunnan bear farms were far more common in Kunming and Pu’er. This suggests there may be an element of Hotelling competition with bear farms. A Hotelling market structure is where the **location** of the firms is one of the strategic decisions they make. Being able to locate away from other large farms generates some market power. (**Maybe put the following explanation as a foot note**) This means that large farms are able to affect the demand for legal bear-bile. If there is a relationship between illegal bear-bile and legal, then, such a relationship should be show up in economic metrics. The illegal market close to farms should exhibit differences to the illegal market that are distant to farms.

Bear-bile is only permitted for use in medicines as the result of a decision in 2005. This means that tonics and the like, cannot include bear bile as an ingredient. All pharmacies visited were checked for non-medicinal bear-bile products for verification.



Figure 1: Bear Bile Crystals in Pharmacy

Bear-bile is used as an ingredient in some medicines. It can also be sold in a pure crystal form (or in capsules). Such medicines are sold in pharmacies as either prescription medicines, or as OTC (over the counter). OTC medicines do not need a doctor’s prescription. None of the TCM hospitals or clinics we visited stocked bear bile. The rationale supplied was that the regulatory cost discouraged them from doing so. The hospitals and clinics were also not in the habit of prescribing bear bile medicine. This may be related to that bile medicines are not listed in *Medicine Catalogue of National Basic Medical Insurance, Industrial Injury Insurance and Maternity Insurance of 2009 and 2015,* and are self-funded medicines.

Restricting the use of bear bile to medicine (2005) has had a negative impact on the farming industry. The demand for bear-bile was lowered. Symptomatic of this is evidence of excess supply in the industry. Evidence for this includes the decline in live bear-prices. There is a market for live bears (zoos and circuses) that operates alongside captive facilities. Bears are an input into bear-farms and their prices reflect their derived demand. This derived demand is a metric for demand in the final market. According to the Qing Shan farms, prices in the early to mid-1990s for bears were in the range of 40-50,000 RMB. Prices now are closer to 20,000 RMB (prices are not adjusted for inflation). Trades appear to be thin also, with weak demand for bears. Zoos and circuses were reported as the only buyers with the Qing Shan farms. It was reported that large farms have little or no interest in purchasing bears from smaller farms wanting to exit the market. One of the reasons cited was the poorer condition of the bears at smaller farms.

Interview evidence was consistent with this. One of the farms at Yan Bian in Jilin was reported to have downsized from 3000 bears to 300. One of the three bear-bile farms in Yunnan was reported to have recently ceased production of bile. The Yunnan Xitao Pharmaceutical Factory reported it has reduced demand for bear bile, which was used in one of its products. According to the interview with the factory, demand for bile peaked around 2010-2011. This suggests that demand for bear-bile medicine follows retail spending trends in China. The retail downturn and loss of consumer confidence from 2014 may also be weakening demand for bear-bile medicines.

This highlights one of the important market properties of bear-bile medicines. It has cheaper, TCM substitutes. Although bear bile is not able to be manufactured artificially, there are numerous herbal alternatives available on the local market. TCM doctors at clinics, pharmacies and hospitals report they typically substitute herbal TCM ingredients for bear-bile. This could explain some of the spending cycle. In downturns, buyers may have a stronger preference for cheaper substitutes. One doctor also claimed that herbal alternatives were explicitly prescribed for poorer patients. This high degree of substitutability is likely to be a factor that has limited illegal demand growing. Buyers are easily able to find substitutes and are willing to do so, because these substitutes have status in TCM. Bear-bile is not a unique good that does not compete against other TCM products.

Synthetic bile however, does not appear to be regarded as a substitute. No synthetic bile products were observed for sale. It was reported that a synthetic bile medicine has not been developed. A pharmaceutical factory in Kunming advised that the research and associated administrative costs involved in changing the ingredients in TCMs were effective barriers to developing synthetic alternatives.

