

INSTITUTE OF ECOLOGY OF NATURE RESEARCH CENTRE
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**PUBLIC ATTITUDES TOWARDS LITHUANIAN LARGE MAMMALS,
THEIR POPULATION MANAGEMENT AND CONSERVATION**

Summary of doctoral dissertation

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**VISUOMENĖS NUOMONĖ APIE LIETUVOS STAMBIUOSIUS
ŽINDUOLIUS, JŲ POPULIACIJŲ VALDYMĄ IR APSAUGĄ**

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INTRODUCTION

Relevance of the study. Large mammals, namely European bison (*Bison bonasus*), brown bear (*Ursus arctos*), wolf (*Canis lupus*) and Eurasian lynx (*Lynx lynx*), are part of autochthonic fauna of Lithuania. The abundance and distribution of these species in Europe is changing. These animals are no longer living in some places, and the European bison even faced threat of extinction as a species. Great concern for these species can be demonstrated by their recognition in international agreements on conservation of biological diversity. Knowledge, experience, beliefs and attitudes as to the management of these animals greatly vary between different layers of the society. Increase of large mammal populations causes greater damage and, consequently, higher numbers of people with negative attitudes towards these animals. Conflicts often arise between different interest groups, which are not for the benefit of the public or wildlife. In order to understand a conflict situation or predict future actions, the notion “cultural carrying capacity” is used in the management of these species. This notion, rather than the ecological carrying capacity of the environment, is a restrictive factor. Public opinion about animals is a decisive factor when adopting legal documents regulating conservation and exploitation of populations, because real conservation is impossible without public support. Large mammals attract public attention; therefore, favourable public opinion about them and tolerance of restrictions of public activities is the only guarantee of co-existence with these animals.

Most European countries responded to multiple recommendations of the Council of Bern Convention to create large carnivore management plans. Such plans have not yet been created in Lithuania for various reasons (Balčiauskas, 2002). Research and assessment of public opinion when managing carnivore populations are accepted in every welfare state. Collection and analysis of such data and recommendations for reshaping of public opinion are essential in Lithuania for the maintenance of vital populations of European bison, wolf and lynx.

The objective of the study is to assess the knowledge and attitudes of the Lithuanian people towards large mammals (European bison, brown bear, wolf and lynx) and their conservation.

The tasks of the study:

1. To assess the knowledge, beliefs and opinion of the Lithuanian people about large mammals – European bison, brown bear, wolf and lynx;
2. To find out differences in the attitudes towards large carnivores among the public, heads of sub-municipalities and foresters;
3. To summarise public attitudes towards measures for conservation and management of large mammal populations and application of such measures;
4. To find out what factors are decisive on public opinion and how they can be used in expanding social carrying capacity (acceptability to large mammals).

Scientific novelty of the study. This is the first dissertation in the Baltic countries to provide a complex assessment of large mammal conservation problems by applying the principles and format of socio-ecological research (human dimensions of wildlife). Such investigations, summarised otherwise than in a report or scientific article, have hardly been done in Europe. This is the first analysis of the change of public opinion during a period of ten years. Also, this is one of the first surveys of public awareness of

European bison and attitudes towards bison conservation. It is the largest by its scope (number of respondents) in Europe. The survey provides grounds for the construction of public opinion on acceptance, management and conservation of large mammal populations.

Scientific and practical significance. Thus far, this is the first summarised study in the Lithuanian language, presenting not only the results of socio-ecological research, but also discussing the methods of sampling and analysis. Exhaustive information on wolf damage in northwest Lithuania and on the circumstances of damage would facilitate more precise assessment of damage by these carnivores all over the country. Multidimensional analysis of public surveys helped to distinguish crucial factors for the formation of public attitudes towards brown bear, wolf, lynx and European bison. Conclusions of the study provide methodical grounds for the development of conservation measures not only with respect to large mammals, but also biological diversity on the whole. The results of the research provide possibilities for environmental and non-governmental organisations to make species conservation more efficient and avoid or mitigate conflicts with the public. This study contributes to the fulfilment of the international commitments of Lithuania in the area of nature conservation.

Defended statements:

1. Lithuanians show the lowest tolerance towards carnivores among all large mammals, in particular when carnivores live nearby and when their behaviour poses a threat to humans and their property.
2. Public acceptance of large carnivores (lynx and wolf) primarily depends on demographical factors (gender, place of living and education) and perceived scope of damage they can make.
3. Of great importance for acceptance of large mammals are latent factors (biocentrism of respondents and basic human values). Tradition, self-direction and benevolence condition negative attitudes towards large mammals, whereas biocentrism determines positive attitudes.
4. Lynx conservation is primarily affected by non-acceptance of the species by the public due to an unreasonable fear of lynx. Regulation of the wolf population greatly depends upon the damage wolves make, negative attitudes of rural inhabitants, and opposition of city inhabitants against lethal control of the population.
5. The degree of acceptance of carnivores is the lowest among the public, higher among heads of sub-municipalities, and the highest among foresters.
6. Public opinion on the presence of European bison in Lithuania is positive; however, conflicts can arise about the manner of maintaining the animals (enclosed or freely) and reintroduction in new locations.

Presentation and approval of results. Results of the work have been presented at five international scientific conferences in Estonia, Latvia and Lithuania. The material of the dissertation is published in four articles in peer-reviewed scientific journals.

Dissertation structure. The dissertation is presented in the following chapters: Introduction, Literature Review, Material and Methods, Results (consisting of six subchapters), Discussion (consisting of five subchapters), Conclusions, Recommendations, References, and two Appendices.

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Approach to Their Regional Conservation, for the possibility to use data and for consultations. My thanks are due to the teachers of schools and gymnasiums who helped to distribute questionnaires and to all who filled in the questionnaires. I thank the foresters who filled in questionnaires and informed of damage caused by wolves. I also thank Rimantas Adomavičius and Robert Lewkiewicz for the possibility to use data necessary for my work, and Algirdas Dumčius for technical assistance. I am grateful to the staff of the Laboratory of Mammal Ecology for consultations, advice and fellowship. The work was supported by the Lithuanian State Science and Studies Foundation in 2009.

