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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

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Status of Large Carnivore Conservation in the Baltic States

Action Plan for the Conservation of Wolf (*Canis lupus*) in Latvia



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The plan is elaborated in frame of the project "Inventories of Species and Habitats, Development of Management Plans and Capacity Building in relation to Approximation of EU Birds and Habitats Directives" financed by the Danish Environmental Protection Agency

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SUMMARY

- **Population status**

The wolf is common in the major part of the country inhabiting most densely the western and eastern regions. According to official data on population trend, the maximum of population size was reached in the middle of nineties (1997 – 997 individuals). Decline in numbers is recorded currently as a result of strengthened control. However, no proper census was carried out and the number few years ago likely was overestimated. Forests and high bogs are considered as the main wolf habitats. There are no significant differences in population status and habitat conditions between Latvia and neighbouring countries, thus a joint wolf population inhabits Eastern Baltic, Belarus and western regions of Russia. The hunting is responsible for the major wolf mortality.

- **Former legislation**

Game species, however, without any closed season and almost no restrictions in hunting methods. From 1995 till 1999, the premium of amount up to 75 LVL (125 USD) was paid by State Forest Service for killing a wolf regardless of its age, sex or hunting mean.

- **Objectives**

To maintain the current status of wolf population compromising economic interests and biological welfare of population. To ensure the spatial continuance of population and a free ranging of animals between western and eastern sub-populations in Latvia. To maintain the carrying environmental capacity and fairly natural ecological functions of the species in ecosystems.

- **Priority statement**

To change the public opinion (special target groups – hunters, farmers, school children) informing people about species ecology, threats to European populations, conservation needs and ways. To prohibit wolf hunting in the breeding period.

- **Broad policies**

A sustainable management has to be initiated with amendments in national legislation making the wolf a game species equivalent to all others. The aim of control can be neither extermination nor reduction of local populations without any significant ecological, economical or social reason (e. g. paying bounties). To stop the use of murdering catching devices like snares and leg-hold traps. To extend informing of public. As a habitat generalist, the wolf in Latvia at least temporarily can not be saved within protected areas and there is no need for a special wolf habitat protection.

- **Actions**

The hunting regulations shall be amended and the wolf hunting ban from 1st April till 31st August introduced. Problem wolves or wolf packs can be eliminated in closed season too. Quotation of hunting bag has to be initiated. The most urgent research activities shall deal with estimation of home ranges, population densities, and other issues of population ecology which can be found by radio tracking. It is very important to ensure a sound monitoring of the whole population in country including co-ordinated investigations of killed wolves. Adapting international legislation, a joint Baltic strategy in wolf management should be worked out for Estonia, Latvia and Lithuania taking into account local peculiarities different from those in southern and central Europe. Action plan should be updated in two years.

INTRODUCTION

Wolf is a typical representative of the carnivorous mammals of eastern Baltics. It has inhabited the land area of present-day Latvia since the post-glacial era, dating back to the 9th millenium B.C. (Taurinš 1982; Timm et al. 1998). Man has from time immemorial held wolf as his competitor in hunting down wild ungulates. The animal husbandry undertaken by man only intensified this conflict. The attacks on domestic animals were the principal reason why humans exterminated wolf, though its hide and meat could be of use (Kozlov 1998). Occasional assaults on people, especially children, only aggravated the situation (Kozlov 1990; Kozlov 1990; Jhala, Sharma 1997).

The earliest data on wolf in Latvia, useful for scientific research, date from the 19th c., when the number of wolves was high (Kalninš 1943). However, by the late 19th c. wolf in Latvia was nearly destroyed by intensive hunting. By the time WWII broke out, only 17 wolves had survived. During the post-war period the wolf population increased rapidly to more than 1,000 heads. According to the hunting statistics, in the 60's the wolf population of Latvia was on the verge of extinction. It gradually stabilized again by the end of the 70's. During the 80's, the wolf population was stable and distributed evenly throughout Latvia, contrary to the situation in western Europe, where wolf was found only in Spain and Italy.

In the early 90's, greatly due to the changing political situation in Latvia, there was for some years no control over the wolf population. A strong population of ungulates of the late 80's and early 90's created excellent feed resources for carnivores. This situation resulted in another rapid growth of wolf population, reaching nearly 1,000 heads. The 90's in Europe, too, were noted for an increase in wolf population and widening of its distribution range. As a result of natural migration, wolf appeared in such countries as Switzerland, France, Austria, etc., where it had been absent for more than a century. Nowadays, wolf is recognized as a part and parcel of natural ecosystems, and a number of countries favour its re-introduction. In Latvia, however, it is quite the reverse: wolf is considered a nuisance to be done away with by all means possible, resulting in another anti-wolf campaign launched in the mid-90's. A marked population decrease was the only outcome that could be expected.

In the modern times the dynamics of wolf population over the most part of its natural distribution range essentially depends on hunting intensity. That is why in controlling wolf we should be guided by the principles of sustainability rather than emotions. The same principles, by which we manage other game animals, should be applied to wolf as well. And first of all, it implies a ban on hunting wolf during the breeding season.

The goal of the given plan is to contribute to the conservation of wolf, done against the background of sweeping changes in the country's political and economic situation. Informing the local and international institutions as well as government officials about the specific features of the wolf's ecology in Latvia, backed up by a campaign of raising public awareness of the problems involved, are believed to be the principal means for achieving the above goal.

BIOLOGICAL REVIEW

1. Species description

1.1. Appearance and the body size

In terms of size, wolf is the biggest animal of the Canidae family. Its body length reaches 160 cm (Taurinš, 1982), the withers height – up to 1 m (Kozlov, 1988) (see also the data of the present study summarized in Table 1). In appearance, wolf resembles a big dog. However, unlike the latter, its withers are higher, showing up long beard hair, the muzzle is shorter and snub-like, the neck – shorter and thicker (Taurinš, 1982). The front part of its thorax is laterally flattened and looks narrower as compared with dog. The wolf's eyes are normally fair – yellow or greenish, also dark brown, situated more sideways and

slanted. Its tail is usually sagging down. Contrary to dog, a grown-up wolf will never have its tail coiled up and held above the line of its spine. Furthermore, wolf is never lop-eared. Its pelt colour may vary from nearly white to completely black (wolves of such colour are frequently found in North America). In Latvia, wolf normally is grey or fawn-coloured, occasionally showing a tint of red. The lower part of its muzzle and neck are usually of lighter colour, the eyes may be encircled by rings of fair colour with a dark stripe extending from the eye corner to ears. Wolf's back and front paws may show up distinctly dark stripes (Bibikov 1985).

Table 1 : Body size of the wolves hunted in Latvia

Dimensions	?					? ?				
	x	min	max	s	n	x	min	max	s	n
Up to year-olds:										
Weight, kg	27.2	18	37.1	6.06	9	26.8	16.4	34.5	7.59	4
<i>Body height, cm</i>	62.3	46	80	7.89	32	63.8	40	78	8.91	36
Body length, cm	94.5	68	121	13.29	32	96	49	129	15.83	36
<i>Tail length, cm</i>	36.5	28	46	4.68	32	35.78	22	55	6.96	36
Hind foot, cm	22.9	15	29	2.86	31	22.5	11	29	3.41	36
Yearlings:										
Weight, kg	28.8	22.7	39	5.74	9	29.7	16.4	52	6.29	25
<i>Body height, cm</i>	69.5	54	82	6.02	31	68.7	50	81	5.76	68
Body length, cm	111.5	84	144	13.48	32	106.9	74	138	10.46	68
<i>Tail length, cm</i>	41.5	34	50	4.63	32	38.9	13	54	6.75	68
Hind foot, cm	25.2	21	34	2.49	32	23	13	32	2.88	66
Adults:										
Weight, kg	38.2	25.7	67	7.26	62	34.2	16	52	6.32	39
<i>Body height, cm</i>	75.5	62	108	6.42	156	71	54	85	5.99	118
Body length, cm	117.2	78	148	10.74	156	109.3	71	135	12.16	115
<i>Tail length, cm</i>	41.4	30	65	5.24	156	41.2	30	56	5.49	115
Hind foot, cm	25.9	17	36	2.47	154	24.5	16	34	2.81	111

Notes: x – averages of the body sizes measured;

min – minimum value of body sizes;

max – maximum value of body sizes;

S – standard deviation, describing the dispersion of the indices measured in relation to the averages, used for comparing the average measurement data between two populations;

n – number of individuals measured; the body height is the distance between the highest point on the animal's back (at shoulder blades) and the rear edge of the balls on its paws; the body length is the distance between the muzzle tip and the anus, measured on laying animal, the length of foot is measured from the joint of the paw up to the longest toe, not counting the claw.

The wolf's gait normally resembles an easy trot. When running, its movements are vigorous, yet not so fast as those of the dog. Wolf often moves in an easy gallop, with its back remaining straight (Bibikov 1985). It may develop a speed of 40-50 km/h, and on shorter distances – up to 65 km/h (? 1990).

1.2. Indications of the wolf's presence

Wolf is a cautious animal, and it may be observed directly only in rare cases. When chased intensively, wolves are active mainly at night or dusk. That is way we may encounter them early in the morning or late at night. Occasionally wolves can be seen also in the daytime, usually on forest roads or rides. Wolf is known to attack domestic animals. Even in the presence of man wolf may snatch a prey and

dash off. Besides, it is at times difficult to state, if the animal seen far off was a wolf or a straying dog. That is why indirect indications rather than occasional encounters with wolf should be taken as the most essential signs of its presence in the locality.

Wolf's footprints, best seen in the snow, are the most common indicators of its presence. In the wolf's footprint we may identify four toes. Contrary to the dog's footprints of the same size, the former is extended longitudinally so that a straight line may be drawn between the lower edge of the ball of the 2nd and 3rd toe and the outer edge of the 1st and 4th toe. As to the size, the footprint of the front paw is larger than that of the hind one. The length of the former may vary between 8.5 and 13.5 cm, the width – between 8 and 12 cm. It is typical for wolves that their footprints nearly fall in a line. Besides, the animals walk in step, and that is why we fail quite often to determine an exact number of them by looking at footprints. To be more precise in estimating the number of animals, one must follow their track till the place the pack dispersed for some reason.

Snow – tracking in the winter season is the principal method of wolf census (and also hunting) in Latvia. However, this method is limited by an instability of snow cover in winter, thus admitting double counts, which result in an overestimation of the population size. Improvements in the footprint assessment could help arrive at a true-to – life picture of the density of wolf population in Latvia and its dynamics.

Faeces dropped by wolves over the itinerary of their regular cruising, especially those intended for marking out the territory held by the given pack, may be regarded as an easy way of assessing their population. Normally, the wolf's faeces, besides emitting a foul stench, are cylinder-shaped of grey or dark colour, containing fragments of bones and wads of mammal wool (Taurinš 1982). The faeces may contain also ova of the parasites harmful to man as *Echinococcus granulosus* (??????, ???? 1967; ????? 1989). Within a territory inhabited by wolves, scats are often situated at forest roads.

