

# Chapter 15

## The Status and Management of Asiatic Black Bears in Taiwan

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The Formosan black bear (*Ursus thibetanus formosanus*), an endemic subspecies of the Asiatic black bear, is the only native bear in Taiwan. Because of severe exploitation and habitat degradation in recent decades, populations of wild Formosan black bears have been declining. This species was listed as “endangered” under the Cultural Heritage and Preservation Law in 1989. Their geographic distribution is restricted to remote, rugged areas without human disturbances. However, every limited specific conservation measurements have been implemented while illegal hunting continues to threaten their long-term persistence.

### Biology

The Formosan black bear (*Ursus thibetanus formosanus*), an endemic subspecies of the Asiatic black bear (Nowak 1991), is the only native bear in Taiwan. Unlike Asiatic black bears in temperate areas, bears in Taiwan do not hibernate in winter. They are active 54-57% of the time over the entire day, and more active during summer (60%) and fall/winter (60%) than spring (47%). They are primarily active during the day in the spring and summer; and increasingly active at night in the fall/winter when acorns are abundant (Hwang and Garshelis in press).

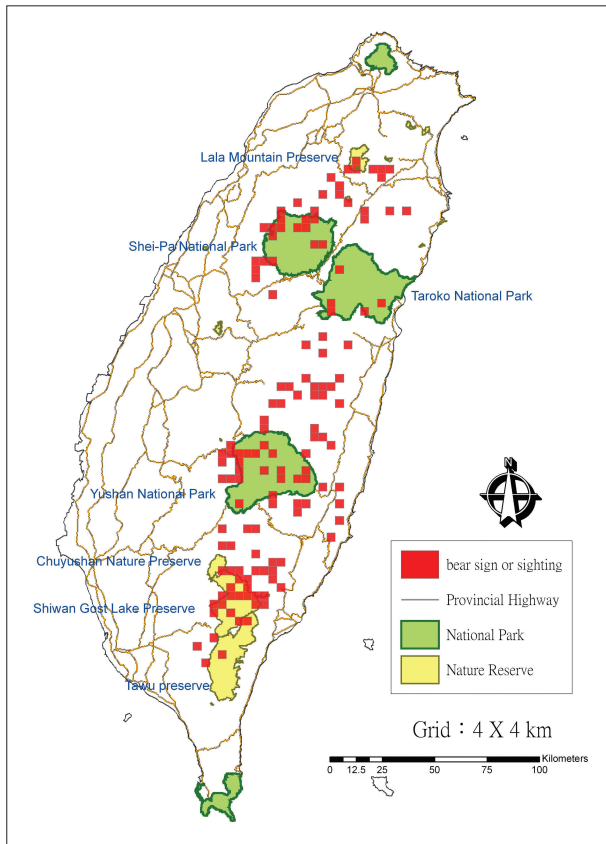
Radio-collared bears in Yushan National Park had annual home range sizes (minimum convex polygons) of 27-202 km<sup>2</sup>. Home ranges overlapped extensively (Hwang 2003; Wu 2004) and often extended well beyond the boundary of the park. Mean maximum straight-line distance between successive locations was 24.6 km (SE = 7.8, *n* = 6). Half of the collared bears traveled beyond the park boundaries where they were more vulnerable to illegal hunting. When acorns were most abundant (usually October-January), bears tended to aggregate in oak forests. Once acorns diminished, bears moved 6-24 km to spring-summer range. Females and young males avoided areas spatially or temporally

where adult males congregated during productive fall seasons. An even greater dispersion occurred in years of acorn scarcity.

Although omnivorous, Formosan black bears maintain a primarily vegetarian diet. They forage on a variety of foods, including various parts of plants, insects, mammals, and carrion. Diets of bears monitored in Yushan National Park included succulent vegetation in spring, soft fruits rich in carbohydrate (e.g., Lauraceae and Rosaceae spp.) in summer, and fat-loaded hard mast (e.g., acorn, mainly *Cyclobalanopsis* and *Quercus* spp, and walnut, *Juglans cathayensis*) in fall/winter (Hwang et al. 2002). Scat analysis indicated that bears also consumed medium-sized ungulates (e.g., Formosan muntjac, *Muntiacus reevesi*; serow, *Naemorhedus swinhoei*) more frequently than in other areas, especially when acorns were less abundant.

