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## CURRENT SITUATION OF THE LARGE CARNIVORES IN ESTONIA

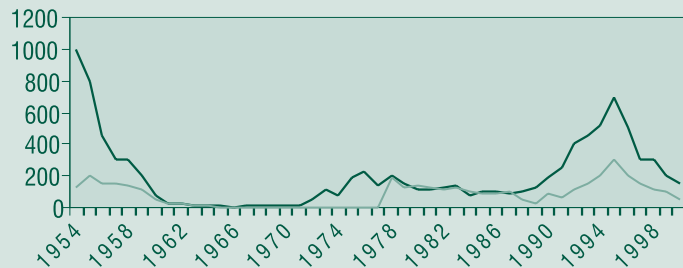
### Population dynamics, hunting

During the latest social changes, the numbers of large carnivores (LC-s) in Estonia increased significantly, partially as a result of decreased regulating effort. This trend is known to have occurred in the nineties in most locations of Eastern Europe, including Russia.

The increasing trend of LC-s, especially that of wolf, was quickly recognized by society, and of course, by hunters. As a result of following intensive hunting, the costs of which were partly compensated, the number of LC-s in Estonia have significantly declined and have reached pre-nineties level, which is generally considered acceptable by the wide public.

In this situation, a different strategy has to be applied for LC management, from which the population viability concerns seem to be of highest priority.

**Fig.1**  
Numbers and shooting  
of wolf (1954 - 2001)



**Wolf** The most controversial and conflicting of local LC-s is definitely wolf.

The local wolf population has had two peaks since WWII; one directly after the war and another in the nineties (Fig.1) (Valdmann, 2000).

Currently, there are about 150-200 wolves in Estonia and only 56 were shot during the hunting season 2000/2001. The shooting bag of LC-s in Estonia (2000/2001 season) by counties is presented in Table 1.

In most Estonian counties, wolf hunting bag during the hunting season 2000/2001 was equally low, except two counties – Põlvamaa and Raplamaa (Table 1). The hunters from Põlvamaa explained their hunting success with wolves coming over from neighbouring Russia (Põlvamaa is on the Russian border).

County	Hunting bag of large carnivores 2000/2001		
	Wolf	Lynx	Brown bear
Harjumaa	4	18	1
Hiiumaa	-	2	
Ida-Virumaa	2	4	5
Järvamaa	5	11	6
Jõgevamaa	3	10	1
Läänemaa	3	9	
Lääne-Virumaa	3	12	6
Pärnumaa	7	12	
Põlvamaa	9	8	
Raplamaa	11	12	
Saaremaa	-	-	
Tartumaa	4	8	1
Valgamaa	2	7	
Viljandimaa	-	3	
Võrumaa	3	4	
<b>Total:</b>	<b>56</b>	<b>120</b>	<b>20</b>

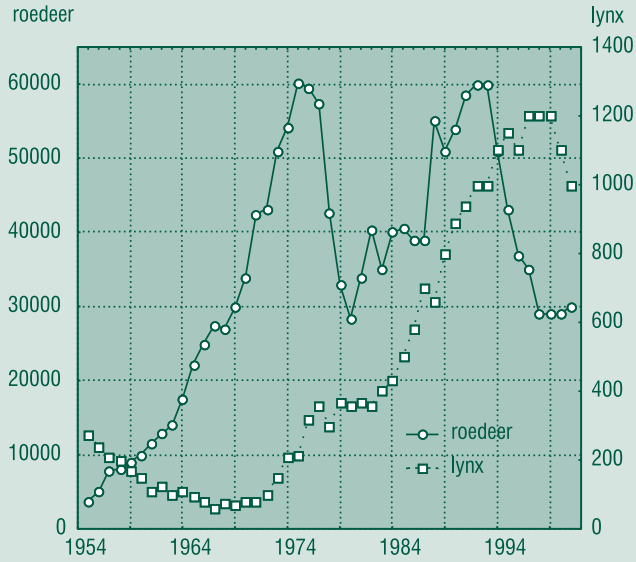
**Table 1**

Hunting bag of wolf, lynx and brown bear in Estonia by counties during hunting season of 2000/2001

A severe bottleneck in lynx numbers occurred in the beginning of the 20th century – in 1935 only 15 lynxes were counted in Estonia and from 1937 till 1945 hunting of lynx was prohibited in Estonia (Ling,1955). A rapid recovery of the local lynx population started from the seventies; it followed the increase of wild ungulate populations, including roedeer (Fig.2).