The marks of the territory, held by the particular pack, is yet another indication of wolf's presence. Sand and soil pawed up by the animals at the places where they defecate or urinate serve an example of such marks.

Howling is also an indication of the presence of wolf in the vicinity. It is the way of socialization and communication between the animals, as well as the means for marking out their territory, thus providing for a more efficient utilization of it (Harrington, Mech 1983). Howling is especially important during the period the wolf's young grow into maturity. In the areas inhabited by wolf howling between the cubs and their parents is quite common at night or dusk starting with the end of June. At that time the cubs also respond to fake howling, practised by hunters. This is one of the ways of watching the young wolves in their natural environment.

Wolf's dens, leftovers of its feed, etc. are also indications of its presence, though rare, and there is little chance of finding them.

1.3. Habitats

As to the type of habitat, wolf is not overly demanding. It is a generalist, whose natural range of distribution includes not only the forest zone, but also tundra, steppe and desert. Wolf may live also in an environment of intensive farming. In Spain, for instance, one can find its dens in the corn fields (J.C. Blanco, personal communication). An availability of sufficient feed resources and safe hiding places for resting and making dens are the chief requirements. Closeness to water is also of great importance for wolf. That is why its dens are often next to rivers or bogs (?????? 1988; ???? 1990).

Nowadays, in Europe the forest is the most essential habitat for wolf, where it feels safe. The fact that wolf has become a typical forest dweller is of less importance here. Approximately one thousand years ago wolves lived in an open landscape (Bibikov 1985).

Swamps are not among the habitats favoured by wolves. Yet, for making dens they often choose islands in the swamps, which are difficult to reach. In the wintertime wolves hide away from the hunters in swamps, where it is hardly possible to encircle them.

Wolves will settle into the farmlands, provided there are patches of forest or other suitable hideaways, where they can retreat. Similar situations create synantrophic wolf populations, feeding on domestic animals, alive or dead, or frequenting dumping sites in search of feed (Salvador, Abad 1987; Meriggi et al. 1991; Boitani 1992; Papageorgiou et al. 1994).

Wolf as a species is highly flexible, and can adapt itself to a wide variety of ambient conditions. However, in the modern times it is only anthropogenic factors, intensive persecution in particular, which are responsible for shifts in the wolf's natural range of distribution.

1.4. Diet

Wolf is a carnivorous mammal, diurnally consuming up to 5 kg of feed, predominantly of animal origin (????? 1990). After a prolonged period of absolute fasting it may devour up to 10 kg of feed. However, such situations are rare, and normally the mass weight of the content of its stomach is below 2kg. Taking into account the periods of starvation, the annual consumption of feed by a single wolf is between 500 and 800 kg (Bibikov 1985).

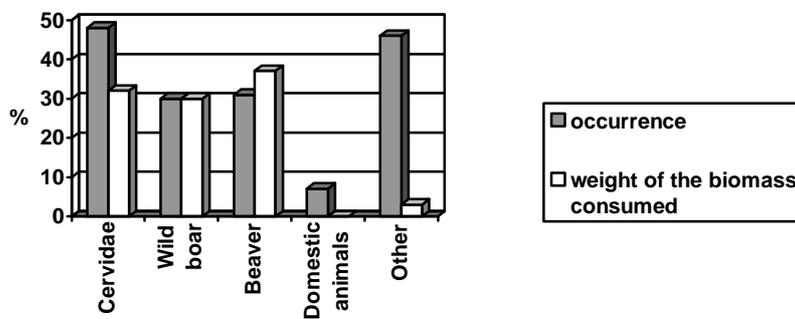


Figure 1. Structure of the wolf's summer diet in Latvia (Andersone 1999).

In Latvia, wolf can enjoy more diverse feed as compared to the situation in the majority of central and west European countries. We have in Latvia four species of wild ungulates: elk (*Alces alces*), red deer (*Cervus elaphus*), wild boar (*Sus scrofa*), roe deer (*Capreolus capreolus*); two species of hare – mountain (*Lepus timidus*), and brown (*L. europaeus*), Eurasian beaver (*Castor fiber*) and a number of other animals, favoured by wolf as prey (Fig. 1) (Timm et al. 1998).

As an opportunistic predator, wolf gives preference to the feed that is most abundant. Thus, in Europe red deer is one of the most favourite preys wolf would choose (Jedrzejewski et al. 1992; Okarma 1995; Okarma et al. 1995; Jedrzejewska et al. 1997). In the localities where red deer is scarce, wolves predate on roe deer and wild boar (Valdmann et al. 1998) as well as elk (Peterson, Page 1983). There are indications that wolf is increasingly hunting on wild boar, i.e. the latter's proportion in the wolf's diet is growing as compared to the share of wild boar in the entire population of ungulates (Jedrzejewski et al. 1992; Andersone 1998b). It appears, it is due to wolf chasing piglets, as the proportion of wild boar meat in the wolf's diet is higher during the summer season (Jedrzejewski et al. 1992).

In the areas of intensive farming, which are strongly impacted by man and, consequently, lack wild ungulates, wolf increases its pressure on livestock (?????, ????? 1975; Salvador, Abad 1987; Meriggi et al. 1991; Papageorgiou et al. 1994; Poulle et al. 1997). It may also roam about dumping sites in search of feed (Boitani 1992).

The wolf's diet may vary depending on the season (Fig. 1 and 2), with wild ungulates – (cervidae, wild boar) predominating in winter (Reig, Jedrzejewski 1998) and more diverse feed in summer, including birds, small mammals, berries, fruit, etc. (Bibikov 1985). In winter, fallen cattle, placed by hunters within

the sites frequented by wolf for alluring it, make up a significant part of its feed (Lesniewicz, Perzanowski 1989; Smietana, Klimek 1993).

The impact of wolf on the populations of wild ungulates differs from that of man as each of them hunts on different age and sex groups of the prey animals (???????, Ka?????? 1989). Wolves predominantly hunt down female deer and fawns (Okarma 1991), and at the end of winter – bulls, weakened during the mating season. (Bobek et al. 1992).

In Latvia, wolf feeds mainly on wild ungulates (Andersone 1998). In winter, cervidae and wild boar account for 80% of the wolf's diet, falling to 10 – 20% in summer (Strazds 1999). During the summer season beaver may become an important source of feed for wolf, accounting for 15 to more than 30% of its diet (Strazds 1997; 1998; 1999). Beaver is reported to be an important constituent of the wolf's diet (Bibikov 1985). Wolf may even reduce the beaver population by cutting back its growth (Shelton, Peterson 1983). This fact is of great importance for the situation in Latvia.

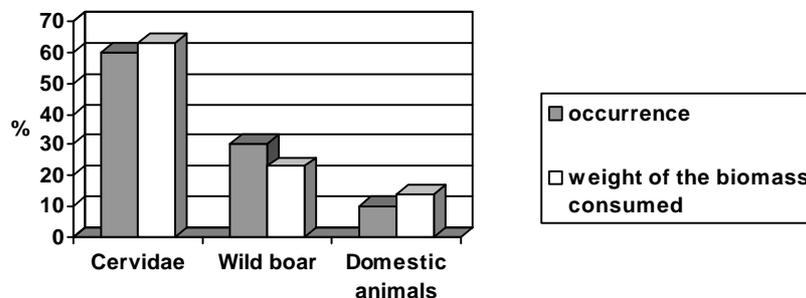


Figure 2. Structure of the wolf's winter diet in Latvia (Andersone 1999).

1.5. Daily habits

Intensive persecution has made wolf change its regular habits, and now you will encounter it only at dusk or night. In the localities, where wolf is not hunted down, it is active also in the daytime, yet the peak of activity falls on the morning and evening hours, when normally man stays out of forest (Theuerkauf et al. 1999).

1.6. Reproduction

As to the reproduction habits, wolf is a monocyclic animal, with the period of heat in January – February and the young born in late April – May. In the countries adjacent to Latvia the average number of cubs in the wolf's litter is 5 to 5.2 (Bibikov 1985). The population of wolf may increase rapidly, as a single couple can breed up to 13 cubs (normally between 5 and 6). However, the mortality of cubs is high – 50% of all the new-born already die by the age of 3 months, and 65% - by the age of 1 year (Jedrzejska et al. 1996).

The investigations done in Latvia (Tab. 1) show the average number of embryos per female wolf to be 6.0 (n=10 SD = 1.89). The number of cubs may be lower than the embryos conceived as a part of them get reabsorbed during the pregnancy, while some of the cubs are delivered dead. Only few litters have been found (n = 3), where the number of cubs is known for sure (on the average 7.3). That is why the collection of the birth rate data for wolves remains an important task.

Table 2. Reproduction evidence in female wolves (n = 18) hunted down in 1998 – 2000.

Age, in full years	Reproduction evidence (fresh placental scars, lactation, rut) in the year the animal was hunted down	Number of placental scars (* number of embryos)
2	+	-
2	-	-
2	+	7
2	+	4
3	+	-
3	-	5
3	+	-
3	-	-
3	+	7
3	+	7
5	+	10*
7	+	6
8	+	4
13	+	6
?	+	-
?	+	-
?	+	4
?	+	-
n=18	Up to 83% of the females were involved in reproduction	Average = 6.0 SD=1,89

1.7. Population structure

Territorial and social structure of European wolf populations is studied mostly in Poland and Russia. Each pack of wolves has a territory of its own, marked out and protected from the neighbouring packs (Jedrzejewska, Jedrzejewski 1998). The size of the territory held by a single pack may vary from 30 to 1,000km² (Bibikov et al. 1983). Inside it one may distinguish between a number of zones: den, breeding zone, the basic territory the pack uses for chasing prey (?????? 1984). There is a neutral or buffer zone between the territories held by neighbouring packs, where clashes between the individuals of rival packs may take place (Mech, 1994). The site of the pack’s territory may vary depending on the availability of feed. However, in this respect some regularities can be singled out, too: the respective territory is larger in winter as compared to the summer season, and again – larger in the north and smaller in the south (?????? 1983; ? ??????? 1984; Bibikov et al. 1983; Bibikov 1985). In the forest zone the territory held by a single pack varies between 100 and 300 km² (Jedrzejewska, Jedrzejewski 1998). No similar investigations are done in Latvia and the average size of the territory held by a single pack is not known.

The spatial distribution of wolf is most strongly affected by anthropogenic factors; especially the intensity of hunting. It disrupts the integrity of the pack’s territory, as the animals increase their home range to avoid hunters (Bibikov 1985). The total wolf population includes also individuals that live solitary. Under normal conditions, about 60% of all the wolves live in packs (Bibikov 1985). Stamping out established packs of wolves enlarges the ratio of solitary animals, disrupting the balance in the system predators – ungulates. For stray wolves, entering a territory, it may take years to adapt themselves to the groups of ungulates there (? ??????? 1984).

