

DAMAGES ATTRIBUTED TO THE BROWN BEAR IN SPAIN: THE CASE OF ASTURIAS

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Abstract: An annual average of 77 claims for damages allegedly caused by brown bears (*Ursus arctos*) totaling 7,159,229 pesetas (\$71,592 US) were reported in the 2 year period of 1989–90 in Spain. Of these claims, 97% were from the Cantabrian Mountains and 3% were from the Pyrenees, reflecting the different sizes of the 2 bear populations. Analysis of the 1,035 claims in Asturias (Cantabrian Mountains, northwest Spain) between 1973 and 1990 revealed more claims concerning cattle and horses than other livestock. Damage complaints peaked in September. Besides the local availability of anthropic food resources, interannual variations in the spacial distribution of claims appear to be due to particular and local bear population trends. These trends should be closely monitored because of the degree of threat to these populations. The bear recovery plans in Spain should consider compensating for damages caused by this species, as well as the damage problem caused by wolves (*Canis lupus*) and wild boar (*Sus scrofa*) because they indirectly affect brown bear conservation.

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The brown bear is present in 2 Spanish mountain ranges: the Cantabrian Mountains and the Pyrenees. In the first, with an area of about 5,000 km², there are an estimated 100 bears (Del Campo et al. 1984). The second area covers Spanish and French territory and includes about 10 individuals (Camarra 1990, Alonso et al. In Press), mainly on the French side of the border (Fig. 1).

Human activity is quite high in both ranges. Bears damage both agricultural products and livestock. This

issue was studied by Camarra (1986) and Chaumiel (1989) in the Western French Pyrenees and by Del Campo et al. (1986) in the Cantabrian Mountains. Additional information can be found in Notario (1964, 1980), Clevenger and Purroy (1988), Del Campo (1989), Berducou (1990), and Purroy (1991).

I update and detail the extent of damages attributed to bears in Spain, particularly in the Asturian Autonomous Community (Figs. 1 and 2) in the Cantabrian Mountains, Northwest Spain. I also estimate the re-

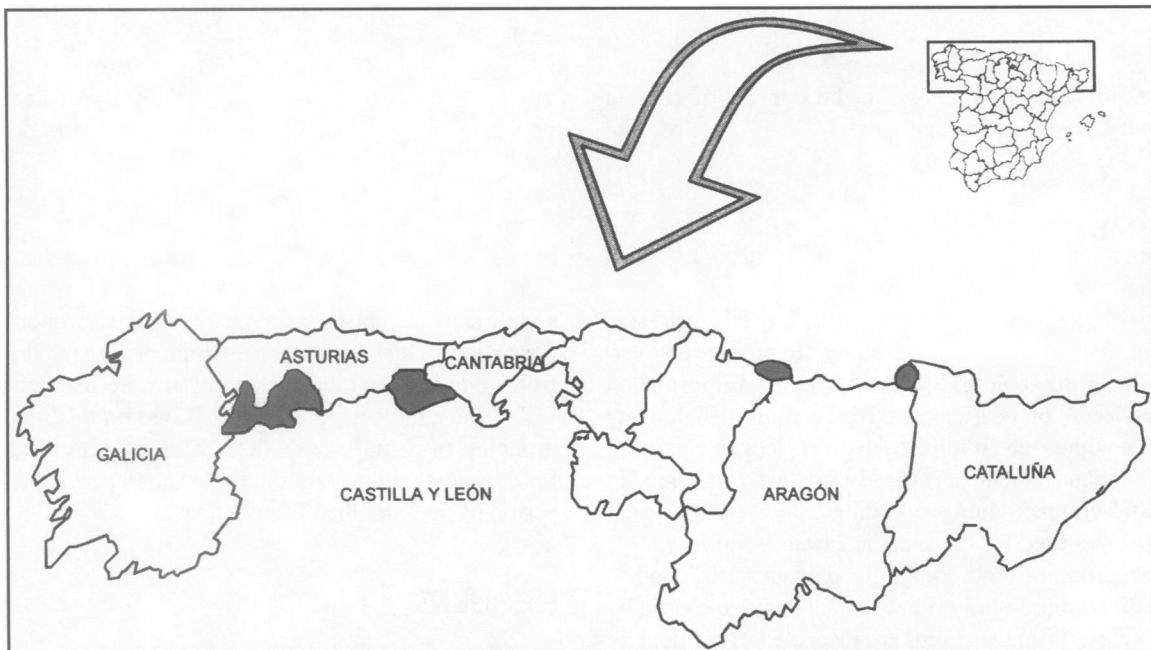


Fig. 1. Location of bear populations in Spain. The 2 larger areas are in the Cantabrian Mountains; the 2 smaller ranges are in the Pyrenees.

