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The Status and Spatial Patterns of Poaching, Illegal Trade, and Human–Bear Conflict of Asiatic Black Bears in China, 2010–2020

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Abstract: Asiatic black bears (*Ursus thibetanus*) are a large carnivore, widely distributed in East, South, and Southeast Asia. However, they have experienced dramatic population decline across this range due to various anthropogenic threats. The great demand for bear parts in the black market exposes this species to intense pressure of being poached and then illegally traded. Meanwhile, the continuous expansion of anthropogenic land use results in the sharpening of human–bear conflicts. In this study, we conducted a comprehensive search and collected information of the poaching, illegal trade, and human–bear conflict events related to Asiatic black bears reported in China during 2010–2020. By systematically searching judicial adjudicative documents and news reports, we identified 351 (64 poaching, 221 illegal trade, and 90 conflict) events across the country. The results showed that Southwest China was a hotspot across all categories (41, 149 and 40 events, respectively). Bear paws were the most common type of bear parts found in illegal trade (52.1%), and the most frequently reported human–bear conflict form was human injury from bear attacks (at least 52 people injured and another 7 killed). By determining the status of black bears being poached, traded, and their conflicts with humans in China, these results will provide important insights into the further research and conservation of this iconic species.

Keywords: wildlife trade; poaching; human–wildlife conflict; human–bear conflict; *Ursus thibetanus*

Academic Editor: Michael Wink

Received: 6 December 2024
Revised: 23 January 2025
Accepted: 24 January 2025
Published: 27 January 2025

Citation: Long, S.; Li, S. The Status and Spatial Patterns of Poaching, Illegal Trade, and Human–Bear Conflict of Asiatic Black Bears in China, 2010–2020. *Diversity* **2025**, *17*, 93. https://doi.org/10.3390/d17020093

1. Introduction

Asiatic black bears (*Ursus thibetanus*) are a large ursid species, mainly distributed in East, South, and Southeast Asia [1,2]. As an omnivorous large mammal with a broad dietary spectrum, Asiatic black bears are adaptable to various forested habitats, including boreal coniferous forests, temperate deciduous forests, subtropical evergreen forests, and tropical rain forests [1–3]. They play important roles in the ecosystems they inhabit, with critical ecological functions such as seed dispersal and carcass scavenging [2,4,5]. They are also considered an effective umbrella species, since they have good coverage of the ecological needs of numerous sympatric species and the ability to be more persistent to environmental disturbances than other large carnivores [6].

Across their distribution range, Asiatic black bears have been facing severe threats of habitat loss and direct killing from humans, resulting in dramatic population decline and range shrinkage over the past century [1,2,7,8]. Traditionally, Asiatic black bears are widely hunted for their fur, meat, and various body parts with specific uses. For example, bear gallbladder and fat have been long used as traditional medicine in Asian countries, and

bear paws are considered a rare food with high nutrition [9,10]. Although the species is now listed as vulnerable in the IUCN Red List of Threatened Species [1], listed in Appendix I of CITES and listed as protected wildlife in many countries, the huge demand for black bear parts and derivatives in the black market has imposed substantial poaching pressure on its wild populations [11–13]. Bear parts and even live bears, primarily young cubs who will be raised as bile producers in bear farms and play animals in circuses, are popular goods in illegal wildlife trade [7,14–17]. Poaching and related illegal trade are believed to be one major direct threat to this species [1,2].

Meanwhile, with the rapid increase in the human population and expansion of anthropogenic land use, conflicts between wildlife and humans have become sharpened [18–20]. Asiatic black bears are also frequently involved in human–wildlife conflicts, i.e., human–bear conflicts. These conflicts often include crop damage (as well as damage to various types of plantations) [21–23], beehive damage [19], depredation of livestock [21,24,25], and human injury from Asiatic black bears [26,27]. If these human–bear interactions cannot be managed well and losses to local residents during these conflicts are not compensated, these conflicts will be further intensified, leading to retaliatory killing of bears [21,28] and imposing additional pressures to this vulnerable species.

Among the 17 countries that still have wild populations of Asiatic black bears, China is considered the one with the largest wild population and the largest area of suitable habitats [1,20,29]. However, Asiatic black bears have been eliminated from many regions within the country, especially in Northeast, North, Central, and South China [1,8,29,30]. Previous studies indicate that there are currently six regional populations in Mainland China and two island populations (i.e., Taiwan and Hainan) [30]. However, their habitats are highly fragmented, especially in East and South China, and the population of Hainan Island may have vanished [30]. Asiatic black bears are listed as Class II national protected animals in China [31], but poaching and retaliatory killings following human–bear conflicts are still believed to be major threats to this species [1,2]. These isolated small populations are specifically vulnerable to illegal killings, since random loss of even a small number of individuals may drive the local population to extinction [32].