The bear-farming industry is also under regulatory pressure. These include compliance costs that have risen over time. Another constraint is that, currently, only the bile may be sold for income. The sale of other bear-parts is prohibited. A significant shift will be new standard that prohibit farms under 200 bears. The industry is thus likely to undergo some rationalisation, some of which is already observed (e.g. the exit of the Yanbian farm). The trajectory appears to be towards fewer farms, but of a larger average size. These surviving farms will be able to pick up the demand from the exiting farms.[[5]](#footnote-5)

In terms of consumer demand, there are two purchasing paths. One is the via doctors' prescriptions/ recommendations, as well as friends’ or relatives’ suggestions. According to our interviews, these made up a significant percentage of sales (60-70%) in pharmacies. The second was over-the-counter sales. Sales however, are low frequency in most instances (1-2 per day) in the stores that stocked it. An exception was the pharmacies owned by the Hei Bao group. This is expected as it specialises in, and has high stock levels, of bear-bile medicines. Another feature of the retail side was that it was impossible to predict what, if any, bear-bile medicines would be present when visiting a store. Common medicines included eye drops or haemorrhoid creams.

We were unable to interview any users of bear-bile products. Pharmacies report customers tend to be male in the age-group of 40-60 years of age. They also reported that buyers were typically repeat customers. Pharmacies corroborate that demand for bear-bile medicines is largely a mediated demand. That is, the demand from buyers is mediated through another person.

All information on the black-market for black bears came from interviews with the Forest Police in the three provinces we visited. In China all wildlife crime is investigated mainly by the Forest Police, irrespective of which agency first detects the crime. The cases related to smuggling are investigated mainly by the Anti-smuggling Police. The Forest Police employs its own staff (for instance, Yunnan has 3600 officers). The Forest Police also undertakes operations to detect wildlife crimes. These include visiting restaurants, local markets and forest reserves.

Crimes detected involving black-bears are rare in the provinces we visited. In Yunnan, it was reported that 0.5% of the cases they investigate involve black-bears. In 2014 the Yunnan Forest Police reported they had detected 25,000 cases of wildlife crime, with 3,800 of these reported to be serious. Currently the Jilin Forest Police is undertaking a 6-month operation that is involving a large commitment of staff and resources. To date this commitment included 38,600 person-hours, 4,580 car-hours. Results so far are that 12,000 items of illegal hunting equipment (mostly snares) have been seized and 78 sellers convicted.

Each of the provinces we visited had a border with a neighbouring range state. This contributed to two categories of black-bear crimes. The first was the smuggling of bear-paws into China. The second was the smuggling of live bear cubs into China. According to the Yunnan Forest Police, the origin of these bear cubs and bear paws was bear-farms, typically in Burma. The bear cubs were intended for sale to Chinese zoos or circuses. Bear paws for private consumption were also detected in Mudanjiang (from Russia) and in Pu'er (from Burma and Laos). Forest Police employ informants in border markets to increase their interdiction success. In Yunnan, it was reported that criminal organisations also prefer to base themselves in Burma. This has led to cooperation between Chinese provincial officials and the Burmese authorities, sometimes necessitating some informant work by Chinese forest police in border markets.

It was reported that along the Burma route, bear paws are obtained at 100 RMB per kg, and sell for up to double that just within Yunnan. Paws that reach Kunming are sold for 400RMB and those that reach Guangzhou are sold for 1000 RMB. Quantity price-discounts may occur as data from Pu'er report that casual buyers pay 200RMB across the border. Prices deviate from those reported in Jilin. One conspiracy (4 individuals) in Jilin poached five bears and sold the paws for 1200 RMB per 500g. This may reflect supply differences (far fewer bear-paws available for sale in the north) or quality differences (the paws came from a reserve inside China, so were fresher and wild-sourced).

Despite the regular arrests made in Yunnan of bear-paw smugglers (and other wildlife crimes), no incident involving gall-bladders was detected. In the period (2013-2015) the Mudanjiang police reported, the only incident involving bear-bile was a captive bear. This was purchased in Jilin, fitted with a metal jacket for extraction, and the bile sold within the local neighbourhood. The criminal was able to undercut legal bear bile prices. Nonetheless, having a black-bear on your property is not an efficient way to avoid detection and he was easily caught.