Table 1. Compensation payment claims for damages by brown bears in Spain, 1989–90.

Area	1989		1990		Average	
	NC ^a	AM ^b	NC	AM	NC	AM
Cataluña	-	-	-	-	-	-
Aragon	2	420,000	-	-	1	210,000
Navarra	-	-	-	-	-	-
Total Pyrenees	2	420,000	-	-	1	210,000
Cantabria	-	-	-	-	-	-
Castilla y Leon	27	3,129,500	17	2,451,500	22	2,790,500
Asturias	44	3,904,889	64	4,412,570	54	4,158,729
Galicia	-	-	-	-	-	-
Total Cantabrian Mountains	71	7,034,389	81	6,864,070	76	6,949,229
Total Spain	73	7,454,389	81	6,864,070	77	7,159,229

^a NC= Number of claims.

^b AM= Amount of money in pesetas (100 pesetas = \$1 US).

was paid in the Pyrenees, while 76 claims and 6,949,229 pts (\$69,429 US) were paid in the Cantabrian Mountains (Table 1). The nature of products damaged was different between the 2 areas (Table 2). In the Pyrenees, the claims always involved sheep, while in the Cantabrian Range the spectrum was much wider and included cows, sheep, goats, horses and beehives as well as grass and fruit crops.

Damages Attributed To Bears In Asturias

Of the 1,035 damage claims attributed to bears in Asturias between 1973 and 1990 yearly totals range from 79 in 1975 to 37 in 1979, with an average of 57.5 (Table 3). No significant regression was observed over the years ($r = -0.167727$).

The distribution of alleged damages vary greatly from one grid square to another (Fig 2). No significant decrease ($r = -0.098633$) in the number of grid squares reporting brown bear damage was observed over the years (Table 3).

However, certain changes in spatial distribution of damages were noted (Fig. 3). Aggregate damage claims from 1973 to 1975 and 1988 to 1990 show a decrease in damage claims in the Somiedo-Courio area, an increase of alleged damages in the Proaza area, and a decrease in both the number of damage claims and damage-related quadrants in the Lena area. Most of the damage to agriculture and livestock combined occurred between the

Table 2. Percent of claims by damage type in Spain, 1989–90 for brown bear damage.

Area	Livestock ^a				B	Agriculture ^b			
	S	G	C	H		N	F	CR	O
Pyrenees	100	-	-	-	-	-	-	-	-
Cantabrian Mountains	3	11	35.6	23	6.6	10	5.4	4.7	0.7

^a S= Sheep, G= Goats, C=Cattle, H= Horses.

^b B= Beehives, N= Nuts, F= Fruits, CR= Crops, O= Others.

Table 3. Claims for damages by brown bears in Asturias (Northwestern Spain), 1973–90.

Year	NC ^a	NS ^b	NG ^c
1973	43	18	33
1974	66	29	53
1975	79	31	36
1976	63	23	40
1977	62	23	46
1978	75	32	55
1979	37	19	31
1980	56	24	48
1981	46	22	28
1982	57	31	43
1983	55	23	41
1984	62	27	50
1985	55	20	25
1986	55	24	42
1987	46	22	35
1988	70	26	52
1989	44	22	31
1990	64	26	48

^a NC= Number of claims.

^b NS= Number of UTM 25 km² grids where damage claims were situated.

^c NG= Number of grouping of damages.

months of August and October, with a small peak in September (Fig. 4). Alleged damage to livestock was highest in Asturias from May to September.

The types of damages attributed to bears have changed over the years (Fig. 5). The importance of cattle losses has generally increased, while crop damage has decreased. In the 18 years examined, of the total 1,035 damage claims considered, 66% affected domestic animals, beehives accounted for 11.4% and 22.6% included damages to crops (Table 4).

Horses were the animals reported most often taken by bears and were taken over a wide geographical area. Depredation claims on horses were reported in 54 grid squares. Damages to cattle, in terms of number of claims filed and distribution (57 grid squares), are also important. Other types of damages (to sheep and goats, various crops, etc.) were generally less important and often showed very localized and sometimes highly concentrated geographical distributions (i.e., 57% of damages to hazel bushes took place within a single grid square).