With the rapid growth of the Chinese economy over the past three decades, the demands for bear parts and derivatives in illegal markets are also increasing. Consequently, in addition to increased poaching pressure within China, a remarkable increase in transboundary wildlife trade has been reported, with bear parts illegally imported into China, mainly from Southeast Asian countries and Russia [12,16,33]. Though previous studies are mainly from Southeast Asian countries like Laos, Vietnam, and Myanmar, limited clues have indicated that China may play a considerable part in the illegal trade chain across various countries [16,34–36]. Asiatic black bears are also a common species involved in human–wildlife conflicts, but relevant studies are limited and mainly concentrated on Southwest China [19,23,28]. Therefore, determining the status, forms, and spatial patterns of these poaching, trade, and conflict events across the country has become an urgent task for wildlife researchers and managers. This will provide the critical knowledge needed to better understand the underlying drivers towards effective conservation of this threatened species.

In this study, by systematically searching judicial adjudicative documents (JAD) and news reports (news), we conducted a comprehensive review and collected information regarding poaching, illegal trade, and human–bear conflict events related to Asiatic black bears in China from 2010 to 2020. For the identified events, we extracted specific information like the date, location, number of bears involved, etc., and we used this information to address the following questions: (1) What are the spatial patterns of the three categories of events? (2) Are the number of poaching and human–bear conflict events correlated with the area of suitable habitat? (3) What is the frequency of different types of bear parts found

in illegal trade? (4) What are the forms of reported human–bear conflicts? Through this study, we hope to fill our knowledge gap regarding the status of Asiatic black bears being poached, traded, and their conflicts with humans in China. The information and results may serve as a baseline and will provide valuable insights into the conservation of this species in the future.

2. Materials and Methods

2.1. Data Collection

During June of 2021 and December of 2023, we conducted a comprehensive review on the poaching, illegal trade, and human–bear conflict events related to Asiatic black bears in China during 2010–2020 by systematically searching JAD and the news. The data resources of this study include: (1) JAD: Using the advanced search function of the "China Judgements Online" dataset (https://wenshu.court.gov.cn/, accessed on 10 December 2023), we searched for relevant cases of poaching and illegal trade of black bears with words in panel A and combined them with each cause of action shown in panel B of Table 1. We also searched for cases of human–bear conflict with "black bear" as the full-text search keyword and "administrative assistance" as the type of action. (2) News: We searched in the two most popular searching engines in China, i.e., Baidu (https://www.baidu.com/, accessed on 5 June 2021) and Google (http://www.google.cn/, accessed on 12 August 2021), using the combinations of keywords in panels A and B of Table 1, and the time limit was constrained from 1 January 2010 to 31 December 2020. We checked all the results returned and then identified the records of our target events. Given that these two engines may have poor coverage in Taiwan, we also searched the news website China Times (https://www.chinatimes.com/?chdtv, accessed on 20 October 2021) of Taiwan using the terms "black bear" and "moon bear" (another commonly used name for black bears in Taiwan) as the keywords for supplementary information of related events on this island. Among all the raw records generated from the news report search (approximately 3000 records), we first removed all duplicates that were forwarded from the same initial source, then we excluded the ones solely from single sources without direct evidence (e.g., photographs or videos) and only retained the ones from multiple (≥2) sources or with direct evidence. All the news records retained for subsequent analysis were from reputable news media and government agencies such as forestry police departments.

Table 1. Keywords used in JAD search and news search in search engines.

	JAD	News
A [1]	[full-text search keyword] black bear [3] [type of action] criminal cases	China black bear
B [2]	[cause of action] illegally hunt and kill rare and endangered wild animals which are under the state key protection	poaching/poach hunting/hunt
	[cause of action] illegally purchase, transport or sell those rare and endangered wild animals and their manufactured products	trading/trade hurting people
	[cause of action] violate hunting law and regulations	beehive/bee farm human-bear conflict

[1] All words in this panel were used for the search. [2] Every time, each word in this panel was used combined with the words in panel A. [3] Contents in square brackets represent different search bars.

2.2. Data Processing

We recorded the unique case number of each judicial adjudicative document and the site URL of each news report. If there were multiple documents or reports for the same event, we kept the one with the most complete information and considered the others as duplicates, which were excluded from the analysis.

