Chapter 3. Brown bear management patterns in five European countries and their implications for a bear management plan in Austria.

INTRODUCTION

Brown bear management in Europe includes a broad spectrum of goals, ranging from no protection, to regulated hunting, to total protection. In each country, different organizations are involved in bear management, including private and governmental organizations.

The first part of this study is an assessment of the organizational structure of different bear management programs in Europe. For each country, including Slovenia, Romania, Italy, Norway, Sweden, and Austria, I identified organizations involved in bear management, determined if a management plan exists, if and how hunting and damage compensation is structured, examined how the countries deal with problem bears, and finally, identified what kind of management problems each country encounters. In the second part of the study I tried to illustrate patterns of bear management in Europe, including advantages, disadvantages, and effectiveness of each approach within the various countries. The results of this assessment will be used to recommend a bear management strategy for Austria and provide a reference on bear management strategies in Europe.

METHODS

I interviewed wildlife managers, hunters, government officials and farmers in Slovenia, Romania, Italy, Norway, Sweden, and Austria. Several people involved in bear management in their countries were interviewed. Following the 'snow - ball method' (Babbie 1992), initial contacts were made by Dr. Wolfgang Schröder of the Munich Wildlife Society (for a list of initial contacts see Appendix 1). Interviews with initial contacts resulted in identification of additional people to be interviewed. The initial contacts also helped to establish contact with other interviewees. A total of 90 interviews

was conducted, including administrative officials (e.g. director of a hunting association), local wildlife managers, researchers, shepherds/farmers, and local residents (Table 19).

Table 18. Number of people interviewed in each study country according to their occupation.

Occupation	Romania	Slovenia	Italy	Norway	Sweden	Austria
Administrative official	4	4	-	5	1	7
Local wildlife manager	2	4	3	3	-	3
Shepherd/Farmer	7	4	8	3	-	11
Local resident	9	-	-	-	-	-
Researcher	2	1	2	2	-	2

The interviews were done in person, using a tape recorder for future review and an interview guide (Appendix 2), which was modified according to the level of professionalism. For example, questions about detailed administrative procedures were not used for interviewing wildlife managers in the field. If the interviewee did not speak English or German, a translator, usually a local student, helped in the process.

A separate interview guide was used for interviewing farmers and shepherds (Appendix 3). These people were chosen by random encounters on the road or while hiking in the backcountry. This method was chosen since a list of all farmers of the areas was not available. The same 'random' method was used for residents of Racadau, a suburb of Brasov in central Romania where bears come to trash cans near the houses.

The information we wanted to obtain from the interviews included:

1. What kind of bear - related problems exist in each study area (e.g. habituation, food - conditioning, property damage)
2. How are these problems dealt with by authorities and the public?
3. Is there a management plan and how is it working?
4. What are the strengths and weaknesses for each management approach?

5. What is the level of public knowledge of bears, their attitudes towards bears and their satisfaction with governmental management, and damage compensation.
6. What is the population status (hunted, protected), population densities, and food availability for bears in each study area.

The interviews were all translated into English. The interviews were then analyzed by content analysis (Babbie 1992), in which I counted how many people answered a question with the same intent. For example in Slovenia, 3 of 9 interviewed wildlife managers mentioned fencing of bee hives as a preventive measure to bear damage. I did not use specific words but rather meaning to summarize the answers since many people did not answer in English and their answers were interpreted by me or a translator. The interviews served as a basis of information for the description of management patterns and the evaluation of effectiveness within each country.

RESULTS

Romania

Organizations involved in the management of brown bears and their duties.-- Brown bear management in Romania is shared by both governmental and private organizations. The Department of Forestry and Wildlife (ROMSILVA), under the Ministry of Water, Forests, and Environmental Protection (Ministry) is the head organization (Figure 18). The Romanian Hunting Association (RHA), a non-governmental organization (NGO), is responsible for bear management on land leased from ROMSILVA. Specific duties of the governmental and non-governmental organizations involved in brown bear management are described below.

Governmental Organizations: Forests and wildlife in Romania are managed by the Department of Forestry and Wildlife, under the Ministry of Water, Forests, and

Environmental Protection (Figure 18). The Ministry approves annual harvest numbers for individual counties, issues permission to shoot a problem bear outside the hunting season, and drafts and approves new hunting regulations.

ROMSILVA has 41 county administrations, which are further divided into about 10 to 15 districts per county. The Department of Game Management in the Forest Administration of the counties decides if a problem bear is to be shot, applies for annual harvest permits at the Ministry, pools all the population data of the districts and decides the magnitude of harvest requests (about 10 % of estimated population). Other duties include the distribution of harvest permits among the districts, within the county, and issuing invitations for international hunting guests to hunt in certain districts.

Each district is again divided into 5 to 10 hunting units (~ 40 km^2 each), some of which are leased to the Romanian Hunters Association. The districts are required to employ one professional game warden who must have a degree in wildlife management. The districts also collect data on problem bears and send a game warden to investigate damage cases. They also coordinate feeding (where, how often, what) and other measures, such as planting oat fields and fruit trees in the forest. Other duties encompass organizing the annual population census and the accommodation of hunting guests. The game wardens' responsibilities are numerous, ranging from accompanying hunting guests and taking care of feeding stations, to planting supplementary foods in the forests and censusing wildlife.

The Forestry Research and Management Institute (ICAS) is a branch of the Ministry and is responsible for all research connected with Forestry and Wildlife. It is a large institution with over 100 members. ICAS has representatives at the county level, but the main office is in Bucharest. Research on bears is focused on population research and management for trophies.

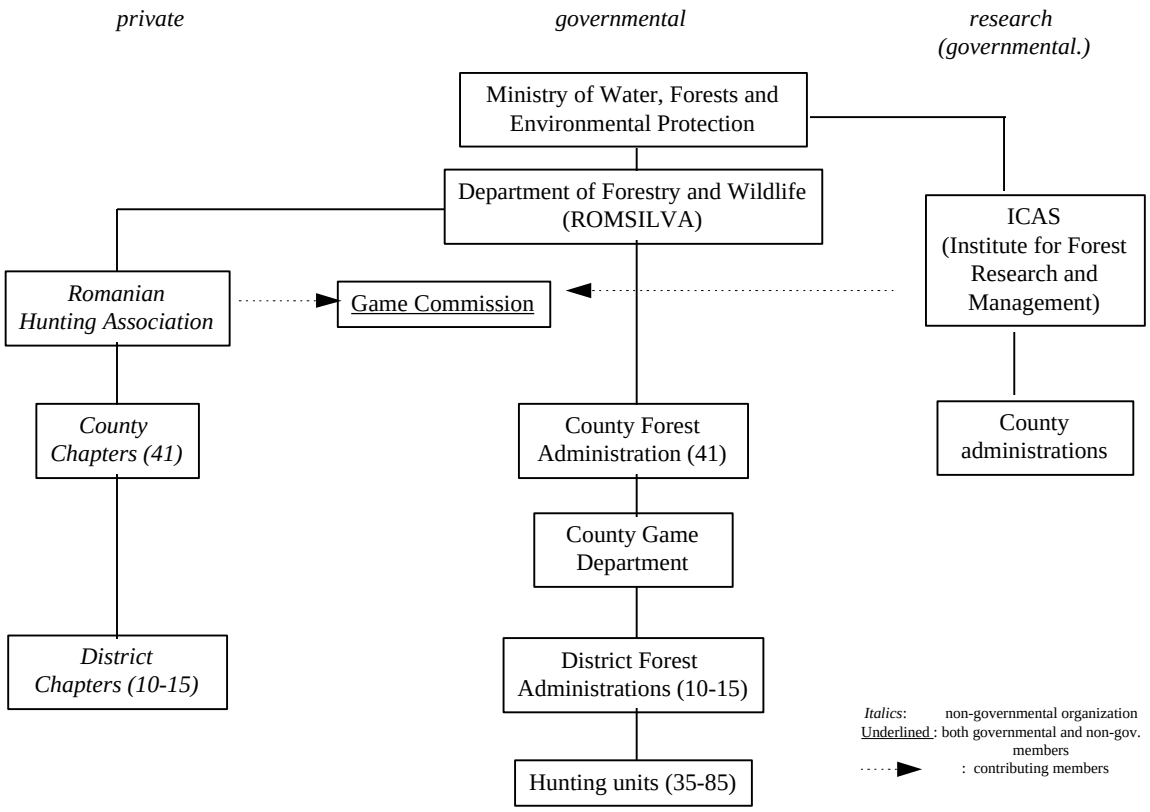

Figure 18. Bear management system in Romania.

Non-governmental Organizations and Cooperation: The Romanian Hunters Association (RHA) is the umbrella organization for the county chapters. It provides a representative to the game commission (see above). Throughout the country, the county chapters collect population estimates and harvest requests from the district chapters and send a collective request to the County Forest Administration. The Ministry endorses harvest requests of the County Forest Administration, which then provides a harvest limit to the county chapters of RHA. The county chapters of RHA then distribute the harvest numbers to the districts. The district chapters of RHA also have to hire game wardens,

who have the same duties as the federally employed wardens (see above). They lease 5 to 10 hunting units with a total area of about 400 km^2 from the county Forest Administration.

Management History.-- Bear management in Romania has been influenced by a strong political regime under the dictator Georgu Ceausescu. During his era (1975 to 1991), bears were fully protected from hunters (except himself).

Intensive feeding all over Romania took place to obtain a strong population of large trophy animals. In the late 1980s, the population reached almost 8,000 animals on an area of 3.8 million hectares, a density much higher than the carrying capacity of the country (Almasan 1994).

In the 1950s, the Ministry of Environment evaluated each hunting unit (*Revier*) for its potential carrying capacity for game animals. The evaluation included abiotic, biotic, and human impact factors. Each *Revier* was then assigned a desirable bear density close to the estimated carrying capacity. The evaluation was repeated in 1987, and concluded that Romania could sustain 4,860 bears (carrying capacity of bears for Romania), far less than the present population size of about 6,000 animals (Almasan 1994).

Present Management.-- *Hunting:* In Romania, bears are hunted during March 15 to May 15 and September 1 to December 31. On average, 500 bears are harvested each year, but females with cubs are strictly protected (Ionescu 1993).

The yearly harvest plan for bears depends on the yearly population census of the districts. Game wardens, with the help of all ROMSILVA personnel, conduct the census and send the estimate to the district office. The districts pass the estimate along to the county administration of ROMSILVA, which gives a pooled estimate for the whole county to the Ministry along with a harvest request (about 10% of the population estimate) (Figure 18).

The Ministry has a game commission, which consists of a forester and a biologist (both from ICAS), and a representative from the Romanian Hunting Association, who review the harvest requests from the counties. Usually, the harvest requests are reduced for each county. The commission considers population trends for the counties and

includes harvest data from the former years to make decisions on the granted harvest number. The reviewed harvest requests are then given to the Ministry for endorsement and passed back to the county administrations.