LITERATURE REVIEW

This chapter presents a review of conflicts between animals and humans, their reasons, consequences and ways of solutions. A more detailed discussion of scientific methods to examine public opinion is given. The conservation regime, distribution and abundance dynamics of the species in question and the main results of socio-ecological research of these species are reviewed.

MATERIAL AND METHODS

The material of the study is composed of the data collected for the dissertation and of the data from earlier investigations on public attitudes towards large carnivores (brown bear, wolf and lynx) collected in Estonia, Latvia, Lithuania and Poland in 2003–2005 during the project *Large Carnivores in the Northern Landscapes: an InterDisciplinary Approach to Their Regional Conservation* under a permit to use the data of the project. Material for assessment of European bison was collected in Lithuania in 2008–2009.

Areas of survey. The material used for the survey of acceptance of large carnivores was collected in five regions (Fig. 1), in two of which, central part of Lithuania, and Vilnius city and environs, large carnivores were not detected.



Figure 1. Areas of surveys performed during an international project in Lithuania in 2003–2005.
1 pav. 2003–2005 m. tarptautinio projekto metu Lietuvoje atliktų apklausų vietas.

A model region (northwest Lithuania) was chosen for repeated survey of attitudes towards large carnivores and assessment of damage they made. A survey on attitudes towards European bison was conducted in middle Lithuania, taking into consideration the earlier and current distribution of these animals.

Material of questionnaires. Over 8000 questionnaires filled in during 2003–2009 have been analysed:

1. Data of the international project collected in 2003–2005 on attitudes of respondents from four countries towards large carnivores (1541 respondents from Lithuania, 860 from Estonia, 881 from Latvia, and 200 from Poland, Suwalki region). The data from Lithuania were divided according to regions, while data from other countries represent the whole country.

2. Data on attitudes towards large carnivores from 3789 questionnaires collected in the model region in 2009 (questionnaire return rate – 75.1%).

3. Data from questionnaires distributed to heads of sub-municipalities (43 questionnaires) and workers of forest districts (127 questionnaires) through mail with prior agreement with the respondent by phone.

4. Data on attitudes towards European bison from 845 questionnaires distributed in Panevėžys (200 questionnaires) and Kėdainiai (645 questionnaires) districts in September and October of 2008 and 2009 (questionnaires return rate – 84.3%).

5. Data from 46 questionnaires collected in the model region (northwest Lithuania) on damage by carnivores (a total of 66 cases of damage recorded).

Only representatives of the general public are referred to as respondents, whereas the samples of heads of sub-municipalities and foresters are referred to as, respectively, heads of sub-municipalities and foresters.

Methods of data sampling. The target group of the survey on attitudes towards large carnivores was composed of Lithuanian inhabitants of 15 years old and older. Questionnaires were distributed in schools and gymnasiums. Schoolchildren were instructed to take questionnaires home to be filled in by a family member aged above 15, applying the next birthday rule (including grandparents, great-grandparents or any other relatives living together). In case of twins in the class, a questionnaire was given to only one of the twins. Such method is widely used in other countries (Kassily, 2007; Andersone, Ozoliņš, 2004; Røskaft et al., 2007). There were no possibilities for probability sampling.

Data on damage caused by large carnivores during the last three years (Fig. 2) were collected through direct questioning. Prior to collecting such data, information on people suffered from damage by large carnivores was being searched by calling to forest enterprises, forest districts and sub-municipalities. Finally, data was also collected directly from street interviews to ask respondents if they were ever attacked, or knew those attacked, by carnivores.

Structure of questionnaires. The questionnaire used to assess attitudes toward carnivores in 2009 was the same as used in the survey of 2003–2005 (Linnell et al., 2010). Most of the questions were closed-end. The questionnaire on European bison was altered to adapt it to species biology.

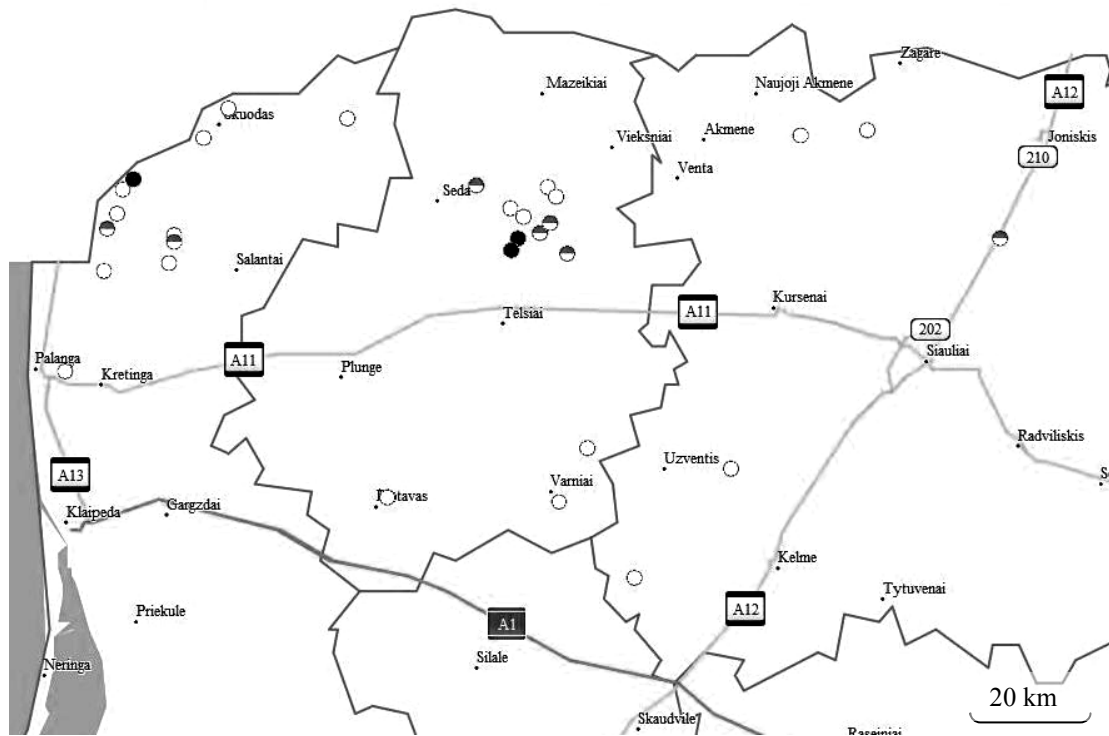


Figure 2. Wolf damage sites in the study area. Empty circle – 1 household, half-full circle - 2–3 households, full circle – more than 3 households (Lithuanian TOPO V1.081NT).