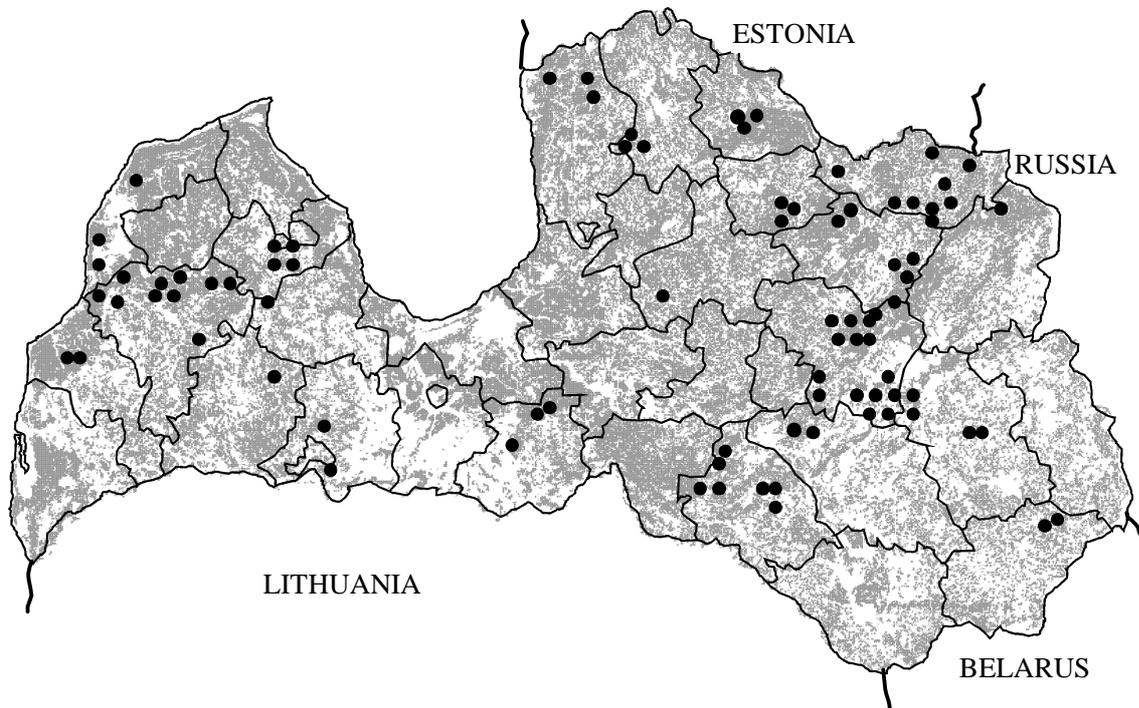


Figure 3. The localities in Latvia where the wolves, included in the given study, were hunted down, years 1998-2000. The distribution of forest is shown in grey.

Elimination of wolf promotes an increase in the number of straying dogs (Kivimäki 1982) which present even more negative predation pressure from the hunters' point of view than wolves do.

The population density of wolf, the same as that of other big predators, is low – between 1 and 20 heads per 1,000 km² (Linnell et al. 1998). However, wrong methods in population census or density estimates, taking into account forest lands only, may yield overstated data (Gaross 1997; Bluzma 1999).

Wolf is a social animal. The pack, comprising the so-called *a-pair*, the cubs of the current year, and one to three offsprings of the previous year, is at the basis of the wolf's social structure (Bibikov 1985). There may be up to 36 animals in the pack, as found in Alaska (Rauch 1967; Bibikov 1985). In Europe the packs are smaller, normally between 3 and 8 heads (Kasprinskis, Kivimäki 1987). In Latvia, the average number of heads in a pack is 5.7 (n = 14).

Nearly over the entire range of wolf's distribution the number of males is higher than females (Bibikov 1985; Kivimäki 1988; Okarma 1989; Kivimäki 1990). The natural mortality is higher for females, while males are hunted down more frequently (Kivimäki 1990). In Latvia, the proportion of males is higher in the total number of wolves hunted down, although this difference is decreasing from year to year. The male/female ratio for the wolves killed in Latvia during the hunting season of 1998/99 was 0.69 (Strazds 1999) as compared to 1.1 for two previous hunting seasons (Strazds 1997; 1998). Normally, the proportion of females increases in the populations under a strong hunting pressure. It seems to be an attempt to compensate for the damage sustained by the population (Bibikov 1985).

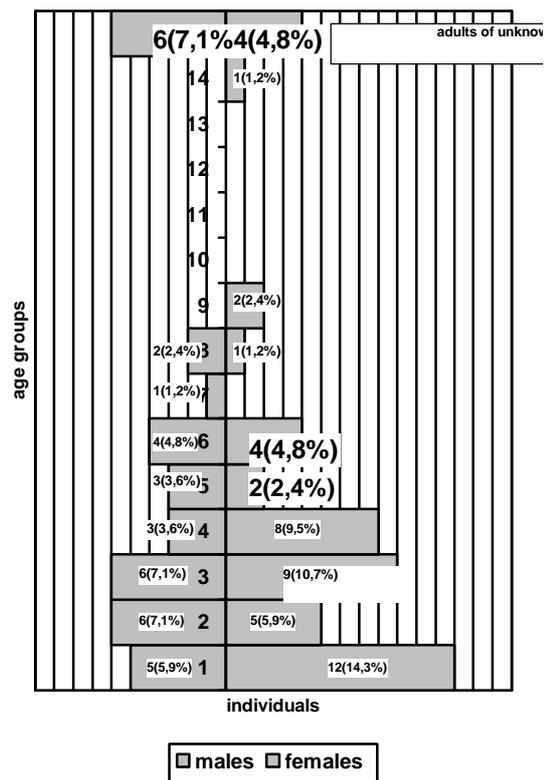
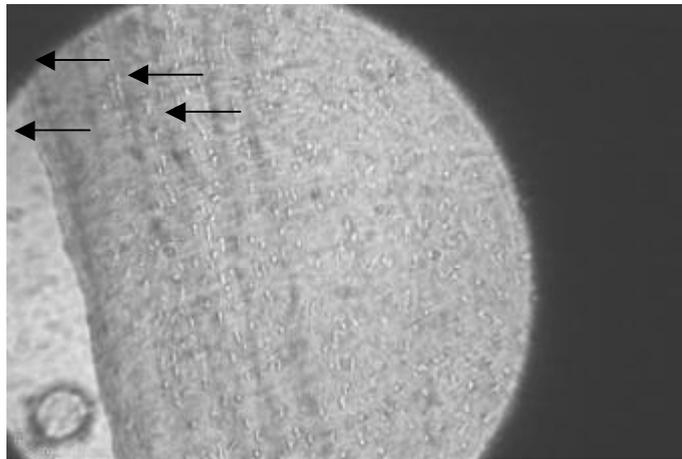


Figure 4. Incremental lines in the tooth cement under a microscope.

The age structure of the wolf population of Latvia was studied between 1998 and 2000. The State Forest Service helped find 14 hunters who volunteered to provide information on the animals killed and give away the skulls for some time for research. The majority of the skulls studied belonged to the individuals hunted down over the past three years (Fig. 3.). To determine the age of the individual, each of

the skulls collected for research purposes had one canine removed and its root of the length of 1-1.5cm sawn off. Afterwards the tooth was placed back in the jaw in order not to spoil the trophy. The individual's age was determined by counting the number of incremental lines in the tooth cement of the given piece of tooth root (Pupila 2000) (Fig. 4).

Figure 5. The age and sex structure of the wolves hunted down in Latvia (n=84)

The animals used for the given study were collected in both the east and west of Latvia. However, the distribution of the samples collected depended on how successfully it was managed to motivate the local hunters to assist in the research work. The research data summarized in Fig. 5 reveal a number of peculiarities as compared to the information found in the literature (see Chapter 3.1).

1.8. Natural enemies

Wolf has virtually no natural enemies over the entire natural range of its distribution. However, there are instances where bear and tiger have attacked wolf (Bibikov 1985). In Latvia, golden eagle (*Aquila chrysaetos*) is reported to have consumed a young wolf (U. Bergmanis, a personal communication). Wolves may also get killed when chasing the big ungulates, as elk, for example, which can defend themselves and even kill a wolf (? ?????? 1988). However, such cases are rare and have no significant effect on wolf population.

1.9. Competitors

Other predators hunting on ungulates and hare, as wolverine, bear, tiger, etc., may compete with wolf for the feed (???????, ? ???? 1967; Bibikov 1985; ? ?????? 1988). As Latvia's bear population is insignificant, lynx (*Lynx lynx*), hunting on roe deer, too, appears to be the only significant competitor of wolf. However, it is quite likely that lynx is a loser in this situation, since a pack of wolves, due to its social structure, easily out competes lynx. Cases are reported on wolves attacking lynx and eating it (Bibikov 1985). Lynx deals with a narrower spectrum of prey animals (mainly roe deer and hare), while wolf can hunt down also bigger animals (Jedrzejewska et al. 1997). Consequently, the competition for feed between the two species is not fierce, as the habitats taken up by each are different (Jedrzejewska, Jedrzejewski 1998). The competition may be not only with other predators but also with wild boar, for instance, which can feed on the prey killed by wolf, thus indirectly competing with the former (Bibikov 1985).

2. Population Size and Distribution

In the 80's the distribution range of wolf in Europe had reached a minimum. However, the past decade shows a tendency towards an increase in both the number of wolves and their distribution range (Fig. 6). In present-day Europe, besides the Baltic countries wolf is found also in Spain, Portugal, Italy, Greece, Poland, Slovakia, Romania, the Nordic countries, Russia. (Pulliainness 1980; Bibikov et al. 1983; Wabakken et al. 1983, 1984; Blanco et al. 1992; Okarma 1989, 1993; Nitsche 1996; Adamic et al. 1998; Bluzma 1999). As a result of natural migration wolf appears also in France, Switzerland, Austria, Germany. In Switzerland and France, for example, wolf has entered the localities where sheep breeding is widely practised, thus creating sharp conflicts between the nature conservation and management goals (Poulle et al. 1997).

