From the Field

Conflicts between local villagers and Tibetan brown bears threaten conservation of bears in a remote region of the Tibetan Plateau

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TIBETAN BROWN BEARS *(Ursus arctos pruinosus)* are rare across most of the Tibetan Plateau (Schaller 1998). Yet, contacts between bears and local herders are increasing. Unlike other countries where nuisance bears may be shot or relocated (Peine 2001, Gunther et al. 2004), China forbids these practices, and most hunting is forbidden. In addition, all firearms were confiscated from local herders in 2000. Thus, despite their increasing threats to Tibetan communities, Tibetan brown bears generally are safe from retaliatory killings by local villagers.

Sanjiangyuan National Nature Reserve, which is one of the largest nature reserves in the world, is approximately the size of Illinois, USA, or England and Wales combined (Figure 1). It is one of China's most important protected areas, covering 50% of the land area of the Sanjiangyuan region. The Sanjiangyuan National Nature Reserve's goal is to protect the biodiversity and ecological functions of the source regions of several major Asian rivers: the Yangtze, Yellow, and Mekong rivers. The rivers originating from the Tibetan Plateau and its surrounding mountain ranges influence the lives of about 40% of the world's population (UNEP/GRID-Arendal 2007).

To protect this watershed, the Sanjiangyuan National Nature Reserve has begun to adopt a new model of conservation in China under the name of community co-management. In this model, government agencies and local communities collaborate to protect the environment and enhance the well-being of local residents. However, an emerging problem threatens to destabilize this approach at the outset; that threat is human–wildlife conflicts between local herders and large predators. Three wildlife species are of particular concern in the region: snow leopard (*Uncia uncia),* gray wolf (*Canis lupus),* and brown bear. The former 2 species are becoming more abundant each year due to natural growth and reduced hunting; they constitute a growing burden on the local economy. Conflicts between brown bears and people also are becoming increasingly common, but it is uncertain whether the brown bear population is growing or whether the behavioral patterns of the bears are changing. Such human–bear conflicts are discussed below, in the context of a newly-proposed, more people-centered approach to conservation in the Sanjiangyuan region of western China.

Historical background

Zhiduo and Zaduo counties are located administratively in the center of the Tibetan Plateau in southwest Qinghai Province (Figure 1). Until the late twentieth century, herders generally lived in tents year round, moving seasonally between pastures with all family members, livestock, and material possessions. During the Collective Era (*circa* 1958–1978), natural resources were owned and managed by the state. However, after the end of the collective era, from the 1980s through the mid-1990s, land and livestock were privatized and allocated among families (Foggin 2000, 2005, Sheehy et al. 2006). Beginning in the mid-1990s, the government began to provide assistance

for Tibetan herders, building houses (winter homes) as part of a new, comprehensive program to alleviate poverty (Foggin 2008). With the provision of such homes, it became possible for people to store greater quantities of food and other supplies for all seasons and to leave these supplies behind when they moved into their traditional yak-hair tents on the summer pastures. Over the following decade, it appears that brown bears discovered a new source of abundant, undefended food and learned that breaking into herders' homes may produce a profitable food reward.

