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**STATUS AND CONSERVATION NEEDS
OF THE WOLF (CANIS LUPUS)
IN THE COUNCIL OF EUROPE MEMBER STATES**

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1. INTRODUCTION

The wolf is not, differing from many other endangered species, a rare and specialised animal with a restricted range and very precise and sophisticated ecological requirements. Quite the opposite. Some centuries ago the wolf was the carnivore most widely spread throughout the world except in tropical regions. There were wolves practically all over North America and Eurasia, from the mountainous range of the Himalayas. They inhabited both the arctic tundra and the taigas, the temperate woods, the prairies, the Mediterranean maquis and the subdeserts. Because of their adaptability to such a wide habitat wolves preyed on moose and caribous in some places, but in others upon bison or deer, gazelles, beavers, or hares and rabbits, to name only some of their usual prey. Besides, according to their large distribution area and their varied habitats and prey, wolves morphologically diversified, no less than 36 subspecies being recognised by several authors, seven or eight of which are presumably extinct nowadays.

How can it be explained that such an adaptable species has disappeared from large areas of its former home range, and is in danger of doing so from many others? The reason is simple and well known: the wolf has always been the most powerful competitor for man in the northern hemisphere, and man, as a rule, has finally won the contest. At present it can only be hoped enough common sense and intelligence from the victor will guarantee the defeated's survival.

Evidently, if at first we accept that the rareness of the wolf has been a consequence of human persecution almost everywhere, we will easily understand that the species situation will be harder in denser and longer inhabited areas, or in those where environment is more affected by man. In this sense, Europe has been one of the world zones where man's struggle to get rid of wolves has been more successful, so much that nowadays only some hundred individuals, hardly a few thousands, are left, while in the farther, wilder and less inhabited areas of North America and North Asia wolves can be counted by tens or maybe hundreds of thousands.

2. THE WOLF DECLINE IN EUROPE

This report is on the 23 countries which are member states of Council of Europe, but at present only eight of them (Finland, Sweden, Norway, Turkey, Greece, Italy, Spain and Portugal) still keep wolves in their territories. So it seems of interest to comment briefly on the history of the disappearance of the wolf in the rest of the Europe. Several authors (e.g. Hainard, 1961; Mallinson, 1978; Zimen, 1978; Grande del Brio, 1984; Boitani, 1986) have dealt with some aspects of this disappearance.

In the British Isles wolves were numerous when the Romans arrived, and during the Anglo-Saxon period, as old chronicles tell, January was practically kept for capturing wolves. It is said that King Edgar tried to eliminate wolves from Wales by imposing a special tax of 300 wolf skins on the Welsh King Ludwall, while on other occasions he granted amnesty to the rebels bringing 100 heads of this animal. Wolf records are still frequent in Britain at least until XIVth century, becoming rarer and rarer as the country was deforested. The last English wolf was killed in 1486, according to some authors, or a little later at the beginning of XVIth century under Henry VII.

In XVth century, during the reign of James I, the wolf was still a pest in Scotland, seeming to reach its peak during Queen Mary Stuart's reign, a little later. Laws to pursue it were issued and at some time it was the duty of all adult men to take part in wolf hunting at least three times a year. Wolves were still hunted in the early XVIIIth century, the last known individual being captured in 1743. Only then was the traditional system of day and night free grazing established, as tending the cattle became unnecessary. In Ireland the species resisted somewhat longer, and the last individual was killed in approximately 1770.

In Central Europe the extinction of the wolf is more recent, since the species remained common everywhere until the beginning of XIXth century, except in Denmark, where the last individual was hunted in 1772. In France practically since Charlemagne's epoch, there have been professional wolf hunters, the "louveteiers". After the Revolution, Hainard (1961) tells, wolves were still numerous in France, there were so many that in 1823 2,131 animals were killed and in 1883, hardly a century ago, 1,300. From 1910 on annual captures were below 50. Beaufort (1987) has given a good description of the disappearance of the wolf in France. The species was present in almost 90% of continental France at the end of XVIIIth century, one century later only in 16%, in 4% in 1908, in 1% in 1923 and extinct at the beginning of World War II. The last breeding wolves occupied central-west France, in the Dordogne, Charente, Vienne and Haute Vienne. Since 1945, several captures have been reported, probably including some erratic individuals coming from Spain or Italy, but mainly some wolves escaped from captivity and even some wild dogs. The last capture was made in December 1987 in the Alpes Maritimes and it corresponded to an individual thought to have escaped from captivity (Beaufort; pers. comm.).

In other countries of Central Europe extinction took place earlier than in France. In 1817 more than one thousand wolves were killed in Prussia, but the species had become very rare by those dates, then practically disappearing from Pomerania and Central Germany. In Bavaria the last individuals were killed in 1847, and in Switzerland, as in most of the Alpine Arch, before XIXth century ended, though a few attacks on cattle and wolf deaths have been recorded till the years immediately after World War II.

3. THE WOLF IN NORTHERN EUROPE

Hardly ten wolves remain in Norway and Sweden, while in Finland their number will probably not reach one hundred. In fact, Scandinavian wolves would have disappeared by now, had not immigrations from the Soviet Union occurred. The wolf situation in Fennoscandia has been revised, among others, by Pulliainen (1965, 1979, 1980, 1982), Bjärvall (1983) and Sorensen et al. (1986). Figure 1 (from Sorensen et al., 1986) shows the variations in wolf distribution in these regions between 1850 and 1980. From them a marked tendency to decline can be clearly noticed, nevertheless with certain fluctuations at the border between Finland and the Soviet Union, undoubtedly due to the species population variations in the Peninsula of Kola and Karelia, in this last country.

For Pulliainen (1982) "The wolf occurred only occasionally in northern Soviet Karelia prior to 1940, inhabiting cultivated areas and the coasts of the White Sea. Practically no wolves occurred in



Figure 1 Changes in wolf distribution in Fennoscandia since 1850 (according to Sorensen et al., 1984)

the taiga, characterised by old, mature coniferous forests, deep, soft snow cover and limited potential prey populations. The major increases in the wolf populations of the area have taken place since the Second World War, the first in the late 1950s and early 1960s, and the second in the 1970s. These were, in many respects, due to human impact. The replacement of the coniferous forest with deciduous forest after clear-cutting increased the food available for moose, and thus their populations which, together with other ungulates, made pathways for wolves in the deep, soft snow. The increased prey populations and accessibility of the areas permitted the wolf population to increase. During both increases, wolves from the saturated populations (5-7 ind./1,000 km²) dispersed into the adjacent Finnish territory, males being the first to enter Finland".

At the end of the XIXth century, wolves were exterminated from southern, central and western Finland. A declining breeding population survived in the eastern and northern parts of the country, close to the Soviet border. The first expansion of eastern wolves in the late 1950s was blocked, as most of the invaders were killed. The second expansion, in the 1970s and 1980s, allowed the north-eastern, eastern and even central and southern regions of Finland to receive wolves. The species was unprotected in the northern part of the country, where bounties were even paid for killing wolves in the 1970s, but it has been protected in central and southern Finland since 1973. Immigration and protection have favoured the Finnish wolf population, which, according to optimistic estimations by Nyholm (1985), would have passed from lower than 100 individuals in 1978 up to about 300 individuals in 1984. For Pulliainen (in litt.; July 9, 1989), however, these figures "are nonsense" and numbers in Finland would be "a little bit more than 50 wolves".

Hunting regulations concerning wolves have recently changed in Finland: in the north and extreme south of the country the wolf can be hunted from November 1 to March 31, in eastern Finland from November 1 to February 28, and in central Finland it is protected, but the Ministry of Agriculture and Forestry can grant special licences to kill some individuals (Pulliainen, 1989). According to the same author and date, "during the past two decades wolves have disappeared from Northern Finland, i.e. reindeer husbandry area, due to intensive hunting (there are also rather fewer wolves in the Kola Peninsula, USSR) while they have appeared in the south-eastern frontier area due to the increase of the wolf population behind the border. The most wolves, however, occur in Northern Karelia, Eastern Finland, and Kainuu, Eastern Finland. In inland areas we have had some wandering wolves. Their maximum number can be estimated "in tens". The total number of wolves in Finland is below 100 individuals. During the years 1983-86 on average 41 wolves were killed yearly. Full compensation is paid by the State for the losses of domestic livestock caused by wolves and other great predators.

Wolves became totally protected in Sweden in December 1965. Then, about ten individuals were assumed to exist in the country, but later evidence indicated that this number was probably an overestimation (Haglund, 1975). From 1970 to 1976 only scattered individuals were reported and the species was considered virtually extinct. In 1977, however, according to Bjärvall (1983), "wolves - a pack of three, a pair and some single individuals - appeared in reindeer management areas in the northernmost part of the country. Their origin is unknown, but the most natural explanation is that they constituted a fraction of the 1976/77 peak in the immigration from the Soviet Union

to Finland". The pair that appeared east of Kiruna in 1977 bred there in 1978. However, these and other wolves which appeared in reindeer management areas were exterminated or moved out before 1981.

Since 1976 there has been news about wolf tracks and sightings from an area in west-central Sweden by the Norwegian border, out of reindeer areas. At present a small population of wolves exists there, but in spite of intensive research both in Sweden and adjacent parts of Norway it has never been possible to prove the presence of more than 10 individuals. Recently, Bjärvall (in litt., March 14, 1988) wrote : "As far as we have discovered, litters were born here in 1983, -84, -85 and -87. Consequently one might believe that the number of wolves in the area should have increased during the last 5 years of so. However, this does not seem to be the case. At the present we know of only 5 wolves in that area and one more some hundred kilometres to the north". Norwegian authors concur with this information. So, Myrberget and Sorensen (in litt., June 8, 1988) said that "the wolf-pack in south-eastern Norway at the border with Sweden is still persistent, though with only four to five wolves. One or two other wolves live further north, mainly in Sweden but might occasionally visit Mid-Norway". These scientists, always with respect to Norway, add : "In the far north we have had occasional visits of wolves from Russia and Finland, but we will regard them as visitors that never stay permanently in any district for a longer period". Wabakken et al. (1984) have also described the situation of the wolf in south-eastern Norway from 1980 to 1984.

Sorensen et al. (1984) summarised the situation of the wolf in 1984 in Norway and adjacent areas of Sweden and Finland. They estimated a wolf population of 14-20-26 individuals (absolute minimum, probable minimum and possible number), more or less similar to the numbers reported in 1960s and 1970s. Myrberget and Sorensen (litt. cit.) consider that the "wolf situation is practically the same now as at the end of 1984".

4. THE WOLF IN GREECE

The wolf is distributed in the central and mountainous areas of continental Greece, in connection with the species populations in Yugoslavia, Albania, Bulgaria and Turkey.