2 pav. Vilkų žalos vietas tyrimo teritorijoje. Tuščias apskritimas – 1, pusiau užpildytas - 2–3, užpildytas – daugiau nei 3 namų ūkiai (Lietuvos TOPO V1.081NT).

A group of manifest questions and independent variables obtained from them was composed of demographic variables, level of urbanisation of the living place, and occupation variables. A group of partially independent manifest variables was composed of the variables which are important in constructing attitudes and motivations. In the survey on European bison, respondents were asked if they had seen a European bison, where, and if they suffered damage from them. In the survey on carnivores, respondents were asked if they would lose money in case of the presence of large carnivores.

Dependent variables were divided into directly related to large mammals and unrelated to large mammals. Intermediate variables were manifest, obtained when calculating responses, while latent variables were obtained when summarising responses to several questions.

Basic human values are *not directly related to large carnivores* (Schwartz, 2010; Skogen, Thrane, 2008). In the survey on carnivores, four basic human values (latent variables) were measured, namely self-direction, universalism, benevolence, and tradition. Relationship between responses and values were verified by factor analysis. Responses were arranged according to the Likert scale, from 1 (completely disagree) to 5 (completely agree). To scale environmental beliefs, the shortened New Ecological Paradigm (NEP) scale was used (Dunlap et al., 2000). Questions (scale elements) in the survey on carnivores and in the survey on European bison were identical. Having summarised scale scores, a latent variable of biocentric worldview was obtained for each respondent. To measure wildlife value orientations (WVO), groups of questions in both surveys were formed. These orientations were divided into protection-use and wildlife

appreciation (Bright et al., 2000). Components were revealed through factor analysis (Table 1).

Factor analysis was carried out using the Principal Components Analysis (PCA) method; the matrix rotation method was Varimax. To check sampling adequacy, we used the Bartlett's Test on Sphericity (BTS) and Kaiser-Meyer-Olkin (KMO) measure. The value of the measure of sampling adequacy (MSA) for each variable was higher than 0.05. 3-point or 5-point Likert scales were most frequently used, as well as Guttman scale and Likert scale without neutral point (forced choice).

Table 1. Structure of wildlife protection-use and appreciation components. In the survey about carnivores: KMO – 0.75, BTS – 4377.61, $p < 0.001$, MSA > 0.60 ; both components explain 55.0% of variation (32.8% protection-use, and 22.2% appreciation). In the survey about European bison: KMO – 0.72, BTS – 934.31, $p < 0.001$, MSA > 0.48 ; both components explain 53.6% of variation (33.8% protection-use, and 19.8% appreciation).

1 lentelė. Gyvūnijos saugojimo ir vertinimo komponentių sandara. Apklausoje apie plėšrūnus: KMO – 0,75, BTS – 4377,61, $p < 0,001$, MSA $> 0,60$, abi komponentės paaiškina 55,0% variacijos (saugojimas – 32,8%, vertinimas – 22,2%). Apklausoje apie stumbrus: KMO – 0,72, BTS – 934,31, $p < 0,001$, MSA $> 0,48$. Abi komponentės paaiškina 53,6% variacijos (saugojimas – 33,8%, vertinimas – 19,8%).

Statement	Carnivores		European bison	
	Appreciation	Protection-use	Appreciation	Protection-use
Animals should be managed in such way that we could benefit from them – surplus animals may be hunted	0.066	<u>-0.763</u>	0.102	<u>-0.755</u>
Animals have the same rights as people	0.298	<u>0.535</u>	0.316	<u>0.350</u>
I am an opponent of hunting, because hunting violates animal right to live	0.110	<u>0.802</u>	0.121	<u>0.819</u>
I like to see animals while travelling	<u>0.779</u>	0.086	<u>0.774</u>	0.074
Though I do not see animals as often as I would like to, I appreciate their existence in the nature	<u>0.782</u>	0.112	<u>0.816</u>	0.078
I like animal presence in the place I live	<u>0.670</u>	0.145	<u>0.687</u>	-0.017
I suppose it is very important to know about animals in the wild as much as possible	<u>0.727</u>	0.019	<u>0.710</u>	0.086

Reliability of information sources about mammals was assessed according to ten responses. Information sources were divided into institutional and informal (according to Skogen, Thrane, 2008).

The variables *directly related with large carnivores* were also distinguished, namely knowledge, beliefs, fears, attitudes, etc. To assess respondents' knowledge, they were asked how many individuals of each species live in Lithuania. Correct answers were considered to be 100–500 wolves, less than 20 brown bears, 20–50 lynx, and 50–100 European bison.

To measure acceptance of carnivores depending on the place of presence and on behaviour, five situations were presented: 1) living at a distance, 2) can be encountered

near human settlements, 3) killing cattle, 4) killing pets, and 5) posing a threat to people. In all cases respondents were questioned about: a) acceptance of behaviour of carnivores, and b) adequacy of management measures. Possible options were from “completely unacceptable” (1 point) to “completely acceptable” (5 points), with 3 points for the response “it makes no sense”. The general acceptance of the species, irrespective of the situation, was the mean of points (if at least one response of the respondent was missing, the respondent’s responses were not used).

Analogically, to assess management measures suggested by respondents according to the Likert scale, a stronger measure was given a higher point, and the response “No opinion” was not given any point.

A respondent’s acceptance of lethal control measures was assessed according to the number of situations (out of five possible options) in which the lethal measure was chosen by the respondent (from 0 to 5). A variable formed in the same way was also used to assess the influence of payment of compensations for damage cause by carnivores on attitudes towards carnivore management methods (according to Naughton-Treves et al., 2003).

When summarising data on the sampling of respondents, it should be noted that young and middle-aged people prevailed among respondents (Tables 2 and 3).

Table 2. Gender and age of respondents in the survey on carnivores.

2 lentelė. Apklaustų apie plėšrūnus respondentų lytis ir amžius.