Management Plan.-- There is no written bear management plan in Romania except annual harvest plans.

Compensation: past, present.-- During Ceausescu's dictatorship, compensation was paid by the local governments after the damage had been inspected by local foresters or police. Damage was compensated according to market value, which is the list price of livestock published by the Ministry of Agriculture. At present, there is no regulated compensation system. Shepherds have to bring their lost livestock to court and claim compensation or have it inspected by police. The amount of money compensated is negligible, and all shepherds interviewed agreed it is usually not worth the trouble of filing a claim.

Problem bear management.-- Problem bears can be shot during the hunting season or with a special permit from the Ministry during the year. The latter is not often done because the killed bear is deducted from the allowable harvest limit of the county the next season. Permits can be sold to hunters at a high price (for foreign hunters up to $ 20,000 US), but special permits to kill problem bears do not require payment. Police can shoot a bear without permits if it poses a personal threat to people or after a person has been injured. Four of 9 interviewed residents of the city of Brasov in central Romania said, however, that officials do not take any measures to deal with highly habituated bears that feed at garbage cans adjacent to houses along the city limits. The general opinion was that these 'trash bears' were not dangerous and only came at night (Table 20, Appendix 4).

Slovenia

Organizations involved in the management of brown bears.-- Brown bear management in Slovenia is shared by both governmental and private organizations. The Ministry of Agriculture, Forestry and Nutrition (Ministry) is the head organization (Figure 19). The Slovenian Hunters Association (SHA), an NGO, is responsible for bear management on

private land or land leased from the Slovenian Forest Service (SFS). A Core Protection Area (CPA) for bears was created by a decree of the Secretary of Agriculture, Forestry and Environment of the Republic of Yugoslavia in 1966. It divided the management of brown bears in Slovenia into the CPA in south-central Slovenia and the area outside of it (Figure 3). Specific duties of the governmental and non-governmental organizations involved in brown bear management are described below.

Government organizations: The Ministry of Agriculture, Forestry and Nutrition approves harvest plans that are sent to them from the Commission for Predator Management (Commission). The Commission is comprised of representatives from the Ministry, the Department of Environmental Management and Forestry, the Forest Management Institute, the SHA, and the State Game Reserves. The Commission receives harvest request for bears every year from game reserves and the SHA. It reviews previous harvest data, population estimates, and damage data to determine harvest quotas in each of the 14 districts. Harvest requests are often too high and get reduced by the Commission, according to 2 interviewed Commission members in Slovenia. Additionally, the Commission discusses requests for permission to shoot problem bears and, if it approves, gives the request to the Ministry for signature. This group is also responsible for lynx and wolf management in Slovenia.

The Ministry employs one carnivore specialist who cooperates closely with the SHA. The carnivore specialist is in charge of damage compensation for bears outside the CPA and the issuing of licenses to kill a problem bear outside the core area. The Department of Environmental Management and Forestry, a branch of the Ministry of Agriculture, employs 14 game wardens for each district who report directly to the carnivore specialists in the Ministry about damage incidents, population estimates, problem bears, and local public relations.

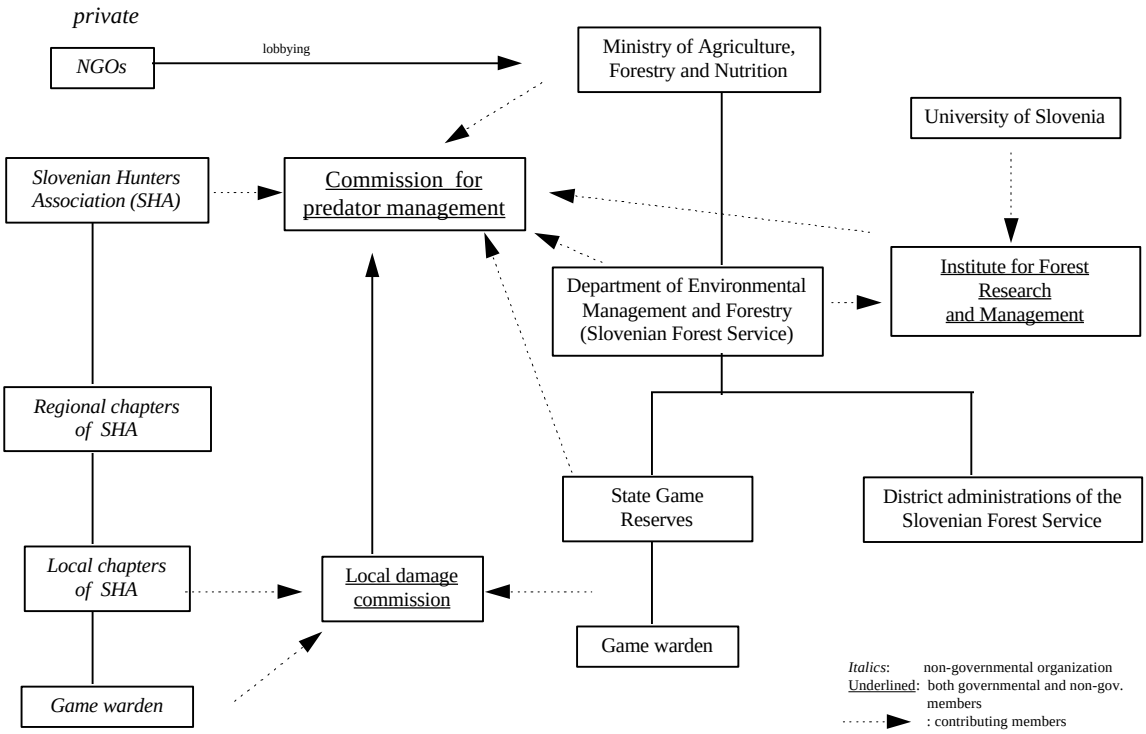

Figure 19. Brown bear management system in Slovenia.

The Forest Management Institute is a joint research institute of the Department of Environmental Management and Forestry and the University of Slovenia. It coordinates research projects, such as the impact of highways on the bear population (Kaczensky 1995), and has a representative in the Commission.

The State Game Reserves' (SGR) goal is to preserve and increase populations of game animals. The SGRs have an intensive feeding program for bears. They also have an annual harvest quota from the Commission and often sell hunting permits to foreigners who provide a major source of income. The SGRs hire professional game wardens, who have degrees in forestry and who usually have some training in wildlife management.

The SFS and its district administrations are also important in the management of brown bears in Slovenia. Each district has a professional game warden who is responsible for damage evaluation for all carnivores and game animals. He sends his reports to the carnivore specialist in the Ministry. If damage reports become frequent and one bear can be identified, the warden asks for a permit to kill the problem bear. The game warden also serves as a consultant for local hunting clubs, including damage prevention, damage evaluation, and population censusing, but this function depends very much on the individual game wardens and the effort they want to invest. One interviewee mentioned that some game wardens do not like to work with local hunting clubs.

Prior to 1996, the SFS was responsible only for areas outside the CPA. However, new hunting regulations and re-organization of the forest districts gave the SFS responsibility for all game animals in the country. The 2 administrative officials interviewed mentioned that the agency's goal is to make forest and hunting districts, which traditionally have not overlapped, the same. The lack of overlap in districts had caused problems in critical habitat protection since the SFS could harvest trees in areas that were, for example, breeding grounds for deer.

Non-governmental Organizations and Cooperation: The SHA is a non-governmental organization that has an important role in the protection of brown bears. The SHA is responsible for damage compensation within the bear core protection area and it adopted voluntary guidelines in 1991, which stated that a bear could be shot outside the core management area only if it caused damage to property or posed a threat to people. Females with cubs could be shot only if they injured or killed a person. The guidelines initiated the formation of the Commission and provided that outside of the CPA, the Ministry would compensate damage victims. Inside the CPA, local hunt clubs that leased the area would pay. The Commission sets a date for all the hunt clubs to conduct population counts, but it is not mandatory for them to do it. The guidelines are followed voluntarily by the SHA. Violations cannot be prosecuted except as an internal matter of SHA. Newly proposed hunting regulations (drafted by the Department of Forestry and Environmental Management) would make it mandatory for hunt clubs to participate in

population counts following a standard protocol, and make the other guidelines a legal requirement.

The SHA leases hunting units from the Ministry and has management responsibility for bears in the leased units. Once each year, the SHA sends a collective harvest request of all hunting clubs to the Commission. Local hunt clubs are subunits of the SHA. They lease areas of about 40 km^2, usually consist of 40-70 members, are in charge of feeding, annual population counts, harvests, damage compensation, and law enforcement.

Management History.-- From 1953 to 1966 brown bears were protected year-round in all of Slovenia. Increasing numbers of human-bear incidents, including the death of a hunter killed by a bear in 1964, led to hunting of bears again. In the CPA, bears were protected from May 1 to September 30, while outside the area, bears could be hunted year-round, including females with cubs.

Present Management.-- The CPA was established to protect bears while allowing strictly regulated hunting. The hunting season lasts from Oct. 1 to April 30. An average hunting quota of 40 bears, divided into 3 weight classes of < 100 kg, 100 - 150 kg, and > 150 kg, is harvested annually. Hunters are generally chosen by seniority, within hunting clubs, to shoot a bear. Licenses cost between $ 300 and $ 500, depending on the size of the bear. Foreigners are frequently charged much more for the license.

A supplementary feeding program was initiated by the SHA in 1986. Local hunting clubs are required to hunt from elevated stands over feeding sites in the forests. Hunting clubs maintain one meat feeding station per 60 km^2 and several corn feeding sites, which are also used for wild boar and deer. These feeding sites are usually stocked with carcasses of livestock local farmers have lost. The goal of feeding is to reduce livestock-bear problems, to keep the bears within the core area, to allow a selective harvest at bait stations, and to facilitate annual bear population counts.

Management Plan.-- The bear harvest quota and the guideline of one meat feeding station per 60 km^2 provide the only written guidelines at the moment. The SFS is developing a management plan at the present time.

Compensation: past, present.-- Damage by bears is compensated by the Ministry outside of the core area (Adamic 1991). A local damage commission, which includes the professional game warden of the district forest administration, the professional game warden of the local hunt club or another representative, and the claimant him/herself, and sometimes a police officer, assesses the loss and sends a report to the carnivore commission. The farmer is paid the market price of the animal (as determined by the Ministry), which includes higher prices for breeding animals with certification.

Inside the core, area local hunt clubs or SGRs cover 2/3 the damage payments, while the Ministry pays 1/3 of each claim. Evaluation of the damage is done by local game wardens who receive no standard training. A summary of the annual loss (in Slovenian currency) is sent to the SHA headquarters.

Problem bear management.-- There are 4 reported cases of bears killing humans in Slovenia since the beginning of the century. In May 1996, a female with cubs seriously injured a man. Most problems involve sheep farmers in northern Slovenia. Since northern Slovenia is outside the core area, special permits, which are limited to a certain county and time period, have to be issued by the carnivore commission. Eight of 9 interviewed wildlife managers pointed out that they are very hard to get. Females with cubs may be shot only in cases of human injury or death.