DISCUSSION

Damage values paid by Spain are similar to those of other European countries (Table 5). Differences between the Pyrenean and the Cantabrian claims are prob-

ably due to the large difference between the size of the 2 bear populations.

The distribution of alleged damages in Asturias, although highly variable from one grid square to another, generally reflect the distribution of the brown bear in the region as reported by Del Campo et al. (1984; Fig. 2).

Although the Cantabrian population is diminishing (Instituto para la Conservación de la Naturaleza ICONA 1986, Naves and Palomero 1989), no significant decrease in the number of claims or in the number of grid squares has been observed over the years in Asturias. There does not seem to be a relationship between bear population density and reported number of damage claims at the regional level (Del Campo et al. 1984).

However, the above changes may nonetheless reflect certain local trends. For example, the eastern limit of the Lena area is marked by Pajares Pass, which is also the distribution limit for the western Cantabrian brown bear population (Fig. 3). Pajares Pass is the main communication link between Asturias and inland Spain, and this is where the split between the 2 current bear populations probably took place during the first half of this century (Nores 1988). These populations may have become even more isolated in recent years due to the improvement of the main road over the Pass and construction of a motorway.

Conversely, the re-establishment of bears in the Proaza area is a relatively recent phenomenon, having taken place since 1950 (Naves and Palomero 1989). Reproduction from this area has been recorded regularly since 1988, indicating a population increase and thus more reported damages.

The nature of products allegedly damaged by bears in the Spanish Pyrenees coincides with that collected by Camarra (1986) and Berducou (1990) in the French Pyrenees. Bear predation on sheep was also reported in Norway (Elgmork 1982), Poland (Jakubiec 1990), Bulgaria (Spiridinov and Spassov 1990), Czechoslovakia (Hell 1990), the Italian Abruzzi (Zunino 1986), the Urals (Sharafutdinov and Korotkov 1976), Idaho (Johnson and Griffel 1982) and Wyoming (Knight and Judd 1983). The situation in the Cantabrian Mountains is more similar to Bosnia–Herzegovina, where cows are reported more often as targets of damage (Rapaic 1979).

Even considering the different lengths of time, there appears to be a small contradiction between the general situation of the Cantabrian Mountains and Asturias, where horses are the animal most included in the damage claims. It is possible that some of these damage claims were due to wolves. This hypothesis is supported by the fact that

25.4% of these claims are concentrated in 1 grid square, in the area known as El Courio, where damage by wolves was not compensated until 1991. In adjacent Somiedo,

Braña et al. (1982) found that damages attributed to wolves, which in this area were subject to compensation, showed a clear bias toward horses. On the contrary, all