### Status

Previous records of Formosan black bear occurrence suggested a wide distribution in forested habitats from low to high elevations throughout the island. However, loss of habitat caused by rapid human development and exploitation (fueled by an increase during recent decades in market demand for bear parts) has constrained bears to rugged and steep terrain far from human activity (Fig.15.1). Recent surveys found bears to be distributed along Taiwan’s central mountain range in 23 districts from 10 counties, ranging in elevation from 300 to 3,500 m (Wang 1999). Evidence of greater occurrence from mid- to high-elevation habitats (2,000-3,000 m) may be due to both the limited human accessibility and the stable food resources found at these elevations. The majority of documented bear occurrence was in forest habitat located within protected areas such as the Chatianshan Nature Reserve, Shei-Pa National Park, Taroko National Park, Yushan National Park, Shuangguei Lake Major Wildlife Habitat, and Dawushan Nature Reserve (Fig.15.1).



**Fig.15.1: Current distribution of Formosan black bears based on sighting and sign reports since 1990 in Taiwan.**

Although no population estimation has been made, 15 bears were captured during 1998-2000 in Yushan National Park. Based on the low number of reported bear sightings in Taiwan, we suspect no more than several hundred bears to occur in the remaining suitable habitat across the island. The species has been legally protected since 1989 but illegal hunting continues. Eight of 15 bears captured in our Yushan study had missing toes or paws, caused by illegal traps (Hwang 2003). This would appear to support a conclusion that poaching continues to threaten Formosan black bear populations.

Approximately two thirds of land in Taiwan is still covered with forest. Ten to 20 percent of this remaining forest is pure oak, mixed oak or broad leaf forest, all of which are good habitat for bears, especially during the fall and winter. A decision by the Forestry Bureau in 1991 to ban logging in remaining natural forest stands seems to have provided a big boost to habitat protection for bears. As of 2006, the primary threat to bear habitat appears to be continued fragmentation caused by road construction. Continued road construction not only leads to greater forest fragmentation but makes remaining forested areas more accessible to humans which may lead to increases in illegal hunting and other activi-

ties that directly or indirectly impact bears.

## Human-bear relationships

The Formosan black bear is generally called black bear or dog bear in Chinese dialects. Some indigenous peoples, such as those from the Bunun or Guma communities, refer to the bear as “Tumad” or “Guma” respectively. One of the best known stories about bears is a phrase originating from Mencius: “Fish and bear paws cannot be obtained at the same time”. The meaning of this aphorism is that one is forced to choose between desired items.

In traditional Han Chinese culture, bears are animals of economic value from head to toe. According to the traditional Chinese compendium of medical material *Ben Cao Gang Mu*, bear gall, fat, bones, meat, and blood are all useful medicines. In Taiwan, bears are especially valued for their gall bladder, which for centuries has been considered a precious medicine, and for their paws, which contain specialized meat which is an ingredient in many delicacies (Chang et al. 1995). As a result, illegal hunting and selling of bears and their parts continue to be a problem in Taiwan.

It is primarily the indigenous peoples of Taiwan that hunt. Bears have traditionally had social and cultural importance to the many indigenous people such as the Bunun. The Bunun viewed killing a bear as inauspicious, maintaining the view that it was the same as killing a person. According to Bunun legend, they share a common ancestor with bears. Therefore, there existed a moderate taboo against consuming bear meat and hunting bears during certain seasons. As a result of this belief (and to honor the taboo), Bunun hunter that had killed a bear would share the bear with all members of their village in a ceremonial feast. Although taboo, killing a bear was still considered a remarkable event because it was rare and difficult. A bear hunter was therefore regarded as a hero, and the killing of a bear often became the focus of the yearly traditional hunting ceremony (Hwang 2003). Although most hunters (67%) still believed the taboo against killing a bear, traditional beliefs and values relating to bear hunting had diminished (Hwang 2003).

Most Bunun hunters kill only one or two bears in their lifetime. Furthermore, the average age of hunters when they killed bears has been steadily increasing, suggesting that fewer young people are becoming bear hunters. Most people perceive bears as potentially dangerous, and as competitors for space and food. Reasons cited by local hunters around Yushan National Park for killing bears included protection of themselves or property (48%), economic benefits (26%), meat consump-

tion (10%), and heroism (17%; Hwang 2003).

Additionally, our survey revealed that bears were generally not specifically sought after by Bunun hunters, but instead inadvertently caught in traps set for ungulates (38%) or were encountered by chance on game trails and then shot (62%; Hwang 2003). Traps with which bears were captured ( $n = 56$ ) consisted of either wire-cable or nylon snares (75%), or steel-jaw traps (25%). Our research further indicated that the proportion of bears caught in traps had steadily increased over time (Hwang 2003).