Gender	Age groups (years)						Total:
	15–24	25–34	35–44	45–54	55–64	>65	
Male	621	54	365	133	42	13	1228
Female	873	277	904	313	69	23	2459
Total N (%)	1494 (40.5)	331 (9.0)	1269 (34.4)	446 (12.1)	111 (3.0)	36 (1.0)	3687 (100.0)

According to educational background, respondents in the survey on carnivores could be grouped as follows: 19.9% of respondents had education of less than 9th Grade, 33.3% had secondary education, 22% had vocational secondary education, 19.5% held a bachelor’s degree, and 5.4% held a master’s degree. For respondents in the survey on European bison, these numbers were, respectively, 17.5%, 37.1%, 21.5%, 18.4%, 5.5%. Respondents from rural areas constituted 44.3%, from small towns 22.8%, from cities 21.2%, and from farmsteads 11.7% of all respondents in the survey on carnivores. These numbers in the survey on European bison were, respectively, 58.9%, 18.6%, 16.4%, and 6.1%.

Table 3. Gender and age of respondents in the survey on European bison.

3 lentelė. Apklaustų apie stumbrus respondentų lytis ir amžius.

Gender	Age groups (years)						Total:
	15–24	25–34	35–44	45–54	55–64	>65	
Male	152	23	55	35	24	13	302
Female	209	63	135	68	29	20	524
Total N (%)	361 (43.7)	86 (10.4)	190 (23.0)	103 (12.5)	53 (6.4)	33 (4.0)	826 (100.0)

In the survey on carnivores, 42.9% of respondents indicated themselves as working, 39.7% were schoolchildren or students, 9.7% took care of home, 5.5% were unemployed, 1.6% were the disabled, 2% were pensioners, and 1.9% were engaged in other activities, referred to by most of them as farming. In the survey on European bison, these numbers were, respectively, 38.7%, 40.4%, 7%, 5.1%, 4.1%, 5.4%, 0.7%, and 4.5% were engaged in farming. In the survey on carnivores, 13% of respondents indicated living with children younger than 6 years old, 72.8% lived with 7–18 year-olds, 13.5% lived with children older than 19, and 14.8% lived without children.

Respondents to the questionnaire on carnivores indicated their interest in different activities in nature. The most popular activities were: picking mushrooms (83.8%), picking berries (76.1%), fishing (55.3%), nature photography (54.9%), and hiking (52.5%). The least popular were snowboarding (17.0%), hunting of large animals (19.8%), and hunting of small animals (20.3%).

Methods of statistical analysis. To assess significance and reliability of differences, chi-square (χ^2) test was used, with prior formation of 2×2 tables (Fleiss, 1989). Relationship between rank variables was accepted or rejected by forming m×n tables and by conducting the test of independence. If cells with probable frequencies took more than 25% of the table or if the sample was smaller than 30, Yates Correction was applied. To explore if means of samples are significantly different (in case of rank data), the Tukey *post hoc* test in the Analysis of Variance was used. The equality of variances of samples was tested according to Levene's test. If the condition of normality was not met, non-parametric tests were used – Mann-Whitney U test in case of independent samples and the Wilcoxon signed ranks test in case of dependent samples.

The values of latent factors were calculated by summing up or averaging the values of elements constituting the latent factor. Records with at least one element missing were rejected. Latent factors were determined through factor analysis. To assess internal reliability of questionnaire scales, Cronbach's alpha coefficient was used.

RESULTS

Knowledge and beliefs about large mammals. Assessment of the knowledge of large carnivore numbers (i.e. cognitive component of attitude, see Bath et al., 2008) showed that more than half of respondents made a mistake when answering the question on the number of carnivores in Lithuania. 31.6% of the public, 40.5% of heads of sub-municipalities, and 75.6% of foresters knew the exact number of wolves; respectively, 23.2%, 24.4% and 30.4% knew the exact number of lynx; and respectively, 68.5%, 89.7% and 100% knew the exact number of brown bears. Less than half of respondents (31.8%) knew the exact number of European bison, 25% overestimated their numbers, and 22.1% underestimated their numbers. 20.4% of respondents could not answer the question on the number of European bison, and 11.7% of respondents could not answer the question on the number of brown bears in Lithuania. Wolf numbers were overestimated by the public and heads of sub-municipalities, but underestimated by foresters (Fig. 3). All groups had a good knowledge of the number of brown bears, and foresters knew their exact number. The number of lynx was overestimated by the respondents of all groups.

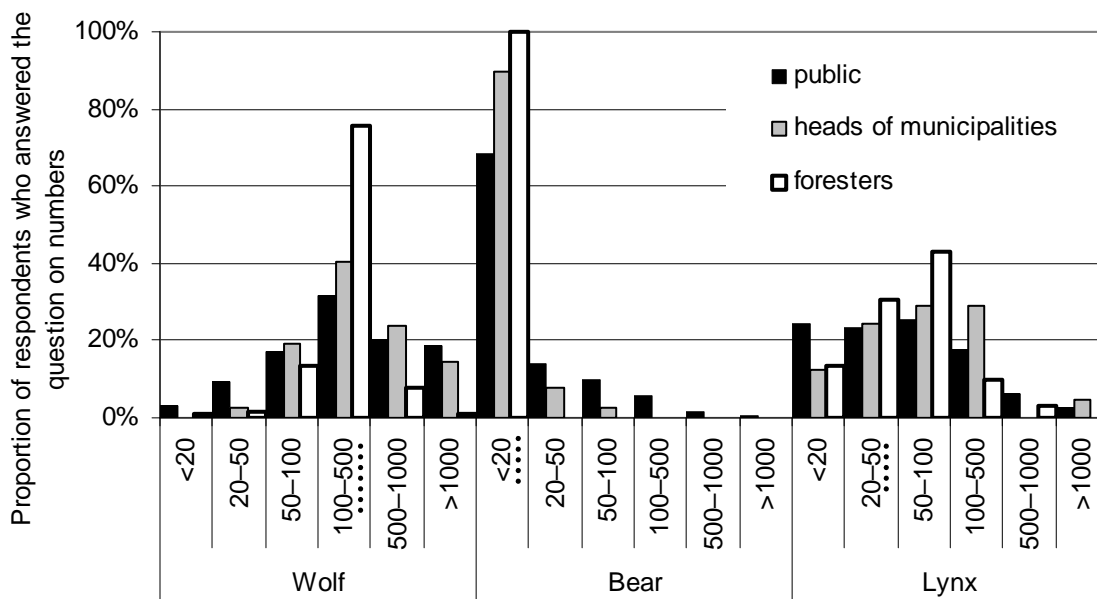


Figure 3. Knowledge of carnivore numbers in Lithuania (data of 2009). The correct number is underlined.