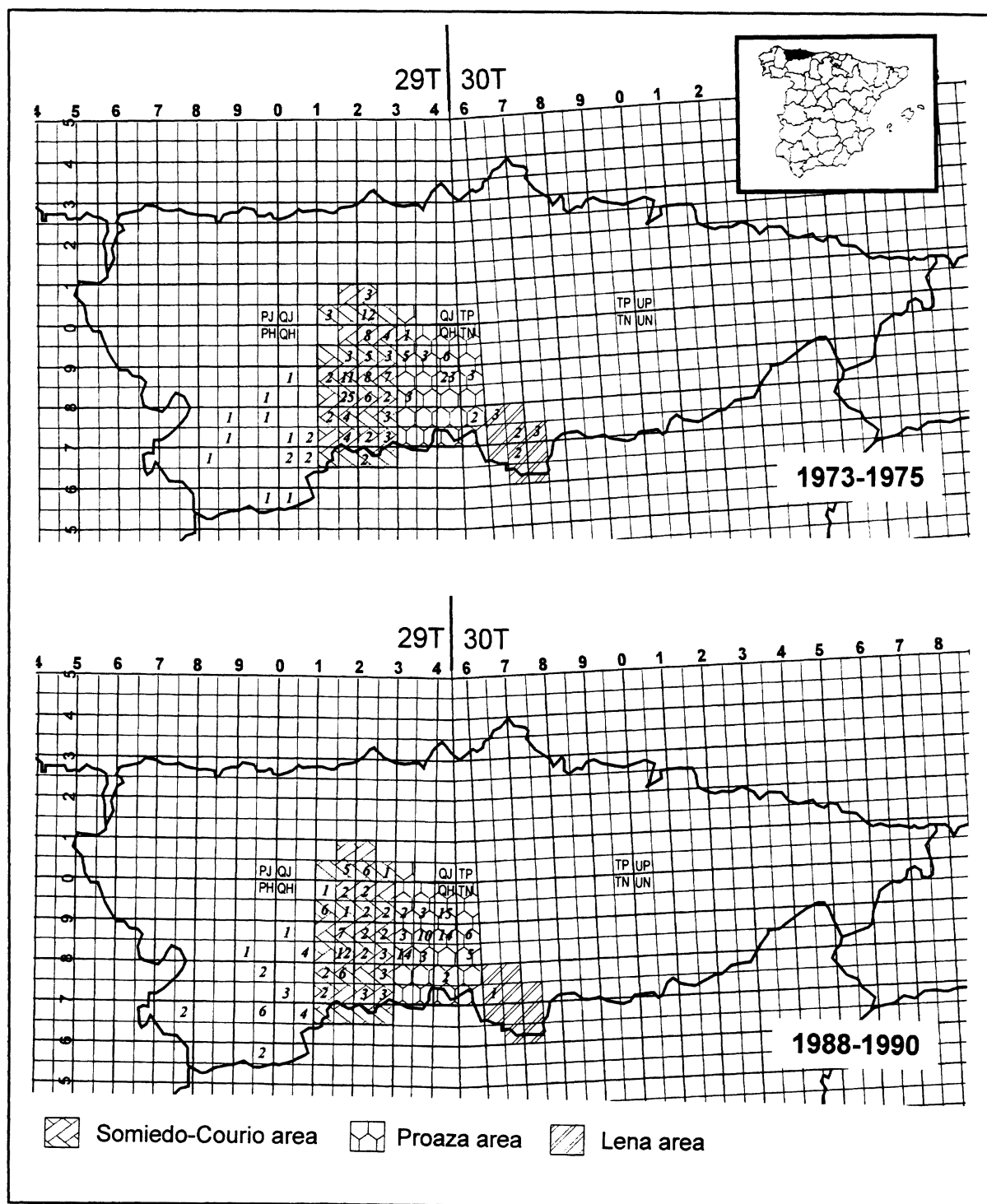


Fig. 3. Distribution of claims for damages attributed to brown bears in Asturias, Spain, in 1973-75 and 1988-90.

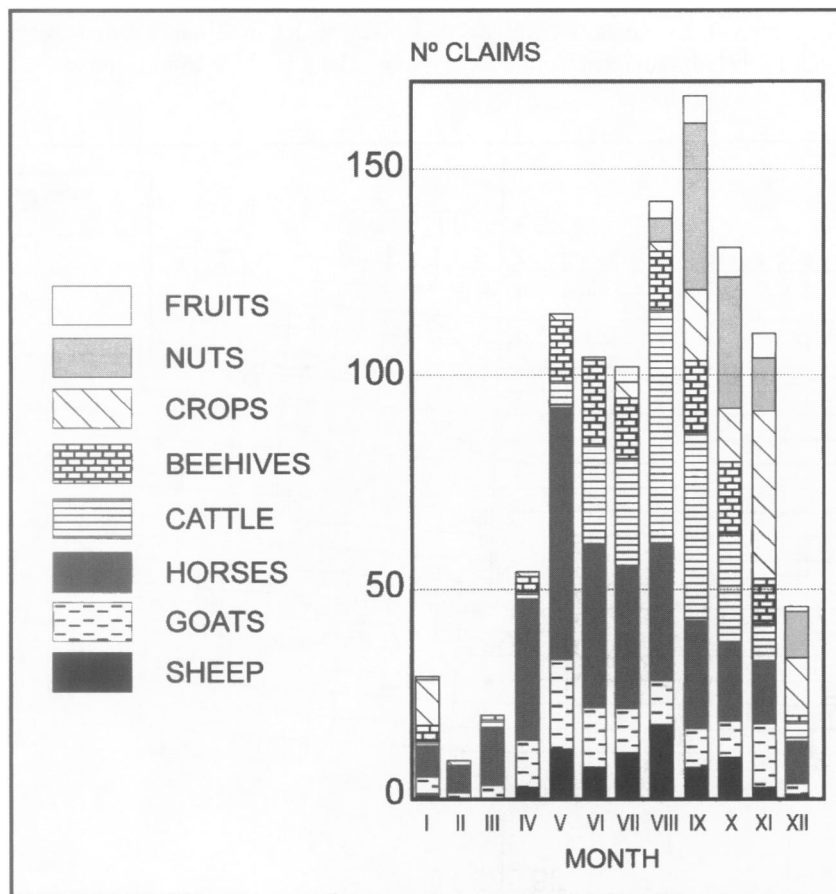


Fig. 4. Monthly distribution of claims for damage by brown bears in Asturias, Spain, 1973–90.