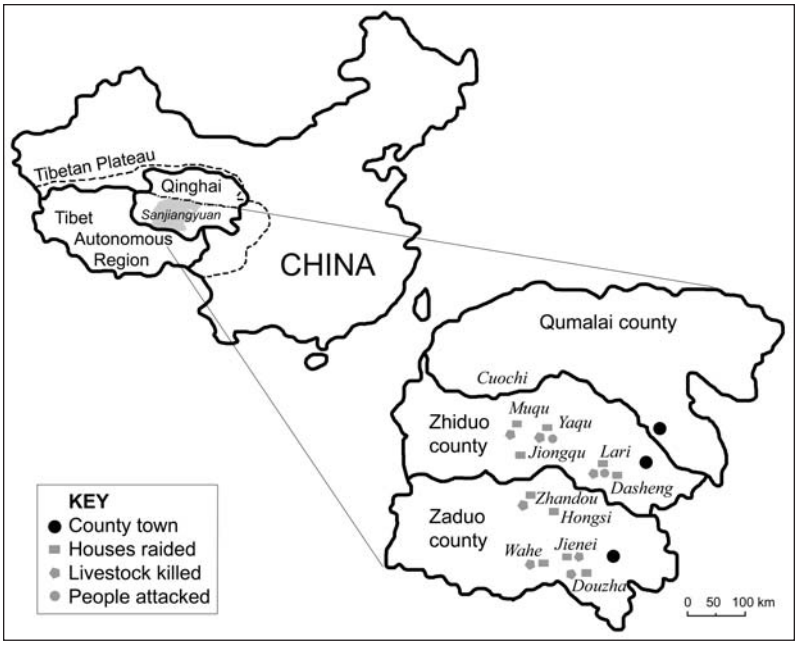

Figure 1. The location of the Tibetan Plateau, Qinghai province, Tibet Autonomous Region, the San-jiang-yuan region, and the study area (gray) within China. Inset is a more detailed map of the study area, the counties of Qumalai, Zhiduo, and Zaduo. Villages are marked where there have been reports of occurrences of conflict with Tibetan brown bears in 2006–2007. Symbols indicate incidences of homes raided (gray rectangles), and livestock killed (gray polygons), and people attacked (gray circles).

Recent developments

According to local herders, such human–wildlife conflicts increased most dramatically in the summer of 2007, purportedly due to a significant reduction in bear prey species following the most recent large-scale implementation of a government policy in December 2006. This misguided policy aimed to eradicate the plateau pika (*Ochotona curzoniae*) to reduce grazing pressure over large areas of the Tibetan Plateau (Smith et al. 1990, Schaller 1998, Smith and Foggin 1999, Xu et al. 2006). Yet, the pika constitutes up to 70% of the Tibetan brown bear's diet (Schaller 1998, Xu et al. 2006), and the pika's eradication could cause starvation to bears (and other predators, as well) unless these predators can switch to an alternative food source, such as food found in human dwellings. This explanation for increased bear–human conflicts is supported further because, to date, there is no reported increase in frequency of raids by bears in Cuochi village, located in neighbouring Qumalai County, where the plateau pika has not been poisoned.

In addition, some herders have suggested that bears might need to supplement their diet with food from local people's homes because another natural prey species, the Himalayan marmot (*Marmota himalayensis)*, also has decreased significantly. The marmot has been subjected to hunting and also to lethal control in recent months to prevent the spread of the bubonic plague.

Results of focus groups and community meetings

From May to November 2006, we conducted 4 focus group discussions in Zhiduo County, specifically in Zhiduo town and in Yaqu, Muqu, and Dangqu villages. Focus group members were livestock herders; group sizes ranged from 5 to 9 herders, with a total of 23 participants. According to official sources, during 2000 the population of Zhiduo county was 24,194 people in 5,202 families (Ju 2002, Zhang and Zhu 2002, Zheng and Li 2004). Human–wildlife conflicts were 1 of 4 topics covered in the focus groups; other topics discussed were

environmental change, grazing systems, and rangeland livestock productivity. Only in Yaqu did participants report that brown bears were attacking livestock.

In June 2007, we interviewed herders and community leaders in Zaduo County about wildlife abundance and human–wildlife conflicts. Participants reported that brown bears were present near Puke village; however, no mention was made of any conflict. No bears were reported near Zhaqing town. However, closer to the border with Zhiduo County, numerous bears were reported and were considered a threat to livestock, as well as to homes in Zhandou village. In neighbouring Hongsi village, bears broke into homes, ate the food supplies, and destroyed furniture. Reportedly, winter homes were broken into each year when the families moved to their summer pastures. Loss of livestock and destruction of homes caused by brown bears also were reported in Douzha, Jienei, and Wahe villages of Zaduo county (Figure 1).