3 pav. Plėšrūnų skaičiaus Lietuvoje žinojimas (2009 m. duomenys). Teisingas skaičius pabrauktas.

Overestimation of the number of wolves was more characteristic of respondents living in north and northwest Lithuania, where wolves cause more damage, than respondents living in central Lithuania ($\chi^2=13.78$, $p=0.002$; $\chi^2=19.23$, $p<0.001$). Though lynx did not cause damage in any region, their numbers were mostly overestimated by respondents from north Lithuania, who suffer the greatest damage from wolves, compared with respondents from central Lithuania ($\chi^2=8.82$, $p=0.003$). Thus, damage suffered by wolves can result in overestimation of the number of both wolves and lynx. According to Bath (2000; 2005), the more people overestimate the number of carnivores the less they favour carnivores, and vice versa. Therefore, overestimation of the number of carnivores by the public is important information for nature protection specialists. Working respondents ($\chi^2=31.84$, $p<0.001$) and students or schoolchildren ($\chi^2=39.90$, $p<0.001$) had a better knowledge of the number of brown bears. However, students and schoolchildren should have a better knowledge of other species. Apparently, educational programs most probably do not contain information about carnivores. Farmers had the best knowledge of abundance of all carnivores: wolves ($\chi^2=7.12$, $p<0.008$), brown bears ($\chi^2=6.91$, $p<0.009$), and lynx ($\chi^2=6.40$, $p<0.011$).

The poorest knowledge of European bison was related to species history, namely that 500 years ago European bison was one of the main game species and was once extinct. The greatest knowledge of European bison was related to their feeding and living patterns (Fig. 4). Such shortage of knowledge is characteristic not only to Lithuanians. Less than half of respondents in Germany knew that European bison had lived at some period of time in their territory (Decker et al., 2010). A poorer knowledge of the history of European bison was found to be directly related with a lower motivation to restore the population. As we can see from our survey, part of the society perceives European bison as a species introduced from other countries. Such perception could explain suggestions by such part of the society to keep European bison only in enclosed

areas. Thus, shortage of knowledge reduces the possibility of long-term conservation of European bison in Lithuania.

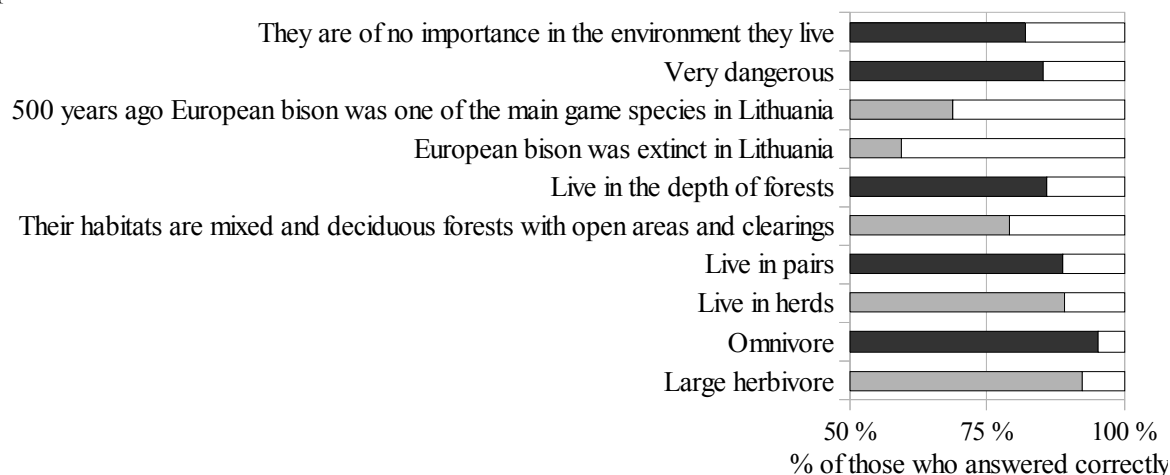


Figure 4. Respondents' knowledge of European bison (wrong statements in dark colour).
4 pav. Respondentų žinios apie stumbrus (neteisingi teiginiai išskirti tamsia spalva).

Nearly half of those questioned (49.2%) were not aware of damage caused by European bison. Only eight respondents suffered damage in their farms, 2.1% knew of damage suffered by their relatives, 17.3% learned about damage from press, and in 6.8% of cases damage was suffered by respondents' acquaintances. 10.7% were believed that European bison lived nearby, 47.2% were believed that European bison did not live nearby, and more than one third (38.8%) did not know. The majority of those stating that European bison permanently lived at a distance of 10 km from their homes were from human settlements in the places visited by bison herds.

48.0% of respondents believed that wolves lived close to their living places, 1.8% believed so of lynx, and 1.1% believed so of brown bears. The number of respondents who did not know of presence of lynx was greater than the number of those who did not know presence of wolves or brown bears ($p < 0.001$). The same regularities obtained during the survey of 2003–2005 confirm that lynx as a large carnivore has the lowest public awareness.

Acceptance of large mammals by different respondent groups. *Assessment attitudes towards large mammals* was done in some aspects according to Kellert's (1993) typology of wildlife attitudes. Most respondents had a naturalistic attitude towards carnivores: 79.6–96.8% of them agreed with the statement that it would be an exciting event to see them in the nature. In this respect brown bears were preferred to wolves or lynx ($Z=10.16$, $p < 0.001$; $Z=3.48$, $p=0.001$), and lynx were preferred to wolves ($Z=7.75$, $p < 0.001$). The heads of sub-municipalities and foresters better appreciated lynx than wolves ($Z=2.25$, $p=0.024$; $Z=2.12$, $p=0.034$).