Regarding the population size the given data disagree, but based on some rough estimations it could be assumed that it varies between some hundreds and possibly over one thousand (Spala, in litt., July 27, 1988). Official estimations (e.g. Papaevangelou, 1988) refer to the wolf in Greece as "the fearful predator numbering more than 3,000 animals, which is probably the biggest population in Europe". However, some other authors (e.g. Matsakis, 1989) estimate the total wolf population in Greece at about 250 +/- 50 individuals. The more recent and comprehensive reports based on field work establish the wolf numbers "at not more than 500 individuals" or "300-500 individuals" (Hazirvassanis, 1988, 1989).

According to Giannatos (in litt., December 5, 1988), "healthy wolf populations have been recorded along the eastern borders of Greece and Bulgaria in Kerkini, Orvilos, Falacro, Rhodopi mountains complex and Evros area (...). From these areas wolves have been known to disperse across the adjacent Menikio mountains, thus reaching the Pageo mountains further south". For the same author, wolf presence is regular in "a) North-western borders with Yugoslavia, across the

Varnos, Verno and Askio mountains, reaching the Vourinos mountains in the south; b) Grammos, Voion mountains, with irregular sightings and killing of wolves in the area of Samarina (Smolika mountains) and Valia Calda; c) Central Pindos, Koziakas, and adjacent mountains, with irregular appearances in the Tzoumerla mountains; d) Olympos, Pieria, Kamvounia and Ossa mountains; e) the hilly area south of the Kerkini mountains (Krousia and Vertiskos mountains) and occasionally in the Kerdilio mountains; f) Chalkidiki, in the Holomon mountains, with appearances in Sithonia and Agio Oros and some occasional sightings in the Hortiatis mountains near Thessaloniki; g) the Agrafa mountains complex and Tymphrestos mountains, from where occasional dispersion occurs through a wider area including Verdoussia, Iti (where damage to livestock has been recorded in 1988), Giona, and Parnassos (where damage to livestock has been recorded in 1987 and consequently two animals were killed; it is important to note that wolves here reappeared after several years of absence)". The last wolves of Peloponnes became extinct between 1940 and 1970 (Hazirvassanis, 1989; Matsakis, 1989). All this information has been recorded in Figure 2.

Hazirvassanis (1989) distinguishes three main habitat categories in the wolf range in Greece. Category A includes only the western and central Rhodopi mountains, covered by extensive forests with a high density of wild ungulates and a relatively low level of human interference. Category B includes all the high mountains of northern and central Greece, with large forests much used by man all year round (forestry, stock-raising, legal and illegal hunting, etc.) and where big game populations are very reduced. Category C includes low and medium altitude areas where vegetation is reduced to shrubs and open fields and big game is extinct, but nomadic sheep and goat herds provide food for the wolves and little human presence balances the relative lack of cover. "In practice - concludes the cited author - the permanent wolf populations exist where there are also permanent populations of wild ungulates".

Most of the authors agree that wolf numbers are declining in Greece. Ondrias and Douma-Petridou (1982) stated that some areas were occupied only in winter. Pimlott (1975) was surprised by the high number of wolves killed in the country: 5,598 animals from 1964 to 1971, that is an average of 700 wolves per year (Ministry of National Economy, 1975) considering only official data; most of these wolves were killed in Macedonia; in that period bounties were paid in Greece for the killing of wolves (this official practice was interrupted in 1980, but at present wolf hunters present the carcasses to gather money from shepherds and local hunting clubs; Hazirvassanis, 1989).

The legal situation of the wolf in Greece is quite bizarre. On the one hand, whole protection was allowed to the species by the Bern Convention, which was later ratified by Law 1335/1983. On the other hand, however, it is still considered as a pest, so that everyone can kill wolves (Theodoros, 1989). Moreover, in three Controlled Hunting Areas bounties are paid for killed wolves and poison and organised hunts under the control of authorities are carried out to eliminate the species (Hazirvassanis, 1989; Theodoros, 1989). The use of poison is generally forbidden, but many poisoned baits are illegally put, so that poisoning and chance meetings with hunters are the main causes of wolf mortality in Greece (Hazirvassanis, 1989). Nevertheless, most of the authors (Giannatos, litt. cit.; Hazirvassanis, 1988, 1989) agree that habitat degradation and lack of wild hoofed prey have been the most important causes of the current

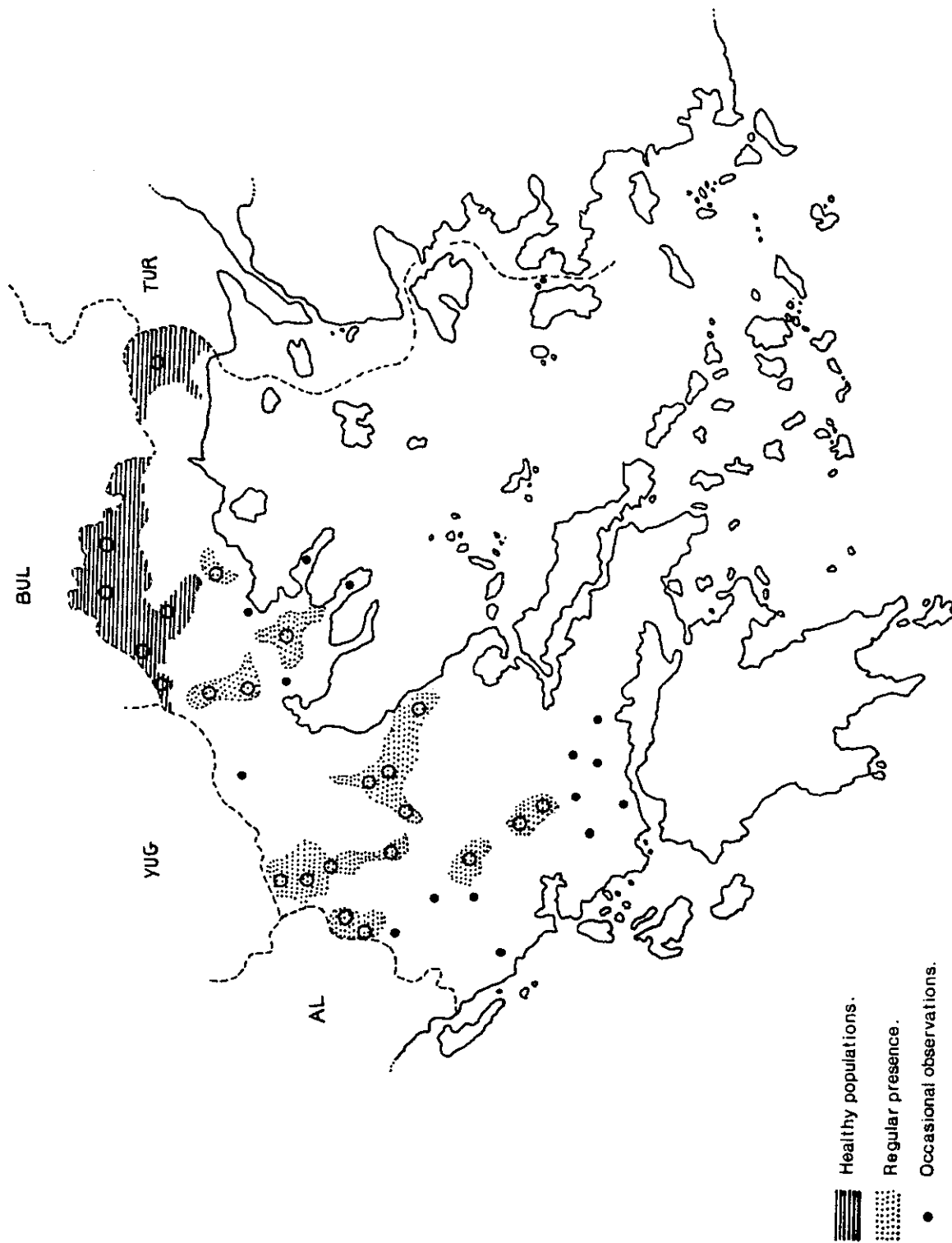


Figure 2 Wolf distribution in Greece (according to several authors quoted in the text)

wolf decline. The diagnosis by Hazirvassanis (1989) is quite lucid: "The opening of many isolated areas to logging and uncontrolled hunting by the construction of many new roads, the fast decline of wild game paired with the decline of the traditional form of nomadic stock raising, the ever growing disturbance by more and more people coming into the mountains for logging, hunting or recreation, are the main threats for the Greek wolf".

5. THE WOLF IN TURKEY

No recent information about the wolf situation in Turkey has been published, but it is likely its populations are linked with the more or less healthy populations in Asia. At a symposium in the XXXVth General Assembly of the C.I.C. (Conseil International de la Chasse) (Florence, Italy, May 1988) it was stated that "the wolf exists everywhere in the country". For the IUCN-SSC Wolf Specialist Group (Mech, 1982) the wolf populations in Turkey were considered fully viable or in a phase of steep decline, but not threatened. They are not protected, and are in need of survey, protection and educational work.

Some time ago, Kumerloeve (1967, 1975) referred to common wolf presence in Asia Minor. For this author, in 1967, it was not necessary to present a map of wolf distribution in the region, since until recent times it lived everywhere, especially in wooded areas below 2000-2500 m, also on central steppes and even on cultivated lands. It then became rarer, almost extinct in areas close to the western and north-western Anatolian coast, e.g. near Balikesir and Tire. Nevertheless, the species would be common over the eastern half, as far as to appear in towns and villages such as Erzurum, Erzincan, Elazig, etc. and it could be considered as abundant on the eastern edge, in the regions of Agri, Kars, Van, Hakkari, etc., by the borders with Iran and the Soviet Union. It would however be rare on the southern plains, near Adana and by the Syrian border. From official sources, Kumerloeve (1975) points out that 1,033 wolf skins were sold in Istanbul shops in 1973.

The present distribution must be very similar to the one shown by Kumerloeve, judging by A. Akin's reports (in litt.; April 9, 1989). For this naturalist, the wolf only lives in the Black Sea area above 400 m altitude and in the Mediterranean area above 800 m. In the Balkan parts of Turkey it is relatively common, in contact with the Greek and Bulgarian populations. In the Marmara area it is rare and in Central Anatolia almost extinct. It is abundant in East Anatolia and common in the Taurus mountains and in the forests by the Black Sea. Numbers are unknown and protection does not exist, tourist hunters paying 250 USA\$ or more for the shooting of a wolf (Akin; litt. cit.).

For Kumerloeve (1967, 1975) persecution and human impact on environment would mainly account for wolf rarification in Turkey. Akin (litt. cit.) justifies a decrease in numbers owing to hunting, trapping and poisoning. Mendelssohn (1983) considers more noticeable the lack of natural prey, writing: "Even in Turkey, where seven species of ruminants were regionally not rare 30 years ago, they are now so rare in most areas, or have been completely exterminated, that wolves cannot rely on them", and concludes: "Thus the life of the wolf in most areas of the Middle East is precarious because of the unpredictable and unsure supply of food, persecution and anti-rabies campaigns. Their survival is due to the fact that in most areas of

this region the density of human population is still low, and nomadic livestock raising is widespread, with quite a high rate of mortality in the herds, thus supplying carcasses...". The low availability of wild hoofed prey, besides an increased density of human population, were considered by Mursaglou (in litt. to the Secretariat of the Council of Europe; May 5, 1989) the main causes of the wolf decline in Turkey, quite apparent, according to this author, in the last decade.