Within the core area, a problem bear may be harvested as part of the set quota for that county or with special permits by the commission, if the quota has been filled or the incident occurs outside the hunting season. The killing of a problem bear is viewed as the only management solution, since relocation is not feasible in such a small area.

Abruzzo Region (central Italy)

Organizations involved in the management of brown bears.-- Bear management in central Italy involves both governmental and non-governmental agencies. Abruzzo National Park (ANP), a non-governmental organization, and the Italian Forest Service

(IFS) are the two head organizations (Figure 20). There is, however, little cooperation between the two and they must be seen as two separate entities.

Government organizations: The IFS, which is a branch of the Ministry of Natural Resources, Agriculture, Forestry and Nutrition, is divided into two divisions, the traditional forest service, which deals with forest operations and harvesting, and the Ex ASFD (*ex azienda di stato per le foreste demaniali*), which is the research branch of the IFS. The IFS is the umbrella organization for the 20 regions of Italy and appropriates the research and wildlife damage compensation budget for each individual region.

The regional branches of the IFS administer a comprehensive data base on all validated wildlife compensation claims. The IFS office of the Abruzzo Region (Figure 4), which is the only region in Italy that still has brown bears, designs a management plan for its region. The regional IFS is further divided into provinces. The Abruzzo Region includes the provinces of L'Aquila, Teramo, Chieti, and Pescara. The provincial branches of the IFS employ local foresters who validate claims and send standard claim forms to the provincial administration. In addition, the veterinarian institute of the IFS (*Instituto Zooprofilattico*) determines the cause of death on the bears, and can make recommendations for management strategies to the regional IFS, e.g. to close dumps because of disease possibilities. The provinces send an annual summary to the regional administration, which controls the wildlife damage compensation budget. By law, the IFS of the Abruzzo region has to provide game wardens and rangers to the Abruzzo National Park, but that has not been accomplished yet. A large portion of land that is administered by the IFS is leased to shepherds in the summer for grazing of livestock.

Non-governmental Organizations and Cooperation: The ANP and its surrounding area in the province of L'Aquila has the main concentration of brown bears

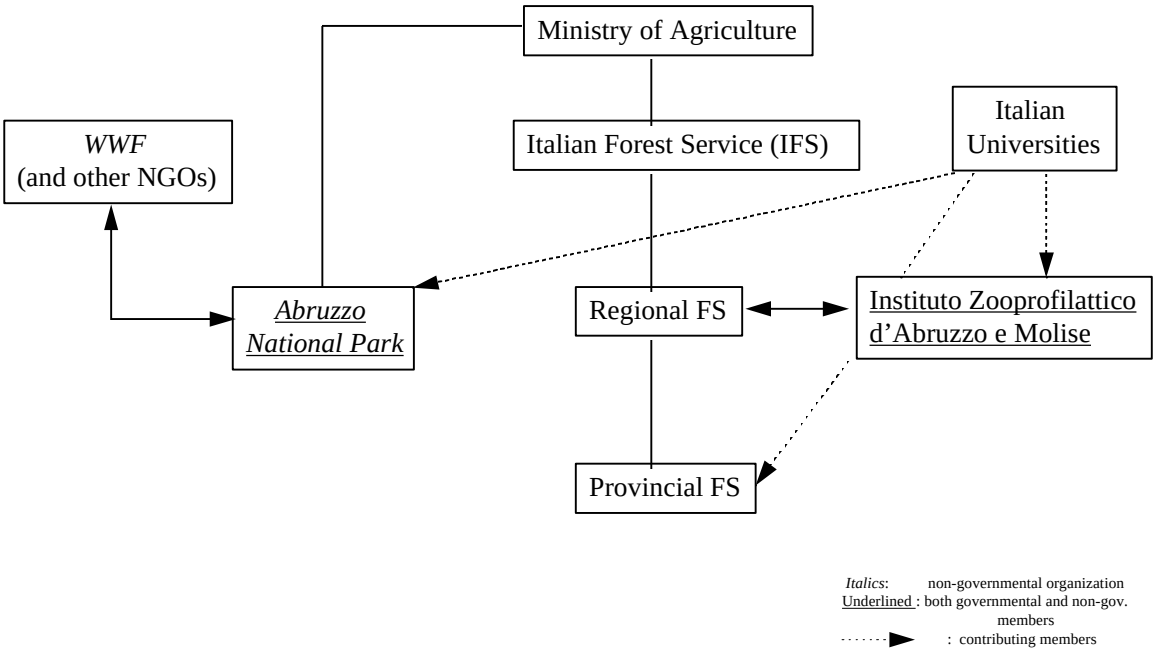

Figure 20. Bear management system of the Abruzzo Region, Italy.

in the Apennine Mountains. The ANP is an autonomous organization with its own administration, although the surrounding area is administered by the IFS and private landowners.

The ANP was founded in 1922 by a private initiative and became a national protected area in 1923. The first bear management plan (*progetto urso*) was designed in 1960 in cooperation with the WWF. The goal of the plan was to preserve and increase the present brown bear population. This goal was not achieved, however, because the population experienced a constant decline in size from about 70 to 100 animals in 1970 to about 45 to 50 in 1983 (Boscagli 1986, Zunino 1981).

Park rangers take care of the feeding stations, the planting program and the monitoring of damage. In spite of a law passed in 1990, which required that all ANP

rangers be provided by the IFS, rangers are still hired though the park. All interviewees stated that there is a power-struggle between the ANP administration and the IFS.

Bear management of ANP.-- A supplementary feeding program (*campania d'alimenatre de l'usro*) was started in the late 1980s with the goal of keeping bears inside the park to save them from being shot. In 1991, 78 ha of crop fields and 1,504 fruit trees were planted in the park (Boscagli 1994). Unlike in American national parks, farmers are allowed to graze their livestock inside the park boundaries, and towns are present in the park. Most apiaries have electric fencing around them, which 2 of 5 interviewed wildlife managers reported to be moderately successful. The farmers do not receive any subsidies for preventive measures, such as fencing bee hives.

In the 1990s, the feeding program was expanded from only feeding sites to fruit tree and grain-field plantations in the forests and high meadows. A map of the general location of each feeding station and supplementary plantation is published every year and is accessible to everybody. The land for these plantations and feeding sites is often leased from private owners.

Bear management of the IFS.-- The IFS of L'Aquila province has a separate management plan from the ANP, which includes feeding programs and research projects with radio-collared animals. There is no cooperation with the park, however, and one interviewee stated that people even work against each other. One such case occurred when a dead bear was found by an ANP ranger on IFS land. If a dead animal is found, it is supposed to be sent to the Veterinarian Institute (*Instituto Zooprofilattico*) of the region in Teramo. Park authorities refused to do so and kept the carcass.

Bear damage compensation in ANP.-- The park introduced a compensation system as early as 1923. From 1968 to 1974 the WWF paid for damages in and around the park. Compensation for livestock damage or apiary destruction within the park is still included in the park's budget, which is supplied by the Ministry of Agriculture. Damages within the park are rare, but no specific data were released by park authorities.

Bear damage compensation of the IFS.-- If a shepherd or farmer who lives outside the park loses livestock or apiaries to bears (or wolves or feral dogs), a forester inspects the

damage and fills out a compensation form. The carcass must be found before compensation can be paid, but the full market price (determined by the Ministry of Agriculture) is paid. All interviewees agreed that claims are processed very slowly. If the annual budget for compensation is exhausted, claims are put into the next fiscal year and new ones get pushed back. Often it takes 4-10 years for the farmers to get the money. The regional IFS administration maintains a central data system for all claims that are paid in the Abruzzo region.

In 1992 and 1993, the IFS wanted to improve compensation laws by paying damages only when it was proven that adequate protection measures had been applied. For example, the law required one shepherd per 100 sheep, and that sheep be put into an enclosure at night. The new law caused much frustration and complaints from the shepherds, and was abolished again in 1994 (Fico, IFS Veterinary Institute, pers. comm.).

Problem Bear Management of the ANP and IFS.-- No special program has been designed by ANP or IFS to deal with problem bears. Few livestock depredation problems or aggressive approaches to humans have occurred.

Sweden

Only one person was interviewed, but damage statistics, maps and extensive literature on the bear population, legal status, and management were available.

Organizations involved in the management of brown bears and their duties.-- *Governmental Organizations:* Bear management in Sweden is mainly a governmental responsibility (Figure 21). Administrations of Swedish counties (county councils) are responsible for bear damage compensation claims. Bear harvest plans are coordinated by the Swedish Environmental Protection Agency (EPA), the county councils, the Swedish Hunting Association (SWHA), and the Norwegian Directorate of Nature Management (NINA, see below). Problem bear management also involves all the above agencies, but

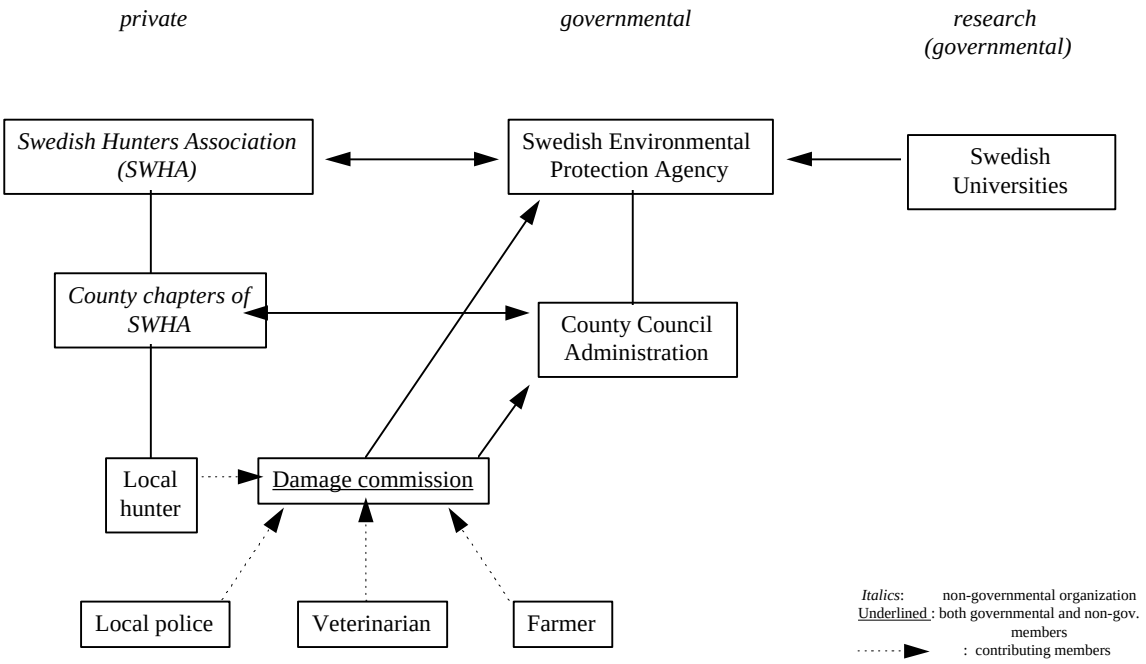

Figure 21. Bear management system in Sweden.

the final decisions are made by the Swedish Environmental Protection Agency (Bjärvall, Swedish Environmental Protection Agency, pers. comm.).