We sorted all records into three categories according to the type of event: poaching, illegal trade, and human–bear conflict. We collected the specific information of each event of the three categories (Table 2). We classified the type of bear parts and derivates reported in illegal trade events as follows: paw, head, gall bladder and derivates, meat, claw and tooth, whole body, live animal, fur, fat, bone, and genital. Because multiple types of bear parts could be involved in one event, and some types of bear parts were uncountable (e.g., meat, fat), we calculated how many times each type of bear part appeared through all events instead of the number of specific bear parts.

Table 2. Specific information recorded for poaching, illegal trade, and human–bear conflict events.

Poaching	Illegal Trade	Human–Bear Conflict
time of poaching	time of trading	time of conflict
site of poaching	site of trading	site of conflict
poaching method	agency conducting the seizure	form of conflict
number of bears poached	type of bear products confiscated	number of human injuries and/or deaths
treatment of bears poached	number of bears confiscated [1]	number of livestock/poultry lost
agency conducting the seizure	number of live bears seized [2]	number of bears causing trouble
whereabouts of live bears seized	whereabouts of live bears seized	state of bears causing trouble
		whereabouts of the bears after the conflict

[1] Sometimes inferred from the number of bear parts. [2] For cases where live bears, primarily young cubs, are sold.

Conflict events were divided into six forms: human injury/death, beehives damage, property damage, intending to enter/entering human living region, livestock/poultry depredation, and crop damage. Here, we referred to residential areas, schools, and farmland as "human living regions", and we combined damages of fruits and other plantations from black bears into "crop raiding". Since more than one form of conflict can happen during one event, we viewed each form in every single event as one incident, then we counted how many times each form appeared through all incidents rather than through all events.

For all the identified events, we extracted the geographic location of each site. We queried the center coordinates (longitude and latitude) of the smallest land unit (e.g., villages, protected areas, parks, timberlands, etc.) using Google Earth (https://www.google.com/maps/, accessed on 20 December 2023) or Baidu Maps (https://map.baidu.com/, accessed on 20 December 2023). We then created a vector point layer for each category of events (see the online shared dataset of this article) in ArcGIS 10.5 (ESRI Inc., Redlands CA, USA) for subsequent analysis.

2.3. Data Analysis

We examined whether there was a correlation between the number of the three categories of events, respectively, and the area of suitable habitat in each provincial administrative region (hereafter referred as province. See province names in Figure S1).

We used the fine-scale distribution map of Asiatic black bears (binary raster, raster resolution 3 km × 3 km) produced by Shen et al. [30] to calculate the suitable habitat area in each province (presented as number of grid cells) using ArcGIS 10.5. We then conducted a regression analysis in R 4.2.2 [37] to examine the correlation between the number of events and the habitat area. Those provinces with 0 records were excluded from this analysis.

3. Results

We collected 351 records (241 from JAD and the remaining 110 from news) and identified 375 events in total (24 records contained both poaching and illegal trade events), including 64 poaching, 221 illegal trade, and 90 human–bear conflict events (Figure 1).

