Evolving human attitudes and management policy in Japanese wildlife management: A case study of the Asiatic black bear (Ursus thibetanus japonicus)

Mina Miyai Roy

The University of Montana

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Evolving human attitudes and management policy in Japanese wildlife management: A case study of the Asiatic black bear (*Ursus thibetanus japonicus*)

By

Mina Miyai Roy

B.S., University of Montana, 1994

Presented in partial fulfillment of the requirements for the degree of Master of Science

University of Montana

1998

Approved by

Committee Chair

Dean, Graduate School

7-14-98

Date
I examine the ecological and human dimensions of Asiatic black bear (Ursus thibetanus japonicus) conservation in Japan. Threats to bear populations in Japan can be grouped into two categories: ecological and socio-cultural. I first review the major ecological concerns, including habitat fragmentation and alteration, overharvest, and illegal trade of bear parts.

In order to document attitude development and the basis of Japanese perceptions toward Asiatic black bears, I visited Honshu (both the northeast and western part of the island) and Hokkaido. I conducted interviews with 62 individuals, including bear researchers, federal, prefectural and municipal government personnel, local hunters and farmers. The method used is ethnographic and data analysis is based on “grounded theory”.

These interviews clarified that a major hindrance to conservation of the Japanese black bear is the general public’s negative perceptions. Black bears are considered pests because of damage to forestry and agriculture. Negative perceptions facilitate extensive nuisance killing, with resultant population declines in many areas.

My field research indicated that dramatic differences in perceptions toward bears exist among groups. Bear researchers exhibited ecological views toward bears. In contrast, government workers presented more utilitarian views. Most interestingly, local hunters and farmers who had daily contact with bears, seemed not to display particularly negative attitudes.

Hunters and farmers’ attitudes differed slightly between study sites in northeastern Honshu and western Honshu. Hunters and farmers in western Honshu seemed to have more strong reactions towards bears. Upon closer examination, however, their frustration was directed more at government agencies which do not offer effective control methods and conservationists who do not understand bear damage than at bears themselves.

I recommend a series of steps that would promote more effective black bear management in Japan. These include additional research directed at more effective population monitoring systems; quantification of damage mechanisms, levels and costs; development of locally accepted compensation systems; improved communication and cooperation between different groups of people; and development of effective conservation education systems.
進化する日本人の野生生物に対する認識と保護管理の方針: タキノワグマ
(Ursus thibetanus japonicus) をケーススタディとして

指導教官: クリストファー サーヴィーン

この研究は、日本のタキノワグマの保護管理における生物学的な側面と人的側面の関係を明らかにしようとするものである。日本のタキノワグマ個体群への脅威は生物学的な側面と社会文化的な側面の二つに分類できる。まず最初に、ここでは生息地の分割と破壊、過剰な狩猟、クマの体の一部の違法な取引など生物学的な問題について述べた。

タキノワグマに対する日本人の認識の形成の土台とその発達を記録するために、私は本州（東北と西日本）そして北海道を訪れ、クマ研究者、国、県、そして市町村の行政関係者、地元のハンターと農家の人々などを含む62人にインタビューを行なった。データの収集には民俗学的手法を用い、分析は"grounded theory"に基づいて行なった。

インタビューの結果、一般人のクマに対する否定的な認識がタキノワグマの保護管理には障害であることが明らかになった。タキノワグマは林業や農業への被害のため害獣とみなされ、大規模な有害駆除が行なわれ、その結果、各地で個体数が減少している。

この調査からクマ研究者、行政関係者、地元の人々などの間でクマに対する認識に違いがみられることがわかった。クマ研究者がクマを生態系の中で位置づけているのに対し、行政関係者は被害などももっと実用的な面からみていると思われる。興味深かったのは常にクマと接する機会のある地元の人々が、クマに対して特に否定的な見方をしていないように思わされたことである。

地元の人々のクマに対する認識は、東北と西日本で若干違いがみられた。西日本の地元民の方が東北に比べてクマに対してもっと否定的な反応をみせたように思われた。しかしながらよく調べたところ、これはクマに対してというよりは効果的な被害の防除法を示すことができない行政や、クマの被害を良く知らない"自然保護の達人"に向けられたものであった。

私は日本におけるタキノワグマの保護管理をもっと効果的に行なうための幾つかの方策を提案したい。それにはもっと効果的な個体群モニタリングの方法の研究、被害を数量化し適切に評価する方法の研究（メカニズム、レベル、金額など）、地元に受け入れられる代償システムの開発、研究者、自然保護家、行政関係者、地元のハンターと農民との間でのコミュニケーションの改善、効果的な自然保護教育システムの開発などが含まれる。
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ACKNOWLEDGMENTS

It is difficult for me to adequately thank the many people who helped me to produce my thesis. So many nice people in Japan took me places, answered my questions, and even housed and fed me! Without these people’s help, I could not have finished my research.

This research was funded by WWF-Japan and WWF-U.S. Especially, thanks to Junko Yasuoka, Conservation Division of WWF-Japan for helping me to receive funding for my second year’s research.

I am especially grateful to Kazuhiko Maita of Japanese Black Bear Research Center, Toshihiro Hazumi of Wildlife Management Office, and Masaki Fujimura of OUTBACK Trading Company. They took me to places, offered me a place to stay during my research, loaned us vehicles, patiently answered my questions, and introduced me to other important people.

I also thank Dr. Shingo Miura of Forestry and Forest Research Products Research Institute in Tsukuba, Dr. Masatoshi Yui of Forestry and Forest Research Products Research Institute in Touhoku, Naoko Maeda, curator of Noboribetsu Bear Park’s Brown Bear Museum, and Akiko Ishihara, programme officer of TRAFFIC Japan for sending me important information for my research, as well as taking the time for my interviews.

I cannot forget the many local people -- city and town workers, hunters, and farmers -- who took me to bear damage sites and answered my questions.

There are so many other people who I cannot even list here. Thank you all. Without your help, I could not have finished this study.

My research is somewhat unusual for wildlife biology program. I would like to thank Dr. Chris Servheen, Dr. Dan Pletscher, and Dr. G.G. Weix. They helped me to put this study together between science and ethnography!

Finally, I thank my husband Mike Roy for his patience, support, and insight while I struggled with completing this research. I would like to dedicate my paper to our four legged pal Aztec who we lost last winter.
Chapter 1: Introduction

It is always difficult to live with wildlife, especially large carnivores. In the American West, there are many conflicts between wildlife and people. Wolves were reintroduced to Yellowstone National Park 3 years ago, yet many local ranchers remain opposed to reintroduction, and court action may result in removal of the reintroduced animals (USFWS 1994). Grizzly bear reintroduction into the Idaho wilderness is currently being considered (USFWS 1997). Regional and national opinion polls show strong support for grizzly reintroduction, but strong opposition remains locally (Responsive Management 1997). These situations point out how important it is to reconcile different group views for wildlife conservation programs to be successful. Conflicts between people and wildlife occur not only in the U.S, but also in Japan. There are two bear species in Japan -- the brown bear (Ursus arctos) and the Asiatic black bear (Ursus thibetanus). There are more brown bears in Japan than remain in the western United States outside of Alaska, and there are consequently many conflicts between bears and people in Japan.

Japan’s second bear species, the Asiatic black bear (U. thibetanus japonicus), is greatly threatened by the general public’s negative perceptions. Black bears are considered pests because of damage to forestry and agriculture in Japan. Extensive nuisance kills occur, and populations have decreased in many areas. More positive perceptions by the general public are essential to the
development of improved bear management policies.

Bears were viewed as sacred animals in ancient Japanese culture. In the Jyomon Era (2,500-10,000 years BP), ancient Japanese hunted for survival, and apparently considered bears as sacred animals (Azumane 1993). Many bear-shaped ceramics have been found in the northeastern part of Honshu (Hazumi and Yoshii 1994).

Hokkaido's native Ainu people, who are believed to be direct descendants of the Jyomon peoples, also considered bears to be sacred animals. The Ainu believed that human-like gods were garbed as animals only in the land of humans, and that meat and fur were gifts to humans from the gods. The Ainu had a famous festival named "lyomante, " or the "sending off" of the bears. This festival included a ceremony in which a bear was killed to take the mask off the god and send him back to his home (Shepard and Sanders 1985; Umehara 1985).

The Ainu language is closely related to the Japanese language; Ainu culture has been said to form the foundation from which Japanese culture was born (Umehara 1985). Approximately 1,300 years ago, a race of rice farmers entered Japan from the Yellow River in China or from the Korean peninsula. This race inter-married with the Jyomon hunters to produce the present Japanese race.

This history, considered along with other Japanese cultural traditions such as flower arrangement, plant cultivation (bonsai), rock gardening, and poetry
(Haiku), suggests that the Japanese have deep cultural connections to and appreciation for nature. Yet in today's society, Japan has a bad reputation in the international community regarding many environmental issues including compliance with the Convention on International Trade in Endangered Species (CITES), whaling, and drift-net fishing. How could this apparently nature-loving culture have come to be regarded as environmental villains? As a Japanese, and also a wildlife student, I have often thought about this subject.

Kellert (1991), using both surveys of the Japanese public and in-depth interviews with experts, tried to answer this complex question. He concluded that the Japanese appreciation for nature has tended to be narrow and idealized, primarily focusing on single species and individual aspects of the environment, and lacking an ecological or ethical perspective. Kellert also compared basic attitudes toward wildlife and nature between Japanese and Americans. He concluded that the Japanese public placed far greater value on satisfactions derived from control and mastery over nature.

When did the Japanese people's negative perception toward the black bear form and how has this perception changed over time? Why has this negative perception formed, because of some intrinsic aspect of the Japanese culture itself or because of historical or structural reasons? Are there differences in perceptions between residents of urban and rural areas? Are these attitudes influencing management directions?

To address these questions, I examined the socio cultural relationship
between Japanese style wildlife management and the management of the Asiatic black bear. I used the black bear as a case study of how Japanese attitudes toward wildlife have developed and how current attitudes and management policy are rapidly evolving from utilitarian/negativistic views (bears as commodity or pests) to more ecological views (bears as species and elements of biodiversity). I document attitude development and the basis of Japanese perceptions toward Asiatic black bears in an effort to find ways that the Japanese can more successfully live with large carnivores.
Chapter 2: Background

A. Range and Life History

The Japanese black bear (Figure 1) is a subspecies of the Asiatic black bear which is distributed across Afghanistan, southeastern Iran, Pakistan, the Himalayan region, Burma, Thailand, Indochina, China, Manchuria, Korea, southeastern Siberia, and Taiwan (Figure 2). The Asiatic black bear resembles the American black bear (*U. americanus*) and is similar in size. However, the white patch on its chest and ears, which is wider at the base and less pointed, is a distinct characteristic of the Asiatic bear. Because of white fur on its chest, the Asiatic black bear is also known as the moon bear (Nowak 1991; Reid 1993).

Compared to black bears on the Eurasian mainland, Japanese black bears are smaller in size and have narrower chest patches (Imaizumi 1960 in Miyao 1989). Chest patch size and shape varies among individuals, with some individuals completely lacking chest patches. In Akita prefecture, traditional Matagi hunters called these individuals “Minaguro” (all black) or “Munaguro” (black chest) bears. “Minaguro” bears were believed to be messengers from the Mountain Goddess; Matagi hunters tried not to hunt “Minaguro” because they feared retribution from the deity. If they accidentally shot a bear with this pelage, they ceremonially served the bear to the Mountain Goddess and quit hunting forever (Miyao 1989). The Japanese black bear occurred on three major islands: Honshu, Shikoku, and Kyushu (Figure 3). The black bear is likely endangered or extinct on Kyushu since 1941 (Tori 1991). However, a black bear
Figure 1: The Japanese black bear (*Ursus thibetanus japonicus*).
Figure 2: Global Range of the Asiatic Black Bear
Figure 3: Range of the Asiatic Black Bear in Japan (Japan Wildlife Research Center 1993)

Japanese Black Bear (*ursus thibetanus japonicus*)

Brown Bear (*ursus arctos yesoensis*)
was shot in 1987 on Kyushu, and occasional bear sightings are reported by hikers.