Non-governmental organizations: The SWHA provides a representative to local damage commissions (Figure 21). They also are consulted for setting harvest limits and when dealing with problem bear management.

Brown bear management history.-- The Swedish EPA started an interview survey of hunters throughout the country in 1975 to determine the distribution and abundance of the brown bear. Survey results indicated that there were 4 bear core areas left in Sweden where females and reproduction still occurred. Following the survey, the hunting laws were changed to a quota system that allowed each county to harvest a specific number of bears per year (see below). The quota, which was not to exceed 50 bears per year, was

set in cooperation with the provincial council governments and representatives of the SWHA (Bjärvall, Swedish EPA, pers. comm.).

To get more detailed information on the bear population, a brown bear project was started in collaboration with the Norwegian government in 1984. The study showed that annual harvest had been about 5.5 ± 2.0 % of the population and that the population was still increasing 1.5% on average every year (Swenson et al. 1995).

Current bear management.-- *Hunting:* Beginning in 1992, the harvest of females was restricted to 1/3 of the total annual harvest. Hunting had to be stopped once this quota was reached, even if males could still be shot. For example in 1994, the harvest quota was 50 individuals, but only 29 bears were harvested before 16 females were shot (Swenson et al. 1995). The annual harvest quota is set by the Swedish EPA, the SWHA, the county councils and the NINA in Trondheim (Bjärvall, Swedish EPA, pers. comm.). Poaching is not perceived as a threat to the population on a national level, but can affect the population at the local level, especially in the reindeer areas in the north (Swenson 1995, Bjärvall, Swedish EPA, pers. comm.).

Conservation: Historically, brown bears occurred throughout Sweden, but had almost disappeared by 1930 because of intensive hunting efforts and a bounty system (Swenson et al. 1995). The recent increase in the bear population is partially attributed to human population decline in rural areas of central and northern Sweden, a parallel decrease of domestic livestock, and an increase of moose numbers (Swenson et al. 1995a).

The national policy goal for the protection of bears is to increase the population to 2,000 animals. This goal could be lowered, however, if human-bear conflicts increase (Bjärvall, Swedish EPA, pers. comm.). Currently, bears cause few problems in Sweden (Chapter 2).

Brown bears do not receive any consideration in forest management planning in Sweden. Much of the nation's forests have been transformed to single-aged monoculture with large clearcuts and an extensive road system (Swenson et al. 1995). The brown bear population does not seem to suffer from these actions and has been reported to be increasing over the last 50 years.

Bear Management Plan.-- A written document for bear management exists only for the northern areas of Sweden in connection with reindeer management. This plan was designed in cooperation with the local reindeer farmers and the SWHA in 1991, and seems to be perceived well (Bjärvall, Swedish EPA, pers. comm.). Guidelines for the management of bears in the rest of Sweden exist, but are not written in a complete document as a 'management plan' (Bjärvall, Swedish EPA, pers. comm.).

Compensation System.-- Until July 1995, the compensation system was divided. The northern part of the country, which includes the counties of Norbottens, Västerbottens, Jämtland and Västernorrlands, was administered by the county councils. The central and southern parts (remaining counties) were administered directly by the EPA. When a farmer found damage to livestock or property he called either the county council (*Länsstyrelsen*) representative or the Swedish EPA (*Naturvårdsverket*) for a claim form. The damage had to be verified by a local police officer, veterinarian or member of the SWHA. The completed form, verification statement and pictures had to be sent to the EPA or the county council. The amount that should be paid for the claim was approved by the Swedish Farmers Association. Compensation for reindeer required that the animal was found. Sheep that were not found were compensated, if a kill by predators had been verified in the area before.

Since July 1995, the county councils of central and northern Sweden handle damage compensation. The Swedish EPA is no longer responsible, but helps to answer questions. Problems occur because the county councils do not have carnivore specialists at the moment who are trained in evaluating carnivore damage. In 1997, $ 4,000,000 US were allocated for wildlife damage compensation in Sweden (Bjärvall, Swedish EPA, pers. comm.).

A new compensation system for reindeer has been recommended by the EPA, which proposes that damage compensation for missing reindeer should be paid if carnivores were observed in the area. This proposal was designed in cooperation with the reindeer farmers and the EPA (Bjärvall, Swedish EPA, pers. comm.).

Problem bear management.-- Very few problems concerning brown bear habituation and damage have occurred in Sweden. Three incidents in 1996 were handled by aversive conditioning and radio-collaring one bear, and killing another one after it had been seen on a local golf course by several people (Bjärvall, Swedish EPA, pers. comm.). There is no written protocol on how to proceed. Decisions on what to do in a problem situation are discussed between the EPA, SWHA and the counties.

Norway

Organizations involved in the management of brown bears and their duties.-- Bear management in Norway is purely governmental. The Directorate for Nature Management (DN) has the main responsibility, but individual counties deal with the daily management such as damage compensation, population monitoring and public education. Non-governmental organizations are not directly involved in the management of brown bears in Norway, but have a strong lobby to influence decisions at NINA and the Ministry of Environments and Agriculture (Figure 22). Specific duties of these organizations are:

Governmental Organizations: The Norwegian administrative system for managing brown bears follows a governmental chain of command. The Ministry of Environment, the highest link in the chain of command, has legal responsibility for bear management. Within the Ministry, the Directorate of Nature Management (DN) is responsible for all specific questions concerning management decisions, interpretation of the management plan, contracting with the Norwegian Institute for Nature Research (NINA) for research projects, budget allocation to the counties, and the collection of all yearly damage reports. There are 18 counties in Norway, which are equivalent to states in the USA or Germany.

The Departments for Nature Management (DNM) in the individual county governments (*Fylkesmannen*) are the next link down. They administer a database on all

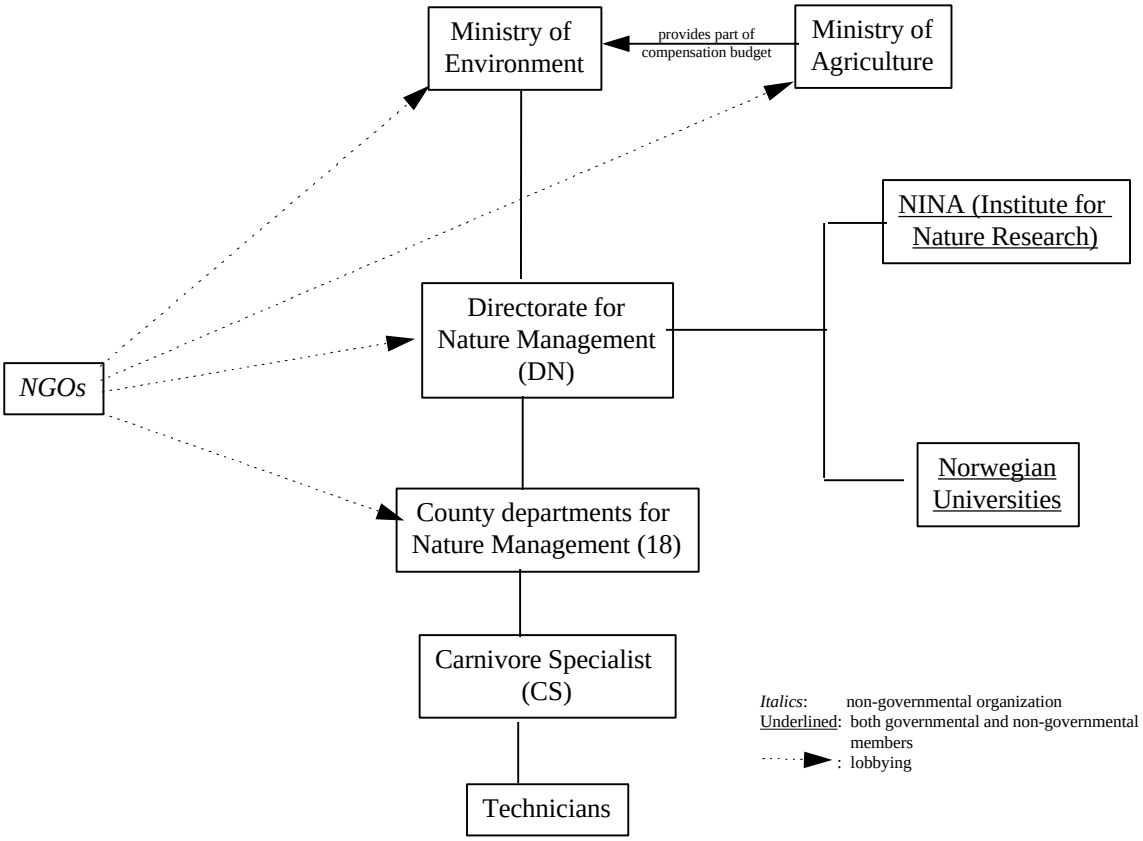

Figure 22. Brown bear management system in Norway.

the damage within the county. The DNM employs a carnivore specialist (CS, *Viltkonsulent*) who is responsible for problem bear management and damage evaluations within the county. Not all of the 18 counties in Norway have a carnivore specialist. Although 9 of Norway's counties have carnivores, there are only 6 carnivore specialists. Consequently, some of them have to take care of several counties.

The DN can issue kill permits for problem bears in advance and let the CS decide when to use them. Under the CS's direction, technicians are trained to evaluate carnivore damages, and compensation is paid. The CS also has research projects, which are often done in cooperation with NINA (Wabakken and Maartmann 1994).

Non-governmental organizations: Other important groups in the management of brown bears in Norway are independent research organizations. Two important research organizations are NINA and the Center for Environment and Development of the University of Trondheim. Together they conduct baseline research on bear population studies, interaction between bears and livestock, bear habitat and other topics. This research is used by the DN for decision-making. For example, NINA revised the bear population estimate from approximately 200 bears in 1986, to the current estimate of 20 to 25 bears (Swenson et al. 1994). Decisions on how many permits to issue for killing problem bears, and how much compensation money to distribute to individual counties are based on the research. Regular meetings and close cooperation between the DN and NINA are facilitated by having the agencies located in the same building in Trondheim.

The influence of NGOs such as the National Sheep Breeders Organization and the National Farmers Association, is also an important factor in the management of brown bears. These organizations reviewed the bear management plan, which incorporated many of their suggestions. The National Farmers Association has strong lobbyists and substantial funding to support campaigns, unlike most of the environmental NGOs. The NGOs also use the media extensively, especially in a negative way. The media are used frequently by both the NGOs and the counties to keep locals informed on decisions regarding bear management. One wildlife manager stated it was a good way to prevent conflict and a good tool for public involvement.