Many other discussions also have occurred since 1998, when one of the authors (JMF) began to work in the area. Recently, in August 2007, we participated in a community festival in Lari village (Zhiduo County) organized by the Upper Yangtze Organization. Meetings were held on a variety of environmental issues. The meetings were attended by many local herders and delegates from several local environmental nongovernmental organizations (NGOs) working in Qinghai and Sichuan provinces. Local government leaders and Sanjiangyuan National Nature Reserve staff and authorities (i.e., key representatives from the national level body that is responsible for nature conservation) also attended the meetings; this was very significant because previously such discussion and collaboration was lacking. The problem of nuisance bears was the main focus of discussion for a full day. Four main communities were represented at the meeting: Muqu, Yaqu, Dasheng, and Lari villages. Within these villages, nearly 50 homes (5–10% of households) were reported to have been raided by bears in 2007. Some homes were raided repeatedly, bringing the total number of incidents to 70, a massive rise over previous years.

A brief description of several specific instances may help further elucidate the nature and extent of the problem. Of 12 participants from Lari village, where the community meeting took place, 5 herders had their homes broken into by brown bears during 2007. Some of the damage inflicted is shown in Figure 2. Two of the 3 herders we interviewed had their winter homes broken into during 3 consecutive years, while the third herder's home was raided for the first time in 2006. In 1 case, a bear entered through the back door; in another case, a bear broke down the back wall of the house; in the third case, a bear broke the door, windows, and roof, and destroyed furniture in every room of the house. Herders reported that bears most commonly break through the door or roof, and most break-ins occur between May and July, after the families moved to their short-term summer pasture homes. In no case had livestock been left near the house. However, in all cases food had been left in the winter home, which may have attracted bears. Although no person in the 3 families was attacked by a bear, bears killed 18 sheep owned by one family and 13 sheep owned by another.

Bears usually raid homes only after the families have moved away; however, bears are not afraid to break in if only 1 person is present. Two anecdotes were given to illustrate this fact. Within the last year, one man in his 50s or 60s was in a back room of his house when a bear entered and raided the main room. On a different occasion, knowing that a bear was in the area, a doctor went to guard his house. However, even loud noises were not sufficient to scare the bear away, and the man was forced to retreat to the roof of his house while the bear raided the room below. Most herders, consequently, now are too afraid to leave only 1 person behind to guard their winter homes. Nonetheless, even this precaution may soon be insufficient for people's safety. In September 2007, 2 bears raided 1 room of a home while the whole family was sitting in the adjoining room.

Several local sources have confirmed that bears began to raid homes 2 or 3 years ago. Such raids have increased, with 2007 being the worst year for bear raids so far. When doors are locked, the bears simply break down the walls of the mud-brick homes. They squash stoves and chimneys and generally destroy the homes

as they consume stored food (Figure 2b and 2c). This was reported to be happening widely in the region with no apparent association with proximity to streams, rivers, or other water sources. Except for open plains, which are farthest from the bears' preferred mountain habitat, bears now are breaking into homes on a regular basis, with some homes having been raided 4 or 5 times in 2007.

Locally proposed solutions to minimize human–bear conflicts

Attempts to minimize human–bear conflicts have included strengthening doors and walls, building fences around houses, placing scarecrows near houses, leaving radios playing while residents are away, lighting firecrackers to scare bears, and leaving dogs to guard the houses. These measures have been largely unsuccessful.

Many families feel they have suffered so much economic loss that they should be allowed to kill problem bears. At a minimum, it was suggested that such bears be relocated. Some herders suggested that as a preventive measure, ≥1 bears should be killed each year so that remaining animals would learn to fear people. This method often was used before guns were confiscated. In another approach, all the families in one village in the neighbouring province of Sichuan chose to build a safe room in which to store food, with 3 people left behind to guard it when herders and their families move to their summer pastures. While communal food-guarding appears to have been successful to date in Sichuan, the approach was deemed impractical by most participants of the community meeting in Lari village.