The Jilin Forest Police reported only one conspiracy trading gall-bladders. This was the same conspiracy trading bear-paws. Of the five bears that were killed, one gall-bladder was sold, allegedly for 15,000RMB to an unknown buyer. This price is extraordinarily higher than legal bear-bile crystals. It should be pointed out that the criminals found it much easier to locate buyers for bear-paws than gall-bladders. The person who bought the gall-bladder also had no standing orders for more, nor returned to buy more. The poachers, in this case, could not find an organised criminal distribution system for gall bladder.

Section C

Conservation

In evaluating the conservation merits of bear farming in China, the critical question that must be asked is: *In the absence of bear farming, would the conservation status of wild populations of Asiatic black bear be any better?* Although the available empirical data on wild populations of this species in China or elsewhere are not sufficient, anecdotal reports of forestry officers and increasing incidents of conflicts with bears support growing wild bear populations. Evidence of any detrimental affect caused by bear farming is conspicuously lacking. Indeed, in all likelihood, the conservation status of wild bears may well be considerably worse if farming had not been initiated in 1983. In order to examine the converse question: *Has commercial bear farming in China benefited conservation of the wild resource both in China and elsewhere?* it is necessary to understand what is happening to wild populations of Asiatic black bear and determine if and why numbers are increasing, declining or remaining essentially stable.

The hypothesis that bear farms in China have had a negative impact on the conservation of wild populations of the species is not supported by the current situation in the three provinces that were visited (Heilongjiang, Jilin and Yunnan). The frequency, reliability and level of on-farm captive production, survivorship and longevity of bears being achieved by the Hei Bao farm, and availability of captive-bred juveniles from other facilities in China removes any need for farms to source bears illegally from the wild. This view was reinforced by interviews with forestry police and evidence of increased frequency of human-bear conflict events in recent years.

Provincial and local forestry personnel (police, administrators and researchers) were all convinced that populations of Asiatic black bear were increasing in all three provinces (Heilongjiang, Jilin and Yunnan). This universal view was based on the increasing number of human-bear conflict incidents and bear 'rescue call-outs' that have been recorded in recent years (see Table 1 below).

|  |  |  |  |
| --- | --- | --- | --- |
| Location |  Date |  Nature of Incident |  Outcome |
|  |  |  |  |
| Heilongjiang Province |  |  |  |
|  (Xiu Li Village) | June 2013 | human fatality | ? |
|  (Chang Lingzi Village) | June 2013 | injured bear (broken legs) | rehabilitated and released |
| Jilin Province | 2013-2015 | human fatality | ? |
|  |  | 44 livestock injuries/fatalities | RMB2.289 millioncompensation paid |
|  |  | 77 beehives damaged |
| Yunnan Province | 1985-1997 | 0-3 human fatalities pa | ? |
|  | 1998 | 9 humans injured | ? |
|  | 1999-2007 | 22 unspecified incidents | ? |
|  | 2008-2014 | 46 unspecified cases(including 3-4 human fatalities pa | ? |
|  | 2014 | 6 human fatalities | ? |

Table 1 - Summary of human/bear conflict incidents recorded by Forestry Police in Heilongjiang, Jilin and Yunnan Provinces

The Asiatic black bear is ranked the third species, after Asiatic elephant and wild boar and followed by Rhesus Macaque (*Macaca mulatta*), most frequently involved in incidents of human-wildlife conflict in Yunnan Province. During the period 2004-2014 damages caused by these four species amounted to many millions of Yuan (RMB). In 2014 the damage bill from these wildlife amounted to RMB52 million. From 2008-2014, damage caused by wildlife in Yunnan Province increased substantially, with Asiatic black bear accounting for approximately 20 percent.

In 1998 and 2006 respectively, Yunnan and Jilin Provincial Governments, with the equal participation of local governments, established a regulation to compensate the public for damage caused by wildlife. Compensation funds were established, which, in the case of Yunnan, the scheme was modified into an 'insurance' program, into which participating agencies contribute monies each year. The Yunnan insurance fund currently receives RMB52 million/year.