Management Plan.-- In 1992, the Norwegian parliament signed a carnivore management plan which was designed by the Directorate of Nature Management in Trondheim, researchers from NINA, and carnivore specialists of the counties. The DN held hearings in communities within the bear core areas (Figure 3), and sent out the proposed management plan to NGOs for review. The stated goals in the plan were:

1. Norway shall have reproducing populations of all carnivores.
2. Damage by carnivores shall be low in Norway.

The plan also listed several preventive measures, which according to all interviewed wildlife managers in Norway were mostly ineffective, for example sheep herding by guarding dogs. The plan stated that there should be protective core areas, but did not specify where. These areas were established in 1994, after peer review of scientists (e.g. at NINA), NGOs and other associations (e.g. Swedish Sheep Farmers Association).

In 1996, the plan was scheduled to be reviewed and changes to be made based on experiences from previous years. The Department of Agriculture, for example, will have a greater responsibility in advising farmers on how to keep their sheep. The Department of Agriculture had been mentioned in the previous management plan, but its role had not been clear.

Damage compensation.-- Compensation is paid at the end of the year with funds from the Ministry of Environment and the Ministry of Agriculture. An annual budget, which depends on the amount of damage that occurred the preceding years, is divided up among the counties by the DN. Prior to 1993, the DN made compensations directly to the farmers.

Brown bear damages in Norway are inspected by the carnivore specialist (CS) of a county or one of his technicians at the time they occur, and are then put into a data base at the county governor's office. The technicians meet at least once a year for training on how to identify carnivore kills and how to write reports. In verifying carnivore damage, the technicians fill out a standard form which includes pictures of the kills. Farmers file a cumulative compensation application for all carnivore damage they experienced during the year by November 1st and usually receive their money by the end of January. They file all claims at once to avoid confusion and extended paper work. A yearly report on all the damage is written and available to the public.

Usually farmers also get paid for lost sheep if bear-kills have occurred in the area that year. About 75 % of the value of the livestock, which is determined by list prices of the National Sheep Farmers Association, is paid in such a case. Two interviewees stated

that farmers usually are compensated for 90-95 % of all their lost sheep, even though a natural loss to diseases is expected.

Problem bear management.-- The DN issues licenses to kill a bear, usually not more than 2 per year, to some counties at the beginning of the year. Only the counties which have had problems with bears before will get such permits. The system is designed to allow for fast action once damage occurs. If a bear has to be killed in a county that does not get permits in advance, the CS must request permission from the DN.

Once damage occurs, the CS and the DN have to decide what damage is compensible and when to issue a kill permit. The carnivore specialists also have to be sure which bear is doing the damage before they can give permission to eliminate it. When the CS and his technicians have identified the problem bear, the counties may hire professional hunters or, as in most counties, hire a group of local hunters to shoot the animal. Since the permits are issued for a designated time period, the hunters have to act quickly. The duration and location of the permit is determined by the CS.

Austria

Brown bear management system in Austria.-- Management of brown bears in Austria presently is not uniformly organized. Management authority falls under the jurisdiction of the individual counties of the states (Figure 23), which have their own hunting and protection laws (Kaczensky 1996).

Bear management plan.-- A bear management plan detailing strategies for bear recovery and handling problem bears does not exist in Austria, but will be written by the Munich Wildlife Society, the Institute of Wildlife Research in Vienna, and the WWF in

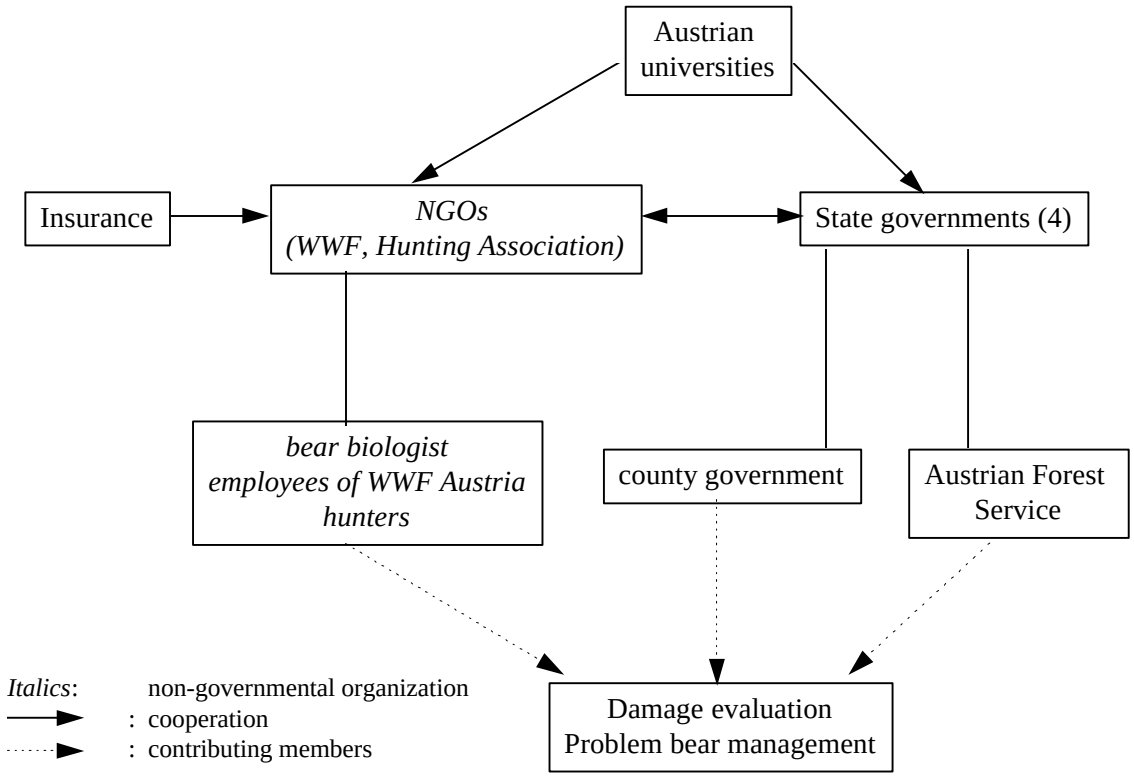

Figure 23. Bear management system in Austria.

1997. Seventy percent of all interviewed farmers and local wildlife managers requested more public information on bear management and reports of recent population developments.

Compensation.-- Each state has an individual system of compensation (Table 19). In Carinthia and Styria, where bears have returned naturally from Slovenia, damage by bears is compensated by a private insurance through the state hunting associations. The WWF Austria pays for an insurance in Lower Austria, where they released bears in the beginning of the 1990s. Upper Austria's compensation fund is supported by the WWF Austria, the Kalkalpen National Park and the hunting association of Upper Austria.

Table 19. Bear damage compensation policies by state in Austria.

State	Compensation payment covered by
Carinthia	Damage insurance of Hunting Association, 100 % reimbursement, no higher compensation for breeding animals.
Styria	Damage insurance of Hunting Association, 100 % reimbursement, higher reimbursement for breeding animals with papers.
Lower Austria	Damage insurance of WWF, 100 % reimbursement, no higher compensation for breeding animals.
Upper Austria	Fund containing ~ $ 10,000 US, paid by WWF (40 %), Hunting Association (20 %), and Kalkalpen National Park (40 %), ~ 50 % reimbursement of market value.

after Kaczensky 1996

Bear damage is reimbursed at 100 % of the market value in all states, except Upper Austria. In Styria, but not Lower Austria and Carinthia, breeding animals are compensated at a higher value.

Damage claims must be confirmed by an authority; which varies among states. Presently, claims are inspected by bear specialist of the WWF (*bear lawyers*), hunters, foresters of the Austrian Forest Service, veterinarians, and policemen. The WWF also pays for electric fencing for beehives in Lower Austria if previous extensive damage was verified. All 9 interviewed farmers in Lower Austria and Styria indicated that they are satisfied with the current system.

Problem bear management.-- Special permits to kill a problem bear may be issued by the county governor if a bear poses a threat to the "culture of the district", or if the bear is an immediate threat to human safety or has killed a person. A study in 1996 by the Wildlife Management Institute of the BOKU University (*Institut für Wildbiologie und Jagdwirtschaft*) in Vienna, Austria, showed that 90 % of the interviewed farmers in Lower

and Upper Austria felt threatened by bears and 70 % of them wanted total elimination of bears in the area.

Problem bear management is hindered by several laws that forbid the use of leg hold traps and poison, and discourage the use of pull-triggered traps. If the use of these traps is needed, extensive bureaucratic obstacles must be overcome (Table 20). The management plan, being written at the moment, aims to facilitate the different laws and interpretations of management authority.

Table 20. Status of legal bear management activities available in Austrian states.

State	Traps	Sedatives	Kill
Carinthia	box or lethal traps	by veterinarian	permit by state and county government
Styria	box trap	by veterinarian	permit by county only
Lower Austria	box trap	by veterinarian	permit by county only
Upper Austria	box or lethal traps	by veterinarian	permit by state and county government

after Kaczensky 1996

Attitudes of local people towards bears in the five study areas

Areas where bears have always been present.-- Bears have always been present in Italy, Sweden, Romania, Austria's state of Carinthia, and southern Slovenia. Interviews with shepherds and local farmers in the Brasov area of central Romania suggested that people believed bears belonged in the Carpathian landscape (Table 21). Only 2 people, a mother with child and a young woman, were afraid of bears. The other 14 answered that they grew up around bears and knew how to behave around them. Similar results were obtained in interview with 2 farmers in Carinthia (Table 22). The difference there,

however, was that the density of bears is much lower and bears are rarely encountered in person.

Areas where bears recolonized naturally.-- Norway and northern Slovenia are study areas where bears have returned naturally from neighboring source populations. Only a few interviews with farmers were conducted in these countries due to time constraints. The 4 sheep farmers interviewed in Norway felt that bears did not belong in the area. Two sheep farmers and 2 bee keepers (n = 4) in northern Slovenia answered in the same manner.

Areas where bears have been reintroduced.-- Central Austria is the only study area where bears have been reintroduced. Eight of 9 farmers interviewed objected to the introduction efforts and were angry at the WWF for doing so (Table 22). Two-thirds of the people interviewed were afraid of bears in the area.

Table 21. Interview results of Romanian shepherds and local people (N = 16) around Brasov, Central Romania.

Question	Yes	No
Do you think bears belong in this area?	15	1
Are you afraid of bears?	2	14
Do you think bears feeding at garbage dumps are dangerous?	5	11

Table 22. Interview results for 9 Central Austrian farmers.

