

Lynx acceptance in Poland, Lithuania, and Estonia

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Abstract. Lynx acceptance in NE Poland, Lithuania, and Estonia was assessed by using a questionnaire survey. Regions under assessment differed in lynx numbers, population dynamics, and protection status. We examined if public opinion was related to the species conservation status and population size. In the northern part of the investigated territory, respondents were the most realistic as to the knowledge of lynx presence in the region and they accepted better lynxes close to their home. In the southern part, respondents were more positive about lynx number increase; in the north, maintaining current numbers was preferred. The importance of wilderness for respondents was increasing southwards. Thus, the south–north gradient on the lynx acceptance in NE Poland, Lithuania, and Estonia followed the species situation.

Key words: lynx, acceptance, human dimensions, Poland, Lithuania, Estonia.

INTRODUCTION

On a European scale, the populations of large carnivores found in the Baltic States and Poland are of great importance, both because of their size and potential to connect European populations with those in Russia and Belarus (Oetjen, 2001). Their future is unclear depending on socio-economic developments and changes in land use after EU accession and the general changes that have resulted from the fall of the Soviet Union (Ozolinš et al., 2001).

In the last decades, the extermination of carnivores in the Baltic region has stopped (Breitenmoser, 1998; Linnell et al., 2001; Balčiauskas, 2008), and this is particularly important for the conservation of lynx (*Lynx lynx*) (Löhmus, 2001; Ozolinš, 2001). In Poland and Lithuania, lynx populations are small, fragmented, and isolated (Jędrzejewski et al., 2002; L. Balčiauskas, unpubl.), while in Estonia the species range and numbers are much higher (Valdmann, 2001). In Poland and Lithuania the lynx has got full protection, in Estonia this species is still a game species as the country has got geographical exemptions from the Habitat Directive. Thus, the situation of the lynx is different between the regions covered. Going from south to north of the region, we can follow a very well expressed change in

the population status (Arx et al., 2004). The highly fragmented distribution of animals throughout Lithuania, northern and western Belarus, and northeastern Poland (Eurasian, 2008; European, 2008) is a cause for concern.

In the Baltic region, lynx is not involved in conflicts with farmers and cattle breeders (Linnell et al., 1996). Fear of lynx for personal safety might become a crucial factor, as is the case with wolves (Bjerke et al., 2001; Linnell et al., 2002). Carnivore–human issues are more important in rural areas (Skogen, 2001; Skogen & Krangle, 2003). These issues have also been investigated in the Baltic countries (Balčiauskas, 2001; Balčiauskas et al., 2005), but conflicts with lynx in particular have not been analysed.

We may expect that in Poland and Lithuania, where public knowledge of the species is worse due to its scarcity, acceptance will be bad. To know the local situation is crucial for successful conservation of carnivores. It was recently confirmed that willingness to pay for large carnivore conservation is negatively correlated with actual presence of wolves (Ericsson et al., 2008).

For lynx such knowledge is so far missing. The aim of our study was to find out if public opinion was related to the species conservation status and population size in NE Poland, Lithuania, and Estonia.

MATERIAL AND METHODS

Lynx acceptance was tested in Poland (Suwalki region, NE Poland), Lithuania (southern, central, and northern parts), and Estonia (southern, central, and northern part, respectively Võrumaa, Jõgevamaa, and Lääne-Virumaa). These areas differ in several parameters: lynx numbers (declining in the south, see below), lynx population dynamics (increasing numbers in the north, declining in the south), lynx protection status (protected in the south, hunted in the north), forest area (declining in the south), and forest fragmentation level (increasing in the south).

The questioning was carried out in 2004–2005. The total number of answers was 1484: 200, 233, 317, 250, 250, 128, and 106 in the mentioned regions, respectively. For our analysis we selected regions from the south to the north, excluding the samples taken in the largest (capital) cities of all countries covered.

The methodology was adopted for the international project ‘Large Carnivores in the Northern Landscapes: An InterDisciplinary Approach to Their Regional Conservation’, and it was used in four countries (Estonia, Latvia, Lithuania, and Poland) simultaneously. Questionnaires were distributed through schools. The children were given questionnaires and instructed to take them home, on the assumption that their households comprised a sufficient variety of age groups to resemble the general population. One class per school (two or three classes in some smaller schools to get an appropriate number of answers) was chosen randomly, and a questionnaire was given to each pupil, excluding siblings if they attended the same class as they could bring duplicate data. The pupils took the questionnaires home, and they were instructed to give the questionnaire to the

person in the household whose birthday was next. Such person could either be a pupil, a parent, or a grandparent etc., provided that they were at least 15 years of age. The next birthday rule was employed to get an unbiased, random sample. Some schools were approached personally, some by students; and some via mail (after a preliminary contact by phone with the head teacher and a teacher of biology).