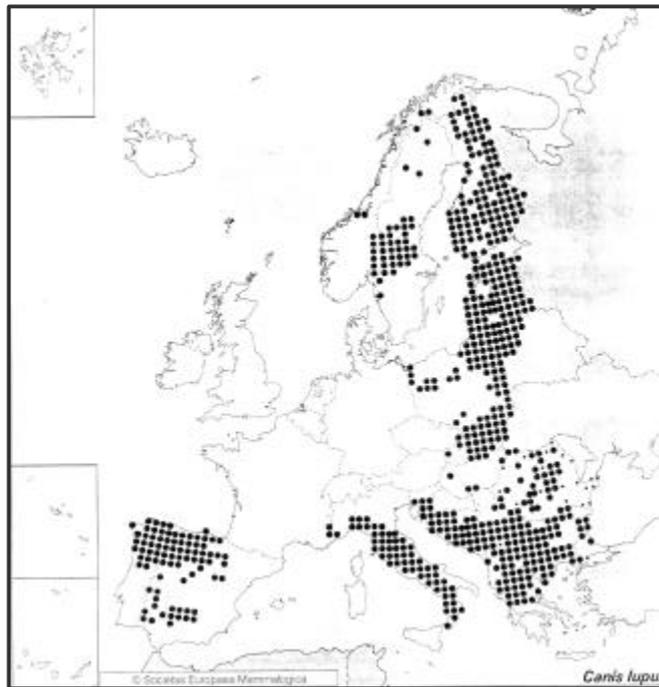


Figure 6. The distribution of wolf in Europe (except CIS countries) shown in 50 x 50 km UTM squares after the Atlas of European Mammals (Mitchell-Jones et al. 1999).

In Latvia, the number of wolves has, over the 20th c., varied considerably, depending on the hunting intensity (Fig. 7). During the period after WW I it increased up to several hundreds. However, over the subsequent period of 20 years wolf was nearly exterminated, with only 17 heads left according to the data of 1940. After WW II, the population re-established itself. The rigorous control of wolf started in the 60`s resulted in another decrease of wolf. During the 70`s the population recovered again to reach another peak in the 90`s – the second one in the post-war years (Anderson, Ozolinš, in press). However, in the past few years there is again a decline in the wolf`s population. The recent period is noted for a tendency towards fragmentation of the range inhabited by wolf (Fig. 8). North Kurzeme (north-west of Latvia) and Latgale (south-west) are becoming the regions where the density of wolf is highest. The sparsely forested Zemgale Plain, lying between the above mentioned regions, appears to make east – west migration of wolf difficult. Provided no ecological corridors are arranged to facilitate the migration, the isolation between the two populations will only increase, ultimately reducing the genetic diversity of wolf (Randi 1993). Already now the morphometric data of skulls show the individuals of the eastern population to be bigger than western ones. This difference may probably be explained by the mixing of population with individuals from further east.

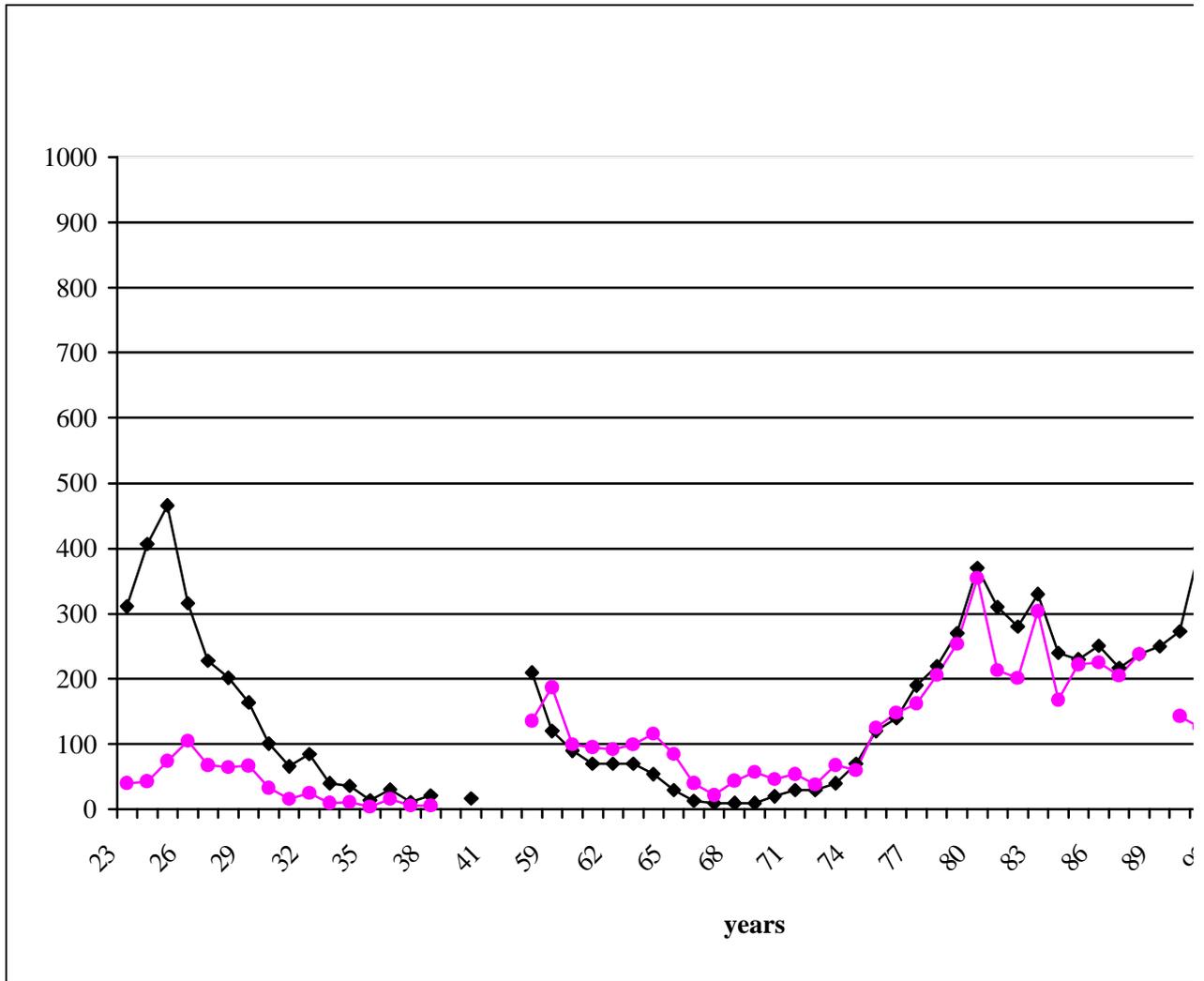


Figure 7. The population dynamics of wolf *Canis lupus* in Latvia (official statistics). Data are missing for the 1

3. Limiting Factors

3.1. Hunting

Hunting is the primary factor limiting the wolf population in Latvia. All other limiting factors stem from problems related to hunting such as: lack of natural feed resources, reduced population density, fragmentation of population leading to inadequate genetic diversity, etc.

The deep-rooted belief among hunters, in particular, is that wolf is man's main competitor for wild ungulates. This is the reason why hunters believe wolf should be exterminated. The damage inflicted by wolf to animal husbandry is insignificant in Latvia and occurs only in certain areas. This loss of livestock could be reduced additionally through awareness raising and educational campaigns informing farmers of how to avoid conflicts with wolf.

Hunting trophies, as skulls and furs, is yet another motive for hunting wolf. During recent years the prestige connected with wolf trophies has grown considerably. Generally the Latvian and Estonian trophies of wolf presented at exhibitions are of high international standard. From the point of view of trophies, it is only the winter fur and skulls from adults, which are of high value.

Generally wolf can actually tolerate a high hunting pressure. Ballard et al. (1987) state that first when the population loss exceeds 30-40 % (of the size of a stable population) a population decrease is unavoidable. However, statistics in Latvia show an almost unbelievable picture (Fig. 7). Each year from the 60-s till late 70-s, the number of killed wolves exceeded the estimated population size. This situation is difficult to explain, but one conclusion, which can be drawn with quite high certainty, is that it was correct to estimate that wolf population was small during this decade. The comparatively low hunting bag reflects this. Two reasons, why the hunting bag was higher than the estimated population size, could be that, the hunters were interested to hide the real wolf number (possible result of soviet regulations), or that the wolves, after the persecution campaign on wolf in post-war period, continually invaded Latvia's territory from Russia because the hunting intensity in Latvia always was higher and wolf density in Russia bigger. We can not tell when exactly the wolf population started to recover in Latvia but by late 70-s, the hunting bag of wolves had increased considerably. It is simply impossible to shoot more than 90% of a wolf population (200-300 animals) and still observe a population increase as shown in Figure 7. Thus it is more likely that the wolf population amounted to about 800 individuals already in the early 80-s. Personal observations, during otter and beaver surveys, confirm that wolves were very widespread in the 80-s. One reason for the increase in population size is probably that ungulate populations also were rich during this period (Andersone, Ozoliņš, in press). The ungulate populations were probably so big that they could support the increase in wolf population without the hunters feeling any kind of increased competition from the wolf. Then in the 90-s, the situation changed. As a consequence of the collapse of soviet economy the game resources were overexploited. Hunters again experienced the wolf as a serious competitor and therefore started to raise the estimate of the population size. The hunting statistics of mid-90's, when 200-300 wolves were killed per season, allow us to assume that the population estimate (of approximately 900 animals in 1994-96) made before harvesting (late summer) was correct since the population tolerated without obvious decline this high hunting pressure from 1992 till 95. However, the rapid increase in wolf population during the 90-s might be not true. What is more likely to be true is that, as stated earlier, the wolf population had already reached 800-900 individuals in the early 80's and that it then remained stable until 1996-1997 when almost 400 wolves were shot. The following fast decline in population size occurred because the critical hunting pressure of above 40% was overstepped.

It is believed by experts that the wolf population has dropped to between 300 and 400 animals on March 2000, but the official population estimate, which in reality is an estimate of the size of the population for the next autumn, when the hunting season for all game species will

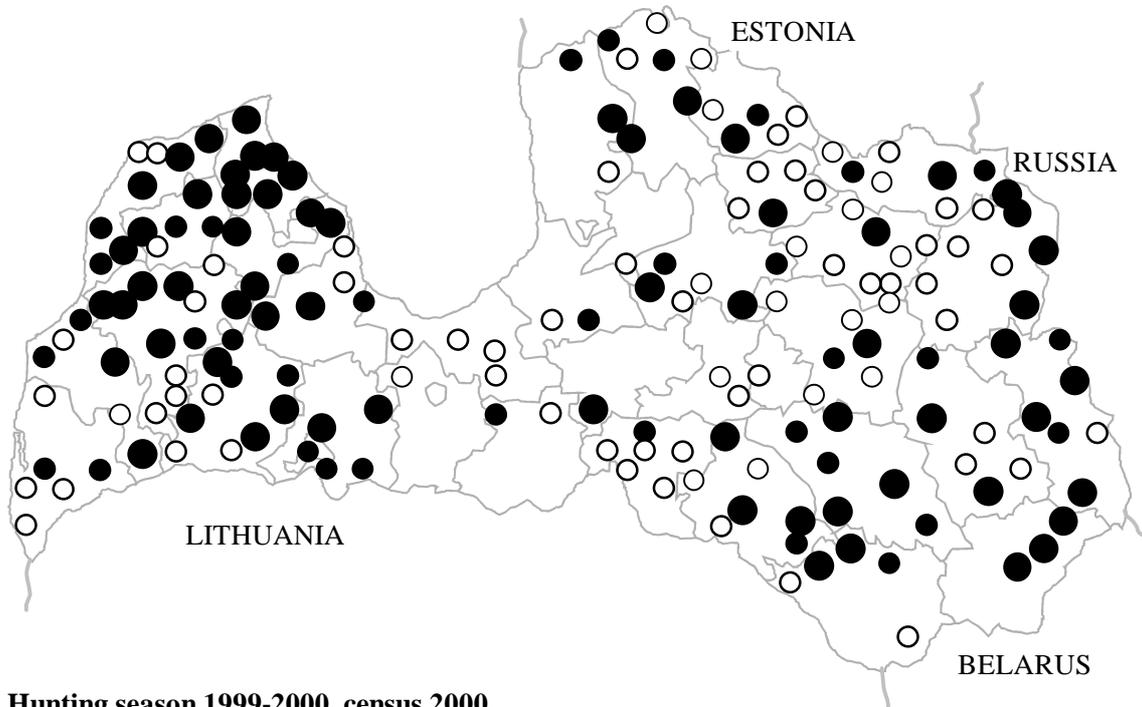
start, is 500-600 animals. The reason for this overestimation of the official number is that the hunters include the expected number of offspring, which may be born after The first of March.

