

Public perception of large carnivores in Latvia

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Abstract: Knowledge of and attitudes toward brown bear (*Ursus arctos*), lynx (*Lynx lynx*), and wolf (*Canis lupus*) in Latvia were assessed through surveys. Brown bears are rare and protected, whereas lynx and wolf are game species. Questionnaires were distributed in public schools and to a self-selected sample of readers of a national hunter's magazine. The Latvian public generally supported large carnivore conservation. Among the 3 species considered, the most positive attitudes were toward brown bears. Negative attitudes were a result of real or perceived effects large carnivores have on livestock husbandry and game management. Nearly 70% of respondents thought protection of bears should be continued, whereas 24% of respondents supported control of bear populations. A majority of respondents believed that wolf and lynx populations should be controlled, but very few respondents supported total eradication of large carnivores in Latvia. A greater proportion of rural inhabitants favored control of carnivore populations than residents in other locales. In contrast, hunters ($n = 157$, almost entirely male, mostly rural, and somewhat older) favored unlimited harvesting of large carnivores. Most respondents expressed interest in obtaining more information on large carnivores, suggesting a role for an expanded education campaign.

Key words: brown bear, *Canis lupus*, Eurasian lynx, human attitudes, Latvia, *Lynx lynx*, *Ursus arctos*, wolf

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Public opinion is an important consideration in conservation of large carnivores (Kellert 1985; Bahunaga 1986; Bath and Buchagan 1989; Bath 1994, 1996; Riley and Decker 2000a,b). Effective conservation largely depends on management practices, the acceptability of which in turn often depends on attitudes toward the species in question (Kellert et al. 1996). Present crises concerning biodiversity result from social pressures, and solutions will need to be social as well as biological (Rientjes 2001). Nonetheless, sociological information is lacking on which to base conservation of large carnivores in Latvia.

Latvia has a population of approximately 2.4 million people (Tisenkopfs 2001). Wolves and lynx have survived in Latvia despite the centuries of persecution (Andersone et al. 2002, Andersone unpublished report), whereas brown bears are rare.

Large carnivore conservation in Latvia is timely because of Latvia's accession to the European Union (EU) and the attendant implementation of European Commission Habitat Directive 92/43/EEC. In most

European countries, wolves, lynx, and brown bears are protected and hunting of these species is prohibited. Nonetheless, conflicts often arise among different interest groups, and socio-economic and psychological factors are very important (Linnell et al. 1996, Breitenmoser 1998).

The purpose of this study was to determine the level of biological knowledge and attitudes of the general public and a selection of hunters toward large carnivores. We also wanted to determine sources of information used to form those attitudes and respondents' willingness to obtain more information.

Methods

We prepared a written questionnaire containing 36 questions. The majority of the questions were related to awareness and attitudes of the public, yet questions pertaining to demographics were included to determine respondents' social status. The country was stratified into 5 geographic regions: Vidzeme (northern part of the country), Latgale (east), Zemgale (south), Kurzeme (west), and Riga, Latvia's capital and most urbanized region, was considered a separate region (along with

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Table 1. Responses of Latvians to questions about large carnivores, 2001. MMD = audience of the hunters' magazine.

Source of information	School sample (%)	MMD (%)
What has formed your image of large carnivores?		
Fairy-tales, legends, etc.	30.3	15.3
Movies	17.3	8.9
Documentary nature films	76.7	79.0
Magazines and newspapers	34.1	65.0
Books	34.6	66.2
Biology lessons	31.6	24.8
Other sources	15.0	43.9
In what form would you prefer to obtain information?		
Books	21.3	44.5
Magazines and newspapers	40.0	72.9
Leaflets	20.3	32.3
Posters	10.3	1.9
During special events	16.1	15.5
Television and radio programs	68.9	80.6
Internet	13.4	7.7

nearby towns). We used Latvian (the official state language), although approximately 30% of Latvia's population use Russian as their first language.

Questionnaires were distributed through schools as a cost-efficient way to sample the total population. In total, 450 questionnaires were distributed through 10 schools. Schools in different regions of Latvia were selected at random. In schools, questionnaires were given to teachers for further distribution; they picked classes at random and distributed them among all the pupils in the class. The number of questionnaires distributed per region was proportional to the number of inhabitants. Questionnaires returned by region were Riga: 137 respondents (34% of total respondents); North Latvia: 92 (23%); East Latvia: 64 (16%); South Latvia: 56 (14%); and West Latvia: 52 (13%).