Acceptance of large mammals according to the tolerated distance from respondents' living places. Only a very small part of respondents tolerated the presence of large carnivores at a distance less than 1 km from their living places (Table 4; 10 km limit chosen according to Roskaft et al., 2007). Brown bears were less acceptable than wolves and lynx, and lynx were less acceptable than wolves (all $p < 0.001$). Thus, public intolerance of lynx was not lower than that of wolves, irrespective of their smaller size, solitary way of living, and absence of damage to livestock breeders. According to the

tolerated distance from respondents' living places, carnivores were best accepted by foresters, followed by heads of sub-municipalities (s-m) and the public.

Table 4. Assessment of carnivore acceptance according to the respondents' tolerated distance (% of responses).

4 lentelė. Plėšrūnų priimtimumo įvertinimas pagal respondentų toleruojamą atstumą (atsakymų %).

		Do not want in my district	Further than 10 km	6–10 km	1–5 km	Closer than 1 km	No opinion	<i>Not acceptable (>10 km)</i>	<i>Acceptable (≤10km)</i>
Public	Wolf	34.9	25.0	16.3	12.6	3.4	7.7	59.9	32.4
	Bear	50.9	20.9	8.5	3.5	1.5	14.7	71.8	13.5
	Lynx	40.1	23.1	12.4	8.5	3.3	12.6	63.2	24.2
Heads of s-m	Wolf	14.0	25.6	27.9	23.3	2.3	7.0	39.5	53.5
	Bear	23.8	35.7	14.3	4.8	2.4	19.0	59.5	21.4
	Lynx	18.6	25.6	25.6	18.6	2.3	9.3	44.2	46.5
Foresters	Wolf	4.7	24.4	29.1	35.4	3.9	2.4	29.1	68.5
	Bear	33.0	28.6	12.5	8.9	0.9	16.1	61.6	22.3
	Lynx	5.0	16.7	26.7	36.7	8.3	6.7	21.7	71.7

Public acceptance of carnivore also depends on demographical factors. All carnivores were more acceptable to men than women: wolves ($Z=-9.77$) brown bears ($Z=-7.87$) and lynx in particular ($Z=-11.51$, all $p<0.001$). E.g. 26.4% of men and 39.5% of women wished that wolves would not live in their district at all, 42.4% and 55.3%, respectively, thought the same of brown bears, and 29.3% and 45.7%, respectively, thought the same of lynx. This research shows that people in Lithuania are more tolerant towards animals that are more common to them. Other research also demonstrated that long-term close proximity to carnivores increases public tolerance towards them (Bath, Majic, 2001; Kaczensky et al., 2004).

European bison were more tolerated by people in their vicinity than carnivores. For 18.8% of respondents of central Lithuania it was not acceptable that bison live in their district, for 47.4% it was unacceptable that bison live at a distance less than 10 km, 60.9% did not accept them at a distance less than 5 km, and 39.1% would not object to bison living closer than 5 km from their home.

Table 5. Tolerance of presence of European bison according to distance and respondent's living place (% of responses).

5 lentelė. Tolerancija stumbrų buvimui pagal atstumą ir respondentų gyvenamąją vietą (atsakymų %).

	Do not want in my district	Further than 10 km	6–10 km	1–5 km	I do not care at all	<i>Not acceptable</i>	<i>Acceptable</i>
City	28.1	28.1	15.6	4.4	23.7	56.3	43.7
Town	19.5	31.2	10.4	12.3	26.6	50.6	49.4
Village	15.7	28.9	14.5	14.9	26.0	44.6	55.4
Farmstead	17.6	19.6	11.8	31.4	19.6	37.3	62.7

Men were considerably more tolerant towards neighbouring bison ($Z=-5.28$, $p<0.001$), e.g. bison living closer than 10 km would be tolerated by 65.2% of men and 45.5% of women. Bison living closer than 5 km from home would be less tolerated by city dwellers than all other inhabitants (Table 5). To sum up, the tolerance of European bison reliably depends upon the respondent's living place ($\chi^2=34.38$, $p=0.001$).

To assess **acceptance of carnivores based on their behaviour and place of presence**, five variants of behaviour of carnivores were analysed (Fig. 5). People most frequently (~75%) accepted carnivores living at a distance. Brown bears were better accepted than lynx ($Z=-23.35$, $p=0.001$) and wolves ($Z=-2.45$, $p=0.014$), and acceptance of the latter two species did not differ.

The majority of respondents did not accept carnivores living near human settlements, mostly brown bears (82.4%) and less lynx (75.2%) and wolves (74.8% of responses). The greatest difference in public opinion was in the situation when wolves pose threat to humans, whereas the greatest difference in opinion between heads of sub-municipalities occurred in the situation when wolves kill livestock (Fig. 5).

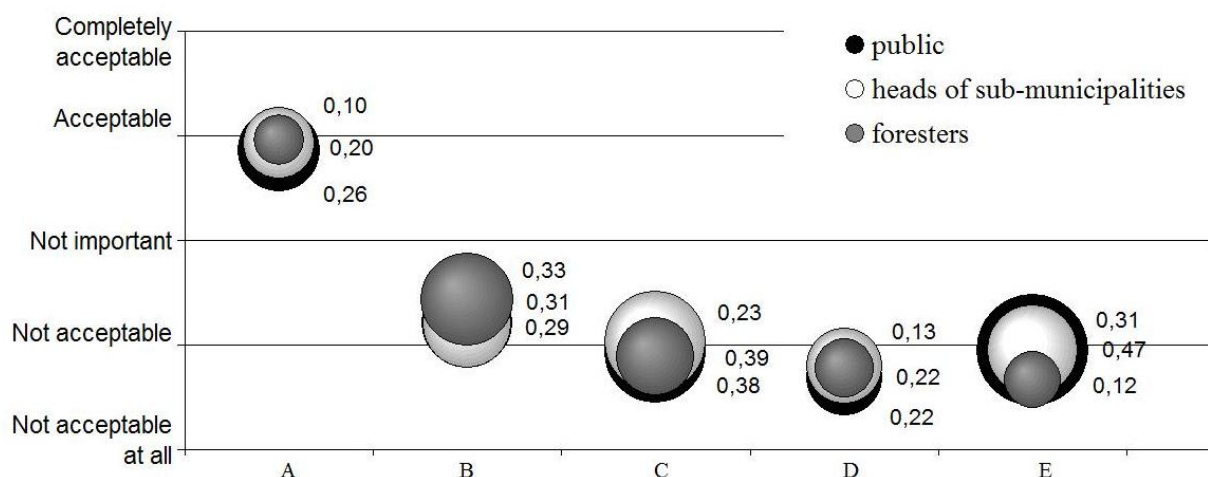


Figure 5. Acceptance of wolf behaviour when they live at a distance from people (A), can be met near human settlements (B), kill livestock (C), kill pets (D), and pose threat to people (E). The size of circles corresponds to the potential for conflict index in the group, i.e. 0 – no conflict, 1 – greatest conflict (according to Vaske, 2010).