To avoid fragmentation of the current wolf population, leading to small isolated populations, which are not sustainable and risk inbreeding, it is recommended not to allow a further decline in population size (Fig. 8). The present research indicates that high hunting pressure also has adverse effects on the population's sex ratio and age structure. The research, based on a sub-sample from the harvested animals (sample number = 84 wolves) starting from the autumn 1998 and until the spring of 2000 (Fig. 3), and accounting for 19 % of the total harvested animals, indicates that there are several differences in the population structure of this sample compared to a natural population structure (see Chapter 1.7). One difference is the predominance of females over males in several age groups, especially the first and third year groups (Fig.5). Considering only the first year group, one reason for the high female number could be that the research group was particularly interested in obtaining adult female carcasses and thus this might have encouraged hunters to provide adult female individuals to a higher extent than males. Another reason may be that females during the first year generally grow so fast that they almost reach the size of an adult (Tab. 1). Consequently they could be mistaken for adult females and therefore provided to researchers. Concerning the males of this age, it can be expected that the recorded number is too low. Again it might be of influence that the researchers showed most interest towards females and thus not all males were recorded. In addition young males have a low value as trophies, and therefore hunters might be less likely to inform about them. It is more difficult to explain the predominance of females among the 3 and 4 year olds. A male of this age is a trophy of high value and therefore it would be expected that the hunters would be keen to inform about such killings. Logically therefore the predominance of females must be a consequence of the effect of the high hunting pressure on the wolf population.

Attention should also be drawn to the age distribution, illustrated by percentage of sample population. If, for the age above 3 years, the pyramid is regarded as optimal, then an insufficient number of the young stands out quite clearly (Fig. 5). When adding up all adult females in the representative sample (31) and by knowing that 83% of them were capable of having cubs, and the average number of embryos was 6, one has to conclude that theoretically the number of cubs in their first year should have amounted to 156 or 70% of the population. However the existing figures are very different, and cubs of the first year only represent 20 % of the total hunting bag. What could be the reasons why 50% of the cubs are not being killed although it should be expected? There is no reason to believe that cubs have a better survival rate than older animals during hunting. Instead, it may have something to do with the mortality of cubs and embryos making results different from the indices of potential fertility in females, estimated by counting placental scars and embryos (83 %). In addition the killing of pregnant and lactating females caused by hunters also reduces cub numbers. A disruption of the population structure, both spatial and social, caused by hunting could be another reason for the age distribution. It is of interest to note that among the kill, the 2-year olds especially females, exceed the 1-year ones. There could be a number of explanations for this. One may be that, the adolescent wolves, compared to matured ones, are more inconsistent concerning the area they inhabit. This could be why hunters find it more difficult to encircle them. A second may be a result of higher hunting intensity in Latvia as compared to the neighboring countries Russia and Belarus. Consequently there might be an influx of wolves from Belarus and Russia that have just reached sexual maturity and are roaming about in search of new territories. Finally it may also be that, the high proportion of 2-year olds in the population indicate that the native population of wolves has reproduced more successfully during the recent years. This assumption agrees with the curve of population dynamics (Fig.7.).

Conclusion. The impact of hunting on the population dynamics for wolf clearly stands out in all the comments given above, although they need backing by further research.

Hunting season 1998-1999, census 1999.



Hunting season 1999-2000, census 2000.

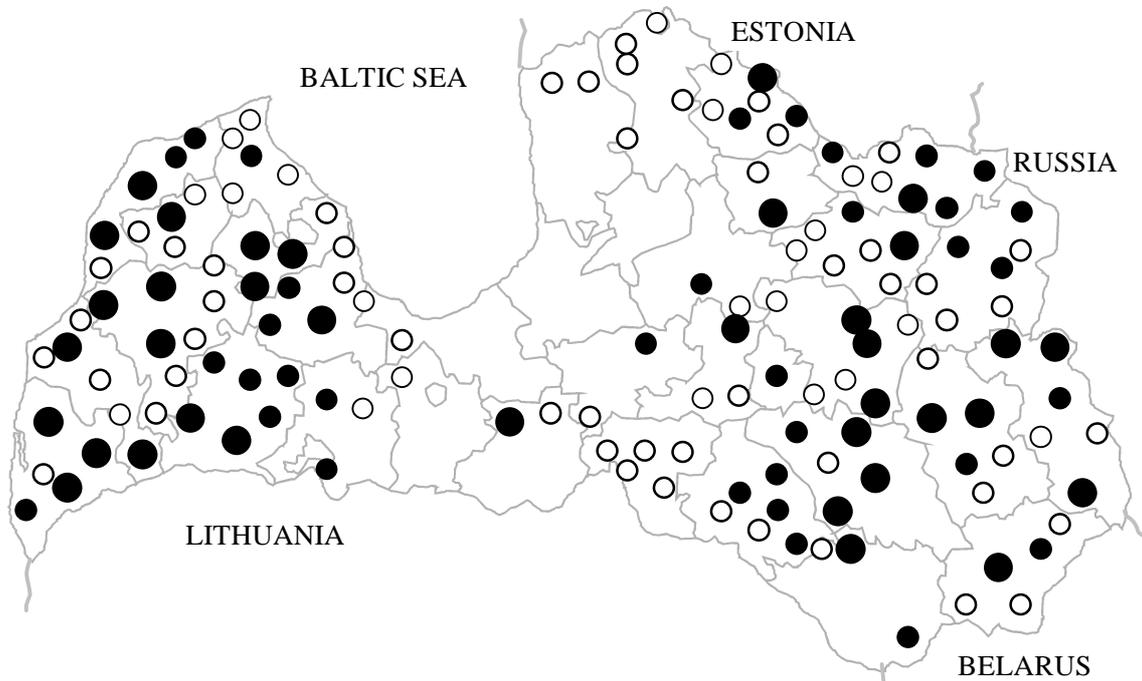


Figure 8. The distribution of wolf in Latvia in the past two years. The bigger dark circles stand for the forest districts where more than one wolf was killed; the forest districts where only one wolf was hunted are marked by smaller dark circles; the white circles denote the forest districts where wolves are recorded but none hunted down.

-

3.2. Diseases

Between 1987 and 1998 the State Veterinary Service has reported 10 cases of rabies in wolves, i.e. one case per year (from 0 to 2 cases in separate years), accounting for ca 0.2% of the total population. The above data refer only to the animals that have in some way been in contact with humans or domestic animals. Since Latvia is quite densely populated by humans, it must be expected that the State Veterinary Service is informed of all infected animals and can control disease. Even if some rabies infected individuals perish without being recorded, then this is a very low number of occasional animals.

Mange is yet another disease that can spread among wolves on a large scale. However, this disease has been found only to a small number of individuals hunted down – 4.3% (10 out of 233) (Strazds 1998).

It may be concluded that the overall epizootic condition of the Latvia's population of wolves is favourable.

3.3. Hybridization between Wolf and Dog

Cases of hybridization between wolf and dog have been observed in the region of Krasnodar, Krasnoyarsk and Voronyezh in Russia, in Moldova and in some Asian countries (?????? 1975; ????? 1985). There exists an opinion that hybridization should be regarded as no danger to an otherwise viable population, as in the subsequent generations the hybrids do not mix with wolves. Ecologically, hybrids can outcompete only weak populations of wolves, under a threat for other reasons (Zimen 1990).

The hybridization litter in Silene (?????? 1971) only proves that natural hybridization can take place in Latvia, too. In 1998, the tissue samples of 25 wolves killed in Latvia were sent to Dr. E. Randi of the Italian Institute of Wild Fauna Biology for testing of the presence of the dog's DNA in them. No admixture of the dog's DNA was found in all the 25 samples. Another case of the hybridization of wolf and dog was reported in March 1999, when a wolf's den containing 7 nearly two-week old cubs was found in the forest district of Aloja. Genetic analyses of the blood samples done in Italy revealed an admixture of wolf's genes from the mother's side, though in appearance they looked like dogs. However, the mother of the cubs, hunted down later on, had no outward traits of dog, except for some slight peculiarities of its skull.

It is to be noted that the above mentioned animals were killed in an area (eastern coast of the Riga Gulf) where wolf is sparse and a wolf-free area is next to it (Fig. 8).

PREVIOUS MANAGEMENT

1. National Legislation Affecting Wolf

Wolf is the only wild predator in Latvia that could be hunted down during the whole 20th c. without any restrictions. Moreover, a considerable bonus payment could be received for killing a wolf. For example, in the late 30's it was 60 LVL (Berzinš 1939), in 1946 – 300 Soviet roubles (Kalninš 1953), in the 80's – 100 Soviet roubles, between 1997 and 1999 – 75 LVL.