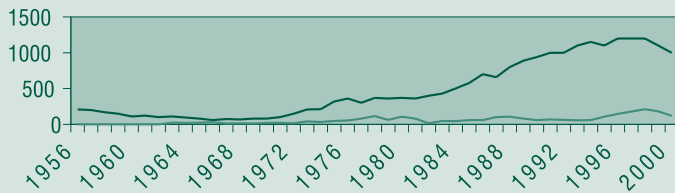
## Lynx

**Fig. 2**  
 Numbers of roe deer  
 and lynx in Estonia  
 (1954-2000).  
 Data from Estonian  
 Ministry of Environment



Since 1998, lynx numbers and the hunting bag has started to decrease (Fig.3). As its staple food in Estonia is roe deer (Valdmann & Koppa; manuscript), the general decline of roe deer numbers may have increased mortality of cubs and subadults. On the other hand, hunters generally consider lynx their competitor for wild ungulates and try to limit their numbers.

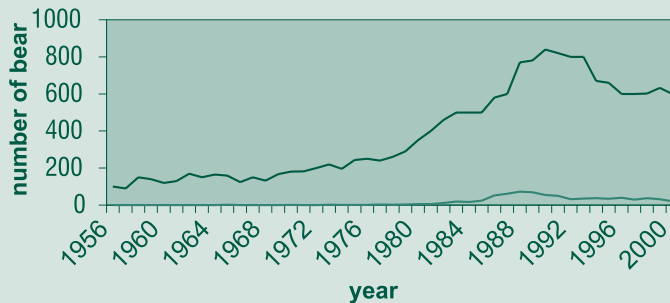
**Fig.3**  
 Numbers and shooting  
 of lynx in Estonia  
 1954-1998



**Brown bear**

The most complicated is situation with the brown bear population. Extensive forest clearance and human disturbance can become a major threat for bears in Estonia. If intensive forestry continues, especially logging of climax forest, bear habitats can become fragmented or even eliminated. Unfortunately, the response of bear population to intensive forest ex-

exploitation has not been studied in Estonia. According to management authorities, the brown bear population is close to 600 individuals. However, this number is not based on any robust and reliable method. Local hunting organisations just send their numbers, based on the guesses of hunters, to Ministry of Environment.



**Fig. 4**  
Numbers and shooting  
of bears in Estonia  
1954-2000

Every year some denning female bears are accidentally driven away from their cubs by hunters or by foresters. If found, orphaned cubs have been picked up and sent to Nigula Nature Reserve, where local reserve staff have successfully raised them and released them back to the same place where found. The bear hunting quota in the 2000/2001 hunting season was limited to a conservative 5% of the estimates of numbers, which has decreased the hunting bag (Fig. 4, Table 1). The Estonian Large Carnivore Management Plan is nearly ready and will be translated into English. It will set means to ensure the viability of local populations of LC-s.

**L**ynx diet in Estonia was studied during 1998-2000. A total of 9 prey species and taxas were identified. Roedeer and hares (brown *Lepus europaeus* and snowshoe *Lepus timidus* ) were the most frequent components of lynx diet, contributing 80 % of diet. We could not find statistically significant differences in diets of young and adults and males and females. But some prey items, like wild boar *Sus scrofa*, red deer *Cervus elaphus*

**Research  
programs  
Lynx**

and raccoon dog *Nyctereutes procyonoides* were found only in diet of adult males. The part of main prey group (roedeer and hares) in the diet was larger in late autumn (89 %) than late winter (77%).

Ungulates, mainly roedeer form the staple prey of local wolf and lynx – Pianka's food niche overlap for pair wolf-lynx was 0.8, indicating of used similar resources by these predators. Combined predation of both of these predators can have significant impact on roedeer population and together with hunting/poaching by humans may lead to remarkable decline of it. Thus we believe, that the latest observed downward trend of local roedeer population from 1993 (Fig. 1) is a result of the combined effect of wolf and lynx predation and hunting/poaching.