analyses of damages attributed to wolves in the Cantabrian Mountains (Braña et al. 1982, Fernandez et al. 1990, Garcia-Gaona et al. 1990) showed a very clear disproportion between the low amount of reported damage and the number of cattle, which are the main livestock in this zone.

Data by Osti (1991) for the Trentino area, in Italy, where beehives are selected, by Bjarvall (1990) for Sweden and by Nyholm (1990) for Finland, where reindeer are mainly affected, together with differences observed from 1 area or season to another within the same mountain range, lead us to believe that the main reason for these differences is variations in food availability. This appears to be reinforced by the changes in the damage claims typology observed over the years in Asturias, where decreased damages to corn and alfalfa are a result of the near disappearance of these crops in the Cantabrian Mountains.

However, other causes such as cultural practices and behavioral differences between individual bears probably

also come into play. Some authors (Del Campo et al. 1986, Spiridinov and Spassov 1990) have reported the alleged existence of bears with markedly individual behavior, to the extent that people talked of honey bears, butcher bears, etc. Existence of such animals cannot be established by data collected in this paper.

Nonetheless, depredations by particular bears were indicated by a tendency toward the formation of grouping of damages. It is suggested that individual bears, for different reasons, may have had easier access to a particular type of resource. Purroy (1991) found that a radiomarked bear in the Cantabrian Mountains damaged a series of beehives in a short time, even though no other incidents of this type of attack were recorded in the 3 years of study.

Regarding the seasons of damage, the existence of a larger number of claims in Asturias at the end of summer and the beginning of fall may be due to human-related resources being more abundant and varied at that time. The marked decrease in claims in winter results from a

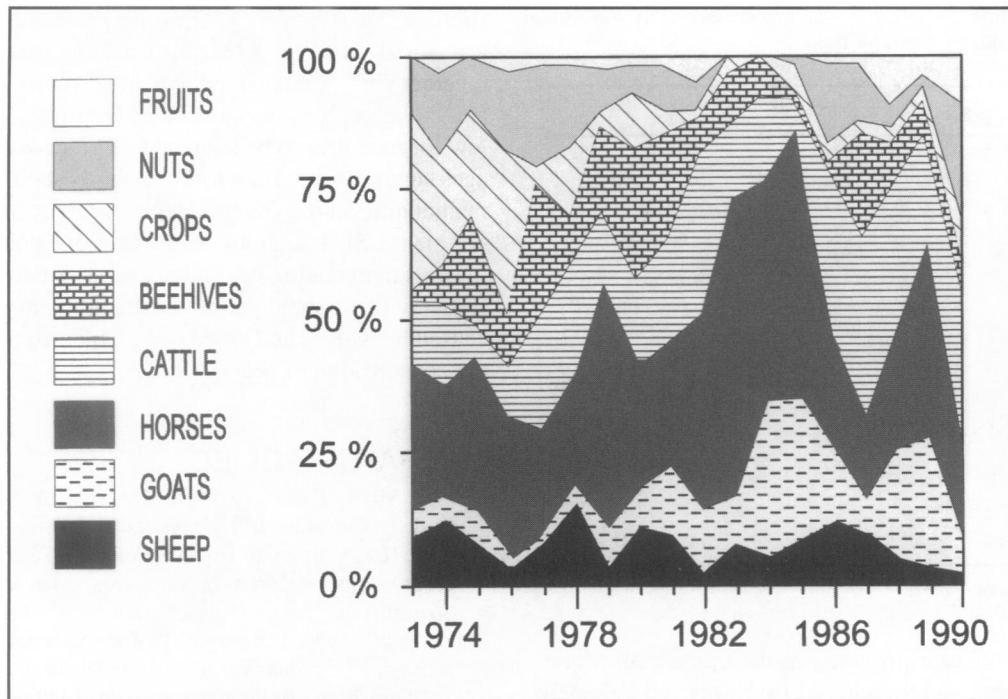


Fig. 5. Percent distribution by years of types of claims for damage by brown bears in Asturias, Spain, 1973–90.

lack of human-supplied resources and bear hibernation, which in the Cantabrian Mountains takes place between December and April (Notario 1964, Clevenger 1991a). Variations in the duration and chronology of bear presence in the den and variations in the degree of hibernation of individual bears, in relation to environmental characteristics of the years involved, could explain why some damages were reported during the winter months.