In its report to the Group of Experts on the Wolf (Dogan, 1989), the Delegation of Turkey states that the species exists all over the country, where it is not protected but its hunting "is forbidden in many areas such as national parks, nature reserve areas (...), etc.", which could account for about 20% of the country's surface. According to the report, wolves in Turkey would be killed mainly with traps and poison, illegal methods which could be used, however, on permission from the local forestry authorities. There are no specialised wolf hunters, but wolves would be killed when met during the hunting of other species. Anyhow, Turkish authorities consider the areas free of hunting as "big enough for wolves to survive".

6. THE WOLF IN ITALY

Considerable attention has been paid to the status of the wolf in Italy. Most of the information has been reviewed among others by Cagnolaro et al. (1984), Zimen and Boitani (1975), Boitani (1979, 1981, 1982), Boitani and Fabri (1983) and more recently by Boscagli (1985) and Boitani (1986) again.

Cagnolaro et al. (1974) reported on the changes in wolf distribution in Italy between 1900 and 1970. By the beginning of the century the species had disappeared from the Alps and in 1950 there were no wolves in Sicily (Fig. 3). Distribution seems to have dropped drastically between 1945 and 1970, when the wolf population was numerically at its lowest.

In the sixties Simonetta (1968) estimated the number of wolves in the Apennines (the only area keeping the species) to be about 300, while Tassi (1971) indicated that this number was decreasing rapidly. In 1973 the lowest estimation in history was obtained: there were approximately 100 wolves in Italy (Zimen and Boitani, 1975). These authors wrote: "The northern limit of land inhabited by the Apennine wolf is now at Mts. Sibillini, the southern limit at Monti della Sila. Within this range the distribution is restricted to mountain areas with the only exception of the 'Agro Romano' area north of Rome. Communication between the wolves of these mountainous 'islands' seems to be very difficult if not impossible. The 'islands' are all surrounded by areas of low altitude with a high human population density and many old and new roads, suburban developments, factories, etc." (however Zimen, 1978, wrote later: "We (...) found no distribution area that seemed to be completely isolated from the rest (...). That would make the final extinction (of wolves) in Italy more difficult than we had originally supposed").

Zimen and Boitani (1975) differentiated 10 wolf inhabited areas (Fig. 3), ranging in extension from 120 km² (Monti Alburni) to 1,900 km² (Mts. Sibillini and Monti della Laga) and in wolf numbers from three (Monti del Matese) to 25 (Monti della Sila). The "Agro Romano" area differs markedly from all the others. Called Monti della

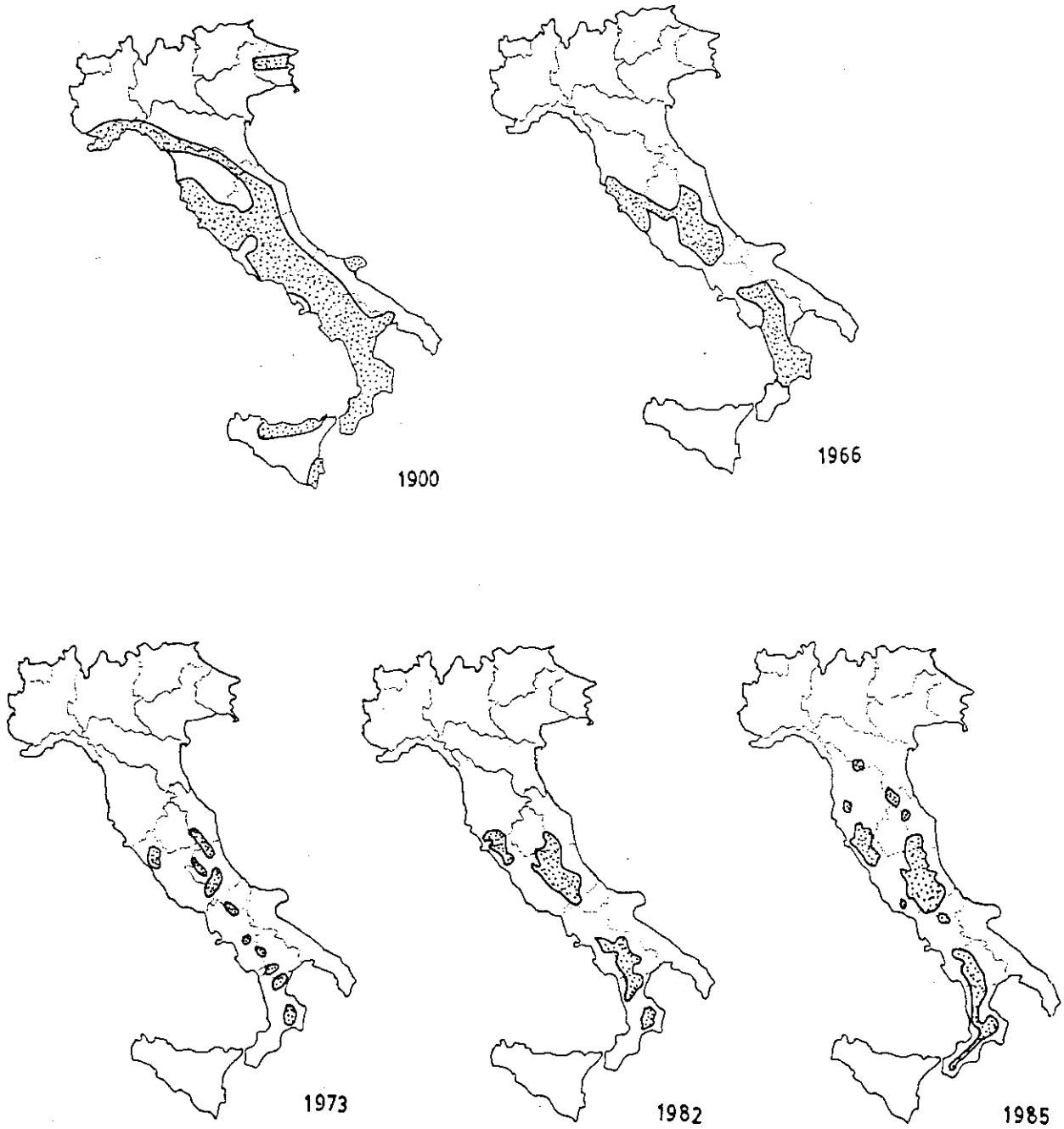


Figure 3 Changes in wolf distribution in Italy since 1900 (according to several authors quoted in the text)

Tolfa, it is characterised by hills or low mountains and typical Mediterranean vegetation. The estimated total number of wolves was 102 individuals in an area of 8,645 km².

Later, Boitani and Fabri (1983) recognised a probable increase in wolf numbers, referring to 150-200 individuals, while a new census in the winter of 1983 gave about 220 wolves for a total area of 13,500 km² (Boitani, 1984). This allows the last author to affirm: "today the wolf is slowly recolonising the former range and the actual ecological conditions of the Appennines seem suitable to allow this dispersal up to the post-war level". In 1983 the wolf population seemed to be distributed in four isolated areas in central and southern Italy (Fig. 3).

In a different way (field observations from the members of the Gruppo Lupo Italia, field research by the author and "wolf-howling" inquiries), Boscagli (1985) made a synthesis of the data on wolf presence in Italy during the years 1978-1984. Contrarily to Boitani's point of view, Boscagli considers the Italian wolf population as stationary, supposing that the apparent increase in wolf numbers is due only to an increase in information. For him, a prudent estimation of population numbers would be from 180 to 200 individuals. He recognises the four large presence areas of Boitani (though the two southernmost would contact), besides a few isolated, small areas, some of them as septentrional as in the Pistoiese Appennine (Fig. 3).

Finally, Boitani (1986) reaffirms his theory of a noticeable increase in wolf numbers and range since 1972. However, he has doubts about some northern observations, thinking that they could correspond to wild dogs or even captive-born wolves released in nature.

The wolf has been a protected species in Italy since 1977.

7. THE WOLF IN IBERIA

In mid XIXth century and early XXth the wolf inhabited almost the whole Peninsula (Valverde, 1962; Grande del Brio, 1984). The history of the growing rareness of the species has been described by Grande del Brio (1984). References on the status of the wolf during recent years appear in Flower (1971), Magalhaes (1975) and Lyle (1988) for Portugal, and Valverde (1972), Castroviejo et al. (1975), Garzón (1979), Delibes (1983), Grande del Brio (1984), Reig et al. (1987) and Blanco et al. (1988) for Spain.

Flower (1971), from newspaper news collected between 1933 and 1957, found that wolves were killed in that period in most Portuguese districts, but mainly in the north and west of the country. In all, 1,245 individuals would have been killed, 570 of them being young animals (cit. by Grande del Brio, 1984). Magalhaes (1975) compiled data about the killing of the wolves from 1963 to 1973. He reported 141 cases (14 per annum, against 52 in the 1933-57 period) in ten districts, but he was doubtful about 14 animals said to be killed on a single drive in Evora. He concludes by signalling the actual presence of wolves, at least sporadically, in the districts of Viana do Castelo, Braga, Vila Real, Bragança, Viseu, Guarda, Castelo Branco, Portalegre, Evora and Beja. All of these districts, except Viseu, are on the border with Spain, which emphasises the important role of this border in conserving Iberian wolf populations. In fact, the same author stated that wolves would be residents in Vila Real, Bragança and Viseu "at least", while in the remaining districts they probably come "from Spain or from Portuguese localities where they breed".

More recently, Lyle (1988) thinks he has detected a decrease in wolf numbers in Portugal. He writes : "At the present time (May 1988), estimates of the wolf population in its Portuguese area of distribution vary from less than 100 to c.200. Enquiries in rural areas, however, suggest that the population is once more on the decline (F. Petrucci-Fonseca, pers. comm.). In fact, an accurate figure cannot be given as no census has ever been carried out ; as before, current estimates must be based on the number of killings, which, if allowance is made for unreported killings, at present amount to between 20 and 30 per annum, which suggests an actual population of 90-120 wolves". With respect to the distribution, the cited author says : "Wolves now range the northern part of the NW province of the Minho, which includes the National Park of Peneda-Geres, the NE province of Tras-os-Montes, which includes the Natural Park of Montesinho, and parts of central Portugal near Viseu and Guarda. They are very thin on the ground except in Tras-os-Montes, where the greater part of the population is now located. Both these northern provinces border on Spain and the wolf populations concerned in fact extend over the border, into Galicia in the first case and into Orense and Zamora-León in the second. The wolf has been totally eliminated from the Algarve and the Alentejo. Sightings in the eastern Alentejo and Beira Baixa, which are now rare, are probably of lone wolves dispersing from Spain, or merely "visiting"; they are also very rare in the central mountain range of the Estrela, formerly a favourite haunt".