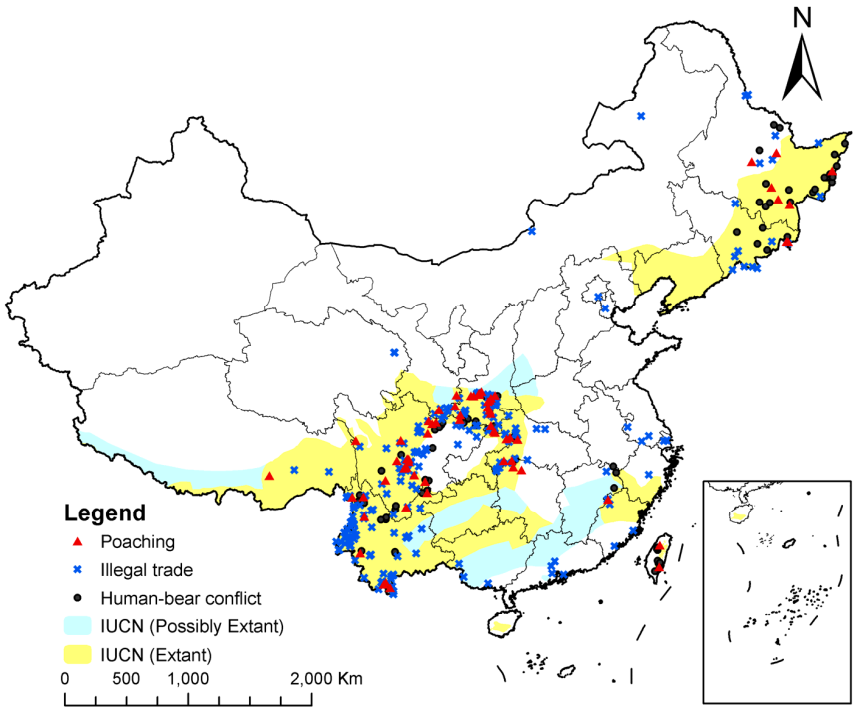

Figure 1. The spatial distribution of poaching, illegal trade, and human–black bear conflict of Asiatic black bears in China during 2010–2020. The species range map of Asiatic black bears from the IUCN Red List is displayed as the background.

3.1. Spatial Distribution

The poaching events (Figure 2a) were mainly reported in Southwest China, with some additional cases in Northeast China and East China. The mountainous areas around the Sichuan Basin, Northeast China, and the border regions in Western and Southern Yunnan Province were the three hotspots of reported poaching events. Eight poaching events happened in national nature reserves. The methods that bear poachers used included setting foot snares or traps, poisoning using baits with toxic chemicals, setting high-voltage electrical wires, using bait mounted with hand-made explosives, and directly shooting with guns.

Figure 2. The number of poaching (**a**), illegal trade (**b**), and human–bear conflict (**c**) events reported in each province of China during 2010–2020.

The illegal trade events (Figure 2b) showed a spatially clumped pattern that could be grouped as three types: (1) at the surrounding mountainous areas of Sichuan Basin, which also overlapped with the largest hotspot of poaching events; (2) at the border regions between China and Southeast Asian countries (i.e., Myanmar, Laos, and Vietnam) and Northeast Asian countries (i.e., Russia and North Korea); and (3) in the areas around big cities in the eastern part of China (e.g., Shanghai and the Guangzhou–Shenzhen–Hongkong urban agglomeration) (Figure 1).

The human–bear conflict events (Figure 2c) mainly concentrated in both Northeast and Southwest China, with sporadic occurrences in Central China. Taiwan of East China was also a hotspot for human–bear conflict.

There were 60 out of 64 poaching events located within the IUCN range map, with 84.4% (n = 54) in the Extant category and 9.4% (n = 6) in the Possibly Extant category (Figure 1). Among the 90 human–bear conflict events, 82.2% (n = 74) were in the Extant category and 1.1% (n = 1) were in the Possibly Extant category, whereas 16.7% (n = 15) fell outside of the range map (Figure 1). At the province level, nine provinces that are included in the IUCN range map with an Extant distribution were found with neither poaching nor human–bear conflict events.

The relationship between the number of human–bear conflict events with area of suitable habitat at the province level are shown in Figure 3. We found no correlation between either the number of poaching events or the number of illegal trade events and habitat area, whereas the number of conflict events was positively correlated with suitable habitat area (a = 0.002, b = 2.98, R^2 = 0.69, $p < 0.05$).

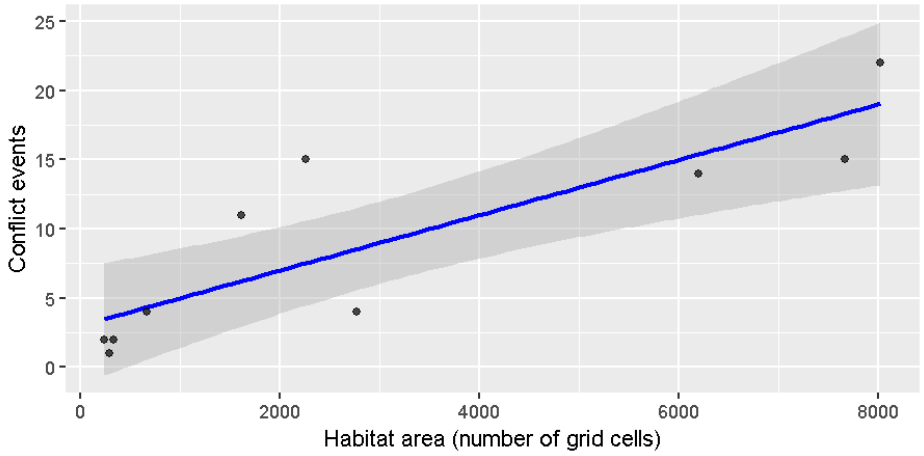

Figure 3. The relationship between the number of human–bear conflict events and suitable habitat area at the province level in China. The solid blue line indicates the median predicted line, and the shaded areas show the 95% confidence interval.