On Shikoku Island, a remnant bear population estimated at several dozen individuals persists (Torii 1991; Hazumi 1994; Hiroshima-ken Tsukinowaguma Taisakukyogikai 1994). One female bear was shot in 1986, and researchers from Tokushima Prefecture radio-tracked one male in 1993. Few bear sightings have been reported in recent years.

Japan's other bear species, the Ezo brown bear, occurs only in Hokkaido; the two species ranges do not overlap (Hazumi 1994; Figure 3).

The Japanese black bear is one of the largest mammals in Japan. Adult males weigh 40-100 kg and adult females weigh 60-120 kg; body length is 120-140 cm (Hazumi 1994).

The Japanese black bear is mainly herbivorous, but also feeds on insects and opportunistically on carcasses of wild animals and livestock (Hazumi 1994). Nozaki et al. (1983) studied the food habits of Japanese black bears in Gifu Prefecture and found that during spring, bears ate nuts of beech and acorns of Mongolian oaks which fell in the previous year, as well as beech buds and shoots of herbaceous plants. During summer, bears ate animal matter such as ants (Formica sp.) and other insects, and plant matter such as the fruits of Japanese cluster cherry (Prunus grayana) and dogwood (Cornus controversa). Bears ate large quantities of beechnuts and oak acorns during fall. Mongolian oak acorns, beechnuts, and Japanese chestnuts (Castanea crenata) were
important food in the pre-denning season.

A distinctive feeding behavior of the Japanese black bear involves climbing trees and eating fruits and buds. Bears build crude leafy platforms on which they can continue feeding. These structures, colloquially known as "enza", resemble a bird nest, and are conspicuous feeding signs in fall (Nozaki et al. 1983; Reid 1993; Hazumi 1994).

A major problem in Japan is the difficulty of observing bears directly in their natural habitat, which includes dense forests, heavy understories, and complex topography. Radiotelemetry efforts were unsuccessful in Ashiu, Kyoto Prefecture, because of steep topography and an inadequate monitoring system. However, Hazumi et al. (1981) have successfully used radiotelemetry at Nikko, Tochigi Prefecture, an area of gentler topography (Hazumi and Maruyama 1986).

Hazumi and Maruyama (1986) radio-tracked 8 black bears in Nikko. Average home range was 1,256 ha and ranged from 322 to 2,814 ha in size. In this study, a sub-adult male had the largest home range; an adult female with 2 cubs had the smallest.

Bear home range sizes differ between different habitats. Maita (1990 in Hazumi 1994) radio-tracked 19 bears at Mt. Taiheizan in an area of heavy snow habitat. Home range sizes were 5000 ha for males (n=7) and 3000 ha in females (n=12). Hazumi (1994) is tracking 11 bears in an isolated population at Tanzawa in a southwestern habitat which receives less snow. Their home range
sizes are two or three times as large as those of the Mt. Taiheizan population. These differences may be due to decreasing habitat capacity as expanding coniferous plantations have fragmented natural forests into small patches (Hazumi 1994).

Japanese black bear habitat use and movement are synchronous with the phenological development of foods. Fluctuation of acorn production affects habitat use, movement, and local density of bears. A radiotelemetry study in Nikko (Hazumi and Maruyama 1987) determined habitat preference patterns. Deciduous forests were preferred and subalpine evergreen conifer forests dominated by hemlock (Tsuga diversifolia) and fir (Abies mariesii) were clearly avoided throughout the year. Food availability in the subalpine forest is very low, since the canopy cover is dense, and little understory is produced. However, food availability is much higher in the more open canopy deciduous forests which have diverse understories, including grasses, forbs, and berries used by bears.

Hazumi and Maruyama (1987) found that in fall, radio-collared bears moved to montane areas in search of acorns, beechnuts, and other deciduous fruits. Acorn crops fluctuated annually in Nikko. During years when acorns were well distributed, bears did not need to concentrate in particular stands. However, during poor acorn years, bears concentrated in the few stands where acorns were still available. In years of total crop failure, bears dispersed from their usual ranges in search of alternate foods.

The denning period of the Japanese black bear is the five to six months
between November and April. Black bears use cavities in trees for den sites, as well as rocky or other ground sites, and do not dig into the ground actively like brown bears (Hazumi 1994). Den sites often exhibit thermal stability, greater snow accumulation, and lack of human disturbance (Hazumi and Maruyama 1987).

The breeding season of most northern hemisphere bear species is in early summer, with delayed implantation occurring after several months, when the animals den (Tsubota 1991). In the Asiatic black bear, females give birth in January, while in the den. Average litter size is two, with a range of one to three. Average weight is about 300 g at birth; cubs will grow to 2 or 3 kg by the time they leave the den with the female (Reid 1993).

B. Recent Population Declines

Asiatic black bear populations are in decline across Japan. The Japan Environment Agency began research in bear population biology in 1980; 10 prefectures have also estimated bear population size within their jurisdictions. Based on aggregation of each prefecture's population estimate arrived at through use of driving censuses and analysis of harvest data, the total Asiatic black bear population in Japan is estimated at approximately 10,000 (Black Bear Management Committee of Environment Agency of Japan in Hazumi 1994; Yoneda pers. comm). Hazumi (1992) defines 34 local populations with varying degrees of isolation throughout Japan (Figure 4); populations are likely in decline
on Shikoku Island, and in the Chugoku and Kinki regions of Honshu Island (Hazumi 1994; Maruyama pers. comm.).

In this study, I mainly focus on the bear populations in Akita and Iwate Prefectures in the Tōhoku region of northeastern Honshu, and in the Nishi-Chugoku mountain region in Shimane and Hiroshima Prefectures of western Honshu (Figure 5).

When compared to the population in western Honshu, bears in Tōhoku appear to be relatively abundant, although Japanese wildlife specialists have cautioned that the population in northeastern Honshu is vulnerable to declines due to timber harvest and increasing pest control kills (Hazumi 1993). In the northern part of Tōhoku, bear populations appear to be relatively continuous from the Oou mountain range to the Shiragami and Kitagami mountain ranges. The population at Kitagami has been isolated because of highway traffic and urban development. A small, isolated population also remains on the Shimokita Peninsula.

In southern Tōhoku, bear populations remain largely in the lide-Asahi mountains; bear range continues to the south of Tōhoku to Niigata, Gunma, and Tochigi Prefectures. The black bear population in the entire Tōhoku area (Aomori, Akita, Iwate, Yamagata, Miyagi, and Fukushima Prefectures) is estimated at approximately 5,500 (Yui 1993).

Human-caused bear mortality is substantial throughout Honshu. Akita Prefecture Forestry Division (1983) estimated the bear population in Akita
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Figure 4: Isolated Black Bear Populations (Defined by Hazumi 1992)
Figure 5: Study Areas in Northern and Western Honshu
prefecture at between 625 and 865. Annual harvest in Akita prefecture during the previous year (1982) had been 151 (24 hunting and 127 control). In 1983, 162 animals were killed (79 hunting and 83 control). Using a mean population estimate of 745, this amounts to 20.3% and 21.7% of the total estimated population in 1982 and 1983, respectively.

Iwate Prefecture’s Nature Conservation Division estimated the bear population in Iwate at about 1,000 individuals in 1991. Annual harvest in Iwate was 209 (169 hunting and 40 control) in 1987 and 150 in 1988 (103 hunting and 47 control), or 20.8 % and 14.9 % respectively of total estimated population (Iwate Prefecture Nature Conservation Division 1991).

While bear harvests are administered at a prefectural level, bears themselves probably move between prefectural boundaries. Hazumi (pers. comm, in Azumane 1993) has recommended that population estimates and harvest plans be based not on prefectural boundaries but on distinct populations. The black bear population in the Nishi-Chugoku mountain region inhabits the northern part of Hiroshima Prefecture, the western part of Shimane Prefecture, and the eastern part of Yamagichi Prefecture, an area of about 3,500 km2 (Figure 5). This is about 4 % of total black bear habitat in Japan (Japan Wildlife Research Center 1993 in Hiroshima-ken Tsukinowaguma Taisakukyogikai 1994).

The Nishi-Chugoku mountain region consists of relatively low elevational mountains, with highest peaks extending to approximately 1,000 m. More than
50 % of this region has an elevation of less than 300 m, yet more than 80 % of
Asiatic black bear habitat occurs at elevations greater than 400 m. Human
inhabitation and agricultural lands are concentrated in the lower elevational
range, therefore, black bears have been excluded to the higher elevation. Also,
deciduous forests which bears prefer are limited to higher elevations (Hiroshima-
ken Tsukinowaguma Taisakukyogikai 1994).

Based on harvest data and the sum of the each prefecture’s population
estimates, Japan Wildlife Research Center (1993) estimated the bear population
in the Nishi-Chugoku mountain region at about 250 to 350.

Harvests in the Nishi-Chugoku mountain region have been increasing
since the latter half of the 1960s. In the early 1980s, annual harvest totals of
pest control and legal hunting reached 80 animals. Recently, however, the
harvest has decreased. Average annual harvests in the 1980s were 73; the
annual harvest in 1990 was 56. If the total population in Nishi-Chugoku
mountain region is 300, the average annual harvest during the 1980s was 24 %
of the total population, with the annual harvest in 1990 at 19 % of the total
population (Hiroshima-ken Tsukinowaguma Taisakukyogikai 1994).

Previously, I conducted a small survey of 7 bear experts in Japan asking
for their opinions regarding the causes of recent population declines (Miyai
1994). The respondents identified two major causes of black bear population
declines: habitat fragmentation and alteration, and overhunting, including
nuisance killing.
Prior to industrialization, Japan was covered with extensive forest and provided rich habitats for wildlife such as serow (*Capricornis crispus*) and black bear. However, human activities began to change forest structures during the latter half of the 19th century, and accelerated during and after World War II. During World War II, forests were cut intensively for supply of wartime resources. As Japan reconstructed its industrial base during the 1960s, the Japan Forest Agency planted large areas in new plantations, which now cover 41% of Japan (Japan FAO 1994). These plantations are mostly conifers such as Cryptomeria (*Cryptomeria japonica*), and Japanese cedar (*Chamaecyparis obtusa*) which have high economic value but are of little value to bears. Natural forests comprised of species which provide good bear feed, such as Mongolian oak (*Quercus mongolica*), beech (*Fagus crenata*), and birch (*Betula ermanii*), are consequently limited throughout Japan's mountainous regions. For example, more than 50% of the total forest area in the western part of Honshu had been changed to coniferous plantations by the end of the 1980s.

Bear habitat has also been lost to resort developments such as ski slopes and golf courses; traffic access has also increased significantly in backcountry areas.

Because of these human activities, bear habitat has been decreasing and has become increasingly fragmented. Many bears appear close to human habitation and are killed as pests. Increasing habitat alteration and nuisance kills have led many experts to conclude that the Japanese black bear is
threatened (Obara 1985; Shibata 1985; Hazumi and Maruyama 1987; Hazumi 1994; Honda 1993; Yamada pers. comm.).