Question	Yes	No
Are you opposed to bear reintroduction?	8	-
Are you afraid of bears?	6	3
Do you think bears belong in this area?	1	8

Comparison between official and actual brown bear management patterns

This section compares the official bear management structure of a country and the realized management situation. Data from interviews of bear management officials and local people (farmers, shepherds, randomly encountered people in the cities and villages) provide the baseline for this comparison. In Sweden not enough interviews were conducted to draw conclusions, and in Norway bear management appeared to follow official guidelines. In some countries, especially Romania, a large discrepancy between official and local opinion on bear management was evident. Other situations involved an agreement on bear management patterns between local people and officials that did not follow the official management plan of the country.

Romania.-- The greatest point of disagreement between local people and official bear managers in Romania was problem bear management and damage compensation strategies. Fifty percent (n = 8) of interviewed officials did not believe that Romania has a problem with garbage-eating bears. However, 100 % (n = 16) of interviewed shepherds and locals reported seeing bears regularly at garbage dumps next to houses and in villages. However, while 67 % of local people believed that bears feeding at garbage dumps are not dangerous and will not harm people, 80 % of interviewed officials agreed that injury to people is a major problem with bears in Romania. All of them agreed that local people are not informed about bears and their management in the region of Brasov, central Romania.

Regarding compensation for bear damage, 50 % of officials believed that insurance was provided to farmers for losses. The remaining officials noted that people can buy private insurance to protect themselves against bear damages. All of the interviewed shepherds confirmed that they have to bring their lost livestock to court and claim compensation or have it inspected by police. In addition, all interviewed shepherds felt that the amount of money compensated is inadequate and often not worth the effort to claim.

Seven of 8 bear management officials had the misconception that local people and farmers/shepherds do not like bears. However, 70 % of interviewed locals/farmers agreed that bears belong in the natural environment of the Carpathians, but mentioned that they

did not like the way bears were managed. Eight of 16 stated that officials do not take any actions against habituated garbage bears or bears that have previously attacked their sheep or bees.

One -half of the interviewed officials stated that the Ministry of Environment must be informed if a problem bear has to be destroyed, whereas the other half observed that bears can be killed as part of the county harvest limit. The 2 local wildlife managers interviewed mentioned that they do not like to shoot problem bears outside the season, since they do not get any money for them, and the pelts are of poor quality at that time.

Slovenia.-- The main difference between the official and actual management structure is that some official bear managers are also members of the Slovenian Hunters Association. For example, a member of the Commission for Predator Management, which determines the harvest limits for bears in Slovenia, can be a member of a local chapter of the Slovenian Hunters Association. In this case, harvest limits for this chapter do not have to be reported from the National Slovenian Hunters Association to the regional chapters and then to the local chapters. The chain of command, especially in damage or problem bear situations therefore can shortened since only one person makes decisions instead of 2 or more.

Eighty-nine percent of interviewed officials (n = 9) mentioned that it is very difficult to get a special permit from the Ministry to shoot a problem bear. One exception was a person who had a good personal relationship with the official who made decisions to shoot a bear.

Central Italy.-- Officially, bear management in the Abruzzo Region should be done by the Italian Forest Service (IFS), including Abruzzo National Park (ANP), where park rangers should be provided by the IFS. The ANP, however, has not followed these guidelines and employs its own park rangers and bear biologists. All interviewed wildlife officials (N = 5), none of whom were ANP employees, agreed that there is no cooperation between the IFS and ANP regarding bear management.

Austria.-- There is no official management structure, and each state has its own bear management approach. In Carinthia, for example, bear management decisions are

officially made by the state government, but the actual decisions are made by the hunters association and then recommended to the government. In central Austria, management decisions are supposed to be made by individual counties, but in 2 problem situations, NGOs were the driving force in making decisions when they were consulted by county officials.

DISCUSSION

Brown bear management in Europe shows some distinct patterns of management approaches, compensation, damage prevention strategies and problem bear management. In the following paragraphs, I will show patterns for management organization (governmental versus NGO-government approach), implementation of management plans, damage management, and problem bear management. I then will attempt to use broad classifications for brown bear management in the individual countries, and evaluate their effectiveness in each country in regard to interviewees' opinions. I will try to point out management problems for each country to help managers in other countries avoid similar problems.

Limitations of data

Obtaining the required data was often difficult, because in most cases several agencies were involved in the management and administration of bear damage compensation. In Slovenia, for example, the southern part of the country is administered by the Slovenian Hunters Association, while the northern area is controlled by the Ministry of Agriculture, Forestry and Nutrition. Data concerning livestock density, land-use and human population demographics were available through the Ministry of Agriculture, the Department of Geography at the University of Slovenia and statistical yearbooks. In addition, most data were in the native language of the study country and not available in English. Problems also occurred when different countries were compared, because they all had a different system of recording data, ranging from reporting bear damage in a

monetary value, to number of incidents recorded, to number of livestock killed by bears. Within a country, data often was not consistent due to inflation or changes in compensation laws.

Interviews in all study countries were not random and not representative samples for the whole country. Time frames available for each country were too short and acquiring a random sample was logistically impossible. In Romania, for example, shepherds are not registered and change locations all summer long. In the Brasov area of central Romania, I interviewed shepherds who lived close to villages as well as shepherds that live high in the mountains to get a broad sample. Interviewees were chosen by random encounters during field trips or while driving along the roads. In Austria, I interviewed farmers whose addresses were provided by the WWF Austria and random encounters while driving to appointments with other farmers. While not completely random, the sample included farmers that had claimed compensation with the WWF insurance, but also farmers who had not dealt with WWF Austria. In Italy it was difficult to obtain information within the ANP because the relationship between the park and the IFS (my host) is poor.

Another limitation is small sample sizes (Table 18). Again, time was a factor that limited sample size. The goal was to cover many countries to get a broad overview. More detailed studies are necessary to obtain a more representative sample of the whole population in each country.

Much information was lost during the translation of the interviews into English. In Romania and Italy I had to rely on interpreters who translated the conversations. In the other countries I understood the language, but translated the conversations of the analysis into English. This study does not attempt to provide a quantitative analysis of opinions in the study areas, but rather a description of the current management situation.

Management Organization

Brown bear management in Europe is either entirely governmental or involves cooperation between governmental and non-governmental organizations (NGOs).

Governmental Organization.-- In Norway, Sweden, northern Slovenia, and central Italy outside the Abruzzo National Park, bears are managed by governmental organizations (Figure 24). Bear populations in all of these countries are small, except in Sweden, where the bear population recovered from a bottle-neck population of about 130 animals to approximately 620 bears in 1991 (Swenson et al. 1994). Sweden resumed a limited hunting season after the population recovered in the 1960s.

NGO-government cooperation.-- Management of brown bears in Austria, southern Slovenia, and Romania is done cooperatively among NGOs and the governments. The 3 countries are distinct in that Austria is focused on preservation of a reintroduced population, whereas Slovenia and Romania manage their bear populations primarily for hunting. In all 3 countries, the national hunters' associations play an important role in the management of bears. They provide damage compensation insurance (except in Romania) and other important aspects of management, such as population monitoring, hunting, and feeding (except in Austria).

Austria has a strong conservation NGO involved in bear management (WWF Austria), which, in fact, drove reintroduction efforts of the species in the 1980s. It also provides a major source of information on bear biology and behavior to the public.

One apparent problem with cooperative management is that it involves more parties in management decisions, and therefore adds more administrative layers. In southern Slovenia, which is managed mainly by the Slovenian Hunters Association (SHA), it has been difficult to coordinate damage reports, to have a uniform compensation system, and to maintain management practices similar to the rest of the country, where the Ministry of Forestry and Agriculture is involved in bear management. The Slovenian government is currently attempting to assume more responsibility to get better control of the bear population in Slovenia. This has to be done in a way that will not alienate

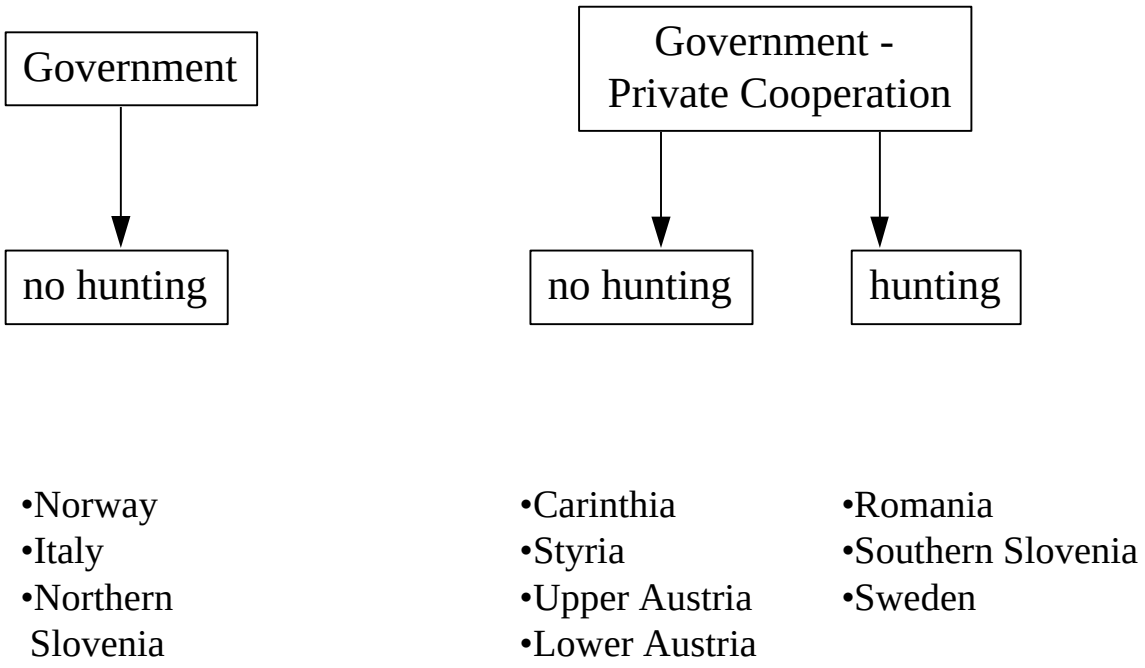

Figure 24. Brown bear management systems in European countries.

hunters, but instead secures their continuous support in management actions such as hunting and determination of bear population estimates.

Norway is also strongly influenced by NGOs, although they do not participate in bear management. The National Sheep Farmers Association has a high level of support in parliament because Norway wants to preserve a rural community and strongly subsidizes farmers to stay on their farms. Their influence is especially apparent in Hedmark county, which, although located in one of the bear core areas, maintains a growing sheep industry that is heavily subsidized by the Ministry of Agriculture. Many farmers are subsidized up to $ 14,000 US for their sheep (NINA unpubl. data). Lobbying efforts from “green” NGOs are too weak to counteract the requests of the National Sheep Farmers

Association. The effort to conserve bears in Norway will have to focus on getting the pro-agricultural NGOs on the side of bear management.