3.2. Bear Parts in Illegal Trade

For 213 out of the total 221 illegal trade events, we found that bear paws were the most frequently traded type (reported in 52.1% of all the 213 illegal trade events), followed by bear meat (18.3%) and whole body (15.0%) (Figure 4). Among all illegal trade events, there were 43 live bears involved. In the remaining eight events, the types of bear parts and derivates were unknown.

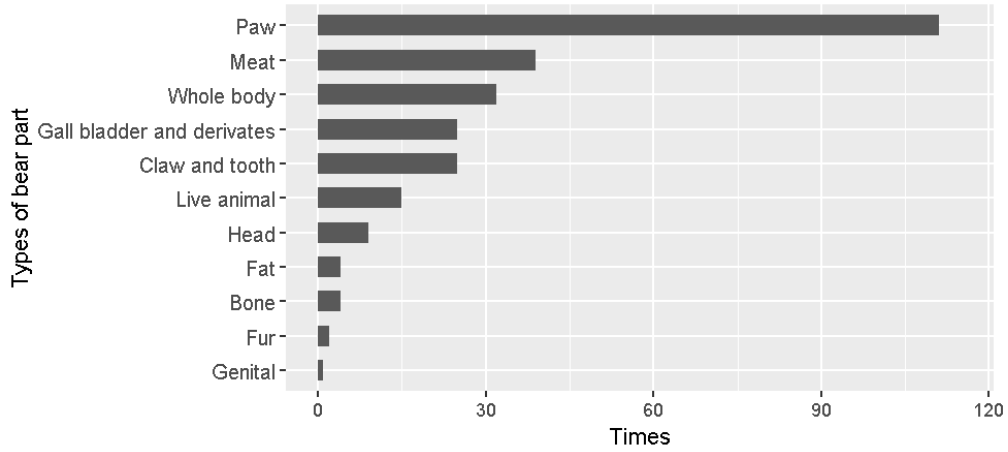

Figure 4. Frequencies of different bear parts appearing in illegal trade events (n = 213) in China, 2010–2020.

3.3. Forms of Human–Bear Conflict

As shown in Figure 5, the most frequently reported form of human–bear conflict was human injury/death (55.3%), followed by beehives damage (18.1%) and intending to enter/entering human living region (10.6%). At least 52 people were injured and another 7 were killed in the cases where severe conflicts occurred during unanticipated encounters.

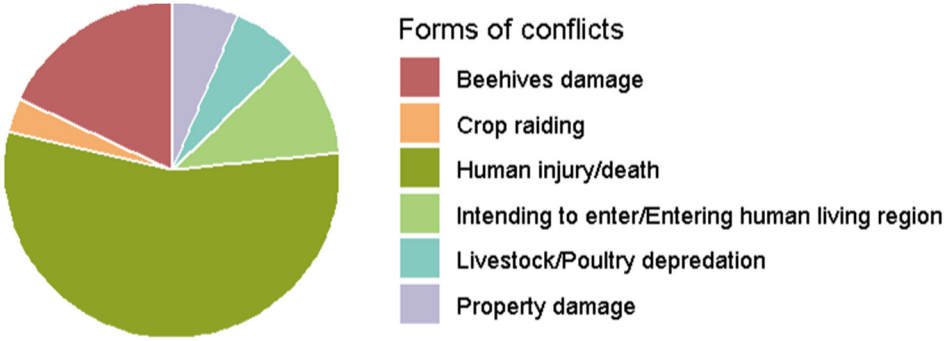

Figure 5. Proportion of different forms of conflict reported in human–bear conflict events in China, 2010–2020.

4. Discussion

4.1. Poaching

Intuitively, poaching of black bears and human–bear conflict involve mainly direct encounters between humans and bears; therefore, areas with more bears would have a higher probability of these two categories of event occurring. But, our regression results showed that only conflict events were significantly related to habitat area, whereas poaching was not. This might be due to two possible reasons that were not considered in this analysis due to lack of information:

(1) Human motivations behind poaching are complicated and could be influenced by various drivers. In general, higher market demands for black bear parts will lead to higher poaching motivations [11] (pp. 1–2). Apart from personal use or economic benefits as common initial motives of poachers, some poaching events occur due to retaliation to "problematic bears" by local residents following their crop or livestock loss and the intention to prevent further damage [21,22,28]. We also found in some poaching events black bears were not the intended target but were captured in traps set for other animals like boars or small ungulates, which has also been reported in other areas [38,39].