Pupils were asked to complete questionnaires anonymously in families according to the next birthday rule, under which the person in the household whose birthday occurs next was asked to respond. A few months were given for this task. We conducted additional personal interviews with haphazardly selected respondents in West and North Latvia using the same questionnaire to supplement the school sample (response rate in the other 3 regions was 100%).

In addition, the same questionnaire was published in the hunters' magazine *Hunting, Fishing, Nature* (*Medības, Makšķerēšana, Daba* in Latvian, MMD hereafter). We analyzed these responses separately from the school sample.

Survey sample and potential biases

A total of 401 questionnaires (89%) were returned. The results may be biased as the sample did not reflect the gender or age distribution of the Latvian population. Nearly 60% of respondents were female, whereas the Latvian population is estimated as 54% female (Tisenkopfs 2001). Approximately 42% of respondents were 20 years old or younger, which we believe represents nearly twice the proportion of that age group in the Latvian population. The next most represented age group of respondents was 36–50 (27%); respondents aged 21–35 constituted 18% of the school sample. People >60 years old were only 7% of respondents (compared with 21% among the Latvian population). Thus, a bias may exist in our data due to age and gender differences between the sample and total population.

We received 157 responses from MMD readers. Only 11% were <20 years old (in Latvia one must be 18 years old or older to become a hunter). The age distribution of MMD respondents was older than the school sample ($\chi^2 = 71.1$, 4 df, $P < 0.001$), although it more closely resembled the age distribution of Latvia's general population than did our school sample of respondents. The MMD sub-sample was 94% male. The ratio of urban to rural inhabitants was 36% to 65%, whereas urban residents in Latvia exceed 69% of the total population (Tisenkopfs 2001).

Results

Characteristics of respondents

Educational backgrounds among the school respondents largely were determined by age structure; school children and students dominated with 33% of the sample population. Among among respondents not in school, the most common group had a university education (19%) followed by secondary professional education (18%). Respondents with secondary education (15%), high school education (14%), and primary education (0.8%) comprised the remaining sample. In the MMD sample, 37% of respondents reported having professional secondary education, 31% university education, 14% secondary school, and 8% primary school education. Only 11% of MMD respondents were schoolchildren and students.

Knowledge

Documentary nature films were the most frequently cited source of information about carnivores by respondents to both surveys (Table 1). Almost one-third of school survey respondents indicated they were

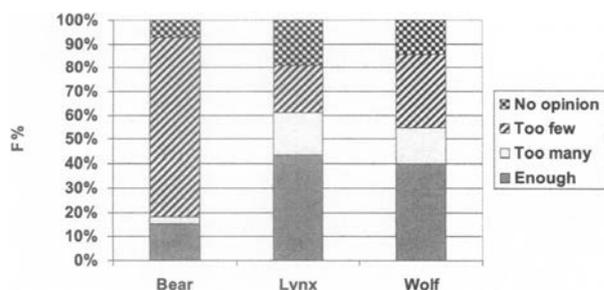


Fig. 1. Attitudes toward populations of large carnivores in Latvia, 2002, by respondents from the school sample.

influenced by fairy tales, which was twice the proportion of hunters, indicating that fairy tales were a source of information about carnivores. A majority of respondents expressed a desire for more information about large carnivores, preferring means such as television, radio, magazines, and newspapers.

Respondents from all age-groups cited television, radio, and articles in magazines and newspapers as preferred information sources. Nonetheless, 12–20 year-old respondents expressed interest in obtaining information via Internet (24%) and during specially organized activities (24%). Adults (36–50 years old) preferred books (25%) and leaflets (23%) as sources of information. Among MMD respondents, books, newspapers, and magazines were cited more as sources of information about large carnivores than these sources were cited by the school sample, regardless of age.

Perceptions of brown bears

School sample. Only 12% of school sample respondents had seen a bear or bear tracks in the wild in Latvia, but 50% expressed a desire to see bears or their sign. Less than half of females (43%) but over half (62%) of males expressed a desire to see bears in the wild. The most frequently expressed attitude by school sample respondents toward the bear population size in Latvia was that there were too few (Fig. 1).