The computerized data were analysed via standard MS Access queries and chi-square statistics for 2×2 tables with Statistica for Windows ver. 6.0 software (StatSoft, 2004).

RESULTS AND DISCUSSION

First, we checked if respondents along the gradient were aware of the population numbers in the country and of the presence of lynxes in their surroundings. The ratio of correct answers was 13.8% for Suwalki (Poland), 23.8% for Lithuania, and 20.1% for Estonia. So, Polish respondents had less knowledge of the lynx population size in the country than Lithuanians ($\chi^2 = 8.89, p = 0.003$) and Estonians ($\chi^2 = 3.60, p < 0.10$). The respondents' knowledge in the last two countries did not differ significantly ($\chi^2 = 2.23, NS$). As to the lynx population size, most Estonian and Polish respondents underestimated animal numbers in their country, while Lithuanian respondents overestimated their lynx population (Fig. 1).

The situation of the lynx is different between the regions covered. Looking from south to north we can observe a very well expressed change in the population status. In Poland, the species is fully protected since 1995, with the population size of about 200 animals (Jędrzejewski et al., 2002). The answer of Polish respondents that there were 100–500 lynxes in the country was accepted as correct.

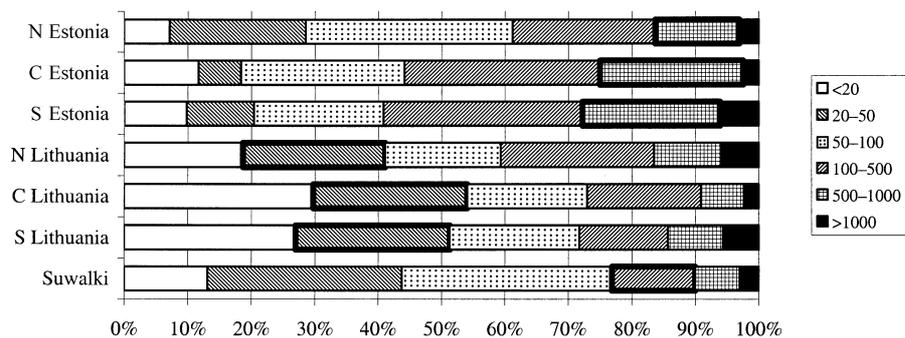


Fig. 1. Knowledge of the lynx population size among respondents from NE Poland, Lithuania, and Estonia: answers to the question ‘How many lynxes inhabit [your country]’. Correct answers are bordered by a bold line.

In Lithuania, the species is not hunted from 1979; it is included into the Red Data Book of Lithuania since 2000. In the official survey data of 1994–2003, lynx numbers were reported as being around 100. Two partial surveys in 2003 and 2004 showed lynx numbers being 19 and 32, respectively (Bukelskis et al., 2004). Full-area snow surveys in 2007 and 2008 confirmed that the lynx population in Lithuania was catastrophically small (30–40 individuals). In south and central Lithuania the lynx is absent. The answer of Lithuanian respondents that there were 20–50 lynxes in the country was accepted as correct. Overestimation of the lynx numbers in Lithuania may arise from overestimations presented in various sources (Bluzma, 1999, 2003; Bluzma & Baleišis, 2001).

In Estonia, on the contrary, the lynx is abundant. In 2004–2005 there were about 1000 animals in the country according to hunters' data and about 700 according to the monitoring data. In 2007 there were 1400 lynxes according to hunters' data (740 according to the monitoring). In 2004–2007 the annual bag of the lynx in Estonia was about 85 animals (Centre of Forest Protection and Silviculture, 2008; Männil & Kübarsepp, 2008). For Estonia, the correct answer was that there were 500 to 1000 lynxes in the country.