(2) The intensity of poaching is also related to the efficiency of local protection and law enforcement, which is however difficult to quantitatively measure. Protected areas, especially nature reserves in the case of China, are the backbone in protecting threatened wildlife from illegal harvest [40]. From the 1990s, the total number and area of nature reserves in China have increased rapidly [41], and patrols in reserves have proven an effective approach in reducing the poaching of wildlife [28]. However, the management strength may vary broadly among reserves, leading to highly varied conservation effectiveness [42]. Meanwhile, many bears and habitats are not yet covered by reserves, and some reserves are not big enough to comprise the home range of Asiatic black bears [43]. Therefore, the ability to protect black bears differs across reserves and regions, and as a result, the occurrence of poaching event varies among provinces. These issues will all influence the intensity of bear poaching.

4.2. Illegal Trade

Given that the illegal trade events do not involve direct interactions between humans and Asiatic black bears, they may not necessarily occur in the bear habitat or at the site where the bear was captured or poached. It was not a surprise that we found no correlation between the number of illegal trade events and habitat area.

In this study, we found that paws were most frequently traded, maybe because many people still hold the view that bear paws are high in nutrition. And, likely for the same reason, bear meat was the second most frequently traded type of bear part. Gall bladder only accounted for ~10% of bear parts illegally traded in China, which is very different from studies in other Asian countries where the gall bladder (and its derivatives) was the most common and frequently traded bear part (e.g., in Lao PDR [33] and India [44]). The potential reason may be partly because bear bile products from licensed bear farms are legal in China [10], which to a certain extent may relieve the pressure from black market demands for bear bile. Even so, the logic of whether establishing bear farms will contribute to the protection of wild black bears is still being questioned, since the preference for wild bear bile due to its unsupported "better quality" still exists [45,46]. Therefore, there is still a need for the publicity of alternatives of bear bile like synthetic bear bile. And, for other traded bear parts, the whole body and fur may be used as trophies and ornaments; claws and teeth are used as charms and ornaments [33,36]; live bears could be sent to bear farms or zoos [12,33]; and the rest may be traded for their purported medicinal properties [36].

Southwest China, especially Yunnan Province where China borders multiple Southeast Asian countries, is a hotspot for illegal trade events. In addition to the relatively high frequency of poaching by local residents, the wildlife trade across borders may also make a considerable contribution to black bear illegal trade [47]. In this study, we only included trade events in China and did not focus on international smuggling, which might underestimate the illegal trade in the country. This cross-border illegal trade could be considered from two perspectives:

(1) Bear parts and derivatives from abroad are sold in China. If we refer to a trade event as smuggling bear parts from foreigners at the border or parts that were seized at customs (entering China), then at least 22 events we recorded as international smuggling (sold into China), among which 16 events happened in Yunnan. Therefore, it is very possible that illegal trade with Southeast Asian countries (e.g., Myanmar, Vietnam and Lao PDR) accounts for the majority of bear parts smuggling in China.

(2) Bear parts and derivatives are sold from China to other countries. In addition to bear bile being exported to other countries in Southeast Asia (e.g., Singapore and Lao PDR) [11] (pp. 29–31, 38–40), there are also other types of bear parts like gall bladder [48] and even live bears [16] being illegally exported. Given that many border regions are remote areas with numerous trails hidden in the forests, bears or bear parts might be stealthily transferred across the border without being detected and captured by the authorities [12] (p. 19). Thus, in the future, the management agencies of China and neighboring countries should collaborate to strengthen law enforcement at the border regions with a high probability of bear distribution, like Northeast and Southwest China, to prevent the possible cross-border trade of bear parts and other wildlife.

4.3. Human–Bear Conflict

In this study, human injury/death was the most frequently reported form of human–bear conflict, followed by beehive damage. Livestock/poultry depredation and crop raiding only accounted for 6% and 3%, respectively. The major conflict form here is very different from that reported in previous studies, like crop damage [19,21,24,49] and livestock

depredation [25]. Additionally, the total number of conflict events is also much lower than other studies of human–black bear conflicts at a smaller scale, which mainly collected data through on-site interviews and questionnaires (e.g., Ali et al. [21] found 296 conflicts in Northern Pakistan). We believe that these differences are mainly due to the highly biased news transmitting phenomenon, where human injury/death receives much more attention than other conflict forms, so these cases were more reported in social media with high-level exposure. Most other conflict forms with minor impacts or financial losses, such as crop damage or livestock depredation, were therefore neglected and could not be found in the news. Such biases are also commonly seen in the human–wildlife conflicts involving other large carnivore species [50,51].