The habitat fragmentation and alteration that is occurring in Japan's bear habitat does not result from rapid population growth as is the case in many developing countries. Rather, it results from a robust economy which encourages forest product production and recreational development. In fact, Japan's human population is stable. Natural deciduous forests which bears depend on have been converted to artificial coniferous plantations. Bears seek food and girdle the cambium of conifers for their high sucrose content. Bark-stripping by bears is especially common in the western part of Honshu, where natural forests have been intensively converted to coniferous plantations (Obara 1985; Yamada et al. 1992). Control kills have increased since 1970, with the advent of highly effective box-trapping methods, and trapping has been authorized throughout the active bear season. Control trapping is largely unregulated, with few regulations addressing open areas, harvest limits, or the age or sex of killed bears. The box-trap hunt has contributed to sharp bear population declines in the western part of Honshu (Hazumi 1991; Yamada pers. comm.; Hazumi 1994).

With increasing habitat conversion, bears increasingly appear close to human habitation, with resultant crop damage and loss of chestnuts and persimmons. Annual sport hunting seasons run from November 15th to February 15th, but once bear damage has occurred, offending bears can be shot
as pests throughout the year. The solution is almost always shooting bears (Obara 1985; Azumane 1993). Therefore these two major threats to bear populations are closely linked together.

Sometimes a bear's appearance causes fear in residents and authorities end up shooting the bear. An Iwate Daily News article (Azumane 1993) reported that when a young black bear appeared close to a highway service area in the summer of 1992, road management office personnel and municipal workers asked for permission from the prefecture to kill the animal. Actual shooting was entrusted to a local member of the hunters association. First the hunter refused to shoot the bear since it was a juvenile. However, the road management office personnel and municipal workers insisted that the hunter shoot the bear because they believed it might attack people. Finally, the bear, which was a 35 kg sub-adult, was shot. Thus, the general public's negative perceptions toward the black bear are also related to population declines.

C. Current Management Status in Japan

The Japanese wildlife management system differs greatly from that of the United States. In the United States, wildlife biology has a history dating back to Aldo Leopold's work in the 1930's. Thousands of wildlife biologists work in federal and state agencies. In the public arena, there are several environmental non governmental organizations (NGO) which have long histories, such as the National Audubon Society, Sierra Club, and the National Wildlife Federation.
These organizations have millions of members (National Wildlife Federation 1994).

However, in Japan, wildlife biology is a new field with few researchers and few advocates. One of the largest conservation groups, the Wild Bird Society of Japan, has only 17,000 members out of the 123 million people in Japan (Ichida 1987).

Budgets for wildlife management and conservation are very limited. Currently, the wildlife-related budget is about 5 billion yen (42 million dollars) for the Environment Agency of Japan and each prefecture. This includes personnel salaries of the Environment Agency and officials in each prefecture. Small budgets and limited number of staff make wildlife conservation work difficult in Japan (Maruyama pers. comm.).

The Japanese black bear typifies this situation. There are many citizens who are interested in conservation. However, Japan’s federal and prefectural governments have not developed systems for prioritizing conservation problems or monitoring wildlife populations. Also, little assistance is available from universities and NGOs.

The Environment Agency of Japan authorizes legal hunting. There are no actual bag limits for sport hunting; animals are also not required to be tagged (Moll 1994). Hazumi (1992) questioned accuracy of harvest numbers, since they are dependant upon hunters reporting after the hunt. In some cases, two or more hunters report on one animal. In other cases, no one reports kills. Pest
control programs do have some administrative or paperwork requirements, so harvest numbers can be estimated quite accurately (Moll 1994). Once damage claims are brought to municipal workers, permission to kill the offending animal is gained from the prefecture. Criteria for pest kills are ambiguous.

Management of pest control kills is a critical problem for black bear conservation. Total annual harvest of black bears in Japan is more than 2,000 (Figure 6). Of the total, over 1,000 bears are killed as pests for damage to crops and coniferous plantations; sometimes prophylactic kills occur for public safety reasons (Hazumi 1991; Hazumi 1994; Azumane 1993).

Spring bear hunts in northern heavy snow habitat and box-trap hunts in the western part of Japan are special problems. In the northeastern part of Honshu, bear hunting is traditionally conducted in post-denning season, since hunters get easy access to bears and get bigger galls than during other seasons. These spring hunts are conducted as pest control in order to decrease summer and fall bear damage (Hazumi 1994).

Figure 6 shows that while nuisance kills have been increasing, sport kills have been decreasing. This is related to the decreasing number of licenced hunters in Japan (Figure 7). Hunter age distribution is changing dramatically. The only age group with stable numbers is over 60 years old; remaining age groups are declining. This suggests that hunting traditions have been vanishing.

Sport hunting is prohibited in areas where populations are believed to be in decline. Due to its isolation from the main part of Honshu and its population of
<table>
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<th>Fiscal</th>
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<th>Control kills</th>
<th>Total</th>
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Figure 6: Black bear sport and control kills in Japan (Hazumi 1992; Japan Hunters Association 1994; Environment Agency 1996).
Figure 7: Licensed hunters in Japan
only several hundred individuals, the Nishi-Chugoku mountain population is
listed as an endangered population in the Japan Environment Agency's Red
Data Book. The Environment Agency has also banned sport hunting for 5 years
in Kyushu, Shikoku, the Nishi-Chugoku mountain region, and on the Kii
Peninsula. This ban does not include pest control kills. As of January, 1995, a
new prefectural law for endangered wildlife became effective in Hiroshima
Prefecture. The black bear was designated as an endangered species.
Hiroshima Prefecture also published a Moon Bear Conservation Plan in 1994
(Hiroshima-ken Tsukinowaguma Taisakukyougikai 1994; WWF 1994).

There is some movement to reduce bear harvest in Japan. In 1993, the
Japan Hunters Association advocated a 30% reduction in annual harvest based
on the average of the previous three years sport harvest. The 1993 harvest was
60 percent of the last three years average (Oguma pers. comm.). The rationale
for a 70 percent reduction from the last three years average was unclear, and it
is impossible to determine whether this harvest level would maintain bear
populations.

This effort to reduce harvest focused on the recreational hunt (Oguma
pers. comm.). While control kills occur throughout the year, little has been done
to reduce this mortality. Pest control kills occur year-round and remove more
bears from the population than sport hunting. Milliken (1988) argued that this
policy is the same as an open season on bears year-round.

Control kills are directly related to people's negative perception toward
black bears. People frequently claim bear damage and authorities allow control kills easily.

Some local authorities in Japan have recently begun to attempt relocation of problem bears. However, relocation systems are poorly developed, and few bear specialists capable of conducting relocations work for local governments (Hazumi, pers comm).

Several federal laws influence black bear management. The federal Mammal and Bird Conservation Act regulates hunting but does not mention habitat preservation at all. Some wildlife specialists argue that the spirit of this act is based more on minimizing negative economic impacts on agriculture and industry than on wildlife protection (Maruyama pers. comm.; Nozaki pers. comm.).

Japan's Rare Fauna and Flora Protection, a new national law based on the Endangered Species Act of the United States, became effective in 1993 (Murakami 1992). However, Environment Agency, Wildlife Protection Division personnel advised me that since the Japanese black bear population numbers approximately 10,000, it is not being considered for threatened or endangered status. The bear is also not included in the Red Data Book of Japan (Mills and Servheen 1991).

Japan accepted the Convention on International Trade in Endangered Species (CITES) in 1980; the Asiatic black bear is listed on Appendix I. Servheen (1990a) indicated that the Japanese black bear had been removed
from the Japanese CITES list because of "trade importance." In my previous survey, no questionnaire respondents mentioned illegal hunting or the bear trade. However, the export of Asiatic black bears from Japan as live animals or as parts is another threat to Japanese black bear populations. Korean importers pay high prices for the Japanese black bear; 244 live black bears were shipped to Korea from Japan between 1980 and 1983. Most of these bears are killed in South Korea for their parts. Gall bladders from Japanese black bears are sold mostly to South Korea; gall used in Japan itself is imported largely from China and India (Milliken 1985 in Servheen 1990a).

According to a 1990 publication (Nihon iyaku hin Shuu) edited by the Japan Drugs, Cosmetic and Medical Information Center, pure bear gall is sold as a medicine by 42 Japanese pharmaceutical companies. Also, many manufactured medicines contain bear gall, including 95 heart medicines, 16 stomach medicines, one digestive aid, and several famous kanpo medicines for children (Nozaki 1990 in Mills and Servheen 1991). As no domestic regulations govern the internal trade in Japanese bear parts (Mills and Servheen 1991; Azumane 1993), it is extremely difficult to determine the source of galls.
Chapter 3: Methods

I visited the northeastern and western parts of Honshu during the summer of 1995 and the fall of 1996. My research areas were Iwate and Akita Prefectures in the northeast and Hiroshima and Shimane Prefectures in the west (Figure 5). I sampled both eastern Japan and western Japan because these areas differ in terms of primary game animal. The black bear is targeted in eastern Japan, while wild boar (*Sus scrofa leucomystax*) are targeted in western Japan. I also sampled the Pacific Sea side and the Japan Sea side of Honshu because these areas differ in terms of development history, human population density, climate, and people's characters and values. These distinctions may effect perceptions toward wildlife (Hazumi pers. comm).

Instead of sociological survey techniques, I used ethnographic methods. Ethnography is an inductive method which is descriptive and focused on individuals or small groups. Ethnography consists of open-ended observation and description. Most ethnographic research has been concerned with developing theories rather than with testing existing hypotheses. The theoretical understandings which emerge from ethnographic case studies are "gradual, tentative and need additional data gathering (Harper 1992; Hammersley and Atkinson 1995). My understanding of people's perceptions toward Asiatic black bears will not be a definitive answer, however it will be a first step toward additional research on human dimensions of wildlife management and may help to develop more effective wildlife management plans in Japan.
The logic and methods of scientific sociology are applied mostly to the study of large scale industrial societies. Anthropologists work among smaller groups in traditional nonindustrial societies to develop methods appropriate for kin groups, informal networks, or small communities (Harper 1992). It is important to get large sample sizes and randomness in sociological surveys (Weisberg et al. 1989).

It is difficult to satisfy these conditions in rural Japan. Japanese rural farming society might be close to the traditional nonindustrial society which Harper describes. Bear damage control is sometimes a sensitive subject for local people (for example, because of conflict within local hunters associations over control killed bears). Also, local people often hate “city conservationists”. Without getting the cooperation of local key persons, I might not get any useful information. Local people are sometimes afraid of outsiders, and are reticent to talk to them about sensitive topics. Also, they might not want to answer long survey questions after a day of farm work.

Harper (1992) studied dairy communities in New York State. As Harper confronted farmers, who were the busiest people he had ever met, it was never clear to either of them why the farmers should stop their work to talk. The answer lies in the irrational rewards of human relationships. If successful relationships are established with those we study, people will cooperate (Harper 1992).

My primary data gathering method was use of key informant interviews.
This method lies between informal methods such as conversations with concerned individuals and reviews of official records, and highly formal methods, such as various surveys and censuses designed to generate precise, quantitative data (Kumar 1987).

Key informant interviews consist of in-depth discussions on a certain topic with knowledgeable persons in order to obtain data, opinions, and perspectives on a topic. Informants should be carefully selected, and information gathered from interviews is best supplemented from other sources, such as published and unpublished records. Key informant interviews are considered most appropriate when quantitative data (in this study such information as bear harvest, number of licensed hunters, crop damage costs, bear injury data, etc) need to be interpreted at the same time that understanding of key persons' motivations and attitude is desired.

This method is the least expensive and most timely among other intermediate methods such as focus group interviews, informal (small sample size) surveys, and community interviews. Kumar (1987) stated that 2 to 3 interviews in a day, and samples of 20 to 30 interviews, were enough to cover a topic. I think that these attributes are particularly important to research in an extremely high cost nation such as Japan.