We also assessed the knowledge of respondents asking them if lynxes were present near the place where they lived. The correct answer of respondents in all Estonian regions covered and in north Lithuania should be 'yes', and in all other regions 'no'. The best knowledge about lynx presence was shown by the respondents from the north: Estonia and the northern part of Lithuania (where animals were actually present). The ratio of correct positive answers grew northwards – from 32.69% in north Lithuania to 93.4% in Lääne-Virumaa (Fig. 2). On the other hand, the ratio of correct negative answers was higher in the southern part of the investigated territory – 54.1% in south Lithuania, 59.5% in Poland, and 71.9% in central Lithuania. Thus, the knowledge of lynx absence was better among respondents from the regions where animals were actually absent ($\chi^2 = 70.65, p < 0.0001$).

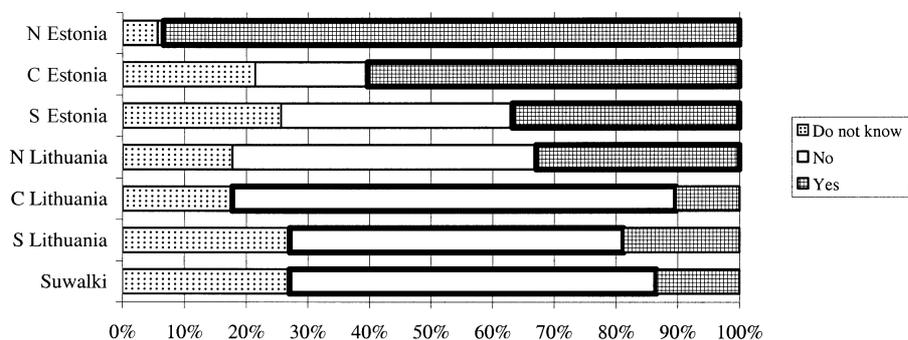


Fig. 2. Answers to the question, 'Are lynxes present in the place where you live?'

Here our analysis is based on the knowledge of the place where the answers came from, and the knowledge of lynx distribution, based on authors' data and published sources (Bluzma, 1999, 2003; Balčiauskas, 2001; Lõhmus, 2001; Ozoliņš, 2001; Valdmann, 2001; Jędrzejewski et al., 2002; Bukelskis et al., 2004; Ozoliņš et al., 2007; European, 2008). All these sources confirm absence of lynxes in the southern part of the territory under investigation. Thus, no lynxes could be found in a 10–20 km zone from the respondents' home in NE Poland and southern or central Lithuania. This question is related to the next one, concerning the acceptance of carnivores nearby.

So, we checked if respondents would accept the presence of lynxes near their homes. The acceptance of lynx presence was higher in the northern part of the analysed territory (Table 1). In Poland and Lithuania, about 20% of the respondents said they would accept lynxes closer than 10 km from their dwelling place; in the southern part of Estonia lynx-friendly respondents constituted about 30%, and in central and northern Estonia about 40% of the country-wide sample. These differences are statistically significant for Lithuania plus Poland versus south of Estonia ($\chi^2 = 14.37$, $p = 0.0002$) and versus central and north of Estonia ($\chi^2 = 39.94$, $p < 0.0001$). In Estonia lynx acceptance by distance was evenly distributed: south of Estonia versus central and north of Estonia $\chi^2 = 3.56$ (NS). The ratio of respondents who would like lynxes to stay more than 10 km away (and even not in their district) was much smaller in Estonia (45.7–52.0%) than in Lithuania (56.4–70.2%) and in Poland (68.3%). These differences are significant: Poland versus Estonia $\chi^2 > 10.88$, $p < 0.001$; Estonia versus central Lithuania $\chi^2 > 10.0$, $p < 0.01$; northern Lithuania versus southern Lithuania $\chi^2 = 9.71$, $p < 0.01$. Thus, in the southern part of the investigated region acceptance of lynxes was worse.

The south–north differences were also present in the respondents' opinion about lynx population management (Table 2). In Estonia (the northern part of the gradient), the dominant opinion was to keep the current population numbers (58.5–65.6% of respondents), followed by reducing them (20.3–31.5% of respondents), whereas propositions to increase lynx population numbers were favoured in the southern part of the compared regions (26.8–32% of all respondents in southern and central Lithuania, 54.7% of all respondents in the Suwalki region).