Preliminary data on lynx movements show that the home range of lynxes in Estonia is dependent on age and varies considerably, 10 - 100 km<sup>2</sup> for the animals fully recorded and is probably much larger for an adult males (Koppa and Kortel,2000).

We have also initiated a study of internal parasites of all local LC-including lynx. Examined samples (40 lynx, 16 wolf and 10 brown bear carcasses) demonstrate their high level of infestation by different flat and roundworms.

## Brown bear

The aim of the "bear project" is to measure and analyse characteristics of brown bear population structure and dynamics by using molecular genetic techniques and statistical analysis.

To evaluate the genetic status of Estonian brown bears we aim to undertake a detailed population genetic survey by:

- collecting hairs of free-ranging animals, using non-invasive methodology;
- extracting DNA from hairs and analysing microsatellite and mtDNA composition from DNA;
- analysis of genetic results by applying statistical methods to assess population genetic parameters of brown bear.

There is a multitude of problems in brown bear genetics and ecology that will be addressed:

- population size and distribution, survival and reproduction.
- short and long term changes in genetic variation in a population;
- current genetic variation in a population;
- existence and number of sub-populations based on genetic differences;
- level of reproductive isolation of a population based on comparison of the number of alleles shared with neighbouring populations;
- patterns of animal movement;
- phylogeography.

“Bear project” has received 100.000 EEK from Estonian Science Foundation and is conducted by U. Saarma from Estonian Biocentre (usaarma@ebc.ee).

Koppa, O., Kortel, A. 2000. Spatial organization and winter diet patterns of Eurasian lynx *Lynx lynx* in Estonia. – *Folia Theriologica Estonica*. 5: 63-66.

Ling, H. 1955. ENSV töönduslikud imetajad. PhD dissertation. Tartu. 461 pp. In Estonian.

Valdmann, H. 2000. The status of large predators in Estonia. – *Folia Theriologica Estonica*. 5: 158-164.

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## DABARTINĖ STAMBIŪJŲ PLĒŠRŪNŲ BŪKLĒ ESTIJOJE

Paskutinių socialinių pokyčių metu stambiujų plėšrūnų skaičius Estijoje žymiai išaugo. Tokių pokyčių pirmieji pajuto medžiotojai. Iš dalies kompensuojant intensyvios medžioklės kaštus, plėšrūnų skaičių pavyko sumažinti ir jis vėl pasiekė iki devintojo dešimtmečio buvusį lygį. Tokiu metu stambiujų plėšrūnų rūšių gausumo reguliavimui reikia naudoti

## References

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skirtingas strategijas, aukščiausią prioritetą suteikiant populiacijos gyvybingumo palaikymui.

Vilkas – pati konfliktiškiausia Estijos stambiųjų plėšrūnų rūšis. Paskutiniaisiais metais vilkų skaičius vėl krito iki 150-200. Gausiau vilkai aptinkami tik su Rusija besiribojančiuose rajonuose.

Lūšių gausumas XX a. pradžios Estijoje buvo katastrofiškai sumažėjęs, o nuo septintojo dešimtmečio vėl atsistatė. Nuo 1998 metų lūšių skaičius Estijoje vėl sumažėjo – tiek dėl stirnų skaičiaus kritimo, tiek ir dėl medžiotojų, laikančių lūšis konkurentais.

Rudojo lokio padėtis Estijoje yra komplikuočiausia. Didžiausią grėsmę rūšies išlikimui kelia intensyvus miško kirtimas bei trikdymas. Ir toliau intensyviai kertant brandų mišką, lokiui tinkami biotopai gali tapti fragmentiški ar netgi visiškai sunaikinti. Lokių apskaita šalyje nėra patikima. Estijos stambiųjų plėšrūnų populiacijos valdymo plane numatomos priemonės, padidinsiančios lokių populiacijos gyvybingumą. Iš stambiųjų plėšrūnų mokslinio tyrimo programų paminėtinos:

- Lūšių mitybos tyrimai;
- Vilko ir lūšies mitybinės nišos tyrimai;
- Lūšies individualaus ploto dydžio nustatymas;
- Lūšies endoparazitų tyrimai;
- Rudojo lokio populiacijos struktūros ir dinamikos tyrimai, naudojant molekulinės genetikos metodus.