A majority (70%) of school sample respondents supported protection (full legal protection with no harvest) of bears; in contrast only 1% supported their eradication (Fig. 2). Bear control (harvesting to reduce numbers) received more support from women (28%) than men (19%). Almost 76% of male and 66% of female respondents supported bear protection.

Within the school sample, the opinion of rural inhabitants did not differ significantly from that of city dwellers ($\chi^2 = 1.12$, 3 df, not significant). The proportion

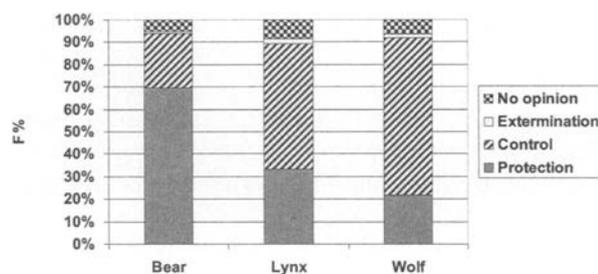


Fig. 2. Opinions of the school respondents about "What should be done with large carnivores in Latvia?" from a questionnaire distributed in 2001.

supporting bear protection among rural inhabitants was 72% versus 69% among urban dwellers. Bear control was supported by 26% of urban dwellers and 21% of rural inhabitants. Rural inhabitants more frequently assessed the number of bears as sufficient (20%) than urban dwellers (12%). More people in towns (79%) than in the countryside (68%) thought that the current number of bears was too low.

Support for bear protection was strong among school-children and students (12–20; 80%) and less so among the older generation (51–80 years old; 55–57%). Among adults (36–50 years old) 36% thought that the bear numbers should be controlled, whereas only 17% of young people between age of 12 and 20 supported control. Among respondents between the age of 51 and 80, 2% supported eradication of bears, but only 1% of young people (12–20 years old) did. Educational level of school survey respondents was not a reliable predictor of support for bear protection. Respondents with a high school education were more likely than those with university education to support protection (71% to 65%), but also more likely to support control (28% to 24%).

Most (62%) respondents in the school sample believed it dangerous to meet a bear in the forest, 18% believed it can be dangerous only under certain circumstances, 11% believed it not dangerous, and 10% had no opinion. Among women in the school sample, 83% thought bears pose a threat to humans, 65% thought bears dangerous regardless of the circumstances, and 18% thought bears dangerous only under certain circumstances. Men were less likely than women to view bears as dangerous regardless of the circumstances or dangerous only under certain circumstances. More males than females believed bears are not dangerous. Those respondents considering bears to be dangerous only under certain circumstances, listed the following reasons: a bear has cubs (29%), it is teased (15%), hungry (14.9%), injured (10%), or startled by people (10%).

Assessment of the number of bears was an open-ended question. Most school sample respondents who considered bear numbers too high cited lack of appropriate kind of forests (67%) in Latvia as their rationale. An additional 11% of respondents mentioned climate in Latvia as not favorable for bears, and 11% mentioned that bears are dangerous to humans. More than 20% of school sample respondents mentioned bears might easily go extinct at such a low population size, and 16% of school sample respondents were confident that the territory of Latvia is sufficiently large to sustain more bears.

MMD sample. Compared with the school sample, fewer ($\chi^2 = 3.294$, 1 df, $P > 0.10$) MMD respondents (56.9%) indicated there were too few bears and more (28.8%; $\chi^2 = 9.040$, 1 df, $P < 0.001$) considered the current abundance of bears enough. Among MMD respondents, 66% supported protection, 40% supported control, and 1% supported eradication.

Only 7% of MMD respondents who answered the question mentioned bears "can not be seen" (a phrase we interpret as indicating low bear density). A similar percentage of MMD respondents mentioned lack of suitable habitats and disturbance of bears by forestry activities. A similar percentage of respondents also believed that a higher bear population would not cause any harm to other fauna; 5% expressed a desire for more bears in order to be able to hunt them.