5 pav. Vilkų elgesio priimtinumas kai jie gyvena nuošaliose vietose toli nuo žmonių (A), gali būti sutinkami netoli nuo gyvenviečių (B), pjauna naminius galvijus (C), pjauna kambarinius šunis ir kates (D) ir kelia grėsmę žmonėms (E). Apskritimų dydžiai atitinka potencialo konfliktui indeksą grupėje, t.y. 0 – jokie konflikto, 1 – didžiausias konfliktas (pagal Vaske, 2010).

To summarize acceptance in all situations, the public accepted wolves better than lynx ($Z=-6.78$, $p<0.001$) or bears ($Z=-14.47$, $p<0.001$), and lynx were more acceptable than bears ($Z=-9.16$, $p<0.001$). For heads of sub-municipalities, wolves and lynx were more acceptable than bears (respectively, $Z=-2.42$, $p=0.015$; $Z=-2.27$, $p=0.023$). Foresters rated large carnivores according to acceptance as follows: lynx seemed more acceptable to them than bears ($Z=-2.27$, $p=0.006$) and wolves ($Z=-3.09$, $p=0.002$). Lynx were more acceptable to foresters than to the general public ($Z=-3.12$, $p=0.002$).

To assess **attitudes towards activities of European bison**, three basic factors forming such attitudes have been distinguished through factor analysis, namely losses, disturbance, and fear. Most respondents (54.7%) agreed with the statements that

European bison devastate crops and that bison damage is considerable low (53.0%). Most frequently (71.4% of responses) respondents objected to the statements that there is no need wasting state money for bison, than bison pose threat to livestock (55.0%), that bison do not cause any damage (54.4%), and that bison are dangerous to people (Fig. 6).

Women felt greater fear of bison than men did ($Z=-2.94$, $p=0.003$). The youngest respondents aged 15–24 were scared of bison more than middle-aged (25–34 and 35–44 year olds) did. The part of those thinking that bison inflict losses was the biggest in the age groups of 15–24 and 35–44. Inhabitants of cities and towns felt greater fear of European bison.

Assessment of measures to manage large carnivores. The carnivore management measures suggested by the public were more dependent on the situation than on the species (Fig. 7). If carnivores live at a distance from people, most respondents (70.0–72.5%) stated that no measures need be applied. The number of respondents stating that no measures are needed in the situation where carnivores could be encountered near human settlement obviously decreased to 4.9–6.7%.

When summarizing respondents' attitudes what measures were in their opinion the most suitable for management of large carnivores, we noticed that the public did not accept carnivores in their close vicinity and suggested scaring them away. Carnivores were most frequently suggested to be eradicated or transferred to other locations if they pose a threat to respondents' life or property (Table 6). Transferring carnivores to other locations is the measure most frequently suggested by respondents. This measure is popular in the USA too (Bradley et al., 2005). Sometimes this measure works – carnivores stop killing livestock (Beyer et al., 2003; Goodrich, Miquelle 2005), but sometimes it is inefficient, because transferred animals can cover long distances to return. Besides, this measure is expensive and mortality of transferred animals is high (Bradley et al., 2005; Naughton-Treves et al., 2003). The application of this measure is aggravated by the difficulty to identify an individual causing damage and finding a place for transfer because local people object to bringing carnivores (Decker et al., 2008). This method is complicated and expensive therefore justifiable only with respect to very rare species. For the above reasons it is useful to know what way the respondents who have chosen such measure would suggest (or would be satisfied with), because transferring carnivores is impossible within Lithuania.

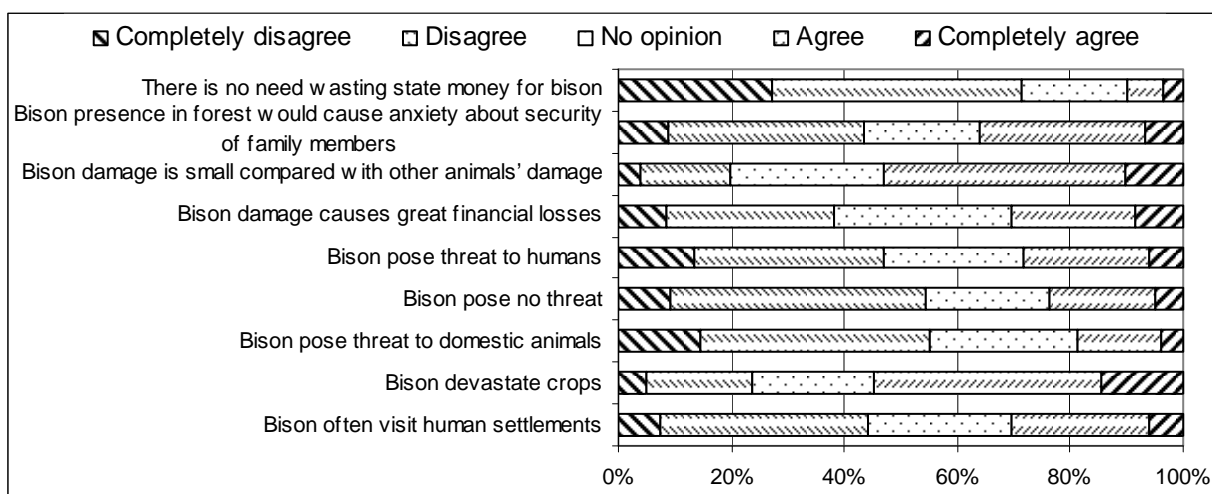


Figure 6. Distribution of respondents' attitudes towards European bison.
6 pav. Respondentų požiūrio į stumbrus pasiskirstymas.