According to Grande del Brio (1984) and Valverde (1972) the wolf was common in most of Spain in 1900. Then such a decrease in numbers began, mainly in the south and east, that in 1920 the species had disappeared from a wide strip close to the Mediterranean Sea. Between 1920 and 1950 it must have vanished from most of the Peninsula central plains (Fig. 4).

In 1970 Valverde (1971) differentiated two large wolf populations in Spain : one in Galicia and another in Castilla-León, getting into Asturias and Cantabria, besides some isolated nuclei, with little survival expectancies, in Extramadura and Andalusia, by the Ciudad Real border. Apparently these populations have followed different trends.

For Bárcena (1979) the wolf population in Galicia, that covers a densely man-inhabited area and with scarce natural prey, has increased since the Spanish Civil War, reaching its peak in 1974. At that date, after the death of two children, supposedly attacked by a female wolf near Orense, an enormous prosecution of the species was started, which caused the extermination of some hundred individuals in only a few months, the population probably reaching its lowest number. Thenceforth wolf numbers have tended to recuperate, though slowly.

Garzón (1979) considers that wolves disappeared from many areas of Castilla-León and bordering regions between 1955 and 1970. In 1955 no wolves were left in Segovia and in 1960 the last ones from Avila and Soria were killed. Many were poisoned in La Rioja in 1961, while in Cantabria 300 adult and 200 young wolves were killed from 1944 to 1966, and almost the same number in Asturias between 1955 and 1961. In 1979 the number of wolves was probably the lowest in history in this part of Spain, in spite of the 1970 Ley de Caza (Hunting Law) and its 1971 Reglamento (Rules) considering the wolf species as big game that made mortality due to human persecution decrease. At the end of the seventies Garzón (1979) estimated this population to be

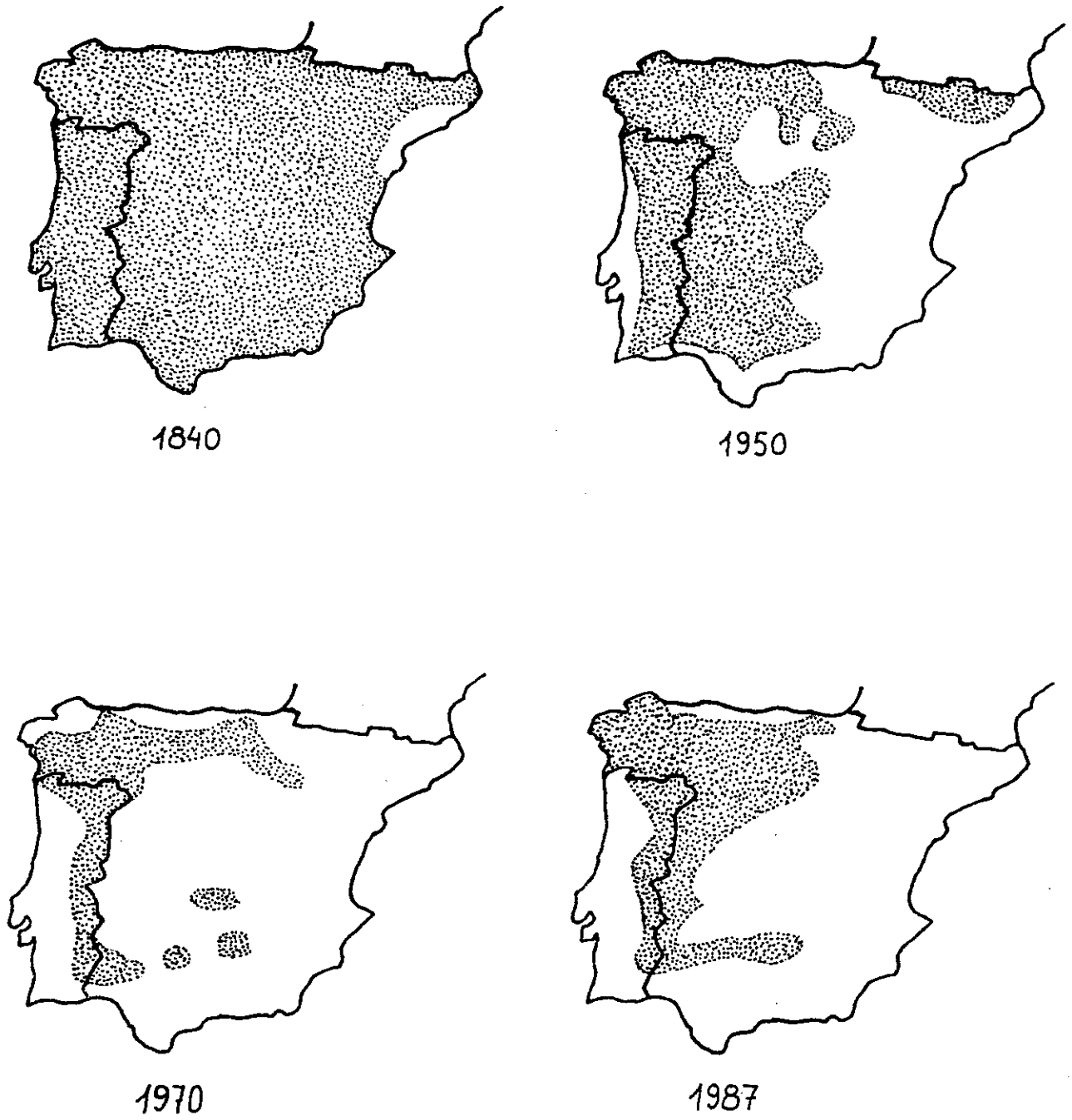


Figure 4 Changes in wolf distribution in the Iberian Peninsula since 1840 (according to several authors quoted in the text)

made up of 300-500 individuals. From then on, nevertheless, a noticeable expansion has taken place, wolves being observed in regions from which they had been absent for fifty years. Only in Valladolid province and its close surroundings, for instance, in the middle of the plain, Barrientos (1987) has heard of no less than 125 wolves killed in eight or ten years, several pairs breeding every year even in cultivated land. Reig et al. (1987) estimated an average of one wolf for each 40 square kilometres on those areas. However, in localised parts of the range "where the information of the wolves killed is considered to be 100% reliable", they estimated densities of one wolf/nine square kilometres.

Since 1970 wolves have disappeared from the Montes de Toledo (south of Madrid province) becoming rarer and rarer in Extremadura - about 25 individuals living in the Sierra de San Pedro - and Andalusia - only lone wolves are now detected in Western Andalusia, and no more than 50 wolves in Sierra Morena Oriental. Thus, these southern populations of the species in Spain do not seem to be affected by now by the detected expansion. The wolf is fully protected in Andalusia.

All in all wolf numbers as low as 200 have been believed for Spain (Mech, 1979), but probably this was an underestimation (Grande del Brio, 1982, considered 160 the average number of adult wolves killed a year in Spain from 1974 to 1981). In 1981 Delibes (1983) estimated the number of wolves in Spain as 600-1,000. Reig et al. (1987) do not give numbers but refer to the noticeable expansion, due, in their opinion, to three main factors: an increase in potential habitat, an increase in food availability and the consideration as a game species since 1971. Very recent estimations by Blanco et al. (1988), based on a detailed field work, reach a minimum number of 1,500 individuals for Spain, which represents a noticeable increase in the number and range of wolves with respect to 15 years ago, especially in the northern half of the country.

As said, the wolf is fully protected in some regions of Spain and considered in some others as a game species.

8. CAUSES OF THE DECLINE

Though it seems evident that there has been a stabilisation - if not an expansion - of the wolf populations of some of the Council of Europe member countries in recent years, nonetheless the available data prove an enormous decline during the last century, implying a substantial reduction of its distribution range. So, to design a conservation strategy for the species, it is essential to analyse the causes of this decline, actually producing the slow pace at which the wolf seems to be moving from extinction limits. At the same time it will be necessary to detect other menacing factors for the species not existing, or unimportant, in the past, but which represent a serious cause of concern nowadays.

Everybody agrees that direct human persecution has been and is mainly responsible for the decreasing number of wolves. Nevertheless this persecution is not gratuitous, but it obeys very concrete motives, though often exaggerated. As the first cause of this decline we will analyse not only poison, snares, traps or fire arms, just mere instruments used by man to exterminate wolves, but the problematic aspects of man-wolf relationships that have led to that animadversion.

9. PROBLEMS IN MAN-WOLF RELATIONSHIPS

Men and wolves have lived together for so many centuries and they are too much alike - up to the point that some authors have told about an "evolution in parallel" (Hall and Sharp. 1978) - to get on well. Throughout history between the two species there have been relationships of predation (one species killing the other), competition (depriving each other of necessary resources) and even of mutualism (helping each other, as the existence of the dog - only a domesticated wolf - proves). Obviously in popular mentalities the two first have predominated and they explain the psychological factors, widely spread in very different cultures (from Sweden to Turkey or Spain), that prejudice man against wolves.

9.1 Competition by the wolf for man's livestock

It is by far the most important fight between wolves and men, as "wherever and whenever wolves and domesticated creatures have inhabited the same general area, the domestic animals have been subject to attack" (Mech, 1970). Domestic animals are easier to catch than wild ones and give the predator a lot of energy, which makes them favourite prey (Valverde, 1964).

Predation on livestock explains (but it does not always justify) the killing of many wolves. In northern Europe the usual domestic prey of wolves is reindeer. Owing to that, wolves rarely survive for some years inside the reindeer management area where they are hunted. The description by Bjärvall (1983) of the hunt of a single reindeer-killer wolf in Sweden - where the species is fully protected - is very enlightening: "In December 1977 a single wolf was discovered within a reindeer herd in a woodland immediately north of the city of Gallivare. From December 6, it killed reindeer, but not until December 14 did a field patrol from the Environment Protection Board establish that the animal was a wolf. Since that day - and probably even before - the animal was almost certainly hunted because, even though wolves are protected, owners of domestic animals are allowed to shoot a wolf involved in direct attacks on their animals, although use of vehicles during the hunt is prohibited. The wolf, however, was not shot, and on December 15 the reindeer owners applied for a licence to use snowmobiles for the hunt. It was then estimated that the wolf in less than 10 days had killed about 50 reindeer. Permission was granted because at least four other wolves were known to be in the country then and because it was expected that the wolf might leave when followed by snowmobiles. However, it stayed within a limited area and continued killing reindeer almost every night in spite of the fact that it was pursued. The situation was carefully monitored by the mass media. After 6 days of this, the herders were granted a licence to shoot the wolf from a helicopter, which they did, on December 25. It had killed between 80 and 100 reindeer" (Lyle -in litt. to the Council of Europe; April 15, 1989- explains that this wolf kept killing reindeer not "in spite of the fact it was being pursued" but because it was being pursued: the animal could not wait to consume its kill and had to kill every time it wanted to eat).