Table 1. Acceptable distances of lynx presence from home (in percent of all answers) in Poland, Lithuania, and Estonia

| | Suwalki | South Lithuania | Central Lithuania | North Lithuania | South Estonia | Central Estonia | North Estonia |
|--------------------|---------|-----------------|-------------------|-----------------|---------------|-----------------|---------------|
| Do not know | 11.1 | 21.6 | 9.7 | 9.5 | 17.6 | 14.2 | 10.4 |
| Not in my district | 24.6 | 36.1 | 45.6 | 41.7 | 36.0 | 32.3 | 31.1 |
| >10 km | 43.7 | 20.3 | 23.9 | 28.5 | 16.0 | 13.4 | 17.9 |
| 6–10 km | 12.1 | 9.7 | 10.4 | 7.4 | 16.0 | 21.3 | 16.0 |
| 1–5 km | 5.5 | 8.8 | 7.4 | 8.7 | 10.0 | 15.7 | 17.9 |
| <1 km | 3.0 | 3.5 | 2.9 | 4.1 | 4.4 | 3.1 | 6.6 |

Table 2. Respondents' opinion about further management of lynx numbers (in percent of all answers) in Poland, Lithuania, and Estonia

| | Suwalki | South Lithuania | Central Lithuania | North Lithuania | South Estonia | Central Estonia | North Estonia |
|---------------------------|---------|-----------------|-------------------|-----------------|---------------|-----------------|---------------|
| Exterminate totally | 3.5 | 5.3 | 3.2 | 5.7 | 0.8 | 0.0 | 0.0 |
| Strongly reduce numbers | 3.5 | 4.8 | 5.5 | 10.7 | 9.3 | 5.5 | 8.6 |
| Slightly reduce numbers | 7.0 | 12.7 | 14.6 | 22.5 | 11.7 | 14.8 | 22.9 |
| Keep current numbers | 31.2 | 50.4 | 44.5 | 44.3 | 58.5 | 65.6 | 61.0 |
| Slightly increase numbers | 46.7 | 21.1 | 23.1 | 13.9 | 17.7 | 12.5 | 6.7 |
| Strongly increase numbers | 8.0 | 5.7 | 9.1 | 2.9 | 2.0 | 1.6 | 1.0 |

These differences are significant statistically. So, compared to respondents from Lithuania and Poland, more Estonian respondents were for keeping the current number of lynxes ($\chi^2 = 55.30$, $p < 0.0001$). The ratio of those wishing to reduce the numbers did not differ among the groups ($\chi^2 = 0.96$, NS), but a significantly smaller number of respondents in Estonia supported total extermination of these carnivores ($\chi^2 = 17.07$, $p < 0.0001$).

From the experience of reintroduction of wolves to Yellowstone and the following public opposition we know that in the background there are not carnivore presence or their numbers, but much more serious social issues, related to access to social power, conflicting ideas about private property, and divergent beliefs about nature (Wilson, 1997). Generally, respondents' position on the wild nature may have an impact on carnivore acceptance (Bjerke et al., 2001). So we checked differences on the south–north gradient with regard to the respondents' opinion about wildlife (Table 3). Compared to Lithuania and Poland, a significantly larger number of Estonian respondents (about 60–70%) declared that wild nature, including big carnivores, was not important for them or they were indifferent to wild nature. In Lithuania and Poland, the number of respondents not valuing wild nature was smaller, about 37–53%. Thus, the importance given to wilderness was significantly increasing southwards ($\chi^2 = 83.81$, $p < 0.0001$). At the same time, acceptance of lynxes was higher in the northern part of the analysed territory. The only explanation for this disagreement may be that in the south wilderness is represented less (forest fragmentation, intensive agriculture, etc.), and thus it is more valued. Carnivores are out of the range of simple 'wilderness', thus, their acceptance may be different.

Table 3. Respondents' opinion about the importance of wild nature (in percent of all answers) in Poland, Lithuania, and Estonia

| | Suwalki | South Lithuania | Central Lithuania | North Lithuania | South Estonia | Central Estonia | North Estonia |
|----------------|---------|-----------------|-------------------|-----------------|---------------|-----------------|---------------|
| Indifferent | 5.6 | 4.1 | 3.9 | 7.1 | 8.1 | 9.2 | 9.8 |
| Not important | 34.7 | 39.6 | 33.6 | 46.1 | 60.3 | 58.8 | 51.0 |
| Very important | 59.7 | 56.3 | 62.5 | 46.9 | 31.6 | 31.9 | 39.2 |

It was shown earlier that an expected property loss is a key factor defining the differences of large carnivore acceptance between countries (Balčiauskas et al., 2005). The distribution of respondents' opinion whether they would lose income if large carnivores were present in their neighbourhood was not clear. Small losses were expected in the southernmost part of the Baltic gradient (35% of the respondents in Suwalki), whereas in north Lithuania and Estonia it was believed that big losses would occur (Table 4).