## Commercialization of bears

In Bunun communities, bears were not favored game species of local hunters because of their rarity, the difficulty of catching them, their offensive taste, and a perceived danger in hunting them. Traditionally, indigenous people have hunted ungulates primarily for cultural and economic reasons (Chen 1997), and bear meat and parts were more of an inadvertent byproduct of ungulate harvesting than a sought-after commodity. Except for meat, bear products (including gall bladders, paws, and bones) were not used by indigenous people, but were sold to outside markets. Villagers did not trade in bear parts among themselves for cultural reasons, their low-quality taste, or their high market value outside the village.

Hunters and bushmeat traders reported that in earlier times only bear gallbladder and bones had economic value. However, after the 1960's with the growth of bushmeat restaurants, bear meat became more popular and consequently hunters began selling bear parts or entire bear carcasses. For example, around Yushan National Park, prior to the 1980's just 22% of bears harvested were killed and for the purpose of sale to the bushmeat market. By the 1990s, this had increased to 59%.

Although our data indicated that prices for bear parts had not increased as rapidly as average per capita income, trade in bear meat was still higher than had been expected (Hwang 2003). Income received from the sale of bears or parts had increased dramatically, from an average of NT\$ 520 in the 1950s to more than NT\$ 80,800 in the 1990s (1 US\$ = 28-35 NT \$). Recent estimates show the average worth of one bear to be equivalent to approximately three months' income for an average laborer. In some cases, sale of a dead bear could fetch more than NT\$ 100,000 (i.e., NT\$ 1,000-1,400/kg). This is two to three times the market value of the most popular illegal bushmeat such as muntjac or wild boar (NT\$ 400-600/kg), and six to ten times the price of domestic pork.

## Current management system

The Formosan black bear was classified as an endangered species by the Natural and Cultural Heritage Act on January 30, 1989. Following the enactment of the Wildlife Conservation Law on August 4, 1989, it was listed as a fully protected species within the endangered species category of this law.

The Forestry Bureau of the Council of Agriculture is the primary agency responsible for wildlife conservation, including bears, in Taiwan. The Park Service, an arm of the Ministry of Interior, is responsible for wildlife conservation within national parks, especially those in mountain areas where bears reside. Governmental agencies, such as Yushan National Park, the Endemic Species Research Institute and the Taipei Zoo, have been engaged in bear research and conservation education. Relevant education programs have included the "BEAR" newsletter (published since 1997), and the website *Conservation and Research of Formosan Black Bears* (<http://tve.npust.edu.tw/project/meibear/>), dedicated to disseminating information on current conservation efforts and research.

## Recommendations

In 1994, a population habitat viability analysis (PHVA) workshop was conducted by the Taipei Zoo and the Council of Agriculture. Unfortunately, not only has there been very little follow-up, there has been limited support for field research on bears. Consequently, research and the collection of basic data on the ecology of wild bears have been restricted to only a few areas.

The future of bear conservation is reliant on developing a strong task force composed of scientists, NGO representatives, and interested government agencies provided with long term financial support. Effective enforcement against illegal hunting and trading of ungulates is one very important area in need of improvement because harvest rates of bears invariably track the harvest rates of ungulates. However, the policing of illegal hunting is sometimes hindered by organizational constraints (e.g., internal capacity, power and authority over resource use) and the logistic difficulties of working in the remote areas inhabited by bears (e.g., due to rugged terrain, thick vegetation, and lack of trails). At a minimum, measures taken to protect bears within protected areas should be strengthened to eliminate poaching. Protected areas provide the source for future expansion of bear populations.

Due to their large home ranges, safeguarding bears in Taiwan will require more than simply protecting populations within designated protected areas. Corridors be-

tween protected areas and other potential habitats should be established and effectively managed to maintain sustainable bear populations. We also suggest a ban on the use of snares for hunting, and greater regulation and monitoring of game hunting.

Given the increasing number of wealthy people in urban areas and the high economic benefits of selling bear parts and meat, there is no indication that this market will diminish within the foreseeable future unless the legal risks increase, conservation awareness increases, and/or the consumer demand declines. Public awareness can and should be increased by greater incorporation of educational material on bear ecology and conservation in schools, as well as by getting these materials into the hands of various environmental leaders.

Increased human-caused mortality of bears is highly correlated with the presence of roads, which provide hunters with not only easy access to bears in their natural habitat but also an easy way of transporting carcasses to markets. Increasing human activities and continued development of road systems have not only led to increased bear poaching activity or by-catch of bears, but to fragmenting remaining suitable habitats which may limit dispersal and movement of bears. To avoid further habitat fragmentation, human activity in remote mountain areas should be regulated, and local people should be informed about conservation of endangered species and provided with means to generate income other than trade in wildlife.

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