Everyone at the recent community gathering agreed that the main cause of brown bears attacking winter homes was their attraction to food supplies left inside. However, those who attended the meeting remained divided about the feasibility of carrying all their food supplies with them when they move to their summer pastures. It may, therefore, be most practical to work together with the community to develop a bear-proof container, possibly partially buried in the ground and located near each family's winter home, and to design and introduce solar-powered electric fencing to protect homes from bear attacks. These approaches will be discussed further at subsequent community meetings. Bear-proof containers have been successfully used in North America, but the cost of purchase and shipping bear-proof containers to Sanjiangyuan region would be prohibitive for these communities. Instead, it is necessary to design, field-test, and locally produce effective but low-cost containers and other equipment.

Figure 2. Damaged homes in Lari caused by brown bears. The destruction observed included (a) broken windows, (b) broken walls, and (c) broken furniture.

Discussion

While the total number (or density) of bears in the area remains unknown, most local people feel that there are too many bears, and they are convinced that it is not just a few nuisance bears causing problems. Indeed, descriptions of the age and gender of raiding bears indicate at least 6 bears are causing damage in Yaqu village alone. Costs of repairing damage have been estimated at between $700 and $2,800—an amount that far exceeds most families' annual income. Further financial costs are incurred by bears killing sheep. Although bears have rarely harmed people to date, many herders fear future attacks. Human–wildlife conflict, therefore, has become a prime concern of the Sanjiangyuan region's herders. It is vital that the plans made by the Sanjiangyuan National Nature Reserve address this human–wildlife conflict in a fair, equitable, and timely manner. A compensation program for local herders who suffer losses from bears needs to be discussed as part of this planning process.

For several years, the local communities have been highly motivated to protect their wildlife

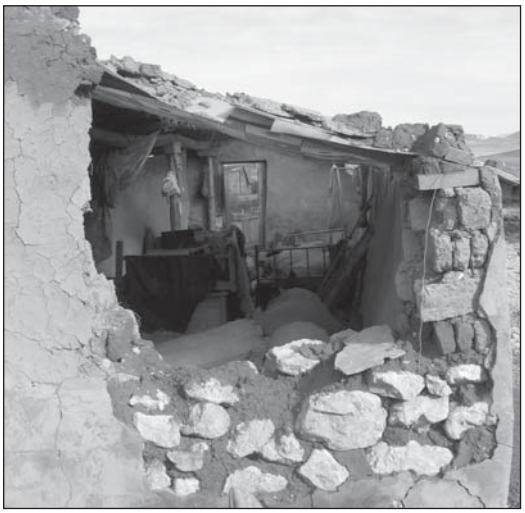

Figure 2 b.

(Foggin 2000, 2005, 2008), and their support for conservation efforts remains invaluable. However, the case of bear attacks in the Tibetan Plateau region illustrates that the human cost of conservation can be high for local villagers and could eventually erode their support. Community co-management of wildlife aims to benefit both people and wildlife by addressing development and conservation in tandem (Cooke and Kothari 2001, Pound et al. 2003, Borrini-Feverabend et al. 2004). To date, such co-management has been manifest primarily in the form of focus group discussions (with representatives from local communities) and community meetings involving higher-level government authorities. Ultimately, all key stakeholders must be considered, and government policy must be applied in ways appropriate to the local ecological and cultural situation for conservation efforts to succeed (Cotton 2008, Lemelin 2008). There appears now to be a new and unique window of opportunity for community co-management to be tested in the Tibetan Plateau region. Hosted by Plateau Perspectives, local communities and NGOs already have met together with local and regional government decision-makers on several occasions to jointly discuss and plan future cooperation for the management of natural resources. As of January 2008, a formal long-term agreement has been signed between Plateau Perspectives and the Sanjiangyuan National Nature Reserve to promote community co-management in the region, including the

Figure 2 c.

mitigation of human–wildlife conflicts. This new approach to conservation is considered to be a top priority initiative for the next few years. Not only the Tibetan brown bear, but all the wildlife and grassland ecosystems of the Tibetan Plateau may stand to benefit from good co-management.

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