Informants were carefully selected to reflect diverse viewpoints that I assumed were present in the society and that might demonstrate the forces shaping Japanese black bear conservation agendas (Tremblay 1982). Agency
and private researchers and conservationists that I was previously acquainted with helped me to identify some initial informants prior to arrival in Japan. These informants in turn recommended other individuals to contact. By the end of my second season of research interviews, most interviewees recommended informants that I had already contacted. Thus, I believe that I contacted most informants knowledgeable of black bear conservation in Japan.

My data analysis method is called "grounded theory". Using this framework, data analysis informs theory development and subsequent data collection is in turn guided by the emergent theory. This process of analysis starts with careful data examination and categorization. By categorizing data, the researcher can compare beliefs, situations, actions, accounts or experiences provided by different people or data from the same individuals at different points in time. Next, theoretical sampling, that is, collection of more data to clarify and fit ideas together, helps to fill out the categories and refine the emergent theory (Charmaz 1995).

I conducted a total of 62 interviews with bear researchers (n=10), government personnel (n=16), hunters (n=10), farmers (n=17), conservationists from private NGOs (n=5), ethnographer (n=1), environmental journalist (n=1) and bear park or zoo employees (n=2). I met bear researchers from both private NGO's and university organizations such as the Wildlife Conservation Society. I participated in field studies with bear researchers and visited bear parks. Also, I met members of Iwate Tsukinowaguma Kenkyukai (Moon Bear Study Group).
The members of this organization included students, professional researchers and local interested people.


I interviewed environmental journalists who are well acquainted with local people and bear conflicts. Additionally, I interviewed local farmers who had experienced damage from bears, hunters who had taken part in pest control actions, and members of the Japan Hunters Association. I visited traditional Japanese "Matagi" hunters, and participated in an annual "Matagi Summit" conference in July, 1995, to investigate hunting traditions.

I did not ask a standard set of questions to each interviewee. However, I did tailor the discussions to different groups. General interview subjects are listed in Appendix 1.
Chapter 4: Results and Discussion

My initial field research in 1995 indicated that dramatic differences in perceptions toward bears existed among groups. Bear researchers exhibited ecological views toward bears. In contrast, government workers presented more utilitarian views. Most interestingly, local people who had daily contact with bears seemed not to display particularly negative attitudes. To better understand these divergent attitudes towards black bears, I focused my interviews on these three different groups of people in 1996.

I placed the key findings of my interviews, as well as information I found in published literature and Japanese agency documents, into 3 categories: ecological, social, and cultural aspects. Ecological aspects include information on harvest management, population monitoring, and research activities. Social aspects include regulation of hunting and damage control systems. Cultural aspects include historical and current human attitudes toward black bears.

A. Ecological Aspects

Harvest management and bear population monitoring techniques differ significantly between Japan and the United States. It is very difficult to estimate the total population of black bears in Japan’s dense forests. Population estimation is generally done by “driving” censuses during the spring bear hunt. In northern deep snow habitat, hunters have traditionally conducted group hunting called Makigari in early spring when snow is still on the ground. Most surveys are done by hunters because they are familiar with mountain topography
and avalanche hazard. Several hunters advance up valleys while calling loudly. They attempt to drive bears ahead of them so that the bears will pass by other hunters waiting further up valley. Hunters provide information on the number of bears they see to agency officials. Currently, most prefectures use this method, because it is easy to see bears on the snow and bears are driven and very visible. Bears sighted in spring are assumed to be predominantly males, as females are assumed to be in dens with young. Raw counts generated by drives are converted into local population density estimates by application of a series of correction factors including percent of females assumed to be with cubs, sex ratio, and age at first breeding. Local density estimates may then be converted into regional population estimates by summing total areas of bear habitat.

Habitats are stratified based on habitat quality in some jurisdictions. These methods rely on many assumptions; Hazumi (1992) has argued that these methods need verification.

Parameters used to assess bear population status and trend in North America include age structure and sex ratio of harvested bears (Montana Department of Fish, Wildlife and Parks, 1994). Other parameters usually monitored include total hunting harvest, hunter effort and success rates, and mortality from control actions. Other data useful to proper interpretation of sex and age are productivity (which may vary from year to year), natural mortality and food availability (Gilbert et al. 1978, Waddel and Brown 1984 in MDFWP 1994). Also, historical information such as knowledge of interchange between
bear populations (dispersal and immigration), changes in habitat factors affecting vulnerability to hunting harvest (such as road and trail densities), and information on hunter effort are needed for interpretation of trend. Without these data, harvest data can be misinterpreted. For example, an increasing number of harvested animals can be indicative of a population decline as well as a population increase (MDFWP 1994).

There is no cookbook approach for managing black bear populations. Garshelis (1990, 1991 in MDFWP 1994) recommended that it is best to monitor as many population parameters as possible and concluded that population trend is best indicated by several indices pointing in the same direction. Miller (1990 in MDFWP 1994) suggested optimum population size will probably never be known because bear reproductive and mortality rates vary annually with food availability. Even if population size is not determinable, the most important factor is to know what harvest rate is sustainable and at what point that rate is exceeded.

Several prefectures have age information of harvested bears based on cementum aging, and aging has been done for brown bears, black bears, sika deer (Cervus nippon), and serow by government agencies (Wildlife Management Office, 1990). However, few municipalities or prefectures have trained specialists capable of interpreting the data. Consequently, the data are rarely used for management decisions (Hazumi pers. comm.; Mano pers comm.).

In Europe and the U.S., assessing population trend from age information
of harvested animal is a routine process. However, aging is not done for all harvested bears in Japan. In Iwate Prefecture, aging is done for only control killed individuals. Hunters send teeth to the Touhoku branch of the Forestry and Forest Products Research Institute. This is not required and depends on each hunters volunteer actions (Suzuki pers comm). In my interviews with local people, several indicated that they did not want to send teeth anymore, because of the need to cut the animal’s head off to send teeth, and because in the past they had never gotten feedback from researchers about the results.

As I looked at some government agency documents, I noticed that the research done by some prefectures is not really management oriented. Typical research projects include such areas as sexual dimorphism of bear skulls and canine teeth (Akita Prefecture), and the relationship between age, body length and weight (Iwate Prefecture).

B. Sociological Aspects

Bear researchers and conservationists pointed out that governmental organizations (at the federal environmental agency and at the prefectural level) do not have wildlife specialists. Also, personnel in conservation divisions of governmental organizations move to other divisions every few years. As a matter of fact, I was greeted with "I just moved to this section this April, I’m not sure I can answer your questions appropriately" from government personnel on several occasions. Again in 1996 some of my previous interviewees were no
longer in the same divisions. It is very difficult to maintain consistent management policy if personnel are being replaced every few years.

Another problem seems to be different awarenesses of bear management in different groups of people. I talked to hunters in Tono in northeastern Honshu. During the season in which crop damage occurs, hunters are asked to patrol the area for pest control. They set up barrel traps, check the traps, and if there is a bear in the trap, they shoot the animal. These workers are volunteers. Most hunters have other professions for a living, and have to take time off from work for these damage control duties. Farmers call the hunters at night and ask them to shoot bears in the barrel traps. However, the hunters don't really want to shoot bears in summer. Hunters who shoot bears can take the meat, though its taste is reported to be not as good as during the fall hunting season. Summer bear fur is worthless, and bear gall, while saleable, is empty and less valuable during the summer season when bears can get food constantly (Azumane 1993; Hazumi, pers. comm.). Hunters also complain of harassment by "urban conservationists" who sometimes telephone them with criticism. Hunters said that they feel that they have nowhere to go between local farmers and "urban conservationists"

I also visited local farmers who had experienced bear damage. I was surprised that none of them seemed to exhibit particularly negative attitudes. A lady in Matsuzaki-cho showed me a damaged field behind her house. "Bears come to eat corn and melon every year" she said. Corn clearly eaten by bears
was still evident on the ground. "I don't know what to do; I don't think I can do anything about it." She had basically given up, but was not particularly angry at the bears. A representative from Tono City Forest Department who accompanied me recommended that she use electric fence and offered support from the city; she appeared positive about the idea and said that she would consider the offer.

Tono City has a compensation program which supports farmers who experience bear damage. The city provides partial funding to set up electric fences. Each electric fence costs 90,000 yen (about $900 USD). The city pays 30,000 yen (about $300 USD). Compared to the cost of damage, electric fences are expensive. However, many farmers agree to build fences if partial funding is provided. In 1994, 23 farmers applied to get funding for electric fences (S. Kikuchi, pers. comm). The staff of Tono City's Forest Department checks every farmer who sets up electric fences to determine if they are being used correctly and to assist with any problems. One problem is that farmers do not always turn the fences on. The city staff pointed out to the farmers that it's too late after the damage occurs and urge them to keep the fences electrified all the time.

A local hunter told me that after initiation of the compensation program, the number of damage reports decreased. Therefore, he believed that the program helped him also. Tono City's compensation program may be an important example for other Japanese jurisdictions to model their bear management programs after.
From my first years interviews in northeastern Honshu, I determined that local people who have contact with bears on a daily basis (bears often appear in people's back yards and eat crops) seemed not to exhibit particularly negative attitudes. Based on the interviews conducted during this study, I now conclude that while this comment about local people is probably true in regard to the northeastern part of Japan, it is not necessarily true of the western part of Japan.

Local people in the Nishi-Chugoku mountain region appear to be very frustrated with these conservation activities. I visited several towns in the Nishi-Chugoku mountain region in 1996. Agricultural damage by black bears was not high in monetary value when compared to damage by wild boars. However, people see bears in their back yard on a daily basis and bears damaged their fruit trees and crops. There are few commercial farms in the area; most fruits and crops are for personal use (though individual growers may sell some of their produce to local farmers associations). Even though the cost of damage has little impact on local industry, it can have a great impact on individual farmers.

There have not been any serious human injuries by bears in the Nishi-Chugoku mountain region in the past decade. However, local people are extremely afraid of human injury by bears. This attitude is an interesting contrast with those in the northeastern part of Honshu, especially in Akita Prefecture. Bear populations are larger in the eastern part of Honshu than in other areas, and the black bear remains a game animal. In Akita, prophylactic kills occur each spring to prevent bear damage in summer and fall. There are several
human injuries every year and several people have been killed by bears in the past decade. In Akita, gathering mountain edible plants such as bamboo shoot, *Zenmai* (a fern species), and mushrooms is very popular. Therefore, people frequently enter dense woods, with resultant sudden encounters with bears. Interestingly, even though human injuries are common when compared to the Nishi-Chugoku mountain region, people in Akita do not seem very angry toward bears.

One local farmer who I interviewed in a town in Nishi-Chugoku stated that the bear conservation movement did not arise from local residents, but rather from urban scholars and environmental NGO's, with the support of the media. He believed that the opinions of local residents who receive bear damage were not solicited as conservation planes were developed. Before they knew it, in his opinion, conservation decisions were already made.

Similarly, a town worker on the Shimane side of Nishi-Chugoku said that no one had ever really explained to local residents the rationale for protecting bears in words which they could understand. Again, without including local people, conservation decisions were made. That is why local people are mad.

The same farmer who I mentioned above said that bears appearance in towns is the fault of humans. Because of resort and ski slope development, and forest conversion into artificial coniferous plantations, bears come into towns to get food. He said "We don't want to extirpate bears. Even bears have a right to survive. If people who live in cities believe that we should keep bears, they also
should do something for it." So it appears that local people in rural Honshu are angry not so much about bears but about "city conservationists (in their words)" who don't understand bear damage problems, and federal and prefectural government officials who don't institute effective damage control policies.

