Chapter 1. General Background

INTRODUCTION

Historically, brown bears (*Ursus arctos*) were distributed throughout Europe (Dandaletche 1989). Since the 12th century, forests have been cleared for agricultural use and livestock grazing, which increasingly fragmented the brown bears' habitat. Bounties on bears existed into the 19th century and greatly reduced the populations. In 1885, Germany and Switzerland eradicated their last bears. Today, most European bear populations are totally isolated from each other (Zunino 1989, Mertzanis 1989) (Figure 1, Table 1).

To preserve the remaining populations, bears have been restocked in some areas to increase genetic diversity and viability (World Wildlife Fund (WWF) Austria 1991). However, bear population growth in small, fragmented areas increases the likelihood of bear-human interactions. Herrero (1985) stated that bears lose their natural fear of people as interactions become more frequent. In addition, living in close proximity with people may eventually lead to problems like livestock depredation or crop damage.

Successful brown bear conservation in Europe is tied to public acceptance of damages caused by bears. Recent increases in sheep depredation and beehive damage in central Austria resulted in the deaths of two bears. Since bear numbers are low in most European populations, alternatives to the elimination of problem bears associated with damage incidents must be sought. The events described above led to the formation of the Bear Management Group, an organization responsible for designing a management plan for Austria that will outline procedures for dealing with bear damage and conservation strategies.

This project was initiated and partially funded by the Munich Wildlife Society (WGM), Germany, and especially Dr. Wolfgang Schröder, president of the WGM, in liaison with the project of writing a brown bear management plan for Austria. This study compares different management strategies for dealing with brown bear damage in several

Table 1. Estimated brown bear population sizes, densities, and status in Europe.

Country	Area	Status	Population size	Bear densities	Source
Romania	Carpathian mountains	hunted again since 1990 closed season Jan.15 - March 1	1950: 1000 1990: 7450 1993: 6000	2 / 10 km^2 8 / 10 km^2 (max.)	Almasan (1993) Weber (1990)
Norway	throughout	protected since 1973	1965: 25 - 50 1982: 20 - 30		Pulliainen(1989)
Sweden	north of 60°	protected since 1912 hunted again Since 1943	1976: 400 - 600 1994: 619	0.012 / 10 km^2	Pulliainen (1989) Swenson et al. (1994)
Italy	Abruzzo Nat. Park	protected since 1939	1970: 70 -100 1983: 50 - 80	0.7 / 10 km^2	Zunino (1981) Sorensen (1990)
	Trentino Nat. Park	protected since 1939	1976: 10 1994: 4	0.13 / 10 km^2	Knauer (1993)
Slovenia	Dinarian mountains	hunted closed season May 1 - Sep. 30	1991: 300 - 400		Adamic (1991)
Austria	south - central	protected	1991: 11 1994: 20		WWF Austria (1994)

Table 1. (cont.)

Country	Area	Status	Population size	Bear densities	Source
Croatia	Dinarian mountains	closed season Jun.1 - Aug. 31	1993: 400	1.0 / 10 km^2 (Plitvic) 0.2 / 10 km^2 (southern)	Huber (1993)
Finland	central to north	hunting allowed in the reindeer areas north	1970: 230 1985: 450		Pulliainen (1989)
Bulgaria	throughout	50 animals hunted / year	1930: 300 1987: 850		Rösler (1989) Genov and Gancev (1987)
Czech republics	Carpathians	protected since 1932	1932: 20 1987: 700		Hell (1990)
France	Pyrenees	Protected since 1972	1937: 150 - 200 1987: 20 - 28 1993: ~ 7		Sorensen (1990)
Spain	Pyrenees, Cantabrian mountains (2 populations)	Protected since 1973	1993: 50 - 70 1993: 10 - 15		Camarra (1986) Clevenger et al. (1990)