Among the 52 conflict events involving human injury or death, at least 46 happened in forests or mountainous areas, which coincides with the patterns reported in many previous studies that the majority of black bear attacks on humans happened in forests [21,24,28,52]. This could be explained by human expansion into bears' habitats [32]. Indeed, attacks on humans by large ursids are mainly caused by involuntary encounters and defensive action of females with cubs [53]. These events are also influenced by topography, vegetation, and their relatively limited eyesight; sometimes, black bears can only notice human presence within a very short distance, which may lead to shock and attack following involuntary encounters [19]. Meanwhile, black bear attacks were fatal in only five events in this study, which also supports the finding that attacks by ursids are much less fatal compared with other large carnivores (e.g., canids or felids) [53].

Bears may approach human residents for crop foraging or preying on livestock due to limited natural food in their natural habitats, especially before winter denning in years with poor mast production [54,55]. According to the Wildlife Protection Law and relevant policies in China, it is the wildlife management agency or local government who shall take the responsibility of compensating for the losses and damages caused by wildlife [56–58]. However, in practice, it is difficult for local residents involved in these conflicts to obtain this compensation. This may be due to various reasons, such as local people not being aware of or familiar with compensation policies [59], or it is difficult for the authorities to verify or quantify the loss claimed by local residents [59,60].

4.4. Conservation Implications

Based on the results of our study, we would like to provide some suggestions for future conservation of Asiatic black bears in China:

(1) Strengthen law enforcement and increase penalties for wildlife crimes, especially in Southwest China. Although in China, Asiatic black bears are listed as Class II national protected animals and trading or killing protected wildlife is prohibited by Criminal Law and Wildlife Protection Law, it is still possible to commit these crimes without being prosecuted and convicted [61]. Southwest China is a hotspot for both poaching and illegal trade events, which could be explained by the weaker enforcement in this remote and vast mountainous area. Thus, strengthening law enforcement in this region could intensify the law's deterrent effects and reduce these crimes [62].

(2) Raise the legal awareness of rural residents in Southwest China. Previous studies have shown that a large fraction of poacher who poach protected animals have an education level lower than senior primary school [63]. Therefore, some local villagers may not be fully aware of the seriousness of committing such crimes, and raising their legal awareness will prevent them being involved in poaching activities.

(3) Increase investment in wildlife protection. Although by 2020, China had achieved Aichi target 11 with a protected area coverage of more than 17% [64], increasing protected areas does not naturally guarantee their effectiveness in wildlife protection.

In China, the salary of reserve rangers may be much lower than the average wage [65], which may affect the eagerness and effectiveness of law enforcement. Meanwhile, a lack of funding would result in a shortage of necessary equipment and logistics needed for law enforcement [66], which also leads to an inability to detect wildlife crime.

(4) Enhance cooperation between neighboring countries to inhibit international smuggling of bear parts and derivatives. Clustering of illegal trade events at the border of Southwest China indicates active illegal trades between China and neighboring Southeast Asian countries, as reported in many previous studies (e.g., [16]). Cooperation between different countries should destruct the illegal trade chain from both ends.

(5) Improve the compensation mechanisms for wildlife damage. Asiatic black bears are a large carnivore that may cause great economic loss (e.g., from crop and beehive damage) to local communities, and they may become the primary species involved in human–wildlife conflict in some regions [67,68]. Consequently, black bears also face severe threats of retaliatory killing. Successful and timely compensation is considered an effective measure to avoid retaliatory killing of animals involved in human–wildlife conflicts [69]. In addition to government-leading compensation, commercial insurance specifically targeting crop/livestock loss owing to wildlife foraging/predation has been emerging as a promising approach to resolve human–wildlife conflict issues [70]. Wildlife managers and management agencies may consider integrating these new commercial approaches with traditional administrative policies to fulfil the needs of relieving the pressures on black bears from human–bear conflicts.

4.5. Potential Limits

Our study demonstrated that, compared with conventional interviews or questionnaire surveys, this keyword-searching method from JAD and news can collect highly reliable data on the poaching, illegal trade, and human–wildlife conflict of specific threatened species across a wide range.

However, researchers must be aware of the limits and potential bias of this method and the information collected. The records extracted from JAD and news may underestimate the target events that happened in the real world. The potential reasons include:

(1) Numerous poaching and illegal trade cases may not be discovered by the police and authority yet [71,72].