Also, people who actually deal with bear damage control are local town workers. These individuals were not hired as wildlife specialists and did not receive any training in wildlife management. However, in addition to their primary duties in forestry or agriculture, they have to deal with bear problems. One of the town workers I interviewed argued that it was the Environment Agency's responsibility to deal with bear problems, not the responsibility of city governments. In Hiroshima Prefecture, several towns have started relocation of problematic bears because of prefecture law. Town workers who are not wildlife specialists have to deal with bear damage control. Sometimes they end up killing bears, and are then criticized by "city conservationists". Between pressure from this strong city-based conservation movement and no actual support from the Japanese Environment Agency and prefectural governments, local people and town workers are very frustrated.

I observed one incident in Nishi-Chugoku which exemplifies the lack of an effective wildlife management system in Japan. A black bear had entered a small town and climbed a backyard persimmon tree to get food, then fell down from the tree. The animal's hind leg had become caught in the tree truck, and it was stuck in the tree. The homeowner called the town government for help.
Because the black bear population in Nishi-Chugoku was listed as an endangered population under Hiroshima prefectural law, the municipal worker who was notified on the situation called an official from the prefectural nature conservation division to decide how to treat the bear. Veterinarians from a closest zoo, in the city of Hiroshima, were also called, as regulations for storing anesthetics in Japan make it very difficult for wildlife managers to keep drugs on hand.

It took approximately two hours for an official from the prefectural government and veterinarians to arrive on the scene. Some “relocation” of bears has been done in this town since 1991. However, the municipal worker recognized that this individual, which was obviously emaciated, malnourished, and suffering from a broken leg from falling from the tree, was not a candidate for relocation. However, he did not want to make this decision by himself as a town worker. Under the strong city oriented conservation atmosphere, if the town decided to kill the bear, they would receive criticism from conservationists. Therefore, the town worker wanted a prefectural official to determine treatment of the bear.

Unfortunately, prefectural agencies also have few wildlife specialists. In this case, the responding official was an administrator with little experience in situations of this nature. The prefectural official could not make the decision as to whether to kill the bear or not. Eventually the veterinarian from the city zoo recommended that the bear be euthanized. At that point, the problem was who
would kill the bear and where would it be transported to. The town worker wanted the city zoo to take care of the bear. However, since the bear had been caught in the town's jurisdiction, the veterinarian refused to receive the bear. After much consultation, and approximately 5 hours total time, the bear was sent to a university veterinary school and euthanized there.

The town worker complained "This is the current situation in Japan! We should have federal wildlife specialists and federal facilities to deal with injured wildlife in Nishi-Chugoku. If the animal is caught in a neighboring town in a different prefecture, prefectural or town workers can't do anything about it." The Nishi-Chugoku mountain region comprises three prefectures and several towns in close proximity. Black bears migrate freely between towns and across prefectural boundaries.

In the Nishi-Chugoku mountain region, Japanese Black Bear Research Center, with the cooperation of several towns, began relocating bears in 1991. Forty eight individuals have been relocated. However, because of the small size of townships, the farthest relocation distance has been only 10 km. Relocated bears were sprayed with Counter Assault pepper spray (Counter Assault, Missoula, MT) before being released for aversive conditioning. Additional damage by relocated bears has not been reported, but individual bears have frequently been observed returning to same area after 2 or 3 days (Maita, pers comm). Thus, local people in Nishi-Chugoku don't believe that relocation is an effective method for controlling bear damage.
There are no detailed guidelines for management of problem bears in Japan. Iwate Prefecture and Hiroshima Prefecture do have pest control guidelines, but the standard for releasing or killing bears, and the chain of command, are vague. In the US, protocols exist which clarify who decides to release or kill bears under various conditions (IGBC 1986). For example, in the case of endangered grizzly bears, male problem bears will be removed from the population after 2 incidents; females are removed after 3 incidents. These guidelines balance the need for removal of problem bears with the goal of avoiding negative effects on the entire population.

There are also clear geographic standards in US bear management guidelines. Grizzly bear range is divided into 4 categories, with different management protocols. For example, if a bear appeared at a campsite in a national forest, authorities might just leave it alone. However, if a bear appeared near the center of a town, it would be relocated. These standards are very clear.

There is not a clear standard regarding what is a problem bear in Japan. Currently, bears that show themselves are considered problem bears. Hiroshima Prefecture’s guidelines state that problem bears in the Nishi-Chugoku mountain region will be released the first time if possible (Hiroshima-ken Tsukinowaguma Taisakukyougikai 1994). But standards for use in determining actions and who will make decisions related to problem bears are very unclear. In the incident I described, use of standard guidelines might have minimized
delay and reduced conflict between officials.

C. Cultural Aspects

The reason why western-style wildlife management has not really been accepted in Japan may be related to different perceptions of nature. Historically, the Japanese experienced nature in all its abundance and variety, such as the nation's abundant fauna and flora, and its distinct four seasons. These distinct four seasons are at the core of Japanese perceptions of nature. However, abundant nature is not necessarily related to appreciation of or intimacy with nature.

The Japanese exhibit two perceptions of nature (Kitamura 1995). The first is the Japanese traditional view of nature. This view of nature is very different from the western view of nature. Traditionally, the Japanese did not recognize nature as existing separately from humans. As a matter of fact, the word nature -- *shizen* -- did not exist in old Japanese language. The contemporary concept of nature is thought to have originated in the writings of Japanese naturalists at the end of the Meiji and Taisho Eras (between 1900 to 1930) who were influenced by western ideas (Shibata 1981 in Kitamura 1995).

What were Japanese traditional perceptions of nature like before this period? Japanese traditional perceptions of nature can be represented by the 17th century poet Basho. Basho's works emphasized a way of life which obeyed *Zouge* and appreciated the changing four seasons. *Zouge* was the word for nature itself, and *Zouge* meant that all living things were created by themselves.
and were changing all the time. This traditional view tells us that nature was viewed as an entity not separated from humanity.

The second “Japanese” perception of nature is the western worldview which arrived after the Meiji Restoration (in 1868). The western perception of nature is objective and has causes and results based on certain rules. This perception of nature became the basis for today’s natural sciences. Nature is something that we can recognize and quantify and which is separated from us humans. Most Japanese people today hold this view, so it is easy to forget that it has been popular in Japan only during the last 100 years of our long history.

Many traditional Japanese cultural activities were formed based on the traditional perception of nature as being inseparable from humanity. However, traditional Japanese lives were not always lived in close relationship with actual nature, and an imaginary nature — one not related to actual nature — can be recognized. The Japanese love of nature is symbolized by the phrase “Ka-Cho-Fu-Getsu” (flower, bird, wind, and moon). These four things represent the beauty of nature. Love of beautiful things in nature formed a culture which put importance on style. We can find examples in Japanese Haiku poetry and in various symbols in art and family emblems (Kitamura 1995). Love of imaginary nature may be adequate for the purposes of art. However, for the purpose of conservation, this is a problem. This love of imaginary nature may be what Kellert (1991) observed.

Kitamura (1995) stated that throughout the historic era the average
Japanese had a close relationship with actual nature. Particularly, traditional agriculture could not exist without close relationships with actual nature. People kept in touch with nature through familiarity with *Satoyama* — the woods adjacent of human inhabitation and agricultural lands where people worked and played. The antonym of *Satoyama* is *Okuyama* (the back country). Traditional Japanese people considered *Okuyama* as the place where scary things such as wild beasts, monsters, and deities lived. *Satoyama* was a buffer zone between the human world and another world from which visitors occasionally appeared. In *Satoyama*, people picked mushrooms and edible plants, caught hares, and collected fuel wood and various natural resources for traditional farming, such as fallen leaves used as fertilizer.

When we had close relationships with actual nature, the Japanese affinity for idealistic nature was not a problem. However, this relationship with actual nature has rapidly disappeared from contemporary Japanese life. Urban life styles predominate, and even people in mountainous villages are losing actual relations to nature. Thus, in many cases, only idealistic nature remains in the Japanese mind. Though western perceptions of nature arrived in Japan after the Meiji Restoration, nature continues to have two meanings for us Japanese — real nature which can be undesirable and dangerous to us, and idealistic nature which is beautiful and unchanging (Kitamura 1995). This double meaning of nature lies at the root of conservation problems in Japan and helps answer Kellert's (1991) implied question, “Why would such a nature loving people cause
environmental disaster?"

How have these perceptions influenced the history of wildlife management in Japan? About 20 years ago, a few university professors started to advocate for western-style wildlife management. At that time, many people, including environmentalists, criticized them, because they viewed it as human arrogance to try to control nature. The traditional Japanese idea of nature is that nature is what allows humans to live. Therefore, for many people it is almost unacceptable to manipulate wildlife populations. Pest control issues came to the forefront in the 1970s, as damage to artificial coniferous plantations and agricultural crops by serow, a natural monument, increased. This was the trigger for many Japanese to think about wildlife management. Environmental NGOs, government agencies such as the Environment Agency, Forest Agency and Cultural Affairs Agency, and people who experienced serow damage debated this issue. Agreement was finally reached that not enough was known about serow, and that scientific research under government control was needed. In Japan, nature conservation is termed *Hogo* - protection - and the word *Kanri* - management - has negative connotations to many people. After the serow problems, the general public accepted the word *Kanri* without criticism. However, the philosophy of wildlife management has not been understood, is not really taught in university, and has no textbook (Miura 1992, 1993; Hazumi, pers. comm).

Maruyama (1993) described a generalized historical progression
necessary for development of a nature conservation-oriented culture. It included
1) avoiding war which wastes society’s fortune, 2) political freedom and equity for
the middle class and a stabilized society, 3) industrial development based on a
stabilized society, 4) fortune and spare time which arise from historic colonialism,
racial discrimination, and exploitation of the lower class, 5) relatively liberal
scholarly activities which are based on fortune and spare time in the society, 6)
environmental degradation based on economic development, and finally, 7) the
birth and development of nature and environmental conservation. I think that
Japan is now in stage 6 of Maruyama’s progression. If Japanese society evolves
in similar directions with many European and North American societies, now is
the time we should develop a new conservation ethic.

What was the human-wildlife relationship in Japan before western-type
wildlife management or conservation was even considered? This relationship is
exemplified by the groups of people called “Matagi” or “Yamabito” in the
mountainous areas of Touhoku where beech forests are dominant. Matagi
people traditionally hunted large mammals such as black bear and serow and
passed on traditional hunting methods and rituals. The Matagi had various
taboos and rules during the hunt. When hunting in the mountains, they used
“Yama kotoba (mountain language),” which was totally different from their daily
language. Yama kotoba was never used in the villages. The animals they
hunted were considered gifts from “Yama no kami (mountain goddess)”.
Hunters showed respect to the mountain goddess and tried to avoid bringing
impurities from their daily life to the pure mountains by using different language. Also, hunters tried to not let animals know what or where they planned to hunt by using different language. Yama kotoba has been disappearing as hunting traditions have faded. Since this language is strictly secret within hunter society, part of the language has disappeared with old hunters.

In the Matagi world, hunters could not join the hunt if any close relative was dying or giving birth. They believed that the mountain goddess became angry with them if they brought impurities to the pure hunting field and would give them bad luck or disaster.

After Matagi returned from hunting bears, they went through a ritual called "Kebokai". Kebokai was performed both to prevent the bear from placing a curse on the hunter and for showing appreciation to the mountain goddess. This ritual differed slightly among areas or even between different hunting leaders in the same area. In Ani, Akita, the "Shikari," or hunting leader, laid the bear on the snow with the head facing north (this mimicking the position of the Buddha at his death) and skinned the bear. Then, the Shikari would recite special prayers while holding the bear’s skin with head down. Other hunters would make a circle around the bear and pray also. Through this ritual, the hunters prayed for the bear’s spirit, thanked the mountain goddess for providing game, asked for good luck on future hunts, and send the bear’s spirit to the mountain goddess.