In southern Europe sheep and in a lesser number goats, cows and horses, are the common prey of wolves. Valverde (1971) gives some data which may explain the conflict between farmers and wolves in Spain. In 1924, when wolves were plentiful, only in the province of Santander, which occupies 5,300 square kilometres, they killed 1,712 sheep, 679 goats, 677 horses and donkeys, 437 cows and 21 pigs,

a very important amount even if exaggerated. Also, in Italy sheep are the domestic animals usually killed by wolves. In 1974 farmers in the Abruzzos were paid refunds for damage caused by wolves reaching 103,000 US dollars, corresponding to 1,412 sheep and small numbers of some other species (Boitani, 1982). In Greece, Spala (in litt., July 1988) also refers to "considerable damages to shepherds, because of killed sheep, are connected to the presence and activity of wolves". In Spain, yearly wolf damage to livestock has been estimated by Blanco et al. (1988) at about one million US dollars, approximately 25% of which would be compensated.

Surplus killing of livestock is not rare, which contributes to the increase of negative attitudes towards the wolf. Following the field study of wolves in Central Italy by Boitani and himself, Zimen (1978) wrote : "... We also saw damage on a large scale. It was not uncommon for as many as ten sheep to be killed, and on two occasions there were more than a hundred. This seemed always to happen when panic broke out among the sheep and a large number ran about bleating wildly. To the wolves this was an only too irresistible signal to catch and kill, and they killed everything they could, like a fox in a chicken run". Also, Pulliainen (1965) reported that in Finland only about 25% of the sheep and goats killed were eaten. This allowed Zimen (1978) to conclude : "It is this behaviour that causes the very understandable hatred of shepherds for these predators... A single sheep, a single foal, or a single calf occasionally would perhaps not be so bad. But killing a hundred or more and then not even eating them is too much. Whenever this happened it was widely reported in the newspaper, and hostility both to wolves and to the movement to protect them became vociferous".

9.2 Competition by the wolf for game animals

This problem is closely linked with the former one. When man substitutes wild ungulates for his livestock, the wolf loses its natural prey and is forced to kill cattle to survive. If man, on the contrary, keeps populations of wild ungulates, generally as game, the wolf is considered a direct competitor since it destroys part of the cinegetic capital.

In fact, the extinction of the wolf from a great part of Europe in the last century occurs only some time after big ungulates, its natural prey, were exterminated or became very rare. So, the last red deer in the Bavarian Forest (West Germany) was killed forty years before the extinction of the wolf ; red deer was exterminated in Central Italy in XIXth century ; the disappearance of the wolf in eastern and southern Spain followed that of red deer and roe deer ; wolves became very scarce in Scandinavia when moose were almost eliminated, etc. Under those conditions wolves had to resort to killing more and more domestic animals, which in turn led to intensifying the efforts to eradicate the predator.

At present the situation has changed in most of Europe, where large ungulates are very common in many places. For instance, moose are heavily shot in Sweden, but their numbers increased up to 1982 and keep very high; red deer damage trees and roe deer are abundant everywhere in Central Europe, etc. However, there are no wolves ! Nevertheless, in some regions where wolves have always existed and game means an important income, conflict does arise. This is the case, for instance, in Andalusia (Spain), where the last wolves are living on red deer kept in estates intensively run as private game

reserves. Most of those areas are fenced and deer are managed almost as extensive livestock (high densities, artificial feedings, etc.). Under those conditions it is very easy for wolves to corner deer against fences and kill them, and wardens can very easily find deer carcasses when patrolling along the fences. Subsequently complaints against wolves do appear and hunts or illegal poison campaigns are organised.

To know if a predator is actually limiting the population of its prey is a difficult task. Obviously, a deer killed by a wolf, if left alive, could be shot by man, but elimination of the wolf would not always mean more deer (Errington, 1967). Anyway, there is some evidence that in local areas wolves may have a detrimental effect on deer (Mech and Karns, 1977), but in exchange they collaborate in making deer populations more balanced and healthy.

9.3 Wolf predation upon man

We, European men, learn to hate the wolf from childhood, when we are told it is our enemy and, if allowed, it would not hesitate to kill and eat us. Stories such as "Little Red Riding Hood" and "The Three Little Pigs" leave no doubts and unluckily they are the only things many people have heard of wolves throughout their lives. As Zimen points out (1978), "the reports are too numerous, fear of the wolf and the forest too strong, the mythology of the wolf too dominant, for the idea of attacks on human beings by wolves to be entirely without foundation". Yet, wolf predation upon man is not so evident as many stories and legends try to make us believe (Grande del Brio, 1984, has made a good revision of wolf mythology in different social groups). In some cases presumed attacks on men can be used to justify wolf killings. So, in Norway farmers and reindeer owners were allowed to shoot wolves in defence of livestock or person, and two animals have been recently killed according to this "self-defence-paragraph" (Myrberget and Sorensen, in litt., June 1988).

Valverde (1971) has remarked that many of the reports of the wolf attacking human beings come from the fact that the wolf, if those conditions occur, will feed on human corpses. Certainly in history corpses of men produced by wars or epidemics outside human dwellings would be eaten by wolves (Valverde even believes that the origin of high cemetery walls and heavy gravestones was intended to keep wolves from unburying corpses). Zimen too (1978) indicates that "many assumed killings of human beings by wolves can probably be attributed to their eating of corpses". And he adds : "But it would not be surprising if some wolves, having grown accustomed to men, both living and dead, and having learned to distinguish between dangerous and non-dangerous ones, should have learned to kill them. Children above all must have been easy prey".

In fact, excepting cases of attacks by rabid wolves, it is very difficult to find authenticated cases of attacks by wolves on adult humans in Europe for the past century. So, Rutter and Pimlott (1968) suggest that only rabid wolves or wolf-dog hybrids would be involved in attacks on human beings in Eurasia, and a Soviet mammalogist (cited by Mech, 1970) said that "an effort was made by one of his associates to document some of the reported attacks by wolves. It was impossible to do so, and it was concluded that, with the exception of possible killing of small children wandering alone in remote areas, reports of such attacks had no basis in fact".

According to the above, children are the most feasible candidates as prey of the presumed man-eating wolf. Strong circumstantial evidence suggests that occasionally it happens like this. Valverde (1971) has investigated the case of two children killed in Galicia at the end of the sixties and another two from the same region in 1974 (Valverde and Hidalgo, 1979), and on every occasion he has concluded that they were attacks by real wolves, in fact, of a female wolf, which was responsible for the two children's death, in the first case and of another female-wolf in the same circumstances in the second. In addition, considerable circumstantial evidence of one or several wolves attacking children in India has been presented (Shahi, 1983). The "official" opinion of wolf specialists in every case was that the facts were not sufficiently proved, since they could be attacks by dogs or wolf-dog hybrids, or else the children might already have been dead from other causes. Anyhow, although the evidence was not conclusive, it would have been accepted as valid by any naturalist in a less controversial case. Certainly, to reckon that on rare occasions some very real wolves have attacked lone little children does not seem to help conservation of the species in the short term, but in the long term it would perhaps be better to accept that it could happen again and that, in spite of it all, the wolf has the right to exist.

To end this part we can repeat what Zimen expresses (1978) about the irrationality underlying the fear and hatred that modern European man feels for the wolf. He says : "More people probably die every day in road accidents than have been killed by wolves during the past thousand years. Yet it is the wolf, not the automobile, that they are afraid of. Nothing shows more plainly how hopelessly our biological evolution lags behind the development of civilisation".

10. OTHER THREATS TO WOLF SURVIVAL

Prosecution by man has historically been the main cause of wolf decline and in many areas it is still the main problem for its survival. However, at present the species is undergoing numerous new menaces that should not be ignored. Many of them are the indirect consequences of human activity.

10.1 Habitat change

As formerly said, the wolf is a habitat generalist, able to adapt itself to the most varied habitats. However, in overpopulated regions like the European ones, the wolf needs undisturbed retreat areas to rest and breed. Relationship between human population density and the wolf's need of refuge is very clear in Italy, Portugal, Greece and Spain. Wolves radio-tracked by Zimen and Boitani (1979) in Italy, van Haaften (1983) in Portugal and Vilá and Urios (pers. comm.) in Spain need good hiding places for the day-time, which they find in woods or rocky areas. However, in some almost uninhabited parts of Old Castile (Spain), wolves rest and breed in grain fields (Barrientos, 1987). As a rule, in highly populated Europe the destruction of the last forests is an important threat to wolf survival, as the species can live close to human settlements, but only with safe diurnal resting places nearby.

Besides the lack of refuges, other changes after habitat humanisation affect European wolves in an important way. Quite a number of wolves are run over on roads and some by trains. American studies (Thiel, 1985 ; Mech et al., 1988) have proved that wolf

distribution can be related to the density of roads passable by 2-wheel-drive vehicles : wolves generally do not occur in areas where road density exceeds 0,58 km per square kilometre, whereas similar areas nearby with fewer roads do contain wolves. Although Mech et al. (1988) affirm that "our findings should not be taken to imply that roads themselves prevent wolves from inhabiting an area", as the "primary threat of high road densities to wolves comes from the accessibility they allow to humans", the relationship must be taken into consideration.

10.2 Undiscriminating shooting

Most of the wolves that die each year in Greece, Spain and Italy are killed by indiscriminate hunters. In this respect Boitani (1982) says that "the density of hunters in Italy (seven per square kilometre) makes an encounter between man and wolf highly probable ; some kinds of hunting such as organised fox and boar hunts, increase this probability. About 70% of dead wolves recovered, 10 to 12 each year, died as the result of gunshot wounds".

10.3 Competition and hybridisation with stray-feral dogs

Mediterranean countries offer good chances for dogs to live in the wild, except where they find a healthy wolf population. In natural condition wolves do eat dogs (dogs are the third most common prey of wolves in northern Spain, following carrion and sheep, according to Castroviejo et al., 1975), but lone wolves usually play and mate with big dogs. Wolf-dog hybrids have been reported at least in Portugal (Fonseca, 1982), Spain (Valverde and Hidalgo, 1979) and Italy (Boitani, 1983). Besides this, feral dogs search for food on human litter deposits and predate on wild and domestic mammals, becoming competitors of wolves and, because of the difficulty of distinguishing, usually at night, big dogs from real wolves, people's hate and persecution is directed at wolves.

The best way of emphasising the problem would probably be to reproduce some of Boitani's (1983) words : "Out of the 3.5 million dogs living in Italy, about 850,000 are free to move in and out of villages, regardless of their having any owner or not. These are an immense reservoir to the 80,000 feral dogs whose biology is very much like that of wolves. In wolf areas, with a mean density of about 1 wolf/100 km² there are 150-310 free-ranging dogs/100 km² and 24-82 feral dogs/100 km², densities increasing from central to southern Italy. Direct and indirect competition of different sorts result : competition for food, as both wolves and dogs feed mainly at the open dumps outside villages and to a lesser extent on livestock ; competition for range, as movement of loners or young wolves in search of new territories are limited by the presence of packs of up to 20-25 dogs ; "genetic" competition, as loners and isolated female wolves may interbreed with dogs and their offspring be more fitted to the Italian environment than wolves, due to their dog-like look".