In the French Pyrenees, a peak in depredation claims was recorded in August and September. Chaumeil (1989) attributed this to increased feeding by bears prior to hibernation; further, at that time of year, sheep were the most numerous and least protected.

Similarly, in Asturias the peaks of damage claims to livestock in May and August are believed to be related to foaling time and the increased number of cattle in this mountain area. This distribution coincides with the bears' feeding pattern in the Cantabrian Range as found by Braña et al. (1988) and Clevenger (1991b). These authors reported a higher content of animal matter in the bear's diet in spring and summer than the rest of the year. Spiridinov and Spassov (1990) reported that bear attacks on cattle are more intense in spring than in other seasons in Bulgaria, and that peak losses were in June. These authors cited the absence of plant food during that period as the explanation.

According to Del Campo et al. (1986) the deficiency in the indemnity system for damages to agriculture and livestock was one of the most important threats to the survival of the bear population in the Cantabrian Mountains, which was already considered endangered (ICONA 1986). In similar environments it is generally believed that a lack of compensation for damages, the bureaucratic difficulties related to processing claims, and the insufficiency of payments to cover the real value of the damaged property, contribute to a hostile attitude toward bears by local people (Mertzanz 1990, Huber 1990, Schevchenko 1990). In contrast, the correct compensation of damages has a positive influence on bear conservation (Jakubiec 1990).

Following legal approval of the recovery plans for this species at the end of the 1980s, the Administration began to correct the main problems of the damage compensation system. Improvements included simplifying bureaucratic procedures, reducing the length of time of compensation payments to 1 month instead of the 9 months reported by Del Campo et al. (1986), evaluating damage claims in accordance with market prices, and providing an additional payment of 20% as an incentive toward bear preservation.

These measures appear to have had an immediate benefit. Dissatisfaction with compensation policies as the

Table 4. Claims for damage by brown bears in Asturias, Spain, 1973–90, by damage type.

Type of damage	NC ^a	%
Livestock	681	65.8
sheep	74	7.1
goats	113	11.0
cattle	195	18.8
horses	299	28.9
Beehives	118	11.4
Agriculture	233	22.5
nuts	100	9.7
fruits	29	2.8
crops	104	10.0
Others	3	0.3
Total	1,035	100.0

^a NC= Number of claims.

main cause for bear poaching in the Cantabrian Mountains was subsequently rejected by Naves and Palomero (1989) and Purroy (1991). However, these authors believe that deficient compensation for damages caused by other species, in particular wolves and wild boars, is one of the reasons for the illegal use of poisoned baits and steel traps which have been documented causing several bear deaths.

MANAGEMENT IMPLICATIONS

Collection of information on damages caused by bears can help identify local decreases in bear activity, which is essential for threatened populations. In these populations it is also important to minimize bear-human con-

flicts. The low number of damage incidents in the Cantabrian Mountains (hardly 1 damage/year per bear), together with the main type of damage (cows and horses) and the extensive management of livestock, does not allow for measures to be adopted to further decrease damages significantly. Therefore, emphasis should be put on maintaining an integrated indemnity policy in the recovery plans. Such a policy would improve public attitude towards maintaining bear populations. Additionally, the recovery plans should consider the problem of damages caused by wolves and wild boars, which could influence the conservation of bears.

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Table 5. Annual damages by brown bears in Europe.

Area	Bear population estimate	Damages	Value (\$US)
Finland	400	-	38,200
Norway	200	500	150,000
Sweden	500	300	-
Poland	80	86	-
Czechoslovakia	600	-	75–150,000
Trentino (Italy)	10	2	-
Pyrenees (France and Spain)	10	-	15,000
Cantabrian Mts. (Spain)	100	76	70,000

From Bjarvall 1990, Camarra 1990, Nyholm 1990, Sorensen 1990, and Osti, 1991.

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