Matagi life was dependent on various natural resources in beech forests. Their life followed the four seasons. They collected edible plants in the
Mountains in spring, fished in the rivers and did shifting cultivation in summer, and collected nuts and mushrooms in the woods in fall, and hunted in winter. *Matagi* life represents traditional mountainous village life in Japan (Chiba 1975; Taguchi 1992; Taguchi 1992; Ishikawa 1995).

As lifestyles in mountainous villages have changed, human-animal relationships have changed also. Before World War II, because of sharp topography, mountainous villages were isolated. Villagers mostly depended on slash and burn farming and hunting for their food resources. Hunted animals were used as food, clothing, and medicine. Animal fur had commercial value. Animals that damaged crops were also killed as pests. Elderly hunters still talk about hunting wild animals for food during wartime.

After World War II, industrialization in forestry occurred rapidly. Automobiles became common in society. Instead of wagons or log rafts, trucks were used for transporting timber. Forest roads were constructed in remote areas. The main industry in mountainous villages changed from slash and burn farming to systematic forestry. During the high economic growth era of the 1960s and 1970s, forestry flourished in mountainous villages, and many people lived in mountainous villages. Yet wildlife still had high commercial value as meat and fur. Professional hunters still existed in that era.

Since the 1970s, domestic forestry has deteriorated in Japan. In this era, the Japanese lifestyle has changed dramatically. Industrialization required increased labor in cities. New generations of villagers quit forestry jobs and
moved to cities. Many villages lost their younger generations. Hunting became just recreation or sport, and hunting traditions were no longer passed on to younger generations. Weekend hunters do not try to learn bear ecology for hunting. Experienced hunters who can hunt bears have been decreasing, and thus the number of people who understand bear habits has been decreasing.

On the other hand, use of box traps for pest control became common after the 1970s, and affected bear populations dramatically in Shikoku and on the Kii peninsula. Box trap use has been banned during hunting seasons, however it is still used year-round as a pest control method in many areas. The Japanese traditional hunting philosophy which tried to save game populations for the next generation has largely disappeared.

Changing hunter philosophy is related to the disappearance of professional hunting. When professional hunting existed, bear fur, meat, fat, organs, and blood was used as food and medicine. Matagi culture was intertwined with local society and hunting bears related to class in local society. Hunting bears was a symbol of mastery, and hunters were highly respected. However, as Japanese lifestyle changes, women do not wear domestic wildlife fur, few people appreciate taxidermy, and in no household is wild meat an important protein source. The philosophy of sustainable hunting is gone because wildlife is not an important resource in daily life. The idea that wildlife is a gift from the Mountain Goddess is gone. Subsistence hunting has changed to purely recreational hunting. These societal changes and the advent of easy box
trap hunting methods came concurrently with high demand for bear gall in Korea (Hazumi 1992).

There is still traditional use of bear gall in Touhoku. A hunter in Tono told me that gall is still used as medicine, and said that an acquaintance of his who had an ulcer had used gall and felt better. He showed me gall that he had dried for his personal use and bear fat which he used for healing burns (Figure 8). He said that it was rumored that Korean buyers used to come and buy gall in the area. According to him, someone gave the buyer fake gall and the buyer never returned. He said that because gall is so precious, he will give it to an elderly sick neighbor lady instead of selling it to outsiders.

The source, marketing routes, and use of bear gall in Japan is not well understood. Anecdotal evidence suggests that many live bears are smuggled to South Korea to take galls. Some Korean customers will only believe that gall is real if the bear is killed in front of them. In one case, a bear in a barrel trap set by researchers was killed by poachers and the gall and paws were taken.

TRAFFIC researchers surveyed Traditional Chinese Medicine shops in Japan in 1994 and 1995. They contacted 166 shops in Fukuoka, Kitakyushu, Osaka, and Tokyo and found that 30.7% of shops sold bear gall. Some shops said that their stock came from China and others said from Japan, but most were not sure of the origin. Many shops which didn't have bear gall on hand indicated that they could obtain gall immediately from their wholesalers (Mills, Chan and Ishihara 1995).
Figure 8: Dried bear gall prepared for personal use.
Maeda (pers comm 1996) said that the bear gall trade is so underground that it is nearly impossible to investigate market routes. Other researchers (Hazumi pers comm 1996; Mano in Fujimura 1997) have commented that we really don’t know the degree to which poaching and the bear gall trade has impacted Japan’s bear populations. Average citizens in Japan don’t know that gall is still used or that many pharmaceuticals contain gall, or appreciate the negative impressions that westerners have toward use of gall by Japanese. In fact, most investigations of the gall trade in Japan have been undertaken by non-Japanese conservationists (Mano in Fujimura 1997). Hazumi said “The Kyoto CITES conference in 1992 included much serious discussion about wildlife trade issues, including bear gall. Yet when I returned to my hotel and read the newspaper, it didn’t mention anything about the conference. People are just not interested in this kind of subject.” As Hazumi suggested, the majority of Japanese seem to demonstrate a sort of “benign neglect” of many international conservation issues such as the illegal trade of bear gall.

After traditional value of wildlife is gone, do bears simply become pests? In Kamaishi City, I visited a person who had been attacked by a bear in the hospital with a local hunter and a staff member of the Tono City Forest Department. The man had been cutting grass in the mountains. Two bears showed up suddenly from a creek and attacked him. He sustained injuries on his face, head, and left arm; it was estimated to take 3 months for him to completely recover. We visited him about a month after the incident. He had
just finished antibiotic treatment the day before we visited him. The scars on his
face still looked fresh. The first words he said was "I wish I had a rifle with me at
that time." He is a former hunter, who had killed more than 30 bears in his
career. "Well, I'm mad at the bears. If I didn't have this incident, now I would be
at home, watching TV and relaxing. Just bad luck!" It was Bon holidays
weekend (a Buddhist holiday). He continued "Bears have come close to town
ever since the government cut too many trees in the mountains. They can't get
food in the mountains." I heard the same thing from local people several times
during my travels.

A hunter in Tono said that he hardly ever saw any bear damage before
1979. "Bear damage started after 1979, about the same time the Forest Agency
expanded coniferous plantations. If bears have enough food in the mountains,
they won't come close to town. It is human's fault." he said. I heard the same
comments from many other hunters and farmers.

On TV, local farmers sometimes say "We don't need bears!" I thought
that this was typical of local people's attitudes, however I did not experience this
sentiment from any of my interviewees. The staff of Tono City Forest
Department said that people in Tono are not short tempered. A bear researcher
who does research mostly in Hyogo Prefecture said that local people's attitudes
are not really negative. Another researcher said that a few people have negative
attitudes but that journalist's reports emphasize these people's opinions.
Chapter 5: Improved Management Recommendations

Perceptions toward bears differ in each region in Japan. As a game species, people view bears differently in Touhoku than in western Japan, and importance as a pest animal depends upon what is the main industry in each area. Development of effective management plans will require understanding of regional differences (Hazumi, 1992).

A. Ecological Aspects

Additional scientific research is needed for effective black bear management in Japan. What is the sustainable level of sport harvest? Is the current level of control kills proper or not? Certain local population should be monitored from the standpoint of sustaining viable populations, and management goals should focus on sustaining viable populations. Levels of hunting and pest control should be determined within management goals. To speed development of ecological standards, it may be appropriate to use North American studies as models, and test them against population data from Japanese local populations. Shaffer (1978 in Hazumi 1993) calculated bear minimum viable populations from population parameters including mortality, fecundity, average litter size, number of adult animals, number of subadult animals, and total population size over 10 years. This demonstrates the need for long term research projects with sufficient staff and funding. It is impossible for individual researchers or NGOs to complete projects of this scale.

We should also study about damage itself. What kind of damage occurs
and by what mechanism? When, where, and who receives damage? Does damage always occur to the same farmers or does damage occur at random? Do farmers who tend to experience damage live in similar locations in different areas (such as close to forest edges or mountainsides)? Where do the animals that cause damage come from? Is damage always caused by the same animals? What is the age and sex distribution of damage-causing animals? We need these data to develop effective solutions.

How can damage be appropriately estimated? Some towns and cities in Japan calculate the cost of damage, others do not. One local government employee told me that damage is not recorded in all instances because so many events occur. He also indicated that damage costs are never estimated. He said “It doesn’t matter if you know damage costs. It won’t help to stop damage from happening. More than crop damage, mental damage from bears around us is the problem. We get more crop damage from monkeys and boars than bears”. While this statement is important to consider, to be able to solve damage problems, we need information about damage costs. We must convince local people to estimate damage cost.

Finally, how should damage to crops for self use or indirect damage to cattle meat quality be evaluated? What is the relationship between actual physical damage and mental damage? These subjects should be studied more by universities or research institutes such as the Forestry and Forest Products Research Institute and Japan Wildlife Center.
B. Sociological Aspects

**Improved Communication**

The different awarenesses of bear management held by different groups of people hinder communication between parties involved in bear conservation and management. I think that improved communication between these groups is the first step toward more effective Japanese black bear management. Similarly, more attention should be paid to including local people’s opinions in decision making systems.

**Compensation program for bear damage**

No government compensation systems exist in Japan. One federal government official said to me that he personally thought that government compensation would be a good idea, except that wildlife do not legally belong to anyone under Japanese law. He said that therefore it is not the government’s responsibility to take care of bear damage. One field biologist elaborated that since wildlife does not belong to anybody, wildlife damage is considered as a natural disaster. Therefore, the government has no responsibility to compensate for wildlife damage.

Maruyama (1993) argued that it will be impossible to get more responsive government attention to wildlife damage until wildlife clearly belongs to the public. In Japan, the general public widely accepts the idea of wildlife as public property, even though this is not codified in law. However, when damage problems occur which require someone to take responsibility, government
organizations tend to fall back on legal rationales that allow them to take "wildlife belongs to nobody" perspectives. Legal changes that establish wildlife as common property are critically needed.

Wildlife belong to the public in the U.S. However, in the U.S., federal government agencies do not compensate for wildlife damage, while some state agencies do compensate for damage within their state. Certain NGO’s have established compensation systems for wolf and grizzly bear damage. The Defenders of Wildlife has placed $112,000 in a fund to be applied to wolf depredation in both the northern Rocky Mountains and the Southwest. The fund pays 100% of market value of livestock losses that are verified by a responsible wolf management official. It also pays 50% of market value for unconfirmed losses if wolves are in the area and evidence exists that a depredation occurred. The Defenders of Wildlife recently expanded its compensation system to include grizzly bears in some areas (Defenders of Wildlife 1994).

I interviewed a representative of one of the biggest NGO’s in Japan. He said that farmers don’t want to receive money from environmental NGOs. In the late 1970s and early 1980s, when Japanese serow damage problems became obvious, this NGO tried to start a compensation system to pay farmers for damaged crops. However, farmers rejected the offer, indicating that they did not want to receive money from nature conservation organizations. This demonstrates the poor communication and lack of common ground between farmers and conservationists.
My interviews with farmers also suggested that money is not the problem. My interviewees said that the problems were lost labor and mental stress. Only one farmer indicated that he would accept compensation from any source. He does not sell his product directly, but leases and cares for apple trees for people who come to pick apples in season. I discuss the fear of bears issue in the human attitudes section. An apple farmer’s statement “Without understanding our feeling about recurring damage and fear of bears always around us, and just paying money, it will not work!” should be accepted seriously by researchers, wildlife officials, and conservationists.