The same author discusses whether having hybrids would be better than nothing, although they would not be true wolves, but experience in Spain seems to indicate that hybridisation on a large scale is the previous step to extinction of real wolves.

10.4 Minimum viable population size

Small, isolated populations like those of wolves in many parts of Europe are in permanent risk of extinction because of two factors : a high probability of extinction due to accidental deaths of all or many individuals (Diamond, 1984) and inbreeding depression (Frankel and Soule, 1981). Boitani (1984) has speculatively analysed the genetical problems linked to the wolf conservation in Italy, reaching to quite pessimistic conclusions. As European wolf populations are highly fluctuating depending upon human reactions to their presence, even quite healthy populations could be endangered for this cause (Boitani, in litt. to the Council of Europe; April 20, 1989).

11. PROPOSALS FOR WOLF CONSERVATION

It will be assumed that all the potential readers of this report agree about the ethical, aesthetic and practical reasons to conserve the wolf as a wild species in Europe. Subsequently, no effort will be made to convince them about this. Simply, I will reproduce the first principle in the Manifesto (Appendix 1) developed by the Wolf Specialist Group of the Survival Service Commission of the IUCN in September 1973 in Stockholm (Sweden). It says ; "Wolves, like all other wildlife, have a right to exist in a wild state. This right is in no way related to their known value to mankind. Instead, it derives from the right of all living creatures to co-exist with man as part of natural ecosystems".

However, it seems evident that European man has actual or imaginary reasons for hunting wolves. As conservation cannot be achieved in theory, but in the "real world" (Soule, 1986), a strategy for wolf conservation with a likelihood of success must include plans to minimise the actual reasons for killing wolves and to eliminate the imaginary ones. Two ways are possible to do this :

- a) By separating the world of the wolf from the world of man ; wolves would be restricted to wilderness, to remote areas where conflicts with man would be reduced to a minimum.
- b) By accepting the wolf in the human world, or, better, by integrating human activities in the natural environment, which includes wolves.

The first way has been chosen in North America, but now it is not viable in Europe. In European countries there are practically no remote, uninhabited areas to keep wolves far away from men. Moreover, at the present time in many parts of Europe wolves need men to survive, as they mainly feed on livestock and human refuse (more than 90% of prey items in faeces in Italy, Boitani, 1982 ; more than 85% in Central Spain, Reig. et al., 1985 ; more than 80% in northern Portugal, Magalhaes, 1975). Thus, an European strategy for wolf conservation would put through :

- a) educating people to admit wolves in their neighborhood, even if they produce some economic losses ;
- b) minimising and/or compensating these losses, and giving the wolf an economic value ; and
- c) diminishing the causes of wolf mortality through legal and management rules based on scientific knowledge.

None of these measures will be feasible unless the rest of them are as well. Most of the proposals presented here have been done so previously by the "Guidelines on wolf conservation" of the Wolf Specialist Group (Appendix 1).

11.1 Education of public

All specialists consider that obtaining support from the public is vital to achieve wolf conservation. So, Bjärvall (in litt., March 1988) writes about Sweden : "... during the last years we have considered information as probably the most important part of the management programme for the wolf. Several steps have also been taken to try to inform people. Articles have been written in different magazines, folders have been distributed to all house-holds in the region, we have had public meetings and the local newspapers etc. derive regular information from the snow-tracking work", and he adds : "We have tried to do all that we possibly can, but if that is enough remains to be seen".

The Wolf Specialists Group of the IUCN recommended the following guideline for education (Appendix 1) : "A dynamic educational campaign should be promoted to obtain the support of all sectors of the population through a better understanding of the values of wolves and the significance of their rational management. In particular the following actions are advocated :

- a) Press and broadcast campaigns ;
- b) Publication and wide distribution of information and educational material ;
- c) Promotion of exhibitions, demonstrations, and relevant extension techniques".

This kind of educational campaigns has been tried at least in Spain (Rodríguez de la Fuente, 1975), Italy (Boitani and Zimen, 1979), Portugal (activities of "Grupo Lobo" since 1985) and Scandinavia (as mentioned by Bjärvall just above), and surely they have something to do with the probable bending in the trend to wolf extinction detected twenty years ago. Campaigns would be necessary in Turkey and Greece, where probably wolf numbers continue to decrease.

Frequently, though inquiries detect that most people hold a positive opinion towards the wolf, wolves are still killed. Boitani (1982) explains as "positive opinion, at least in the major cities, is necessary to legislate protective laws, yet it is local opinion which controls, judges and influences application of the law. As long as the local public is hostile and suspicious about the species, it is useless to hope for the peaceful protection of the wolf ; breaking the law has little effect if one is pardoned or even encouraged by local public opinion". So, to achieve wolf conservation it is essential to secure cooperation, or at least tolerance from local people. But to do so it is necessary to complement the educational campaign (which must include sociologists ; Boitani and Zimen, 1979) with practical measures to reduce economic damages.

11.2 Legal and administrative measures

It is very difficult to decide which types of legal protection must be recommended for the wolf in Europe. In fact, fully legal protection is a meaningless measure when local people decide to kill wolves on account of the damage they cause. Besides, to prevent wolf hunting when serious damage has been caused would undoubtedly make public opinion turn against the wolf.

European states must guarantee the survival of viable wolf populations in their territories, but they must as well be able to enjoy a certain flexibility to control wolves where they cause important damage. Among the guidelines of the above cited wolf Specialist Group, the following proposal is included: "Each country should define areas suitable for the existence of wolves and enact suitable legislation to perpetuate existing wolf populations or to facilitate reintroduction. These areas would include zones in which wolves would be given full legal protection (...) and additionally zones within which wolf populations would be regulated according to ecological principles to minimise conflicts with other forms of land use". In Italy too three types of zones have been defined where different actions could be carried out, but the criterion to define them has been the frequency of wolf presence in them and not damage minimisation (Boitani and Fabri, 1983).

Up to three zones could be considered in each country :

- a) zones where the wolf would be wholly protected ;
- b) zones from where selected wolves could be removed according to a management plan ;
- c) zones where the wolf could be hunted with only the limitations of hunting regulations, by considering those zones inadequate to maintain stable populations of the species for the serious conflicts they would generate.

These three types of zones would not have to correspond to the actual wolf situation, but to their capacity to keep wolf populations causing little economic damage (for instance, Blanco et al., 1988, prove that on the average one individual wolf in some Spanish regions causes damage estimated at a bit more than 2,000 US dollars, while in some others they would be less than 200 US dollars). Obviously, individuals behaving abnormally (e.g. prone to attack children) could be eliminated in all the zones. It is important to remark that zones wholly protected cannot be assimilated to national and natural parks, whose dimensions in Europe make them unable to maintain viable wolf populations. It is also necessary to have in mind that the strategy for wolf conservation must be flexible, so that zonification can be revised every two or three years regarding its suitability for the proposed objectives.

This flexible strategy must and can be carried out according to the Bern Convention, either if the wolf is kept in Appendix II (full protection), or if it is included in Appendix III (it can be shot, but under regulations imposed by the government to guarantee its survival). Under the legal aspects of wolf protection, probably Portugal leads the way, as a new law has been issued (November 1988) after its approval by Parliament on August 13, 1988. The object of this law is "to integrate the bases for the protection, conservation

and fomentation of the iberian wolf..." (Grupo Lobo Newsletter, September/October 1988). The means to achieve it are by banning the hunting of the species (except in some cases authorised by the government), banning of the use, trade and storage of poisons, traps and laces, indemnification for wolf damage, etc.

11.3 Compensation for wolf damages

Society must pay for having wolves, so that losses do not entirely fall on cattlemen. Even more, a European Fund for compensating wolf damage should be established, since conservation of the species is an European problem, and it is not fair that the price of this problem be exclusively paid by those countries that did not suppress wolves some centuries ago as the rest did.

Two alternative or complementary ways can be used to compensate damages: to pay for each case when it occurs, or to remunerate shepherds having livestock in wolf areas, not depending on the amount of damage caused.

In the first case it is proposed that all damage by wolves be compensated in fully and mid-protected zones. Procedures to pay generously and, above all, promptly, should be studied, as usually herdsmen would not delay for months trying to eliminate the wolf.

In the second case, cattlemen would receive a yearly reward for each head of cattle raised in wolf areas, especially in wholly and mid-protected zones. Previously, cattlemen would accept the potential damages, taking themselves the necessary measures to diminish them (use of shepherd dogs, electric fences, etc). In this way, when and where rewards were high enough, cattlemen could accept wolf presence in their territories, thus helping wolf conservation movements and reducing illegal hunting.

Anyway, the development of measures to prevent wolf attacks on livestock (keeping the cattle in at night, training dogs, etc) and to push the socio-economic development of rural populations in areas where wolves were accepted, would be favoured.

11.4 Prohibition of poison and other indiscriminate killing methods

According to the Bern Convention, the use of poison and any other indiscriminate killing methods would be forbidden in the three types of zones. Watching to have this and other rules kept and penalties for infractors must be reinforced, and the need for these measures explained to public.

11.5 Reinforcement and eventual reintroduction of wild ungulates

It has already been said tht wolves resorted to livestock when wild ungulates, their natural prey, disappeared or became very rare. Reinforcement of wild ungulate populations and their eventual reintroduction in zones where they have disappeared from, would help the stabilisation of wolf populations that would not need to kill sheep. In some areas of Old Castile (Spain) the wolf number has increased after red deer reintroduction and a natural repopulation by wild boars and roe deer (Tellería and Saenz-Royuela, 1984).

As an alternative or a complement to wild ungulate repopulation, that necessarily is a slow process, artificial feeding places could be set up at some periods of the year in fully protected zones so as to minimise wolf damage to livestock.

11.6 Reinforcement of the economic value of the wolf

The presence of wolves can be used to promote wolf-related tourism activities, as is done in some Canadian National Parks or in Sweden (Björvall, 1989).

In game reserves the value of the wolf as a game trophy should be remarked, as an economic compensation for wolf predation upon ungulates. This would especially be the situation in the so-called partial protection zones, where limited and controlled wolf shooting would be encouraged as happens in some countries of East Europe.

11.7 Recognition of the importance of the wolf in planning

Forest disappearance, high density of roads and many other environmental alterations after economic development do affect wolf survival. Thus, the importance of wolf conservation should be borne in mind when planning, and especially considered in environmental impact evaluations.

11.8 Control of stray-feral dogs

Feral dogs must be eliminated from European environments. Direct elimination should be accompanied by informative and educational work, trying to show the need of the measures to be taken and making people aware of their responsibilities when leaving their dogs in the country.