2. International Legislation

The Wolf in international Red Lists

Document	Category
<i>IUCN</i> Red List 1996	vulnerable
European Red Data Book	Species not globally threatened but of special concern in Europe
Red Data Book of the Baltic Region	not threatened in Latvia

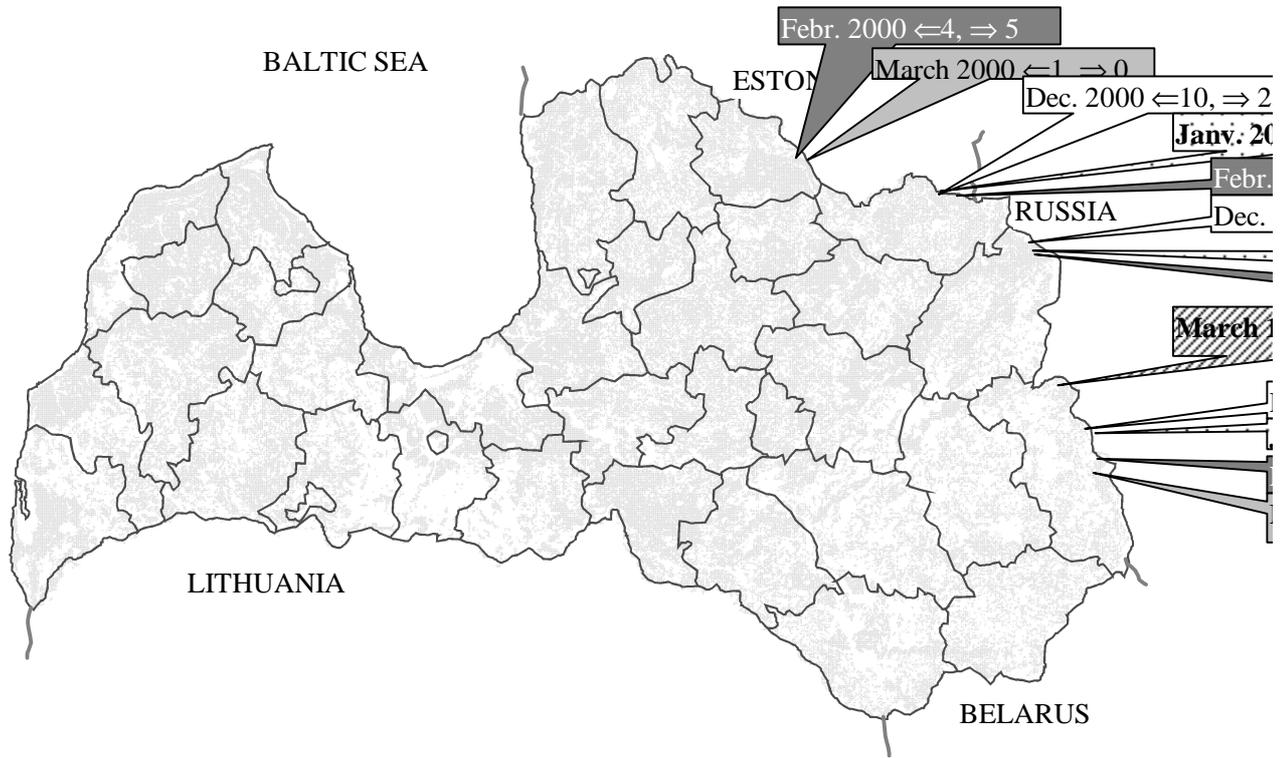
In 1973 IUCN worked out a manifesto to ensure the protection of wolf, comprising a statement on the changing global status of wolf and describing the general attitude and the basic management principles to be followed in relation to the wolf. In 1989 the European Parliament passed a special resolution related to the above manifesto and appealed to the European Commission to support the idea of the conservation of wolf and allocate financial resources for it.

In Annex 2 of the Washington Convention on the International Trade with Endangered Wildlife Species (CITES) wolf is mentioned as a potentially endangered species. It means that the international trade with wolf is restricted and kept under control.

In annex 2 of the Berne Convention on the Conservation of Wildlife Species and Habitats wolf is specified as a species under strict protection. It implies a ban on catching and killing wolf, destroying or intruding upon its habitats and breeding sites, including a trade with specimens, alive or dead. Latvia signed this convention on 01.05.97., making a reservation that in relation to Latvia the commitments undertaken do not apply to wolf.

The Rio Convention on Biological Diversity has no such annexes as the lists of protected species. However, it sets forth the basic principles for the conservation of nature's diversity, including guidelines for research and of raising public awareness.

Figure 9. The data from the Border Guards on the number of wolves crossing the country's eastern border when there was snow.



⇒ outgoing tracks
 ⇐ incoming tracks

Wolf is mentioned in Annexes II and IV of the Directive 92/43 EEC of the Council of Europe on the Conservation of Natural Habitats and Wildlife. In accordance with directive a member state is obliged to identify the habitats of wolf, set up specially protected areas for it and impose a ban on harvesting wolf. In view of Latvia's anticipated accession to the European Union, the country has, following set procedures, to apply for transferring wolf and the related conservation measures from Annex IV to Annex V of the said directive. Only then wolves can still be hunted by use of accepted hunting methods and providing an adequate monitoring system of the wolf's population.

3. Previous Research

The research done so far in Latvia on wolf can be evaluated as local observations only (Gaross 1997). The research on the population of wolf was started in 1997 when the State Forest Service placed a contract with the Latvian Forest Inventory Institute for the 3-year project "Ecological Arguments for the Population Control of Wolf". Within the frame of the given project the basic data on wolf ecology in Latvia, its distribution and the demographic structure, and the morphometrics of wolf, were obtained.

During 1998 and 1999, a project under the title "Biological and Socio-Economic Preconditions for Sustainable Existence of Wolf and Lynx in Latvia", financially supported by the Environmental Conservation Fund, was carried out in the North Vidzeme Biosphere Reserve. The research project contributed to collecting material on population structure in this area and published an educational pamphlet on wolves which was distributed during this project.

The joint project of the Latvian Fund for Nature and its corresponding partner in Estonia "Conservation Planning for Wolves in the Estonian-Latvian Cross-Border Region", done with the assistance from the border guards of the two countries, has investigated the movement and/or migration of the big predators in the border zone between Estonia and Latvia, and Latvia and Russia (Fig. 9.). This work will continue.

4. Habitat status

Up to now wolf has been hunted also in Latvia's protected areas. A successful re-introduction of beaver in Latvia has a positive impact on the establishment of habitats favoured by wolf (?????? 1990), although the law provides no protection for the beaver's habitats. Beaver sites, nevertheless, improve the availability of feed for wolf and create areas virtually inaccessible to man (hunting).

5. Damage Incurred by Wolf

Although the problems of compensating the damage by wild predators so far remain unsolved in Latvia, the cases when wolf has attacked livestock are recorded in different regions of the country (Strazds, 1998): in Kurzeme (Slitere, Oviški, regions of Liepaja and Tukums), in Latgale (regions of Ludza and Daugavpils), in Vidzeme (Valmiera region) and elsewhere. The data on similar cases were collected from the farmers and forest officers, using the questionnaires distributed by the staff of the mentioned wolf project.

Wolf attacks sheep, calves and other domestic animals mainly during the summer and autumn season, when the livestock is out in the pasture. Assaults on dogs happen mostly in winter while other domestic animals were taken in late summer and autumn.

Sheep and dogs are the domestic animals that suffer from wolf most of all (Fig. 10). In some cases reported wolf has attacked fowl, too (hens, geese). In one case wolf had attempted to tear a foal to pieces, yet the mare had managed to beat off the attack. The maximum number of livestock killed in a single case was 13 heads.

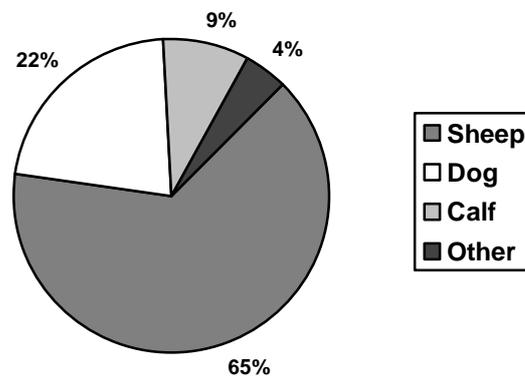


Fig. 10. The proportion (%) of different domestic animals in the wolf's feed (n=68).

As it follows from the questionnaire results, the time of the day the assault took place had no special importance nor was there any clear pattern of attack.

However, in Latvia attacks on livestock in many cases is in general more accepted by people than so called "loss incurred to game management" (Gaross 1997). The wolf control is mostly motivated by "game conservation". The total sum paid by the State Forest Service, between 1995 and the first half of 1997, for killing 276 wolves is 18,238.96 LVL. The bonus had been paid not in all cases during that period. Starting with the hunting season of 1997/1998 until Dec.31, 1999, the bonus paid for each wolf hunted down was 75 LVL. Since 1st January 2000 awarding a bonus is cancelled.

ACTION PLAN

1. Conservation Policy

The policy goal is to keep the wolf population of Latvia in a viable state. The management practices applied should aim for the following:

- Maintaining a unitary range of distribution of wolf over the land area of Latvia.
- Avoiding an increase in the areas where wolf is not found.
- Striving for public acceptance of wolf in near-natural ecosystems, so that it is treated as a part and parcel of environment rather than an adversary to man, or a nuisance interfering with management actions, ideally, the public is feeling a satisfaction, when running into evidence of wolf's activities.
- The wolf's functions in ecosystems (feed, choice of sites for dens, migration and dispersal opportunities) are kept as close as possible to the ways established by nature.

The framework of the conservation policy is shown in the figure on page 30. A draft for the action plan to implement the conservation policy of wolf is given in Annex.

2. The Legal Status Required

Taking into account the threats to wolf's existence, international activities for its protection and the situation with wolf in Latvia, it is recommended that in the national legislative acts wolf should be retained in the list of game animals. In any case, a closed season is to be determined for wolf and the methods of hunting, that contradict with the international law, banned. Most of these hunting methods are practically not used in Latvia, although, hypothetically, they could be

used. In line with Annex VI of the EU species and Habitat Directive (92/43 EEC), the national legislation of Latvia should impose a ban on the following:

1. Use of blind or mutilated animals as a live bait.
2. Use of sound (howling) recordings for alluring animals.
3. Use devices of artificial lighting or illumination to spot the target while hunting down the animals (so far allowed in sites, where animals inflict damage).
4. Use of sight devices adopted for night use and having electronic magnification or image transformation possibilities.
5. Use of nets of non-selective action; it implies using nets for animal trapping without keeping watch over them; not practised in Latvia.
6. Deployment and use of traps of non-selective action. According to the Hunting Regulations now in force it means a ban on the use of any trapping gear on wolf.
7. Use of automatic or semi-automatic weaponry capable of holding more than two ammunition units in the magazine.

3. Habitat Protection

Providing that Latvia's wolf population is maintained at its present level, there is no need for new protected areas intended as reserves for wolf's habitats. Hunting down wolf in the existing protected areas or those going to be established should, in its turn, be allowed only in cases when it is impossible to compensate for the damage incurred. It is believed that a ban on hunting wolf in the Kemeri National Park would create a so-called ecological corridor between the Kurzeme (western) and Latgale (eastern) range of wolf's distribution in Latvia (Fig.8.).