Zero crop damage cannot be guaranteed, even with effective damage control systems. Compensation programs would, however, help some to reduce local farmers hostility toward bears.

Managers should listen to what local farmers say. Local farmers often do not hate bears, but are frustrated by ineffective damage control programs. The only way that managers can hope to change people’s attitudes is by listening carefully to what they have to say and trying sincerely to address their concerns.

Some local cities and towns do have damage control programs. However, local managers feel that they don’t get adequate support from prefectures or the federal Environment Agency. It is essential that prefectures and/or the Environment Agency employ specialists to deal with damage problems.
Develop professional management systems:

There is a need to professionalize wildlife management in Japan. Some local governments have begun to "relocate" problem bears or establish partial compensation systems for crop damage. Tono City in Iwate Prefecture partially pays for establishing electric fences and the local hunters association relocates bears in cooperation with the city. In the Nishi Chugoku mountain region, 4 towns relocate bears.

Some very enthusiastic workers are employed by local governments, and many individuals at several NGOs are interested in bear problems and are trying to seek solutions. However, there is a big difference between the U.S. and Japan. In the U.S., most wildlife managers work for federal or state agencies. They are paid for their work and get some level of respect from the public. In Japan, however, local government workers are either administrators or forestry technicians. Some workers happen to be interested in bear damage control in addition to their real duties. Much bear research in Japan is financed by the researchers themselves. And local hunters associations voluntarily trap and relocate bears. Management systems will not improve until primary government agencies recruit wildlife specialists, guarantee their positions, and provide support for local governments and private researchers.

Interim steps

These changes to government systems will not occur quickly, and bear conservation in Japan needs immediate improvement. In the near term, we will
continue to depend on volunteer workers. Many young, enthusiastic students and members of the public in Japan are interested in wildlife. With acceptance and training by bear researchers, private conservationists, local government personnel, local hunter’s associations, and farmers who experience bear damage, trained volunteer workers could assist with bear relocation and other management activities. There should be a certified volunteer system. Organizations such as Japan Bear Association could develop acceptance standards for volunteers, screen applicants, and design training programs. Bear researchers could teach bear life history, conservationists could teach conservation ethics, and local government personnel could outline current bear problem status and damage control regulations. Of equal importance, local hunters could explain hunting regulations and approaches to bear damage, and local farmers could discuss the reality of bear damage. After completion of such a training program, the volunteers would be permitted to work in the field. When and if government systems evolve, some of these volunteers may be hired into the system, and hopefully, become the core of the next generation’s wildlife management system.

C. Cultural Aspects

Black bears are considered pests in Japan largely because of damage to forestry and agriculture. Interestingly, crop damage from bears is lower than from serow in northeastern Japan and lower than from boars in western Japan. Figure 9 shows damage cost from various wildlife species in Akita and Shimane
Prefectures in 1995 (Akita Pref unpublished data; Shimane Pref unpublished data). In Shimane Prefecture, damage cost from boars was the greatest, amounting to 51% of total damage cost. Compared to boars, bear damage cost was only 3% of the total. In Akita Prefecture, damage from birds such as crows (Corvus spp), tree sparrows (Passer montanus), and rufous turtle doves (Streptopelia orientalis) accounted for 37% of the total damage cost. Serow damage was 11% of total damage cost. Bear damage, however, was only 2% of the total damage cost.

Different wildlife species damage slightly different crops. For example, birds such as gray starlings (Sturnus cineraceus) and brown-eared bulbuls (Hypsipetes amaurotis) mostly eat fruits in orchards. Boars damage most crops, but not bee keeping operations. Serow mostly eat field crops. Bears eat a variety of crops including apples, pears, grapes, chestnuts, squash, rice and corn. Only bears harm bee keeping operations. It is somewhat hard to compare damage from different species. However, damage cost is still a good indicator for evaluating wildlife damage. In my interviews, many local farmers said that boar (in western Honshu) or serow (in Tohoku) damage is greater than bear damage. One farmer who has an apple orchard in Tono said that he had more brown-eared bulbul damage than bear damage in 1996.

Why do people react more strongly toward bears than any other wildlife? A former Akita Prefecture official who worked for the hunting policy department for 13 years said that people treat bears as villains since bears attack people. In
<table>
<thead>
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<th>Crop Damage</th>
<th>Species</th>
<th>Cost (Yen)</th>
<th>Total</th>
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<td>Japanese macaque</td>
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<tr>
<td>Akita</td>
<td>Black bear</td>
<td>9,485,000</td>
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<td></td>
<td>Serow</td>
<td>62,153,000</td>
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<td></td>
<td>Hare</td>
<td>30,654,000</td>
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<td></td>
<td>Red-eared bulbul</td>
<td>2,900,000</td>
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<td></td>
<td>gray starling</td>
<td>10,237,000</td>
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<tr>
<td></td>
<td>Crows, tree sparrow, and rufous turtle pigeon</td>
<td>217,039,000</td>
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<td><strong>588,618,000</strong></td>
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Figure 9: Crop damage in Akita and Shimane Prefectures in 1995 (All species not included in totals)
my interviews with local people, almost everyone described mental stress from fear of bears and anger about recurring damage without having effective
damage control methods. When I asked about compensation, most people said that money is not the problem, but that human safety is the most important thing.

More fear of bear appearance or human injury by bears has been reported on the Japan sea side of the northeastern part of Honshu. In Akita prefecture, 12 people were injured by bears in 1996. Few people were killed by bears in the last decade (Kobayashi, pers. comm). Figure 10 shows human injury data in Akita and Iwate Prefectures. High numbers of human injuries may be due to gathering edible mountain plants such as bamboo shoots and various mushrooms in seasons with high bear activity. Gathering these plants to sell in towns is still a big industry in Akita Prefecture (Misawa, pers. comm).

In contrast, no one has been killed by bears south of Fukushima Prefecture in the southern end of Tohoku. Also, no serious injuries by bears have been reported in the last decade in Nishi Chugoku (Maita pers. comm). However, people's perception toward bear in Nishi Chugoku seem more negative than in either Akita or Iwate Prefectures. In my interviews with local farmers, almost everybody mentioned “mental stress” from bears. Most farmers in Nishi Chugoku mentioned the bear’s protected status as a endangered population in the area and the 5 year hunting ban. Some farmers said that no one had explained clearly to them why they need to protect black bears. I hypothesize that lack of effective damage control systems and conservation
## Human Injuries

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</thead>
<tbody>
<tr>
<td>Akita</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>5 (1 death)</td>
<td>4 (1 death)</td>
<td>7 (1 death)</td>
<td>6</td>
</tr>
<tr>
<td>Iwate</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>7</td>
<td>9</td>
</tr>
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</table>

Figure 10: Human injuries in Akita and Iwate Prefectures (Akita Prefecture Forest Policy Division 1995)
actions that do not acknowledge damage problems are causes of local people’s negative perceptions toward bears. In Tohoku, where black bears have status as a hunted animal, local people seem more tolerant than in Nishi Chugoku.

**Develop effective education system:**

To be able to change the public’s negative perceptions toward bears, education is important. Education efforts should be tailored to different groups such as hunters, local farmers, and the general public.

**Hunters:**

Hunter education is very important because hunters deal with actual damage control in many areas. In places like Akita Prefecture, black bear management is under the jurisdiction of the prefectural hunting division. The hunting division and the Akita Hunters Association maintain close relationships.

Hunters have many myths about black bear ecology. For example, hunters stated to me their belief that yearling male bears often den with their mothers, mate, and produce offspring. They attributed rapid bear population increases to this phenomenon.

Other hunters expressed the opinion that bears identify individual humans who have injured them and take revenge on these individuals at later times.

It is very important for managers and scientists to maintain good relationships with hunters. This can be achieved if managers respect traditional hunter’s empirical knowledge but at the same time correct myths. One way to do this is to focus education efforts on respected members of the community.
Japanese society is quite hierarchical; this is especially true in the Matagi hunting tradition in Tohoku. In this culture, traditional leaders (shikari) exerted absolute command of teams of hunters. Even today, managers might communicate with hunt leaders who will in turn influence other hunters.

Local farmers:

Local farmers are frustrated not by bears themselves, but due to recurring bear damage, ineffective control methods, unsupportive government agencies, and city oriented conservation movements. In my interviews with local people, most said that we don’t need to extirpate bears. Some of them would vaguely smile and say that we don’t need to kill all bears, because even bears have a right to live. I asked them again. Should we kill all the bears in every mountain range and every forest in Japan? They all said that they did not mean that. They said bears which come into towns should be removed, but if bears remain in the backcountry and don’t bother them, they can be tolerated.

In order to try non lethal control methods, local people’s cooperation is necessary. This means that we have to change their negative perceptions. Researchers have to explain the rationale for bear conservation. Many local farmers think that bear populations have been increasing because they see many bears in towns. Local people in Nishi-Chugoku believe that bears must be increasing because of their 5 years of protected status. They said that they want to know how many bears actually live in the area and how many bears could potentially live in Nishi-Chugoku. One local farmer said that conservation
decisions were made before they knew it. For effective conservation work, researchers and conservationists need to visit local people and build rapport with them. These visits should not be merely one-way information and education efforts. Rather, researchers and conservationists need to approach visits with the attitude that they can learn from local people.

General public:

Education for the general public should target the younger generations. Kellert and Berry (1980 in LeCount and Baldwin, 1986) stated that movies, talks, and popular articles about bears will not solve all the problems of bear management, because they are normally directed to adults who have already developed attitudes about bears and are often slow to accept new ideas. However, children have open minds about bears. They have not developed negative attitudes toward bears as predators or animals capable of harming humans or property. If accurate information about bears can be a part of children's educational experience, knowledge and appreciation for bears and their habitats can be engendered before biases against bears form. Educating children will not only help future bear management by creating more understanding in the general public, but will also help future bear research financially, because today's children will be the adults paying for tomorrow's research. Any wildlife education program should focus on environmental interdependence between all wildlife species. Unless basic ecosystem facts are taught, the general public will be more easily affected by emotional, illogical, and
misleading information. Wildlife education programs should be developed cooperatively with researchers. In this way, biological information will be interpreted in a sound educational format, and will have an enduring impact on the audience (LeCount and Baldwin, 1986).

In the U.S., portable multimedia boxes are used for environmental education programs on predators such as wolves and grizzly bears. Box contents include pelts and skulls of animals, various books, photos, tapes and videos, and teacher curriculum guides and reference materials which help teachers to develop educational programs for their students. These boxes are usually housed at local natural resource agencies offices or educational facilities and are shipped to interested teachers for use in the classroom (Roy, Petty and Durgin 1997). Two studies have documented improved subject matter knowledge and/or attitudes by students exposed to the boxes (Lett 1993; Moore 1994).

This idea may be applicable to Japan. “Bear facts” boxes could be developed which include information of different bear species. A bear facts box might help erase the general public’s misunderstandings which confuse polar bears (*Ursus maritimus*) and our domestic bear species. “Beech forest ecosystem” boxes could be developed which provide information on bear habitat, relationships with other wildlife species, and human use of various natural resources in beech forests. These boxes could help teach the next generation about the environmental interdependence of all wildlife species and
appreciation of nature.

Bear parks might also have an educational role in Japan. Nine large bear parks operate in Japan, with 1250 animals in captivity (this number excludes animals in regular zoos (Maeda 1997 unpublished data)). Bear parks are highly controversial. However, it is unlikely that captive bears could be released into the wild, because their behavior has been modified so much (Maeda pers. comm.), and it is not politically realistic to kill all captive bears and close bear parks.

I visited Ani bear park in Akita and Noboribetsu bear park in Hokkaido. Visitation by families was high over weekends, though visitors who saw bears playing with auto tires and other amusements might think that bears can live in captivity peacefully, and have no recognition of the need to preserve wild bears and their habitats.