There are no data on populations of Asiatic black bear in Heilongjiang, Jilin or Yunnan. Conducting scientifically-based, field surveys of this species is logistically difficult and, hence, expensive. Furthermore, available funds for research and surveys are limited and provincial forestry departments are required to prioritise fieldwork. The Asiatic black bear is a Class 2 Protected Species and, as such, is afforded a lower priority relative to other species with which it is sympatric; viz. Amur tiger (*Panthera tigris altaica*), Amur leopard (*Panthera pardus orientalis*) and Giant panda (*Ailuropoda melanoleuca*), all of which are Class 1 Protected Species under national legislation. Local forestry departments are more willing to divert spending to other priorities than Asiatic black bears. This should be taken into account in future research.

In the absence of any field data on bear numbers and the high cost of acquiring data, the frequency and distribution of human-bear conflict incidents may offer an approach to monitoring population trends that is a more practical and cost-effective alternative to conducting field surveys.

Conclusions

While the data have been obtained from a small sample of provinces over a limited time period, the following initial inferences and general conclusions can be used to guide further research:

1. The policy in the early 1980s to promote commercial bear farming was innovative. In the absence of an efficient and effective bear farming industry in China, it is plausible that wild populations of all species of bears in China, and elsewhere, would have been subject to much higher levels of poaching. The scale and organisation of the black-market in bear-bile in the areas reviewed, is not consistent with stimulated poaching.

2. Present demand for traditional medicines based on bear bile within China is being satisfied by products derived from captive-bred bears. Illegal demand is not a product of insufficient legal production. The main substitute for farmed bear-bile is not synthetics, but herbal alternatives.

3. Although there are no quantitative data on population numbers to determine unequivocally current population trends, there is a general belief, based on increasing incidents of human-bear conflict that numbers of black bears are increasing in parts of China, particularly in the more remote regions of the north east and south west.

4. Changes in demand appear driven by regulatory changes or economic cycles. No downward trend in demand is manifested. This is supported by the investment plans by the Hei Bao Company o increase its captive population of bears to 10,000 animals. Other large farms elsewhere in China are known, by one author (RWGJ), to have similar expansion plans. Such investments would not be planned if there was a long-term decline in demand underway.

5. From an animal welfare perspective, all animals observed appeared healthy and well fed. Bile is extracted while the animal is fully occupied in eating. The entire extraction process takes <20 seconds. No bear exhibited any sign of stress or any overt sign of stress or disturbance during the extraction process.

6. The black-market for gall-bladders is likely to exhibit the regional differences. The black-market in Jilin is not like the black-market in Yunnan. Gall-bladders are dried and are sold as a whole-unit. The relation to legal bear-bile is not clear as it differs in price and product-type.

7. Black-bears are clearly a multi-product animal. In terms of volume, bear-paws are more important to poachers and smugglers than gall-bladders. For some reason, it appears criminals are able to identify buyers for bear-paws much more easily than gall-bladders. One possibility is that many buyers of gall-bladders have left the market because of concern about fakes. (In economics this is known as the lemons problem, too many ‘inferior’ products offered causes the market to shrink). Another factor may relate to the need for subsequent processing of gall bladders to produce useable bile, whereas bear paws do not require any processing beyond preparation for cooking.

8. The relationship between the different bear-parts is unclear. It is plausible the gall-bladders are a by-product of the bear-paw trade and not the main motivation for poachers. More investigation is needed. Given that there is no legal trade in bear-paws, and there is a legal trade in bile, it is important to resolve this relationship.

9. The enforcement environment in China is relatively effective. In the major conspiracies described to us, the criminal-leaders relocated themselves outside of China to Burma or Russia. Sanctions are high inside China with any person implicated in the deaths of 3 or more bears, getting a minimum sentence of 5 years. Note that “relatively effective” does not mean a 100% interdiction rate.

10. If the illegal market mimics the legal market’s Hotelling structure, then the black-market will be densest closest to large wild populations of black bears

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1. LY/T 1783—2008黑熊养殖技术标准.