4. Regulation for Harvesting Wolf (Work Agenda B, page 31)

Legal harvesting of wolf is possible:

1. Between Sept. 1 and March 31; in the periods other than specified, wolf, upon drawing up a statement as provided by the regulations, may be harvested only in the places it has inflicted damage, or when found in human settlements, or attacking domestic animals and man (the statement is drawn up post factum after the wolf is killed).
2. By using legal weaponry in the daytime only (except automatic or semi-automatic firearms capable of holding more than two ammunition units).
3. Hunting involving beaters or encircling the area by a rope with flags, or hunting by an individual from a hiding place either with or without fake howling.
4. In specially protected areas, against a permit of the Ministry of Environmental Protection and Regional Development (for research purposes, in places where wolf has inflicted serious damage, etc.).
5. The fact of hunting down a wolf must, within 3 days, be reported to the nearest Forest District Office.
6. A case of accidentally killing a wolf or finding it dead (run down, killed during an assault on livestock, etc.) must, within a day, be recorded by drawing up statement and reporting to the respective Forest District Office.
7. No traps of any kind can be used in hunting wolf.

Hunting quotas on wolf should be introduced along with a demand for compliance with the above provisions. For the time being it is difficult to establish definite hunting quotas, since it is impossible to evaluate the effect of closed season for wolf, the more so because we have no means of comparison as in Latvia the wolf has over centuries been persecuted without any restrictions. We suggest that the current population status and the results of the hunting season of 1999/2000 should be set as a benchmark in this respect. This is possible as the present population density poses no significant danger to the animal husbandry and most of the hunters' collectives accept it, too. At the same time the very existence of the species is not under a threat, except for possible isolation between the eastern and western metapopulations. All this implies that for the hunting season to come there is no special reason to increase the hunting quota for wolf compared to the previous season (150 heads). As we have no experience of how to divide the hunting quota between the regions of the country, and taking into account that population migration can lead to a high concentration of wolf in some localities, it is suggested that the hunting season should be closed as soon as the number of the previous season is hunted, but not later than by March 31. This can only be done if the State Forest Service sums up the hunting data on a regular basis and the hunters inform the forest authorities on the results of a hunting within 3 days. The hunting data should be linked to the monitoring research for the given species. In future when a clear picture of the population size is available, hunting quotas may be either increased or reduced in addition to changing the duration of the hunting season.

5. Preventive Measures against Damage

A unified formal procedure must be established for reporting, recording and checking the damage done by carnivores. In the localities where regular substantial damage is inflicted by carnivores, special short-term hunting permits may be issued, thus legalising the hunting, done outside the time-frame of the hunting season (see the chapter "Regulation for Harvesting Wolf"). At the same time solutions should be sought for compensating the damage caused by wolves to the domestic animal holders. International experience must be used to work out the compensation mechanism (Compensation for damage caused by bears and wolves ... - see the list of references). Priority should be given, and the compensation mechanism tested first of all, in relation to protected areas.

6. International Co-operation

Latvian experts have the opportunity to participate in the Large Carnivore Initiative for Europe. The initiative was launched in 1995 in Italy. It is supported by WWF, its co-operation partners and individual experts are from a number of European countries. The goal is to create a support network for the conservation of big carnivores in Europe, involving governments, international organizations, land owners and managers, researchers and the public at large. Specifically, the job undertaken is targeted at achieving co-existence in Europe at present and in the future between man and the top predators as brown bear, lynx, wolf, wolverine. Currently, the initiative group has worked out action plans for the conservation of Europe's large carnivores, covering also Latvia in so far as the protection of wolf, lynx and brown bear is concerned. An Action Plan for the Conservation of Wolf in Europe is made up by Luigi Boitani (1997).

The contact person of the respective working group is:

William Pratesi Urquhart
LCIE Co-ordinator
Craigston Turriff
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Scotland AB535PX

Phone: 0044 1888551228- Fax: 00441888551717- E-mail: Wpratesi@sci.com

In April 2000, the Baltic Large Carnivore Initiative was set up with the support of the Large Carnivore Initiative for Europe. The goal is to develop a strategy and co-ordinate the research programmes and conservation-oriented actions for the species involved, taking into account the peculiarities of the Baltic Countries.

National contact person:

Žanete Andersone (Table 3)

7. Advisory Capacity

Table 3

Institutions and individual experts	Addresses and contact persons	Professional awareness
the Ministry of Environmental Protection and Regional Development	Vilnis Bernards Peldu iela 25, Riga, LV-1494 Phone: +371 7026524, Fax: +371 7820442, E-mail: mopsis@varam.gov.lv	Permits for export/import, hunting and catching in special protected areas, public awareness
State Forest Service	Janis Baumanis 13. janvara iela 15, Riga, LV-1932 Phone/Fax: +371 7212776, E-mail: baumanis@vmd.gov.lv	Monitoring, hunting
WWF Latvian office	Ugis Rotbergs Elizabetes iela 8-4, Riga, LV-1010 Phone: +371 7505640 Fax: +371 7505651, E-mail: wwf@com.latnet.lv	International co-operation, public awareness
Latvian University Department of Biology	Dr. Janis Priednieks Kronvalda bulv.4, Riga, LV-1842 Phone: +371 7325593, E-mail: jpriedn@lanet.lv	Ecology, education
Latvian Fund for Nature	Maris Kreilis Kronvalda bulv. 4, Riga, LV-1842 Phone: +371 7322852- Fax: +371 7830291	Public awareness, international co-operation, research
Latvian Mammalogical Society	Valdis Pilats Kristapa iela 30, Riga, LV-1046 Phone: +371 7614808	Ecology, research, public awareness
Latvian Hunters' Association	Juris Rankevics Ormanu iela 26, Riga, LV-1002 Phone: +371 7228257	Game management, contacts to hunters' clubs
Žanete Andersone	Kemeri National Park, "Meža maja", Kemeri, LV-2012, Jurmala Phone: +371 7765386. Fax: +371 7765040, E-mail: kemeri@vdc.lv	Ecology, research, international co-operation, Baltic Large Carnivore Initiative
Janis Ozoliņš	State Forest Service, 13. Janvara iela 15, LV- 1932, Riga . Phone: +371 9364528, E-mail: ymi-riga@latnet.lv	Ecology, monitoring, public awareness
Ugis Bergmanis	Teici Nature Reserve, Aiviekstes 3, Laudona, LV-4862, Madonas raj. Phone: +371 4848277, E-mail: Bergmanis.teici@apollo.lv	Management in specially protected areas
Alda Pupila	Kronvalda bulv.4, Riga, LV-1842 Phone: +371 7325593, E-mail: sb60027@lanet.lv	Age determination
Agris Strazds	State Stock Holding Company "Latvian State Forest" Kristapa iela 30, Riga, LV-1046 Phone: +371 7602075 / +371 9343702 E-mail: a.strazds@lvm.lv	Game management, eco-tourism

8. Research and Monitoring (work Agenda, A, C – page 31).

Objective of monitoring - identify the trends in the wolf's distribution, population size, self-regeneration capacity, the status of health, habitats, and the attitude of general public to wolf.

Duration: year 2001-2003.

Taking into account the research done so far, it is considered feasible to continue data collection and analysis of the following:

1. Annual inventory of wolf by the State Forest Service organizations. Estimates of the distribution of wolf in Latvia are based on these data.
2. Recording by the State Forest Service organizations of wolves accidentally killed or found dead. The data are used for the estimates of the distribution of wolf; they also reflect the public attitude towards wolf and the efficiency of the related regulatory acts.
3. Snow-tracking for annual monitoring surveys of the population density, establishing the size of the pack (Strazds, 1999). The data obtained will describe the population density, including the variations in the population size. The surveys should be organized simultaneously in one or a number of regional forest districts, involving 5-10 professionals, equipped with means of communication and maps and inspecting the localities where fresh tracks of wolf are detected in snow.
4. Stock taking of the dens by the method of fake howling.
5. Information from the state border guards on the number of wolves crossing the country's boarder.
6. Collecting and inspecting the wolves killed or found dead: morphometric measurements, investigation of genitals, age estimation, inspection for parasites and the status of health, making collections of skulls, muscle tissue and viscera. The data will be used to describe the status of health and self-regeneration capacity of wolves.
7. Creating a centralized data base on the damage inflicted by wolf, expert surveys of the cases of damage. The data will be used to evaluate the public attitude to wolf.
8. Epizootic information from the State Veterinary Service.
9. Monitoring of feed habitats by analyzing the stomach contents and faeces. The data will provide basis for comparing the changes in habitats and the feed resources available. Because of the large amount of work, involvement of students of the Faculty of Biology of the Latvian University and post-graduate students working for their doctor's degree are welcome in so far as it agrees with the curricula to be covered by them.

The most urgent task in scientific research is to identify the size of home ranges and assess different patterns of habitat use under the conditions of Latvia. Opportunities should be sought for applying radio telemetric methods in research. The objectives identified are as follows: (1) finding ways for checking on the results of the previous research, used for assessing the situation with the given species; (2) acquiring knowledge how the existing network of protected areas (in the future Natura 2000) actually complies with the objectives of species conservation; (3) proposals to improve the monitoring system and interpretation of existing data; (4) further development of the conservation policy, including raising public awareness.

9. Education and Public Awareness (Work Agenda D – page 31)

At present, education and public awareness are the top priorities in the conservation policy for the species in question.

The goal of information and public awareness raising is to make people change their attitude towards wolf, i.e. the public should no longer perceive the conservation of wolf and its habitats as contradicting the economic, recreational or aesthetic interests of humans.

The changes in attitude can be achieved by informing people generally about the wolf, its biology and functions in natural ecosystems, thus breaking stereotype conceptions of the wolf as a “bad” predator attacking other “useful” animals. Focus could be placed on the social relations between wolves and their care for their young. Use should be made of unusual and easy to understand results of related research work.

The work on educating the public should not be planned and executed only by way of campaigns on individual species. The actions taken should not be obtrusive, but harmoniously fitting into the overall processes of environmental education aimed at the public at large.

The principal target groups are hunters, foresters, schoolchildren, tourists and landowners. Of special importance is the educational work with media representatives and their involvement in further dissemination of the ecological knowledge.

Initially, the executors in education and public awareness raising should be experts involved in wildlife conservation or concerned with government or non-governmental educational establishments. International knowledge can be used for clarifying the public attitude to the problems in question and developing the related policies.