Noboribetsu bear park is located in a nationally famous site within Shikotsu-Toya National Park and receives visitors of various age groups, occupations, and place of residence.

Noboribetsu bear park's brown bear museum has an excellent exhibit on bear biology and conservation. This example should be followed by other bear parks (Maeda and Roy 1997). Since many families with children visit bear parks, they could be a good opportunity to educate the general public. Exhibits should make visitors think about why these bears have to remain in captivity. Bear parks should change from roadside attractions to environmental education centers.
Chapter 6: Conclusion

There are historical, cultural, and structural reasons why Japan has not developed a western-style wildlife conservation ethic or wildlife management system. Historically, until the Meiji Restoration, we Japanese did not experience large-scale extinctions of bird or mammal species. In the recent past, however, industrialization has led to the reduction of many wildlife populations and the extirpation of others. It may be that concepts of environmental ethics and philosophies of wildlife conservation only arise after many wildlife species or natural landscapes have been lost. Ivy (1995) described Japanese culture after modernization. She concluded that contemporary Japan is haunted by the ghosts which its modernity created, and that the Japanese are disturbed by deep anxieties about potential loss of national identity and continuity. People have nostalgic feelings about cultural traditions such as Kabuki or folklore, because real Japaneseness was lost after modernization.

We can apply Ivy’s theory to wildlife management. Perhaps one reason why North American society acted to formulate a wildlife conservation ethic is because many natural environments and well known native species, such as the bison (Bison bison) and passenger pigeon (Ectopistes migratorius) were lost a century ago. In the case of Japan, abundant natural resources were only recognized as in decline in this century. The ensuing pace of environmental degradation has been so rapid that Japanese society has been unable to keep up with it. Now is the time to establish such as ethical framework.
Culturally, the Japanese traditional view of nature is based on animism. Everything in nature, rivers, mountains, woods, and animals were deities. People worshiped all beings thought to have greater power than they as gods, and tried to convert harmful powers into beneficial powers. This philosophy lives on in Japanese Shinto today (Umehara, 1991). The Japanese still relate to such nature deities as Yama no kami (mountain god), Kawa no kami (river god), Kaze no kami (wind god), and Kaminari no Kami (lightning god). As well, animals such as snakes, bears, and wolves may be considered gods. Even trees may be sacred beings.

In western society where Christianity is dominant, human relationships toward nature have traditionally emphasized human dominance over nature. In the Christian dogma of creation, God created light and darkness, the heavenly bodies, the earth, and all the creatures on the earth. Finally, God created humans in His image. Man named all the creatures, thus establishing dominance over nature. White (1967) argued that Christianity is the world’s most anthropocentric religion, and that the victory of Christianity over paganism was the greatest psychic revolution in western culture. This Judeo Christian view of nature is the root of western science and technology. Some more recent researchers have disagree with White’s assessment. Callicott (1994) pointed out that while White emphasized Zen Buddhism’s positive attitude toward nature, environmental crises have occurred in many non-Christian parts of the world, such as China, India and Japan.
When I consider the Japanese cultural base, it makes sense to me why Japan has not developed a western-style wildlife conservation ethic or wildlife management system. A systematic wildlife management would be unlikely to arise from philosophies in which nature and humanity are not completely separated. This legacy helps answer Kellert’s question as to how such a nature loving people could cause environmental disaster. And it also answers our question; that is, why we have so many wildlife problems.

I now go back to my initial questions. When did the Japanese people’s negative perception toward the black bear form and how has this perception changed over time? Why has this negative perception formed? I hypothesize that it happened after World War II. Hazumi (1992) mentioned that people’s negative perceptions are closely related to changing hunting culture and changes in people’s lifestyles. His research had demonstrated that people who live on Japan’s urbanized plains respond strongly and panic easily upon bear appearance, whereas people who live in more mountainous areas are less fearful. A survey in Ishikawa Prefecture showed that residents in remote mountainous villages had more accurate knowledge of bears than residents in urban areas and in towns in the foothills. Less people in mountain villages considered bears as pests than people in other areas (Mizuno et al. 1984).

After World War II, and especially in the 1970’s, the average Japanese lifestyle changed dramatically. For people who live urban lifestyles, nature no longer exists close by, and animals are no longer sacred. People who live in
cities don't have opportunities to see real bears. Their information comes from TV or books, and they think of bears as vicious animals.

The lifestyle of people who live in rural areas, and actually experience bear damage, is no longer dramatically different from people who live in cities. Bears are not important natural resources anymore, and they are no longer respected as deities. With alteration of bear habitat and pressure from human inhabitation, bears have simply become pests.

Our ancestors respected bears as deities and managed populations with various taboos and by trying in their own way to maintain sustainable hunting levels. These cultural myths and taboos are no longer relevant in current society. Today, we need education as a replacement for traditional respect, and scientific management to replace myth and taboo.

There are also structural reasons why we don't have effective management systems in Japan. Japanese government agencies seem to withdraw from interagency work. Not only in wildlife management, but across the public policy spectrum, many people complain about the Japanese "vertical administrative system" in general. The Environment Agency does not support prefectural governments. Prefectural governments do not support city or town governments. Different cities or towns are unable to work together on the same problems. As I mentioned before, town workers can't relocate bears across town boundaries, and the city zoos can't take care of bears caught in towns, etc.

Not just government agencies, but universities and government don't work
effectively together. In the U.S., Cooperative Wildlife and Fisheries Research Units facilitate joint research by federal, state, and university personnel. In Japan, universities and government agencies seem much more separated from each other. Government agencies might ask that some research be conducted by university professors. However, no government systems fund graduate student research or research directly applicable to wildlife management.

In Japan, people work together very efficiently inside single organizations, but not between organizations. Once problems expand beyond one organization’s boundary, organizations seem to not be able to deal with problems efficiently. I think that cooperation between different government agencies, and between government agencies and universities or other research institutions are key to effective wildlife management.

Three years have passed since I started this research. During this time, several new processes related to black bear conservation have been initiated in Japan. In the spring of 1996, the Forest Agency’s Aomori regional office announced a plan to designate a natural forest corridor along the Oou mountain range in Touhoku. The corridor will consist of several core protection areas with a 1 km wide natural forest corridor between them. Total area size will be 76,657 ha (Yui, 1997). In 1997, a new conservation group, Japan Bear Network, consisting of researchers, students, and interested individuals, was born. This group’s goal is to serve as a connection between researchers, NGOs, hunters, farmers, and journalists (Fujimura 1997).
Japan continues to have a relatively large black bear population and significant amounts of high quality habitat, though many habitats have been degraded. Careful management attention and habitat protection, coupled with needed changes in public perceptions and cooperation between different groups such as researchers, conservationists, government officials, and local people, as outlined in my recommendations, could guarantee the persistence of black bear populations into the next century.

The Japanese black bear is the symbol of Japan's abundant nature. Our choice of economic growth and urbanization or protection of Japan's unique environment will determine the black bears future. Black bear management is a touchstone of wildlife management in Japan. Maintaining healthy bear populations will be a first step toward development of improved wildlife management in Japan.
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Appendix I: Information gathered from various groups:

Environmental Agency

Data on bear population censuses in 10 prefectures (existing).
Land tenure - Wildlife refuge system, National park system.
Harvest records of both sport hunting and pest control (sex and age group).
Hunting regulations and legal systems related to pest control (Who authorized the hunting? Is there any bag limit? What kind of paper work do you need for both sport hunting and pest control? If damage occurs who authorizes control kills and who actually conducts the killing?).
Does any government compensation program exist? If it doesn't, how do you feel about it? If you are positive about it, which government agency should take care of it? How should it be funded?

Forest Agency

Land tenure - Wildlife refuge system, National park system.
Data of crop depletion and bark stripping.
Does any government compensation program exist? If it doesn't, how do you feel about it? If you are positive about it, which government agency should take care of it? How should it be funded?

Prefectural and town government: Iwate prefectural government, Tono-city government

Human injury data - the number of injured people and the situation regarding how they were injured.
Data of crop depletion and bark stripping.
What programs exist to assist farmers with reducing bear damage?
Does any government compensation program exist? If it doesn't, how do
you feel about it? If you are positive about it, which government agency should take care of it? How should it be funded?

**Environmental NGO (WWFJ and Nature Conservation Society of Japan)**

What is the role of NGOs in black bear conservation?
How large is your membership?
Does any government or private compensation program exist? If it doesn't, how do you feel about it? If you are positive about it, who (government or NGO) should take care of it? How should it be funded?
The value of bears: fur, meat, galls, etc.

**Hunters Association**

Harvest records of both sport hunting and pest control (sex and age group).
Hunting regulations and legal systems related to pest control (who authorized the hunting? Is there any bag limit? What kind of paper work do you need for the both sport hunting and pest control? If damage occurs who authorizes control kills and who actually conducts killing?).
Data about the number of registered hunters.
Is the number of the registered hunter increasing or decreasing?
How is the hunting tradition being passed on?
The value of bears: fur, meat, galls etc.

**Local farmers**

Data of crop depletion (Local farmers association?).
Do you think bear population has been decreasing or increasing?
How do you attempt to prevent bear damage?
   Fencing
   Electric fencing
Chemical repellents
Guard dogs
Other
Do you think bear is harmful animal?
Should we extirpate bears?
What kind of damage do you get?
Would you tolerate bear damage if you were paid for it? If yes how much would you require?

Local hunters
Do you think bear populations have been decreasing or increasing?
Do you think the bear is a harmful animal?
Should we extirpate bears?
The value of bears: fur, meat, galls, etc.
How do you feel about the pest control system?

Matagi people
What do they do right now for their living?
When do they hunt?
How many bears do they hunt?
Their view toward bears.
The value of bears: fur, meat, galls, etc.
How their life style has been changed?
How is the hunting tradition being passed on?

Categories of Questions
1. Bear ecological studies, recent studies, accurate data.
   Data on bear population censuses in 10 prefectures (existing).
   Data of crop depletion and bark stripping.
Human injury data - the number of injured people and the situation regarding how they were injured.

2. Sociological aspects of bear management - human-bear relationship (how do humans manage bears currently?), regulation of hunting etc.

- Land tenure
- Wildlife refuge system, National park system.
- Harvest records of both sport hunting and pest control (sex and age group).
- Hunting regulations and legal systems related to pest control (Who authorized the hunting? Is there any bag limit? What kind of paper work do you need for both sport hunting and pest control? If damage occurs who authorizes control kills and who actually conducts the killing?).
- Data about the number of registered hunters.
- What kind of damage do you experience?
- Does any government compensation program exist?
- What programs exist to assist farmers with reducing bear damage?
- How do you attempt to prevent bear damage?
  - Fencing
  - Electric fencing
  - Chemical repellents
  - Guard dogs
  - Other
- What is the role of NGOs in black bear conservation?
- How large is the membership of NGOs?
- What do Matagi people do right now for their living?
- When do they hunt?
- How many bears do they hunt?

3. Evaluation - human attitude toward black bears (historical perception
section - literature research, interviews, current attitude - survey),
recommendations for improved bear management (how should people be managing the bear?).

  How do you feel about the government compensation program? If you are positive about it, which government agency should conduct it? How should it be funded?
  Would you tolerate bear damage if you were paid for it? If yes, how much would you require?
  How is the hunting tradition being passed on?
  The value of bears: fur, meat, galls etc.
  Do you think bear population has been decreasing or increasing?
  Do you think the bear is a harmful animal?
  Should we extirpate bears?
  How do you feel about the pest control system?
  Matagi people’s view toward bears.
  How has their lifestyle changed?