*Feeding Technical rules of Asiatic Black Bear, LY/T 1783—2008.*

1. 国家林业局、卫生部、国家工商行政管理总局、国家食品药品监督管理局、国家中医药管理局关于进一步加强麝、熊资源保护及其产品入药管理的通知（林护发〔2004〕252号）.

*Notice on the Further Strengthening Of Musk Deer, Bear Resources Protection and Their Medicine Product Management,* Notice 252 of 2004 issued by the SFA, the Ministry of Health (MH), the State Administration for Industry & Commerce (SAIC), the State Food and Drug Administration (SFDA), and the State Administration of Traditional Chinese Medicine (SATCM) in 2004.

1. 关于天然麝香、熊胆粉等使用问题的通知（国食药监注〔2005〕110号）.

*Notice on the problem of natural musk, bear bile powder utilization*, Notice 110 of 2005 issued by SFDA in 2005.

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*Medicine Catalogue of National Basic Medical Insurance, Industrial Injury Insurance and Maternity Insurance of 2009,* issued by the State Council in 2009.

1. 人力资源和社会保障部办公厅关于对国家基本医疗保险、工伤保险和生育保险药品目录中部分药品进行调整规范的通知（人社厅函〔2015〕92号）.

*Notice on the Adjustment of Some Medicines of Medicine Catalogue of National Basic Medical Insurance, Industrial Injury Insurance and Maternity Insurance of 2009,* issued by General Office of Ministry of Human Resources and Social Security in 2015*.*

 Annex 1

BREEDING FACILITIES INSPECTED

Four facilities, representing operations at different ends of the range of bear farms in China, were visited in the north-eastern provinces of Heilongjiang and Jilin.

The oldest and largest bear farm in China is located a few kilometres away from Mudanjiang, in the north-eastern province of Heilongjiang. The farm is privately-owned by Hei Bao Medicine Limited Company. The family company also owns a pharmaceutical factory in Mudanjiang that manufactures a suite of four traditional medicines containing bear bile for the treatment of a range of ailments[[6]](#footnote-6). The company also owns retail outlets in Mudanjiang City

The Hei Bao Farm was established and commenced breeding bears in 1985. The first captive-bred offspring were produced in 1987, and the farm has been successfully producing animals annually since that time. Production in 2015 was 347 animals. Comparable numbers of offspring were produced in 2013 and 2014. This farm has been operating for many years and has clearly demonstrated a capability to satisfy the CITES definition of ‘bred in captivity’ as it applies to Appendix-I listed species. During 1990-1995, Hei Bao increased its captive population of bears by purchasing additional animals from smaller farms elsewhere in China that were being closed because they did not comply with Government requirements. The farm occasionally receives small numbers of injured, orphaned juvenile bears from the Forestry Department of Mudanjiang City or animals confiscated by the Mudanjiang Forestry Police.

The present captive population is circa 2800 (approximately 1♂:1♀) animals comprising the following:

|  |  |  |  |
| --- | --- | --- | --- |
| Component | Males | Females | Total |
| Breeding Adults | 100 | 280 |  380 |
| Juveniles (<3 years-old) | - | - |  1,120 |
| Bile Producing Animals | - | - | c1,200 |
| Retired Animals |  50 |  50 |  100 |
|  |  | N = | c2,800 |

Table 2 presents information obtained from interviews with the proprietors of three, closely associated and adjacent, but independent bear farms situated in Qingshan Township, Jilin Province. In each case, founder stock and subsequent animals were purchased as juvenile animals from large farms elsewhere in China (Heilongjiang and Sichuan).