11.9 Security of a minimum population size

The fully protected zone must be large enough to allow a minimum-sized viable wolf population to live in it, and be as connected as possible to other zones by corridors or passages allowing genetic interchange among different population. Boitani (1982) estimates that in Italy each fully protected area should cover at least 20,000 square kilometres.

The convenience of artificially introducing individuals from other populations into one must be studied. Regarding this the problem of subspecies should be considered. All European wolves probably belong to the subspecies Canis lupus lupus, except Asian wolves in Turkey that belong to Canis lupus pallipes. Nevertheless, subspecies for the Iberian wolf, the Italian wolf, etc. have been described. Even if those subspecies are not recognised, each one of the isolated populations of European peninsulae is doubtlessly genetically adapted to its habitat. The maintenance of genetic purity of these locally adapted forms is a great responsibility (regarding this, the possibility that captive wolves from an unknown provenance may willingly or unwillingly be released in the field is an additional risk, largely present in Italy according to Boitani, 1989. As is already done in Sweden and in Portugal, captive wolves in other European countries should be tattooed on their lips, so that they could be controlled and identified at any moment).

11.10 Captive breeding and reintroduction

Reintroduction is the only possibility for the wolf to exist again in some European areas where it has disappeared from. However, it is not easy to find suitable areas for reintroduction since they must be free from all the already mentioned causes of wolf decline. In the Bavarian Forest, for instance, bearing quite suitable conditions for wolf reintroduction, such as plenty of ungulates, nine young wolves (five males and four females) accidentally escaped from an enclosure in January 1976. Two years later all of them had been killed (Zimen, 1978) which proves that the needed conditions for a successful reintroduction were not present.

Probably the only European zones where wolves could be reintroduced is Scandinavia. Wolves in Sweden and Norway come from NW Soviet Union, but they will usually stay in reindeer management areas where they get exterminated. The small population presently living in SE Norway and W Sweden is not causing damage to reindeer owners and has a fair chance of survival. As it is generally known that the Scandinavian wolf population is in "need of a constant flow of emigrating wolves to support and build up a future genetically healthy population" (Myrberget and Sorensen, in litt., June 1988), this flow could be artificially increased by reintroducing Russian wolves.

Many topics related to wolf reintroduction have been revised by Zimen (1976) and Mech (1979), among others. Dracht and Soutar (1982) have developed a model to determine the feasibility of reintroducing the wolf in the island of Rhum, Inner Hebrides, Scotland. The results from their computer simulation suggest that the island is not a suitable site for reintroduction.

Very often captive breeding is considered as the best way of establishing a gene bank and to produce individuals for reintroduction (e.g. Segnestam, 1975). However, Mech (1979) strongly recommends using wild wolves rather than wolves reared in captivity for reintroductions, as the probability of success in a relocated wolf population appears proportional to the wolf's fear and avoidance of man. On the other hand, captive breeding has been considered the "last opportunity" to save some gene pools (species or genetically isolated populations) (Durrell, 1975). Nevertheless, European populations of wolves, although quite isolated, could survive without captive breeding (considering the proposed importation of Russian wolves in Scandinavia), which should be taken into account only in Italy.

On the other hand, one or several wolf packs raised in captivity could be very useful for educative and research purposes.

11.11 Scientific research

To develop a management plan for the wolf demands a solid knowledge about ecological requirements, behaviour, genetics, pathology (parasites, control of rabies), etc., which can only be obtained through scientific research. Thus, research on wolves must be intensified and be part of any management plan for the species (see Appendix 1).

11.12 International cooperation

The hitherto presented proposals are very general and must be developed in each country through a management plan for the species, similar to the one Boitani and Fabri (1983) have tried to design for Italy. Yet, the Italian case is unusual since it is the only Council of Europe member country that maintains an almost exclusively national wolf population. In all other cases wolves live by boundaries or migrate from one country to the other. International cooperation is needed to develop management plans for wolves in Iberian Peninsula (Spain and Portugal), Balkan Peninsula (Rumania, Yugoslavia, Albany, Bulgaria and Greece), Fennoscandia (Sweden, Norway and Finland) and the Middle East (including Turkey). Obviously, coordination among the several regional governments, where conservation of wild fauna depends on them, should precede international cooperation.

Besides conjoint management plans among those countries sharing wolf populations, the several states should cooperate by interchanging publications and specialists and by organising meetings.

Coordinating the efforts of the different European countries would be encouraged. A European Centre of Information, a European Fund and even a European Strategy for Conservation and Management of the wolf, including a European Permanent Committee, could be created, perhaps under Council of Europe tutelage.

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APPENDIX 1

**CONVENTION ON THE CONSERVATION OF EUROPEAN
WILDLIFE AND NATURAL HABITATS**

Berne 19.IX.1979

Standing Committee

RECOMMENDATION N° 17 (1989)

**OF THE STANDING COMMITTEE
ON THE PROTECTION OF THE WOLF (Canis lupus) IN EUROPE**

(adopted by the Standing Committee on 8 December 1989)

The Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats, acting under the terms of Article 14 of the Convention;

Having regard to the aims of the "Convention for the Conservation of European Wildlife and Natural Habitats" to conserve wild flora and fauna and their natural habitats;

Considering that the grey wolf (Canis lupus) (hereinafter referred to as "wolf") is a fundamental part of the European natural heritage for its symbolic, scientific, ecological, educational, cultural, recreational, aesthetic and intrinsic value;

Recalling that Article 1 paragraph 2 of the Convention requires that Contracting Parties give particular emphasis to the conservation of endangered and vulnerable species;

Recalling that the wolf is listed in Appendix II to the Convention as a strictly protected fauna species;

Considering that the wolf is seriously threatened throughout Western Europe, having become extinct in the territory of many Contracting Parties and reduced to small populations in some others;

Considering that habitat loss, prey shortage and human persecution have been the most significant causes of its extinction (or the drastic reduction of its populations) in Western Europe;

Conscious that the wolf is a species that, in some circumstances, may come into conflict with human activities;

Recalling that out of the eight Contracting Parties that find wolves in their territories, three have made reservations under the terms of Article 22 of the Convention, which in practice means that the most important populations of wolf in Western Europe do not benefit from the protection accorded by Article 6 of the Convention;

Recalling that in Greece and Turkey the wolf is classified as a pest;

Referring to the report on the status and conservation needs of the wolf (Canis lupus) in the Council of Europe member States;

A. RECOMMENDS THAT CONTRACTING PARTIES:

1. Draw up management plans for the species in view of assuring viable populations at appropriate levels;
2. Favour, in order to avoid conflicts, the development of measures aimed at preventing wolf attacks on livestock, for instance by encouraging herdsmen to keep their cattle in at night, using electrical fences or dogs; encourage the maintenance and training of local races of shepherd dogs;
3. Establish, wherever absent, compensation schemes for damage caused by wolves to cattle and farm animals, improving the payment of compensation where such schemes already function, for instance by simplifying and accelerating administrative procedures and increasing, if required, the amounts paid;
4. Consider the development of general systems of insurance for wolf damage and the financing of works for the prevention of such damage;
5. Promote the establishment of funds to be used for financing conservation work, payment of compensation for damage caused by wolves and the socio-economic development of important wolf areas;
6. Consider, in important wolf areas, the reinforcement and eventual reintroduction of wild ungulates as alternative prey to livestock; facilitate, if necessary, co-operation with other Contracting Parties for such reintroduction;
7. Strengthen the enforcement of the ban on the use of poison, poisoned or anaesthetic baits, and any other indiscriminate methods of killing, for example by introducing appropriate vigilance, setting higher penalties for infraction and carrying out the required publicity on the effects of poison on wild life;
8. Take necessary measures for the marking and register of wolves reared in captivity;
9. Elaborate and implement plans for the elimination of stray and feral dogs; encourage research on the biology of these dogs;
10. Assess the impact on wolf populations of projects for public works, reafforestation, touristic uses or other developments in areas known to be of importance for wolves;
11. Undertake the organisation of awareness campaigns, aimed at the rural populations in wolf areas and other target groups (hunters, school children, decision-makers), and support actively the voluntary groups that are already engaged in such campaigns;
12. Encourage research on all aspects of the biology of the wolf that may permit a more efficient management of it; carry out, in particular, the monitoring of the size, biological characteristics and geographical distribution and dispersal patterns of its populations;

13. Consider the possibility of carrying out captive breeding and reintroduction programmes in areas where the species has been extinct or is endangered; carry out the necessary genetic studies in order to avoid possible negative effects of introducing individuals from genetically different stocks;

14. Consider, while drawing up their wolf management policies, the principles and suggestions contained in the "Manifesto and Guidelines on Wolf Conservation" prepared by the Wolf Specialist Group of the International Union for the Conservation of Nature and Natural Resources (IUCN), given as appendix to this recommendation;

15. Develop, where appropriate for scientific or conservation purposes, bilateral or multilateral contacts with other States and conservation bodies and agencies, including those situated outside the present scope of the Convention;

B. RECOMMENDS THAT CONTRACTING PARTIES THAT HAVE MADE RESERVATIONS CONCERNING THE SPECIES IN THE SENSE OF ARTICLE 22 OF THE CONVENTION OR MAKE EXEMPTIONS IN THE SENSE OF ARTICLE 9 OF THE CONVENTION

1. Identify within their territories the areas with different potential value to wolf conservation, mainly of three kinds:

- a) zones where the wolf would be fully protected,
- b) zones from where selected wolves could be removed according to a management plan,
- c) zones where the wolf could be hunted with only the limitations of the current hunting regulations;

2. Give full legal protection or enforce existing protection of the wolf in zones referred to in paragraph 1a) above;

C. RECOMMENDS THAT FINLAND, NORWAY AND SWEDEN:

continue and strengthen present efforts to coordinate conservation actions and research on the wolf, and consider the need and opportunity to coordinate, within the framework of the Convention, management plans and strategies for the species in Finland, Norway and Sweden;

D. RECOMMENDS THAT GREECE:

1. remove the wolf from the list of pest species,
2. carry out, as a matter of priority, detailed inventories of the wolf population in Greece,
3. draw up a national management plan for the species, and therefore establish adequate wolf protection measures,
4. look for exchange of information on management plans for wolves within the Balkan Peninsula, wherever appropriate;

E. RECOMMENDS THAT ITALY:

1. implement a national conservation strategy for the species,
2. enforce the prohibition to possess in captivity individuals of all subspecies of Canis lupus and to release them in the wild,
3. continue and improve the present captive breeding programme already started;

F. RECOMMENDS THAT PORTUGAL AND SPAIN:

examine the need and opportunity to draw up, within the framework of the Convention, a joint management plan for the population of the Iberian wolf (Canis lupus signatus);

G. RECOMMENDS THAT TURKEY:

1. remove the wolf from the list of pest species,
2. carry out, as a matter of priority, detailed inventories of the wolf populations in Turkey,

H. FURTHER RECOMMENDS Contracting Parties where the wolf has disappeared to support actively the conservation of this species, particularly by promoting public awareness, encouraging research in its present distribution area, studying reintroduction possibilities, and collaborating with the States where wolves survive;

I. INVITES FRANCE to assure the strict legal protection of the wolf, specially for individuals that might migrate from neighbouring States;

J. RESOLVES to encourage Contracting Parties to communicate regularly to the Secretariat of the Convention the information on their wolf populations and/or their research programmes on the species with a view to reassessing the status of the wolf in Europe in 1992 at a second meeting of the Group of Experts.