The lessons for Austria should be to keep the hunting associations of the states involved in bear management as much as possible without adding too many bureaucratic layers to the organization. This is especially important with respect to damage compensation insurance. A goal of the management plan, that is currently being written, is to make damage compensation the same in all Austrian states. The support of the hunting associations, who currently pay for damage insurance in Styria and Carinthia, should not be jeopardized as long as the current system is working well. One concern for making damage payments a responsibility of the states is that the states generally do not have the funding for compensation of bear damage. Each state has to be evaluated separately to find the best solution. In the case of Upper Austria, where no regulated compensation system has been set up besides a fund that covers 50 % of recorded damages, a better system has to be found. In my opinion, functioning systems should be preserved, but improved in a way that all states pay equal rates for compensation to their farmers and adjust premiums for breeding animals with papers.

Management Plans

Most European countries do not have a "management plan" equivalent to the American national parks' format. Most American national parks that have viable bear populations have a bear management plan that includes behavioral research, population research, other research (e.g., habitat), education (public and employees), management actions (e.g., aversive conditioning, relocation, destruction, closures), law enforcement (e.g., poaching prevention), damage preventive actions (e.g., food storage), regulated reporting of incidents (central agency for reports), and monitoring (Bear Management Plan (BMP) Katmai National Park 1986 and 1990, BMP Gates of The Arctic National Park 1989, BMP Glacier National Park 1981, Bear Incident Management Plan of Yukon Charley Rivers National Preserve 1990).

Italy and Austria have no written policy as yet, Romanian and Slovenia have only a bear harvest plan. Sweden maintains a comprehensive plan for bear-reindeer interaction management, while Norway has a management plan closest to the American format (Table 23).

A problem that has been identified with the Norwegian plan is that it is too loosely defined. One management goal, for instance, is that damage by bears shall be low in Norway, yet "low" is not defined. For some farmers, 2 killed sheep exceed the definition of "low". The focus for the Austrian bear management plan should be on outlining clear goals and achievable objectives that all involved parties fully understand.

Damage management

Damage compensation.-- All European countries evaluated for this study had some form of damage compensation program, but the quality varied widely (Table 24). As mentioned above, the hunting associations of Slovenia and the Austrian states of Styria, and Carinthia use membership fees to pay a private insurance company, which is used to reimburse farmers who experience bear damage. Damages by bears in Norway, Sweden, Romania, and Italy are covered by their respective governments. In all countries, bear damage must be verified by either foresters, bear biologists, veterinarians or other officials (Table 24), and a report has to be sent to the responsible agency.

A variety of problems with compensation were observed. For example, in Italy the yearly budget for compensation is not very large and claims can be pushed back for several years before they are paid. Romania has been struggling with inflation and can pay only a minimal amount that often does not make it worth while to go through the application process. In Norway, compensation claims are paid once a year, thus farmers have to pay for new sheep with their own money and receive reimbursement at the end of the year. Austria should consider carefully if changing to a governmental compensation program might cause budget problems in the future. Private insurance, purchased by the hunting or conservation associations, might be more reliable over the long term.

Table 23. Overview of brown bear management for 6 European countries including population situation, and management tasks.

	Austria	Abruzzo	Norway	Northern Slovenia	Southern Slovenia	Sweden	Romania
Situation							
Introduction of bears?	yes	no	no	no	no	no	yes
Protection status	protected	protected	protected	protected	hunted / protected	hunted	hunted
Population trend	increasing	decreasing	increasing	increasing	increasing	increasing	increasing
Population status:	highly endangered	endangered	endangered	endangered	viable	viable	viable
Management							
Who designed the management plan	being written at the moment by WWF, WGM, IGJ	no written plan, memos	Parliament and Ministry of Environment	Ministry of Forestry and Agriculture	Ministry of Forestry and Agriculture	EPA	Ministry of Environment
What does it contain	no written plan	• protection zoning • research monitoring	• population goal • zoning • damage compensation • education	• hunting quotas • core area • feeding • population estimation	• hunting quotas • core area • feeding • population estimation	• quota hunting • damage compensation • zoning • research	• hunting quotas
Management plan implemented?	no	no	yes	yes	yes	yes	yes
Management tasks							
- reserves	no	yes	no	no	no	no	no
- zoning	no	no	in discussion	yes	yes	no	no
- damage compensation	yes	yes	yes	yes	yes	yes	not really
- hunting system	-	-	-	-	quotas	quotas	female quotas
- feeding	no	in ANP	no	no	yes	no	yes

Table 23. (continued)

	Austria	Abruzzo	Norway	Northern Slovenia	Southern Slovenia	Sweden	Romania
- education/ PR	yes	yes	yes	no	no	yes	no
- defined population goal	(yes)	no	yes	no	yes	yes	yes
Problem bear management:							
Responsible Institution	• county government	• Italian Forest Service	• county government • Directorate for nature management	•	• Ministry of Forestry • Slovenian Hunters Association (SHA)	• EPA	• ROMSILVA
Who is it reported to	• bear specialists	• foresters • police	• carnivore specialist	• foresters • hunters	• foresters • hunters	• carnivore specialist • hunters	• foresters • hunters
Who does the management work	• emergency team	• foresters	• carnivore specialist • hunters	•	• hunters • foresters	• hunters	• hunters • foresters
Hunting							
Who plans amount					Carnivore specialist group	EPA	Ministry of Environment
Methods				•	• elevated stands	• rifle hunting	• elevated stands • dog chase
Amount harvested					~ 40 (10%)	~ 35 (5%)	~ 600 (10-15%)
Research Institutions:	• university • WGM • WWF	• FS • veterinarian Institute	• NINA • university	•	• university • Forestry Institute	• university	• university • ICAS

Table 24. Overview of brown bear damage and compensation for 6 European countries.

	Austria	Abruzzo	Norway	Northern Slovenia	Southern Slovenia	Sweden	Romania
Damages							
What kind	• sheep • bees • fish	• sheep • bees • cows • horses	• sheep	•	• sheep/goats • bees • few cows	• reindeer • sheep	• sheep/goats • bees • few cows and horses • orchards
Peak time	June - August	July - September	August		June - August	July - August	June - August
Damage compensation:							
Present	yes	yes	yes	yes	yes	yes	not really
Proof necessary	yes	yes	yes	yes	yes	yes	yes
Adequate	yes	yes	yes	yes	yes	yes	no
Problems	• Upper Austria only 50% reimbursement of market price	• waiting time too long - up to 8 years	-		-	-	• too little money • too much paperwork • not accessible for a lot of farmers
Who evaluates	• bear specialists • veterinarians • hunters	• forester • veterinarian	• county carnivore specialist • his technicians	• foresters	• hunters • foresters	• carnivore specialist • hunters	• police
Who pays	• insurance of NOGs	• regional FS	• county government	•	• SHA • Ministry of Forestry	• EPA	• county

Table 24. (continued)

	Austria	Abruzzo	Norway	Northern Slovenia	Southern Slovenia	Sweden	Romania
Where does money come from	• membership dues	• FS budget • taxes	• national budget • taxes	• national budget • taxes	• membership dues • national budget	• national budget • taxes	• national budget
Is it used	yes	yes	yes		yes	yes	not often
Damage prevention:							
What kind	• fencing of bee hives	• sheep herding dogs	• fencing • removing sheep from the pastures early • changing from sheep to cattle	• fencing of hives • herding dogs	• fencing of hives • herding dogs	• herding dogs	• herding dogs • fencing of hives
Subsidized	some	no	yes	some	some	yes	no

Damage prevention.-- Most countries studied offer limited financial assistance in damage prevention measures, such as building electric fences around bee hives or paying for hay if sheep are taken down from the pastures early. Most prevention measures that are subsidized are in damage-prone areas where extensive damage has been recorded before. Some parts of Austria, especially Carinthia, do not provide fencing because damage to bee hives is rare, and it would be more expensive to pay for fencing than for the occasional damage. Slovenia is experimenting with a government-owned sheep herd that replaces farmers' sheep directly rather than paying money. Italy and Romania do not provide such services, mainly because of budget problems that hardly allow them to pay for damage compensation. Other preventive methods, such as sheep-guarding dogs or feeding of bears in remote areas, are commonly practiced in Slovenia, Italy, and Romania, but are not subsidized.

Damage payments have been controversial in Austria and the USA (Wagner 1997). The attitude is that carnivore damage is just another risk farmers have to deal with, such as bad weather. Olsen (1991) also reported that damage compensation does not take care of the problem itself, but rather serves to increase the tolerance of farmers to damage. In most US states, damage by wildlife is not compensated. Nineteen states offer compensation programs, but 34 states offer materials to prevent damage, such as fencing of bee hives (Wagner 1997).

In my opinion, in places where the bear has been reintroduced (e.g. Austria), farmers should not be responsible alone to finance this " wilderness status symbol." Studies in the USA have shown that states have the responsibility of managing wildlife for the "good of society," but might pose disadvantages for some people by doing so (Conover and Decker 1991, Conover 1994). The authors also mentioned that the main problem in doing so is that a small group of people may suffer from the majority of damages while the rest receive the benefits of having the wildlife. As shown in Italy, poaching of bears is high due to a malfunctioning compensation system (Fico et al. 1993). The bear population there has been declining and conservation efforts, such as improving the compensation system to stop poaching, should be a top priority.

Problem bear management

In countries where bears are hunted (southern Slovenia, Romania, Sweden), a problem bear can be shot within the legal harvest limit if it is during the hunting season. If the problem occurs outside the season, a special permit has to be issued by the responsible management organization (Table 23). During the interviews, wildlife managers frequently complained that getting a hunting permit to kill a problem bear often takes too long, and the bear escapes from the area before action is taken. In addition, it is very difficult to get a permit for a female with cubs. Meagher and Fowler (1989) hypothesized the brown bear population in Yellowstone National Park might be more endangered by not shooting a mother that causes problems, since the cubs often learn her behavior and end up being shot too. Craighead and Craighead (1971), on the other hand, saw a great threat for the population by killing habituated females and recommend their elimination only in extreme cases of habituation to people.

Countries in this study that do not have a regular hunting season experienced difficult decisions regarding the elimination of problem bears. Most of them have small populations and the elimination of one bear may seriously affect the viability of the population, especially if it concerns a female. In Norway, it has been very difficult to get a permit in the protective core areas along the border because females cannot be shot at all and it is difficult to distinguish a female from a male (Wabbakken, NINA, pers. comm.). The issuance of a license has become much more restricted since bear numbers in Norway were overestimated in the past (Swenson et al. 1995). In 1991, a kill permit was issued after 3 sheep were killed in South Trondelag. In 1995, a permit was issued only after 40 - 50 sheep had been killed (Wabbakken, NINA, pers. comm.).

If a permit is issued, local hunters are involved in the hunt and often do not have the experience to succeed in killing the problem bear (Mysterud 1980). In general, farmers would like to see professionals take care of a problem bear as fast as possible.

An additional problem with issuing kill permits is to eliminate the right bear. At the moment, most studied populations are small enough that local hunters and bear

biologists can locate the offending bear. However, with increasing populations, this task might become more difficult.