Table 2

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Farm | YearCommenced | Founder Stock | Current Stock (December 2015) |
| N | ♂ | ♀ | <2yr old |
| Changcheng Asiatic Black Bear Farm, Yushu City | 1997 | circa 50 | 460 | 100 | 280 | 80 |
| Fubao Asiatic Black Bear Farm, Yushu City | 1996 | 50-60 | 470 | 159 | 233 | 78 |
| Baolai Asiatic Black Bear Farm, Yushu City | 1997 | circa 55 | 3521 | 100 | 152 | 32 |

Footnote1: This figure includes seventy (70) 3-4 year-old sub-adult animals of unrecorded gender

These facilities, previously involved in extracting bile for sale to pharmaceutical factories, have been prohibited by the Yushu Forestry Department, because of their failure to employ current extraction methods required by the Government. As a consequence, all three farms now concentrate on breeding and producing bears for sale to zoos and circuses. The farms are required to employ a qualified veterinarian and are subject to monthly inspections by the Yushu Forestry Department. Sales commenced in 2012 with potential buyers being sourced through the internet. Table 3 displays the numbers of bears sold by each operation and the price paid for each animal.

Table 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm | 2012 | 2013 | 2014 | 2015 | Price |
| Changcheng Asiatic Black Bear Farm, Yushu City | - | - | 18 | 20 | RMB12,000 |
| Fubao Asiatic Black Bear Farm, Yushu City | 5 | 5 | - | - | RMB20,000/adult |
| Baolai Asiatic Black Bear Farm, Yushu City | - | 4 | 3 | 3 | RMB17-18,000 |