APPENDIX TO THE RECOMMENDATION

**MANIFESTO AND GUIDELINES ON WOLF CONSERVATION
OF THE WOLF SPECIALIST GROUP OF THE
INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE
AND NATURAL RESOURCES**

Manifesto

Declaration of Principles for Wolf Conservation

1. Wolves, like all other wildlife, have a right to exist in a wild state. This right is in no way related to their known value to mankind. Instead, it derives from the right of all living creatures to co-exist with man as part of natural ecosystems.
2. The wolf pack is a highly developed and unique social organisation. The wolf is one of the most adaptable and important mammalian predators. It has one of the widest natural geographical distributions of any mammal. It has been, and in some cases still is, the most important predator of big-game animals in the northern hemisphere. In this role, it has undoubtedly played an important part in the evolution of such species and, in particular, of those characteristics which have made many of them desirable game animals.
3. It is recognised that wolf populations have differentiated into sub-species which are genetically adapted to particular environments. It is of first importance that these local populations be maintained in their natural environments in a wild state. Maintenance of genetic purity of locally adapted races is a responsibility of agencies which plan to reintroduce wolves into the wild as well as zoological gardens that may provide a source for such reintroductions.
4. Throughout recorded history man has regarded the wolf as undesirable and has sought to exterminate it. In more than half of the countries of the world where the wolf existed, man has either succeeded, or is on the verge of succeeding, in exterminating the wolf.
5. This harsh judgement on the wolf has been based, first, on fear of the wolf as a predator of man and, second, on hatred because of its predation on domestic livestock and on large wild animals. Historical perspectives suggest that to a considerable extent the first fear has been based on myth rather than on fact. It is now evident that the wolf can no longer be considered a serious threat to man. It is true, however, that the wolf has been, and in some cases still is, a predator of some consequence on domestic livestock and wildlife.
6. The response of man, as reflected by the actions of individuals or governments, has been to try to exterminate the wolf. This is an unfortunate situation because the possibility now exists for the development of management programmes which would mitigate serious problems, while at the same time permitting the wolf to live in many areas of the world where its presence would be acceptable.

7. Where wolf control measures are necessary, they should be imposed under strict scientific management, and the methods used must be selective, highly discriminatory, of limited time duration and have minimum side-effects on other animals in the ecosystem.
8. The effect of major alterations of the environment through economic development may have serious consequences for the survival of wolves and their prey species in areas where wolves now exist. Recognition of the importance and status of wolves should be taken into account by legislation and in planning for the future of any region.
9. Scientific knowledge of the role of the wolf in ecosystems is inadequate in most countries in which the wolf still exists. Management should be established only on a firm scientific basis, having regard for international, national and regional situations. However, existing knowledge is at least adequate to develop preliminary programmes to conserve and manage the wolf throughout its range.
10. The maintenance of wolves in some areas may require that society at large bear the cost, eg by giving compensation for the loss of domestic stock; conversely there are areas having high agricultural value where it is not desirable to maintain wolves and where their introduction would not be feasible.
11. In some areas there has been a marked change in public attitudes towards the wolf. This change in attitudes has influenced governments to revise and even to eliminate archaic laws. There is a continuing need to inform the public about the place of the wolf in nature.
12. Socio-economic, ecological and political factors must be considered and resolved prior to reintroduction of the wolf into biologically suitable areas from which it has been extirpated.

Guidelines

The following guidelines are recommended for action of wolf conservation.

A. General

1. Where wolves are endangered regionally, nationally or internationally, full protection should be accorded to the surviving population. (Such endangered status is signalled by inclusion in the Red Data Book or by a declaration of the Government concerned.)
2. Each country should define areas suitable for the existence of wolves and enact suitable legislation to perpetuate existing wolf populations or to facilitate reintroduction. These areas would include zones in which wolves would be given full legal protection, eg as in national parks, reserves or special conservation areas, and additionally zones within which wolf populations would be regulated according to ecological principles to minimise conflicts with other forms of land use.

3. Sound ecological conditions for wolves should be restored in such areas through the rebuilding of suitable habitats and the re-introduction of large herbivores.
4. In specifically designated wolf conservation areas, extensive economic development likely to be detrimental to the wolf and its habitat should be excluded.
5. In wolf management programmes, poisons, bounty systems and sport hunting using mechanised vehicles should be prohibited.
6. Consideration should be given to the payment of compensation for damage caused by wolves.
7. Legislation should be enacted in every country to require the registration of each wolf killed.

B. Education

A dynamic educational campaign should be promoted to obtain the support of all sectors of the population through a better understanding of the values of wolves and the significance of their rational management. In particular the following actions are advocated:

- a) Press and broadcast campaigns;
- b) Publication and wide distribution of information and educational material; and
- c) Promotion of exhibitions, demonstrations and relevant extension techniques.

C. Tourism

Where appropriate, general public interest in wolf conservation should be stimulated by promoting wolf-related tourist activities. (Canada already has such activities in some of its national and provincial parks.)

D. Research

Research on wolves should be intensified, with particular reference to:

- a) Surveys on status and distribution of wolf populations;
- b) Studies on feeding habits, including especially interactions of wolves with game animals and livestock;
- c) Investigations into social structure, population dynamics, general behaviour and ecology of wolves;
- d) Taxonomic work, including studies of possible hybridisation with other canids;

- e) Research into the methods of reintroduction of wolves and/or their natural prey; and
- f) Studies into human attitudes about wolves and on economic effects on wolves.

E. International cooperation

A programme of international cooperation should be planned to include:

- a) Periodical official meetings of the countries concerned for the joint planning of programmes, study of legislation, and exchanging of experiences;
- b) A rapid exchange of publications and other research information including new techniques and equipment;
- c) Loaning or exchanging of personnel between countries to help carry out research activities; and
- d) Joint conservation programmes in frontier areas where wolves are endangered.

Nature and environment

1. Aspects of forest management, 1968 (*out of print*)
2. Freshwater, 1968 (*out of print*)
3. Animals in danger, 1969 (*out of print*)
4. A handbook for local authorities, 1971 (*out of print*)
5. Soil conservation, 1972 (*out of print*)
6. Endangered Alpine regions and disaster prevention measures, 1974 (*out of print*)
7. Air pollution problems – Manual of experiments, 1975 (*out of print*)
8. Evolution and conservation of hedgerow landscapes in Europe, 1975
9. The integrated management of the European wildlife heritage, 1975 (*out of print*)
10. Threatened mammals in Europe, 1976 (*out of print*)
11. The effects of recreation on the ecology of natural landscapes, 1976 (*out of print*)
12. Heathlands of western Europe, 1976 (*out of print*)
13. The degradation of the Mediterranean maquis, 1977 (published jointly with Unesco) (*out of print*)
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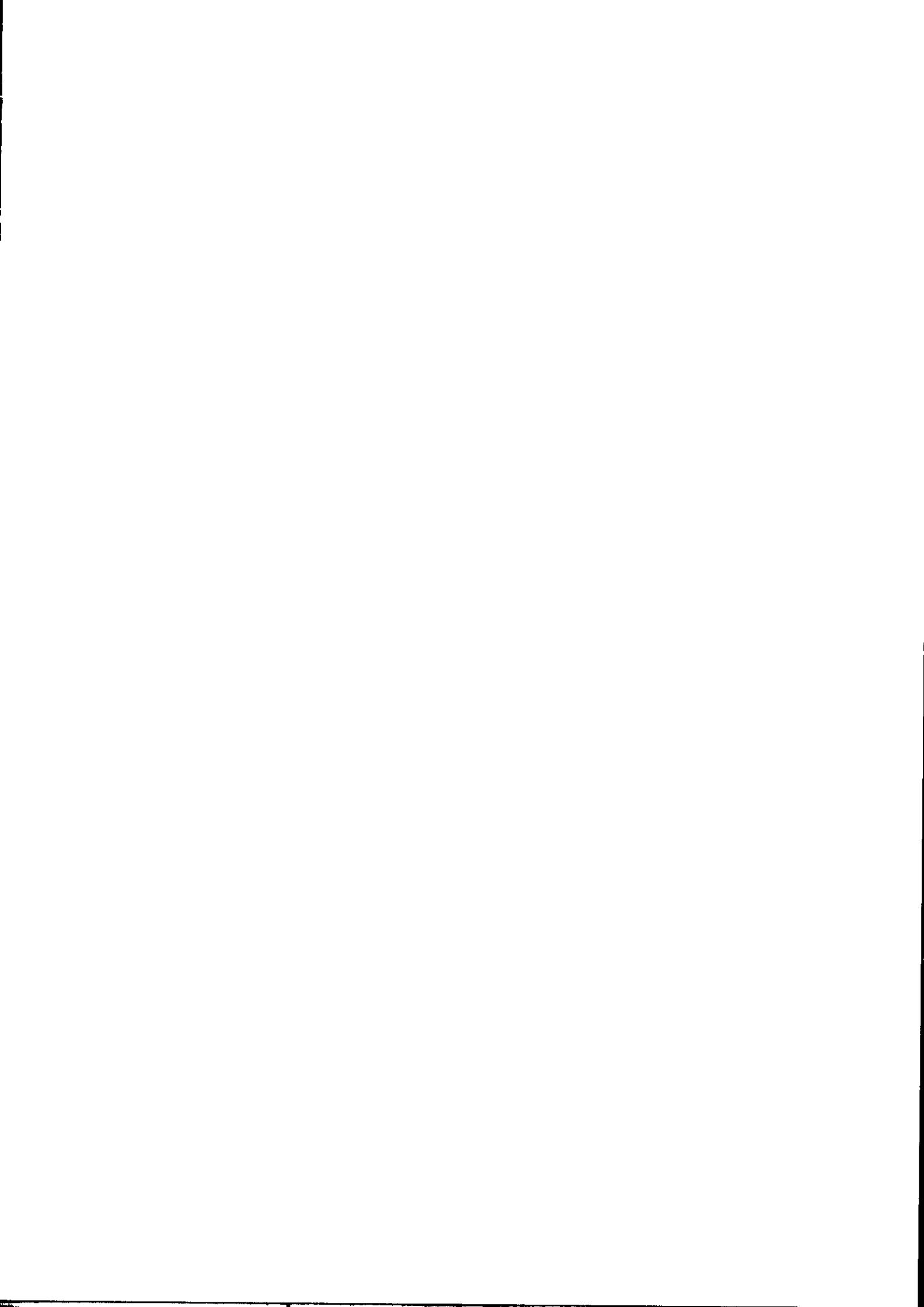
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