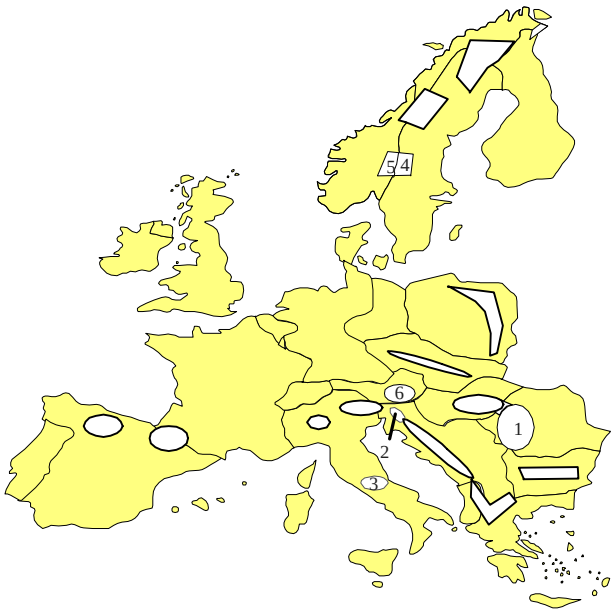

Figure 1. Brown bear (*Ursus arctos*) populations in Europe. Study areas included Romania (1), Slovenia (2), Abruzzo, Italy (3), Sweden (4), Norway (5), and Austria (6).

European countries, including Romania, Italy, Slovenia, Norway, Sweden, and Austria. It also provides an overview of the magnitude and seasonal patterns of damage by brown bears, and describes how bear management is organized, which organizations are involved, and which duties these fulfill. These concepts will be used for designing a brown bear management plan for Austria, where bears recently returned naturally and also were stocked by the World Wildlife Fund (WWF) in 1989, 1992, and 1993.

Literature review

Published literature on the magnitude of European bear damage and management is scant. The following data are from the USA and Canada.

Bear damage in the USA and Canada.-- Losses of livestock and agriculture to bears in the USA and Canada are insignificant compared to losses from other predators, such as coyotes (Jorgensen et al. 1978). A nationwide survey in 1990 revealed that 1,800 sheep and goats with a value of $454,475 were reported lost to black bear predation (USDA 1991). Jorgensen et al. (1978) reported that only 1.7% of lost sheep in 15 western states could be attributed to black bear predation. Cattle and calves lost to black bears in 1991 numbered 1,900 animals with a value of $1,020,000 (USDA 1992). A conservative estimate of apiary damage by black bears amounted to $623,000 in 1988 (O'Brien and Marsh 1990). Black bears also cause considerable damage to orchards and timber production (Calvert et al. 1992). In a 1,630 ha parcel of land in Washington state, black bears destroyed 60% of all trees over 15 cm tall (Hygnstrom 1994).

Bear damage compensation in the USA and Canada.-- Only 12 states or provinces in North America provide bear damage compensation programs (Wagner 1997, Table 2), and most of these do not cover all losses to bears. Livestock losses were compensated in 11 states/provinces, damage to apiaries in 12 states/provinces, damage to crops in 9 states/provinces, and other property in 5 states/provinces (Wagner 1997). Almost all programs require farmers to take preventive measures in advance, in order to be covered in a damage incident. The majority of states allow farmers to shoot a bear if it is caught damaging property or livestock. In many states/provinces, state wildlife agencies offer counseling in preventive measures, and 25 states and provinces loan or finance electric fencing (Wagner 1997). Few states keep complete records of damage incidents, and the remainder only estimate bear damage (Vaughan and Scanlon 1990).

Wagner (1997) reported that most compensation programs were established for valuable species, such as bears, elk and deer, which have increased in population size due to management efforts by state/provincial wildlife agencies. Funding for these programs is supplied by user groups (hunting licenses), general tax revenues, or funds from non-governmental organizations (NGO), such as the Great Bear Foundation in Montana, that are interested in the protection of the species.

Table 2. U.S. states and Canadian provinces that had programs to compensate bear damage in 1994.