Annex 2

Consultations Undertaken in Heilongjiang, Jilin and Yunnan Provinces

|  |
| --- |
| Heilongjiang Province (7-9 December 2015) |
| Name | Position | Organization |
| LIU Jide | Chairman | HeiBao Medicine Limited Liability Company |
| Ms LIU Jingxia | General Manager | HeiBao Medicine Limited Liability Company |
| Ms LIU Jingli | Vice General Manager | HeiBao Medicine Limited Liability Company |
| ZHANG Xinghua | Standing Vice General Manager | HeiBao Medicine Limited Liability Company |
| LIU Hongyan | Sales Manager, Mudanjiang Branch | HeiBao Medicine Limited Liability Company |
| YUAN Hui | Factory Manager | Heibao Pharmaceutical Factory,Heibao Medicine Limited Liability Company Mudanjiang City |
| SUN Lili  | Medical Practitioner | TCM Clinic, Mudanjiang Hongqi Hospital |
| WEI Qingwu | Director | TCM Clinic, Mudanjiang TCM Hospital |
| HUANG Jinghu | Medial Practitioner | Hualin Huangjinghu TCM Hospital |
| LI Li | Deputy Director | Division of Wildlife Conservation and Management, Heilongjiang Provincial Forestry Department |
| PEI Naixi | Section Chief | Wildlife Conservation and Management Section, Division of Wildlife Conservation and ManagementHeilongjiang Provincial Forestry Department |
| DU Yongbin | Director | Forestry Bureau of Mudanjiang City |
| YANG Xuhui | Deputy DirectorDirector | Forestry Bureau of Mudanjiang CityForestry Police Department of Mudanjiang City |
| LI Jiuchang | Political Commissar | Forestry Police Department of Mudanjiang City |
| HUANG Hao | Section Chief | Forest Administration Section Forestry Bureau of Mudanjiang City |
| XUE Wenping | Vice Section Chief | Forest Administration Section Forestry Bureau of Mudanjiang City |
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| Jilin Province (10-12 December 2015) |
| Name | Position | Organization |
| XIAO Wanjun | Deputy Director | Division of Wildlife Conservation and Management, Jilin Provincial Forestry Department |
| WU Jingcai | Professor | Jilin Academy of Forestry |
| XU Ge | Deputy Mayor | Government of Yushu |
| LIU Chunlai | Director | Forestry Bureau of Yushu City |
| MENG Fanjie | Deputy Director | Forestry Bureau of Yushu City |
| HAN Fenghua | Section Chief | Section of Wildlife Conservation and Management, Forestry Bureau of Yushu City |
| YANG Guijun | Secretary of CCP | CCP Committee of Qingshan Village Government, Yushu City |
| WANG Shushen | Township Head | Qingshan Village Government, Yushu City |
| XU Changcheng | Owner | Changcheng Asiatic Black Bear Farm, Yushu City |
| SHI Changqing | Owner | Fubao Asiatic Black Bear Farm, Yushu City |
| GUO Fujiang | Owner | Baolai Asiatic Black Bear Farm, Yushu City |
| LIU Lihua | Director | Outpatient Service, Yushu TCM Hospital |
| LIN Zhenting | Medical Practitioner | Xinxin Pharmaceutical Store |
| ZHANG Zhimen | Medical Practitioner | TCM Clinic, Yushu General Hospital |
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|  |
| Yunnan Province (13-18 December 2015) |
| Name | Position | Organization |
| LI Peng | Deputy Director | Division of Wildlife Conservation and Management, Yunnan Provincial Forestry Department |
| LI Hengming | Member | Division of Wildlife Conservation and Management, Yunnan Provincial Forestry Department |
| JING Liangying | Deputy Director | Division of Wildlife Conservation and Management, Forestry Bureau of Kunming City |
| ZHANG Tao | Member | Division of Wildlife Conservation and Management, Forestry Bureau of Kunming City |
| ZHAO Yanxiang | Manager | Beijing Road Store, Yunnan Baiyao Medicine Pharmacy |
| JIANG Lijuan | TCM PractitionerDirector | Yunnan TCM HospitalResearch and Education Section, Yunnan TCM Hospital |
| LI Songmei | Director | Section of TCM Management, Yunnan TCM Hospital |
| LI Ruijiao | Shop assistant | Kunming Pharmacy, Tongrentang |
| LI Yongming | Shop assistant | Kunming Pharmacy, Tongrentang |
| XIAO Minghui | TCM Practitioner | Kunming Pharmacy, Tongrentang |
| JIAN Lifang | President | Sheng Ai Hospital on Beijing Road, Hualong Sheng Ai TCM Group |
| PU Junyong | Production Director | Ynnan Xitao Green Pharmaceutical Limited Company |
| LI Hongyun | Manager | Purchase Department, Yunnan Xitao Green Pharmaceutical Limited Company |
| YANG Yan | Buyer | Purchase Department, Yunnan Xitao Green Pharmaceutical Limited Company |
| TANG Jianghong | Director | Forestry Bureau of Eco-Tech Development Zone, Kunming City |
| ZHANG Yufa | Member | Forestry Bureau of Eco-Tech Development Zone, Kunming City |
| LI Guoyou | Director | Criminal Investigation Division, Yunnan Provincial Forestry Police Department |
| ZHANG Qian | Deputy Director | Criminal Investigation Division, Yunnan Provincial Forestry Police Department |
| CAI Xiujiang | TCM Pharmacist | Pu’er TCM Hospital |
| LI Zong | TCM Practitioner | TCM Clinic, Pu’er People’s Hospital |
| HE Shaoxing | Deputy Director | Forestry Police Department, Pu’er City |
| SHANG Hongbin | Director | Criminal Investigation Division, Forestry Police Department, Pu’er City |
| LI Zhengquan | Political Instructor | Public Security Division, Forestry Police Department, Pu’er City |
| YANG Tianrong | Deputy Director | Forestry Bureau, Pu’er City |
| LUO Wenya | Section Leader | Section of Wildlife Conservation, Forestry Bureau, Pu’er City |

...END

1. Massey University, Auckland, NEW ZEALAND [↑](#footnote-ref-1)
2. Creative Conservation Solutions, Canberra, AUSTRALIA [↑](#footnote-ref-2)
3. Chinese Association of Traditional Chinese Medicines, Beijing, CHINA [↑](#footnote-ref-3)
4. Northeast Forestry University, Harbin, CHINA [↑](#footnote-ref-4)
5. A similar path was observed in Louisiana with alligator farms. After the 1990-91 recessions, the number of alligator farms declined. The farms that survived were larger and increased in size in subsequent years. [↑](#footnote-ref-5)
6. a) eye-drops for the treatment of conjunctivitis; b) capsules for treatment of heart and liver diseases; c) cream for the treatment of haemorrhoids; and d) crystals for treatment of liver problems (cirrhosis). [↑](#footnote-ref-6)