A higher proportion (57%) of MMD respondents than school sample respondents considered bears dangerous only under certain circumstances ($\chi^2 = 89.291$, 3 df, $P < 0.001$). MMD readers mentioned the following circumstances in which bears were dangerous: accompanied by cubs (37%), bear is injured (37%), bear is ill (21%), bear just awakened from hibernation (14%), or bear acting in self-defence (10%).

Perceptions of other large carnivores

School sample. In contrast to perceptions about bears, the most frequently expressed attitude toward lynx and wolves in Latvia was that there were enough. Most school sample respondents supported wolf and lynx control (Fig. 2). However, very few respondents favored complete eradication of lynx and wolves: 2% of the school sample for both lynx and wolves. Respondents >50 years old were more negative toward wolves: 8% supported wolf eradication whereas only 1% school-children and students (12–20) and 2% adults (36–50) supported eradication. Among respondents aged 12–20, 30% supported wolf protection, and among adults aged 36–50, 11% supported wolf protection. Control of wolves was supported by 60% among 12–20 year-old

respondents, 84% among 36–50 year-old respondents, and 75% among respondents >50 years old.

More than half of school sample respondents (63%) supported banning hunting of wolves during summer (when wolf pups are young), whereas 16% did not support any closed season and 11% had no opinion. Opinions of males and females did not differ: 63% of women and 62% of men opposed summer hunting, whereas 14% of women and 19% of men supported continuing the current practice of year-round hunting. Almost half of the school sample believed it dangerous to encounter a wolf or lynx in the forest. More respondents (24%) had seen a wolf than a bear in the wild, and 47% expressed a desire to see a wolf. Interest in seeing wolves in the wild differed by gender, with 36% among women and 64% among men ($P < 0.001$).

Lynx protection elicited more support among school sample respondents aged 12–20 (39%) than among adults between 35 and 50 (22–25%), but the difference was not significant. Lynx control was supported by 46% respondents aged 12–20, 72% among 36–50 year olds, and 60% among the older generation (51–80 years). Only 17% of school survey respondents had seen lynx in the wild, but 55% would like to. Less than half of women (47%) expressed interest in seeing wild lynx, whereas 67% of men expressed such interest ($P < 0.001$).

The proportion of wolf and lynx control supporters was higher among rural inhabitants than urban dwellers: for lynx, the discrepancy was 65% to 52%; for wolf, 77% to 67%. Respondents with a university education more often supported wolf and lynx protection than respondents with only secondary education: 21% to 17% for wolf and 36% to 26% for lynx.

MMD sample. MMD respondents were more likely than school sample respondents to view wolf and lynx populations as too large (43% for wolf and 31% for lynx). Nearly half of MMD respondents (46%) considered wolf and lynx numbers in Latvia sufficient, whereas 9% and 18% considered wolves and lynx too few. Predation was also the main reason (61%) cited by MMD respondents who considered lynx too abundant. These respondents mentioned that lynx kill roe deer (*Capreolus capreolus*; 38%) and other wild herbivores (25%), causing losses to hunters. Those considering lynx too rare in Latvia most often mentioned they had seen them too seldom or not at all (30%). Three respondents mentioned that it was impossible to get a valuable trophy because of the low lynx density. Two of the 27 who thought there should be more lynx in Latvia considered that lynx do not cause any losses, and 2 other

respondents were unhappy with the uneven distribution of lynx.

In contrast to the school sample, only 5% MMD respondents considered it dangerous to encounter a wolf in the forest, and only 5% regarded lynx as dangerous animals. A lower proportion of the MMD sample than the school sample supported a summer ban on wolf hunting (40%) ($\chi^2 = 7.791$, 1 df, $P < 0.001$), and 45% of the MMD sample did not support a ban on wolf hunting during any season. Asked about particular circumstances when wolves and lynx can be dangerous, respondents most often mentioned animal's illness or injury as reasons.

A higher proportion of MMD respondents (80%) than school sample respondents had seen wolves in the wild, and a similar proportion (81%) expressed interest in seeing wild wolves. More than half (57%) of MMD respondents had seen lynx in the wild, and 93% would like to. A higher percent of MMD respondents than school sample respondents supported control of lynx (89%) and wolf (92%), whereas a lower percent of MMD than school sample respondents supported protecting lynx (21%) or wolves (15%). However, only 1% and 2% of the MMD sample favored complete eradication of lynx and wolves, respectively.