(2) The judgments of some seized cases may have not been pronounced or not been input to the online database yet. We can only collect JAD data after July 2013 from "China Judgement Online", which was launched at this time.

(3) Many human–wildlife conflicts with minor impacts (e.g., crop damages) do not receive significant attention from public media. For example, we found fewer events for a specific site or region compared to some onsite studies with extensive interview efforts: Liu et al. [28] reported at least 117 poaching events of black bears in Sichuan Province during 2003–2007, and Ji et al. [19] found 207 human–bear conflict events in Gaoligongshan National Nature Reserve, Yunnan Province during 2015–2019.

Nevertheless, this method still can serve as an effective approach to conduct quick scans to reveal the general large-scale patterns across the country, which is critical for national assessments and the development of effective conservation policies and action plans in a timely manner.

4.6. Other Implications and Conclusions

Among the three categories of events we collected, both poaching and conflict events could be considered as confirmed occurrence records of Asiatic black bears in China. Based on the IUCN range map, although most of the 64 poaching sites (84.4% in the *Extant* and

9.4% in the *Possibly Extant* categories) and 90 conflict sits (82.2% in the *Extant* and 1.1% in the *Possibly Extant* categories) were inside the range, there were a few records falling outside (one in Sichuan, one in Hunan, and two in Heilongjiang provinces). The IUCN species range map has been widely used in regional and global biodiversity assessments and large-scale macro-ecology research [73,74], whereas the accuracy of this dataset, which is primarily based on expert knowledge, is also frequently disputed [29]. Previous studies have demonstrated that, with occurrence sites collected from field surveys or observation, sometimes combined with modern approaches of species distribution modelling, the species' distribution and range map could be greatly improved [29,30,75]. These sites we identified outside the current IUCN range could be incorporated into future assessment of this species and therefore contribute to the verification and future updating of its range map.

Meanwhile, we also noticed that few poaching and conflict events were reported in East and South China during 2010–2020, and none in Hainan Island. A previous study by Shen et al. [30] indicates that suitable habitats of Asiatic black bears in both East and South China are highly fragmented, and the bear populations in both regions are considered under high risk with the highest conservation priority level. Shen et al. [30] also speculated that this species may already be extinct in Hainan, since no confirmed record has been reported during the past decades despite substantial survey efforts on this large island. Our results further support the conclusions of Shen et al. [30] and suggest that systematic surveys, assessments, and conservation actions are urgently needed for the bears inhabiting East and South China.

In conclusion, through collecting and organizing relevant information regarding poaching and illegal trade of Asiatic black bears and their conflicts with human reported in China during 2010–2020, we revealed the common patterns of these three categories of events across the country. Our results showed that Southwest China was the hotspot of all three categories of events. Bear paws were the most common type of bear parts found in illegal trade (52.1%), and human injury/death from bear attack was the most frequently reported form of human–bear conflict. We suggest that the authorities strengthen law enforcement and raise legal awareness in Southwest China, especially increasing investment in wildlife protection, enhancing international cooperation to reduce smuggling, and improving compensation mechanisms to alter people's negative attitudes towards black bears.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/d17020093/s1.

Author Contributions: Conceptualization, S.L. (Shuzhi Long); methodology, S.L. (Sheng Li) and S.L. (Shuzhi Long); software, S.L. (Shuzhi Long); validation, S.L. (Shuzhi Long); formal analysis, S.L. (Shuzhi Long); data collection, S.L. (Shuzhi Long); resources, S.L. (Shuzhi Long); data curation, S.L. (Shuzhi Long); writing—original draft preparation, S.L. (Shuzhi Long); writing—review and editing, S.L. (Shuzhi Long); visualization, S.L. (Shuzhi Long); supervision, S.L. (Shuzhi Long); project administration, S.L. (Shuzhi Long); funding acquisition, S.L. (Shuzhi Long). All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the National Key Program of Research and Development, Ministry of Science and Technology of China (grant numbers 2022YFF0802300, 2022YFF1301500).

Institutional Review Board Statement: Not applicable, since this study does not involve the use of humans or animals.

Data Availability Statement: The dataset of occurrence sites used for this analysis is available at https://doi.org/10.13140/RG.2.2.24680.17927/1.

Acknowledgments: We are grateful to the members of Wildlife Ecology & Conservation Lab at Peking University for their support and help.

Conflicts of Interest: The authors declare no conflicts of interest.

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