State or Province	Agency
Colorado	State wildlife agency
Idaho	State wildlife agency
Manitoba	Provincial wildlife agency
Montana	Great Bear Foundation (grizzly bear damage only)
New Hampshire	State agricultural agency
Pennsylvania	State wildlife agency
Saskatchewan	Provincial wildlife agency
Utah	State wildlife agency
Vermont	State wildlife agency
Virginia [a]	Counties
West Virginia	State wildlife agency
Wisconsin	State wildlife agency

Table after Wagner (1997).

[a] Program only available for residents of counties choosing to require a wildlife damage stamp on hunting licenses. Only 4 counties were involved in the 1994-95 hunting season.

Wagner (1997) pointed out, however, that compensation programs do not take care of the actual problem of bear damage. They only reduce financial problems due to bear damage and increase farmer tolerance of the problem. In order to devise management strategies to actually reduce bear damage, one has to understand the behavior that makes bears cause damage. This aspect of dealing with bear-people conflicts is the degree to which a bear has become used to the presence of people. A bear that is not afraid of people is dangerous and can cause injuries and/or damage

(Herrero 1985). To deal with habituation, one first has to know what it is and secondly what can be done to prevent it.

Definition of habituation and food-conditioning.-- When brown bears become habituated to humans and/or use foods associated with humans, they become a management problem (Herrero 1985, Jope 1985, Mattson et al. 1992). Habituation occurs when a stimulus is delivered repeatedly without any negative or positive reinforcement, and responses to the stimulus weaken or totally disappear (Thorpe 1963, Herrero 1985, McCullough 1982). Thorpe (1963) considered habituation a primitive form of learning through which an animal stops responding to stimuli that are not significant for its survival.

Originally, habituation was thought to be a short-term change in response, which would return to the original response pattern over time. Peeke and Petrinovich (1984), however, showed that in cichlid fish, birds, and dogs the effects can last a long time. He redefined habituation as a relatively permanent waning of a response as a result of repeated stimulation. The waning of the response is specific to the original stimulus, but can be triggered by another stimulus afterwards.

The term "food-conditioned" refers to bears that have formed an association between food and people (Herrero 1985). Once a bear is habituated or even food-conditioned, a strong negative reinforcement (e.g. aversive conditioning) is needed to reverse its behavior. A positive reinforcement of habituation or food-conditioning, such as success in getting food, has a stronger effect than a negative enforcement to reverse the behavior, such as shooting a bear with a plastic slug (Peeke and Petrinovich 1984).

Hinde (1970) distinguished between stimulus-specific and stimulus-general habituation, pointing out that both could result in long- or short-term habituation. He also assumed that the degree of habituation is positively correlated to stimulus frequency and intensity.

A habituated bear that loses its natural fear of humans can tolerate people at close proximity, as shown in Katmai National Park, Alaska (Holmes 1994). While

fishing for salmon along a stream, bears in Katmai often pass within 10 yards of a visitor platform without seeming wary of people (personal observation 1992).

Herrero (1985) believed that habituation can occur without food-conditioning, but that a food-conditioned bear has to be habituated to the smell or sight of people to a certain degree. He considered food-conditioned bears as dangerous and prone to injuring people. Craighead and Craighead (1971), however, observed bears at Yellowstone National Park garbage dumps that were very wary of people and would flee at their sight. They hypothesized, that on rare occasions, bears can become food-conditioned without becoming habituated to the presence of people.

Bears in eastern Europe may live in situations similar to that described by the Craigheads for Yellowstone grizzlies. They are fed carcasses at feeding sites in the woods, but are still wary of people (pers. observation, 1995).

Objectives

The goal of this study was to provide baseline data on how brown bears are managed in some European countries and to use that information to design a management plan for the Austrian bear population. Specific objectives were:

1. Compile damage statistics for brown bears in Slovenia, Austria, Romania, Italy, Norway and Sweden.
2. Compare bear management systems and management practices of Slovenia, Austria, Romania, Italy, Norway and Sweden.
3. Develop management strategies for bear-human coexistence and conservation of the brown bear in Austria.