Discussion

Biases caused by the choice of respondents

Because we used school children as the primary mechanism for distributing questionnaires, participants in our school sample were disproportionately families with children of school age. In Latvia, the average number of children/woman is 1.2 (Tisenkopfs 2001). The proportion of single and married people without children is not accurately known. We also do not know whether the next birthday rule was followed properly. Consequently, our sample is probably biased to some unknown degree. We know that young people were over-represented and the older generations were under-represented. Language could also be a reason why our sample cannot be regarded as a true representation of the whole population. Latvian was used for the questionnaires, but the Russian-speaking minority is well above 30% (Tisenkopfs 2001).

Nevertheless, our study allows identification of certain target groups important for conservation and management of large carnivores. Our results indicated an age-biased attitude regarding the knowledge of wolf and bear numbers, the wolf hunting ban, and preferred policies toward bears. The older generation (>50)

tended to be more negative toward carnivore protection, and the proportion supporting total eradication of large carnivores was higher among the older age categories. Our results also suggested that formal education alone might not change attitudes. We speculate that older people feel more responsible for economic welfare and have no time for compromises, especially under the current rapidly changing economic conditions.

Hunters are a particularly important target group. Although only approximately 35,000 people have hunting licences in Latvia (1.5% of all inhabitants), their opinion can significantly influence the brown bear's status. We assumed that readers of MMD represent this group and hoped that respondents to the MMD survey were an unbiased sample of MMD readers. We found notable differences between the 2 samples. This suggests that surveys of the population at-large cannot be expected to accurately reflect the age and gender composition, educational level, experience, or—most importantly—views of hunters.

Implications to management and conservation policy

The brown bear is one of the rarest mammals in Latvia (Timm et al. 1998). Almost every record of the presence of bears is noted by the national mass media, whereas wolves and lynx usually are mentioned by journalists only when they cause damage or are shot in great numbers. Our inquiry indicated that people realise how dangerous bears can be. At the same time, the fear of wolves and lynx is only slightly less. The same respondent groups display contradictory opinions regarding management approaches toward these species. A majority supports the complete protection of the brown bear, but control is preferred for lynx and wolf in particular. There is a clear contradiction in perception of the brown bear, as on one hand, people acknowledge that this predator can be the most dangerous to humans. On the other hand, 11% of respondents has an image of the bear as of a harmless animal. Even divergence in gender-specific attitudes toward the brown bears differed from those regarding other large carnivores. Significantly fewer women supported bear protection than did men, and proportionately fewer welcomed an encounter with a bear. Similar trends have been found elsewhere (Bath 2000).

As other studies have found (Bath 2000), urban people were more likely to support carnivore protection than rural inhabitants, who, living close to carnivores and thus more likely to suffer economic losses, generally preferred control. Therefore, we believe that support for

bears might decline if the bear population in Latvia increases and causes more damage than at present. Wolves are still recovering after at least 50% annual harvest in the mid-1990s (Ozoliņš et al. 2001), but there are no documented cases of bears reproducing in Latvia recently (Ozoliņš and Pilāts 2002).

Due to our initially rather pessimistic assumption, we were surprised to find that respondents (including the MMD sub-sample) appeared to be quite tolerant of large carnivores and showed more biological knowledge than we expected. However, we note specific areas in which our respondents evidently lacked information. About one-fifth of school sample respondents had no opinion about lynx abundance. We interpret this as an indication of the lack of information on lynx status. Similarly, in Lithuania, more than half of respondents had no idea about lynx population trends, and knowledge of wolf status was even worse (Balčiauskas 2001). In Lithuania, lynx are protected and comparatively rare in contrast to wolves (Bluzma 1999, 2000). We suggest that the status of an endangered animal might favor the knowledge of the species, raising interest and probably even improving the attitudes towards it, whereas a species considered a common pest, like the wolf, can suffer from intense persecution and have a negative image.

Knowledge of communication means preferred by each respondent category can help to plan awareness-raising campaigns. Hunters as a separate social group should not be underestimated (Skogen 2001, Skogen and Haaland 2001) and should be addressed separately through their magazines. Establishment of a national damage compensation system is also urgent for Latvia as stated in the European Action Plan for the Conservation of the Brown Bear (Swenson et al. 2000).

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