One suggestion of the Bear Management Plan Team in Austria for managing problem bears is to create a "bear specialist police", a group of experienced bear biologists, who would be summoned if a problem arose. This group should aim at expanding the number of people who are experienced to deal with a problem bear situation, since not everybody in this group can be on call all the time. Local contacts, who know the individual area, are important in dealing with a situation quickly and efficiently. To avoid frustration of the locals, this group has to be able to react quickly. This task can only be achieved if hunting and trapping permits can be issued quickly on a regional level. It would be difficult to achieve this at the moment since every county has its own laws. Relocation, as a management tool, is not feasible in Austria since the area is too small and bears would be back in their home ranges very quickly. Studies in the USA have shown that bears should be relocated at least 64 km to avoid a return of the bear (Comly 1993). Relocations in Austria could be at a further distance, for example from central Austria to Carinthia, but it would not be a relocation into remote areas as is recommended in USA studies, since Carinthia is also a densely populated area (Table 9). Aversive conditioning has been tried in the past, but takes a lot of time and money to do properly (Knauer et al. 1994, Wagner 1997). If a bear is aversively conditioned early in the process of habituation, it is possible to reverse the behavior at least for some time (Herrero 1985). If a bear has experienced frequent human contact, however, a successful aversive conditioning is unlikely (Herrero 1985, McCullough 1982, Cole 1971 and 1973).

Since there are only a small number of females in the Austrian population at the moment (probably not more than 5), it will be a difficult decision to deal with a problem female bear. If an offending female has caused extensive damage and poses a threat to human safety, it should be eliminated. Decisive actions of this sort should improve public support for bear conservation.

Management problems

Romania.-- Effective management is often hindered by lack of equipment and people. Frequently, game wardens are on foot or horseback and are responsible for an area of 40 km^2 or more. Areas are very remote and difficult to reach quickly. In addition, 50 % of interviewed shepherds complained that hunters and wildlife managers were not very concerned about their problems with bears, but would rather have a large population of bears that could be sold as trophies. One-half of all interviewed officials agreed that they prefer to kill problem bears during the hunting season because the pelt of the animal is better quality and sells for more money. Cooperation between local residents and bear managers was poor.

Habituation and food-conditioning (Chapter 1) in Romanian brown bears frequently occurs. All of the interviewed shepherds and local people had observed bears feeding at garbage dumps, at garbage cans in the cities or approaching shepherds' camps when people were around. At the moment, habituation is not considered a problem by the authorities and nothing is being done to address it. There are no official records of how many people are injured or killed every year by bears, but interviews with residents in the area indicated injuries to people occur regularly. This may be explained by the belief of 67% of local people that bears feeding at garbage dumps are not dangerous (Table 20). I observed people approaching bears, including mothers with cubs, feeding at garbage cans in Brasov, Romania. The interviewees mentioned that under the communist regime they did not dare complain, and even now do not think that government authorities would change the situation if they complained.

Slovenia.-- Current management problems are 1) that damage is not reported to a central agency, 2) that damage compensation rules for the core bear management area and the outside area differ, and 3) that funding for bear damage compensation by the Ministry of Forestry is inadequate. As in Norway, most wildlife managers (90 %) complained that it takes too long to issue special kill permits for problem bears. In addition, there is no special training for wildlife managers regarding brown bear behavior and management; most managers learn on the job. The government currently is trying to

organize regular training for managers (Adamic, Slovenian Institute for Forest Research and Management, pers. comm.).

The Slovenian brown bear population is currently the only source of bears naturally recolonizing the Austrian and Italian Alps. It also served as a source population for the Austrian restocking program in 1989. Further spreading of the population is hindered, however, by the recent construction of highways, which bisect the migration corridor towards the Alps (Kaczensky 1995).

Italy.-- One primary conservation problem is lack of cooperation between the Abruzzo National Park and the surrounding Forest Service area. Several simultaneous research projects are being conducted by both agencies, but no exchange of research findings has been reported (Posillico, IFS, pers. comm.). The ANP has not published findings of their telemetry study on the bear population.

From 1980 to 1985, 22 bears were killed by poaching and traffic accidents outside the park (Fico et al. 1993). Poaching may be encouraged by the long waiting period for compensation money, which can take up to 8 years. An additional threat to the population is accidental killing of bears by hunters on chase hunts for wild boar. In 1989, a new hunting law was established to reduce this problem. A 600 km^2 buffer zone was established around the National Park, in which game hunting was reduced by one-half and a maximum hunting pressure of 1 hunter per 30 ha was enforced (Boscagli 1994).

Sweden.-- The main preservation problem in Sweden is poaching in the reindeer areas. The government has been trying to reduce poaching by involving reindeer herders in the design of a new management plan with improved compensation regulations (Bjärvall, Swedish EPA, pers. comm.). The bear population is expanding and might cause more damage problems in the future.

Norway.-- The primary conservation problem in the future seems to be the coexistence of sheep farmers and bears. With increasing bear numbers, damage to sheep will inevitably increase. The government still encourages the expansion of sheep farming into the bear core protection areas along the Swedish border, thus guaranteeing an even bigger

problem in the future. As mentioned previously, a frequent complaint is the inefficient handling of problem bear kills by local hunters.

Austria.-- Management problems for Austria arise in the states having different regulations in dealing with problem bears and compensating farmers for damage. Especially in the area of central Austria, where the bear population is split among the states of Lower Austria, Upper Austria, and Styria, previous problems have shown the difficulties that have to be overcome. When a bear was causing problems in 1994, kill permits had to be issued in 2 different states by several different counties individually. Each permit was difficult to obtain and some counties did not issue one at all. The bear ended up being shot 'illegally,' but was reported as 'self-defense' (Styrian forester and WWF Austria, pers. comm.). A common management approach for dealing with dangerous situations is needed. Bureaucracy must be reduced to allow issuing permits faster. Ideally, one permit should be issued per problem bear and not per county the bear could be in. This would have to be organized on a state level with state governments adopting the same guidelines in problem bear management.

Another major problem in brown bear management in Austria is the lack of public education. Many of the people I interviewed in central Austria had no information about bear management. Most interviewees reported that local people were never asked their opinion on reintroducing bears in the area in the 1980s. Not surprisingly, farmers dislike the bear and its managers. Efforts to gain local support should concentrate on informing them of actions taken and educating them about bears and the goals of bear management. What lack of support can do to a population is obvious in central Italy, where poaching rates are quite high and the bear population has been declining.

Management classification

Two main patterns of management are evident for European brown bear management. Broad goals of preservation or conservation determined management patterns of the individual countries (Figure 25). The preservationist approach to management is associated with setting aside and protecting a resource. Usually,

preservationists want to maintain something in its natural state, such as a wilderness area. It was the philosophy of John Muir, founder of the Sierra Club, who wanted pristine wilderness areas set aside as national parks (Owen and Chiras 1990, Meffe and Carrol 1994). With regard to bear management, preservation means that bears are neither hunted nor fed to increase the population. The preservationist approach to bear management was practiced mainly by the countries that had small bear populations, such as Norway, Italy, Northern Slovenia, and Austria (Figure 25). Management philosophies in these countries might change as the populations grow and are stable enough to support bear harvest.

The conservationist approach to management is more utilitarian, aiming for sustained yield of the resource. It is used in a manner that ensures the resource will be available for future generations (Owen and Chiras 1990, Meffe and Carrol 1994). Characteristics of a conservationist approach to bear management are regular hunting seasons and stable or increasing population. An advantage of the conservationist approach, which was demonstrated in Romania, southern Slovenia, and Sweden, is that hunters have a reason to protect bears. The bigger the bear population, the more they can hunt in the future. In all 3 countries, bear management had a strong component of NGO-government cooperation, in contrast to the preservationist approach, in which, with the exception of Austria, government agencies were in charge (Figure 24). Romania and southern Slovenia additionally practiced trophy hunting. However, it differs within the conservation approach by supplementary feeding of bears and artificially increasing the populations.

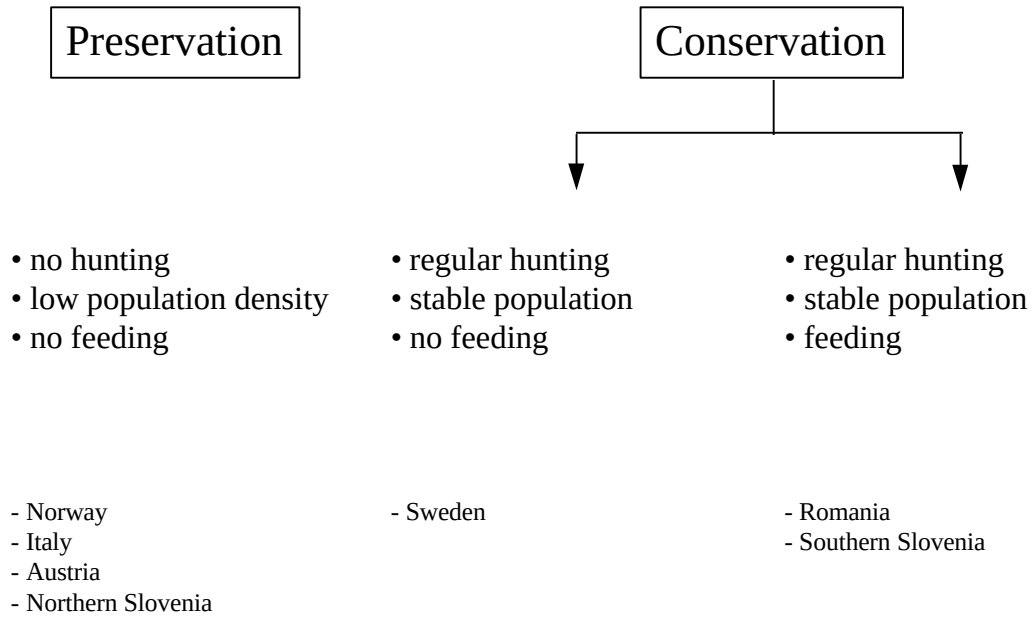

Figure 25. Approaches to brown bear management in five European countries.

CONCLUSION

Successful brown bear management in Europe seems to involve a proper, quick, and easily applicable compensation program for bear damage. People who experience damage by bears must feel confident that the authorities, be it government or non-governmental organizations, will deal with the offending bears quickly and efficiently. Good communication between all parties involved is a must and should be stressed in Austria in the future.

Another key to success seems to be local involvement in management decisions. Wildlife managers, with knowledge of the land around them and contact to local people, can work more effectively and quickly than people unfamiliar with the area. A management plan has to be available for everyone and has to be written in clear terms that avoid confusion.

Brown bear management in Europe differs among countries in governmental-NGO cooperation, hunting practices, bear damage compensation programs, and public involvement. Management goals follow either a preservationist approach, which usually applies to small populations that cannot be hunted, or the conservationist approach with regular hunting seasons and a planned bear population goal.

In countries with a high human population, problems with large carnivores are inevitable. It is important, however, that the local people are not left alone in paying for a "status symbol" that is wanted by the population as a whole.