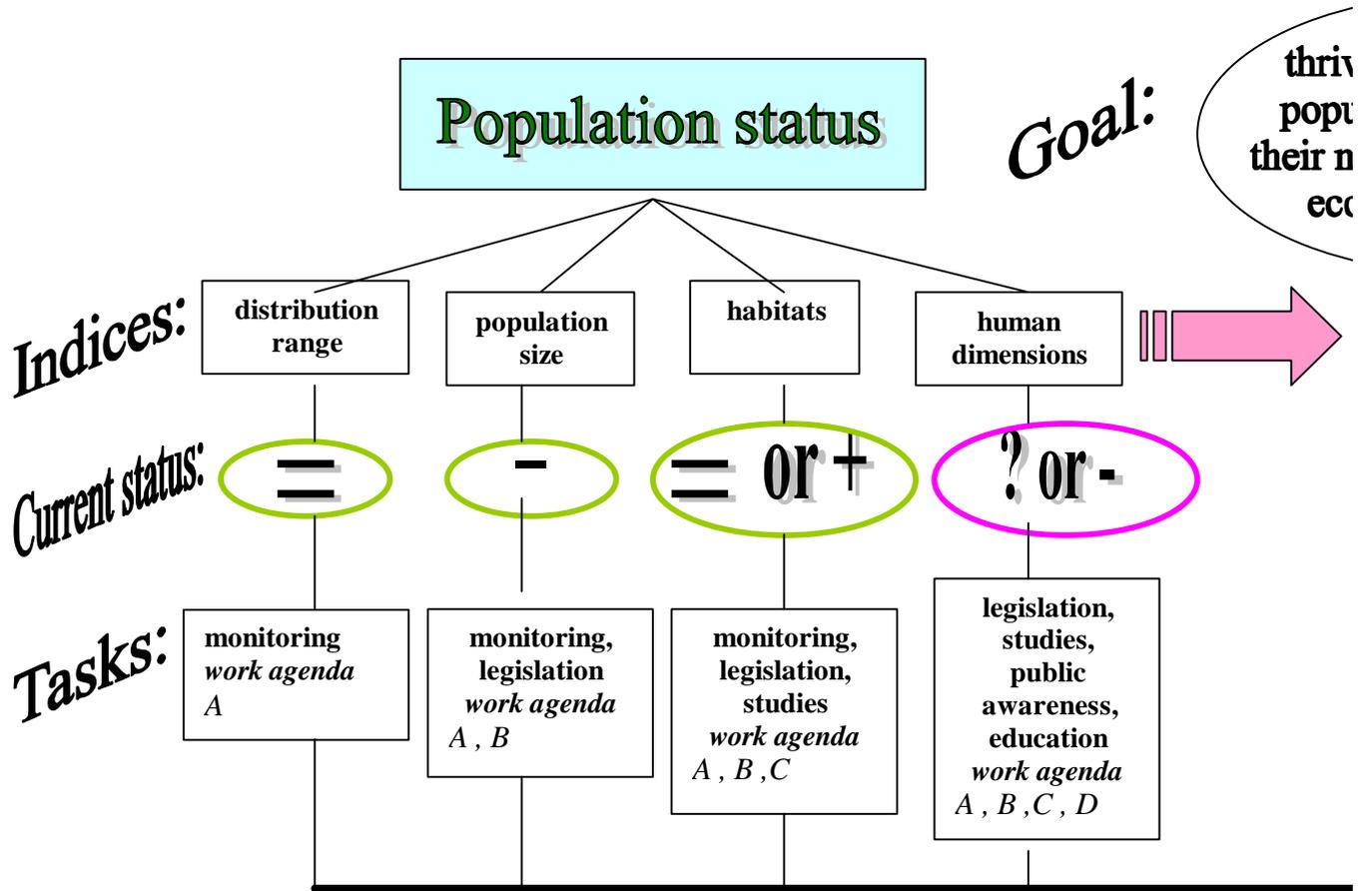
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10. Approximated costs for the Required Activities

<i>Action</i>	<i>Duration</i>	<i>Costs in LVL</i>
<i>Approximation of national legal acts to requirements of species conservation and international standards</i>	<i>2001</i>	<i>-</i>
<i>The preliminary study of damage problems</i>	<i>2001</i>	<i>1500,-</i>
<i>The monitoring</i>	<i>2005</i>	<i>5000,- per year or 25 000,- for 5 years</i>
<i>Expert assistance in building public awareness</i>	<i>permanent</i>	<i>-</i>
<i>Compensations for caused damages</i>	<i>?</i>	<i>?</i>
<i>Radio-telemetric investigations</i>	<i>2004</i>	<i>40 000,-</i>
<i>Elaboration of Action Plan for the next triennium</i>	<i>2003</i>	<i>3000,-</i>

Framework of Wolf conservation strategy for Latvia



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PROJECT IDEA: IMPLEMENTATION OF THE ACTION PLAN FOR WOLF CONSERVATION IN LATVIA

Introduction

The public opinion about large carnivores in Latvia is not a heritage from ancient fairy-tales. On the contrary, one can find certain evidences of co-existence and acceptance between people and carnivores in national folklore from the period before and about middle age. The attitude to large carnivores is biased rather by comparatively recent stories about wolves killing the single calf which was legally allowed for a family to keep out of collective farms during soviet times, or about a women fatally wounded by a rabid wolf. During 45 year period of incorporation of Latvia by former Soviet Union, the game management was considered as a significant part of economy because of permanent meat deficit in local market and consequent state fixed procurement quotas even for sport hunters. That was a sufficient reason for overall legally accepted persecution of large carnivores particularly wolves. At the same time, the habitats maintained at a quite natural status and in large area significantly supporting populations and providing good links with northern and eastern parts of species distribution range in Russia and Belarus. Populations never have been extinct or considerably threatened. Suggestions about initiation of sustainable management and conservation strategy were caused by political choice of Baltic nations. The new politic way should be accompanied by development of new economy, new international liability and new attitude to nature management. Within the countries of European Union, the large carnivore conservation is underlined by many legal acts, planning documents and following actions as one of the priorities in species protection. Carnivores are mostly considered as large scale indicators and protective umbrellas for ecosystems. However, the different status of carnivore populations and completely otherwise motivated public attitude in Latvia and other Baltic countries need developing of a special action strategy and its different implementation police.

Background information

1. Population status

There are three large carnivore species in Latvia: the wolf *Canis lupus*, the lynx *Felis lynx* and the brown bear *Ursus arctos*. The latest is very rare and completely protected, however a considerably numerous population of brown bear exists in Estonia. The lynx is more common in the north and north-east of the country. It always has been a common game species and 50-150 individuals were shot annually during nineties. Latvia is an obvious link connecting lynx populations in Estonia and Russia with Lithuania. The wolf has been the most widely distributed and common carnivore throughout Latvia as well as in the whole Baltic with exception of some deforested areas in the central part. It was hunted without any restrictions and the annual hunting bag exceeded 300 individuals in some years of the eighties and nineties.

2. Pilot studies

During the last four years several activities in research and awareness promotion were done. Studies on wolf diet and morphometrics were carried out (Andersone 1999). 70 wolf individuals shot from autumn 1998 till late winter 2000 were examined for their exact age and reproductive status (2000 unpublished). One graduate project on status of lynx (Bagrade 1999) and another post graduate project on the status of wolf (Andersone 1999) were written at Department of Biology Latvian University. Inquiries on brown bear status and the attitude of hunters to large carnivores took place in 1999. A co-operation with border guard on recording tracks across country border was achieved (joint project of Estonian and Latvian Funds for Nature).

3. Public awareness

Two leaflets on wolves and lynxes in Latvia were published by North Vidzeme Biosphere Reserve and one leaflet about implementation opportunities of Habitat Directive in respect to large carnivores and beavers by Baltic Environmental Forum, Regional Ecological Center and Latvian Mammalogical Society.

4. Action plans

As a result of the project “Inventories of the Species and Habitats, Development of Management Plans and Capacity Building in relation to Approximation of EU Birds and Habitats Directives” financed by the Danish Environmental Protection Agency, the Action Plans for the conservation of wolves and lynxes in Latvia were elaborated.

5. The Baltic Large Carnivore Initiative

Regular meetings on co-operation in the field of research, educational activities, fund raising etc.

Aim and objectives

The aim of this project is to initiate an action framework changing the negative public attitude to large carnivores and ensuring the maintenance of populations at favorable conservation status under circumstances of developing economy in Baltic countries. We plan to achieve this with:

- ◆ monitoring the indices of population status;
- ◆ improving and implementation of legislation which supports carnivore protection;
- ◆ developing research of species requirements essential to conservation strategy;
- ◆ gradual changes in the currently mostly negative public attitude to large carnivores.

Required actions

Monitoring (*Work Agenda A*)

Task: to follow changes of distribution pattern, population size, reproduction capacity, animal condition and health, abundance and quality of habitats.

Methods and data sources:

1. Records on presence-absence per forestry unit given by foresters and hunters.
2. Records on killed individuals.
3. Records of frequency of the border crossings.
4. Field surveys by experts
 - 4.1. Snow tracking to estimate pack size.
 - 4.2. Howling surveys to find dens and reproductive pairs.
5. Collection and laboratory examination of killed individuals (at least 50 wolves and 30 lynxes per year).
6. Analyses of scats.
7. Damage counts.
8. Data on abundance of prey animals (elk, red deer, roe deer, wild boar, mountain hare etc.).
9. Data on size of hunting bags for above mentioned prey species.
10. Statistics about forest area, individual farms, live stocks and other economic indices.

Legislation (*Work Agenda B*)

Task: to achieve optimal amendments and supplements to national legislation in accordance with EC Habitat Directive and conventions signed by government and to contribute to implementation of legal acts.

Actions:

1. Provide data for evident restrictions of hunting (breeding seasons, birth rate etc.).
2. Prepare guidelines in species determination after certain body parts (to control import/export).
3. Take a part in designing of protected areas (Natura 2000).

4. Take a part in elaboration of regulations how to record and examine cases of damage, to estimate amount of loss.

Studies (*Work agenda C*)

Task: to develop research for information essential to an effective conservation strategy – requirements of the species, sensitive monitoring and convincing education material.

Actions:

1. Radio-tracking of 1-2 wolf individuals and 1-2 lynx individuals (preferably implantation of transmitters in pups).
 - 1.1. The size of home range.
 - 1.2. Dispersal.
 - 1.3. The use of habitats.
 - 1.4. Crossing of the borders between Baltic countries.
 - 1.5. Activity within the day and the season.
 - 1.6. Feeding on large prey.
 - 1.7. Behavior regarding human presence.
 - 1.8. Mortality cause.
2. Analysis of links among monitoring indices.

Public awareness and education (*Work agenda D*)

Task: to achieve public acceptance of large carnivore (particularly wolf) conservation idea and to get a wide support.

Actions:

1. Revision of former concept about target groups on the base of responses to distributed leaflets, first Action Plans and lectures on subject “Inventories of the Species and Habitats, Development of Management Plans and Capacity Building in relation to Approximation of EU Birds and Habitats Directives”.
2. Promotion of examination standards for hunters in favor to management of large carnivores and their prey species (link to Legislation).
3. Implementation of carnivore conservation issues into professional education programs (universities, post graduate courses).
4. Informing the media (TV, radio, press) about carnivore issues. It is of particular importance to provide scientific explanations against rumors and overstatements some times being a case in press.
5. Educational campaigns in hunter societies, involvement of hunters into monitoring network.
6. Lectures and camps for school pupils.
7. Informing about carnivore signs in tourist guides.
8. New leaflets and other educational materials on the base of new data (links to Monitoring, Research and Legislation).