Statistically expectation of big losses was higher in northern Lithuania than in southern Lithuania ($\chi^2 = 12.25$, $p < 0.001$) or north-eastern Poland ($\chi^2 = 15.15$, $p < 0.001$). In Central Estonia, expectation of big losses was higher than in southern Lithuania ($\chi^2 = 5.06$, $p < 0.05$), but not than in north-eastern Poland ($\chi^2 = 3.79$, $p < 0.10$). Considering the actual situation, this is unfounded. In Lithuania there are no cases of lynx damage at all (L. Balčiauskas, unpubl. data). In Estonia only six cases are known in 2007–2008 (Männil & Kübarsepp, 2008). Expectation of losses was shown to be one of the main factors forming acceptance of wolves in Lithuania and Estonia (Balčiauskas et al., 2005). Until today no comparison between wolf and lynx acceptance as depending on the damage done has been made. Possibly, the relatively higher damage by lynxes in the north and higher damage by wolves in the south (Linnell et al., 1996, 2002; Breitenmoser, 1998; Bjerke et al., 2001; Balčiauskas et al., 2005) may influence species acceptance on a wide geographical scale. Thus, in the future we are going to check acceptance forming factors on a smaller scale, inside a single country.

Table 4. Respondents' opinion about expected losses of income (in percent of all answers) in case large carnivores were present in their neighbourhood in Poland, Lithuania, and Estonia

| | Suwalki | South Lithuania | Central Lithuania | North Lithuania | South Estonia | Central Estonia | North Estonia |
|--------------|---------|-----------------|-------------------|-----------------|---------------|-----------------|---------------|
| Do not know | 27.0 | 45.3 | 31.8 | 27.9 | 26.4 | 27.6 | 24.5 |
| No losses | 34.2 | 35.4 | 44.5 | 41.8 | 53.6 | 49.6 | 51.9 |
| Small losses | 35.2 | 16.1 | 16.9 | 17.2 | 13.6 | 14.2 | 17.0 |
| Big losses | 3.6 | 3.1 | 6.8 | 13.1 | 6.4 | 8.7 | 6.6 |

CONCLUSIONS

- Most Estonian and Polish respondents underestimated the lynx population size in their country, and Lithuanian respondents mostly overestimated it.
- A better knowledge about lynx presence was shown by the respondents from the north (Estonia and north Lithuania), and about lynx absence by those from the south (central Lithuania, south Lithuania, and north-eastern Poland). Thus, respondents' knowledge was formed by the actual presence or absence of lynxes.
- The acceptance of lynx presence close to the respondent's home was higher in the northern part of the region covered.
- In the north (Estonia) the dominant opinion was that the current lynx numbers should be kept or reduced, whereas in the southern part (south Lithuania and north-eastern Poland), increasing the lynx population size was preferred.
- Thus, for north-eastern Poland, Lithuania, and Estonia, a south–north gradient was found in the respondents' knowledge of lynx status (numbers or presence in the region), species acceptance, and preferred management options.
- These regional differences in the lynx acceptance should be taken into account in planning regional species conservation measures on the population level.

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Suhtumisest ilvesesse Poolas, Leedus ja Eestis

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Ankeetküsitluse teel on uuritud elanikkonna suhtumist ilvesesse Kirde-Poolas, Leedus ja Eestis. Uuritud piirkonnad erinevad üksteisest ilveste asustustiheduse, arvukuse dünaamika ja kaitsestaatuse poolest. On uuritud, kas ja kuidas mõjutavad need näitajad elanikkonna suhtumist nimetatud liiki. Põhja pool on inimesed ilvese tegelikust arvukusest teadlikumad, aktsepteerides tema olemasolu lähikonnas. Lõuna pool suhtutakse positiivsemalt ilvese arvukuse suurenemisse, põhja pool praeguse arvukuse säilitamisele. Metsiku looduse tähtsus inimeste väärtushinnangutes kasvab lõuna suunas. Seega, lõuna-põhjasuunaline gradient ilvesesse suhtumises sõltub liigi seisundist.