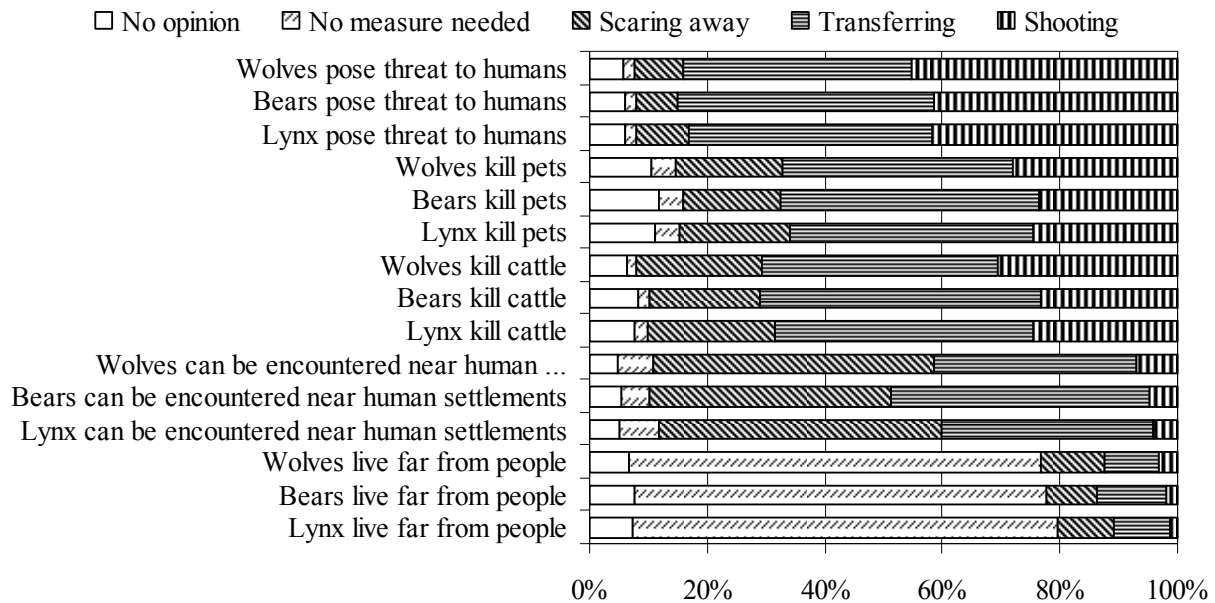


Figure 7. Public attitudes towards carnivore management measures.
7 pav. Visuomenės požiūris į stambiųjų plėšrūnų valdymo priemones.

A comparison of the attitude of respondents of some countries towards carnivore management measures in every situation of their behaviour shows that Lithuanians tend to suggest stricter measures than inhabitants of Latvia or Poland ($p < 0.001$). The measures by Lithuanians are stricter than those offered by Estonians only in the cases when carnivores live at a distance or may be encountered close to human settlements ($p < 0.001$); in other situations Estonians have a stricter attitude than Lithuanians, in particular when speaking about lynx ($p < 0.001$).

Table 6. Degree of tolerance of large carnivores according to strictness of suggested measures (> shows reliably stricter measures for the species, $p < 0.05$ according to Wilcoxon test, „-“, no reliable difference; Lo – brown bear, Vi – wolf, Lū – lynx).

6 Lentelė. Stambiųjų plėšrūnų toleravimo laipsnis pagal siūlomų poveikio priemonių griežtumą (> ženklas rodo patikimai griežtesnes priemones rūšiai, $p < 0,05$ pagal Vilkoksono kriterijų, „-“, patikimo skirtumo nėra).

Behaviour and place of living	Tolerance of carnivores	Most popular measure		
		for lynx	for bear	for wolf
Living at a distance	Lo>Vi>Lū	No need	No need	No need
Encountered near human settlements	Lo>Vi>Lū	Scaring away	Transferring	Scaring away
Killing livestock	Vi>Lo>Lū	Transferring	Transferring	Transferring
Killing pets	Vi> Lo-Lū	Transferring	Transferring	Transferring
Posing threat to humans	Vi> Lo>Lū	Shooting	Transferring	Shooting

It is easier to change wildlife population management measures than public opinion. Lethal control is an exceptional measure; therefore, it is necessary to explore it in the first place. Assessment was made of the number of situations (out of five options) where respondents were choosing this measure. Half of respondents supported lethal control of carnivores (Table 7). Respondents believed that lethal control is more suitable for wolves than for lynx and bears ($Z = -14.18$, $p < 0.001$; $Z = -13.58$, $p < 0.001$) and more

suitable for lynx than for bears ($Z=-1.69$, $p=0.090$). Suggestions to apply lethal control can be related with the attitude towards the value of animals, at least in cases when they do not pose threat to human life, because people tend to transfer or scare away animals that are considered highly valuable.

Table 7. Support of lethal control of carnivores (from 5 options); M – mean, s – standard deviation.

7 lentelė. Respondentų pritarimas letalios stambiųjų plėšrūnų kontrolės priemonėms (pasirinkimų skaičius iš 5 galimų). Lentelėje M – vidurkis, s – standartinis nuokrypis.

Species		How many times lethal control was chosen						M	s
		0	1	2	3	4	5		
Lynx	N	1727	785	458	442	71	13	0.97	1.171
	%	49.4	22.5	13.1	12.6	2.0	0.4		
Bear	N	1736	794	397	429	81	19	0.95	1.188
	%	50.2	23.0	11.5	12.4	2.3	0.5		
Wolf	N	1584	779	491	540	118	35	1.14	1.278
	%	44.7	22.0	13.8	15.2	3.3	1.0		

Lethal control measures for wolves were more often supported by men ($\chi^2=27.20$). This difference was even greater for bears and lynx ($\chi^2=36.75$ and $\chi^2=27.65$, all $p<0.001$). Hunting of carnivores was more often supported by older generations. Support of lethal control highly depended on the respondent's place of living. Shooting of carnivores was most rarely offered by urban inhabitants. This regularity is reliable for wolves ($\chi^2=135.32$), lynx ($\chi^2=73.33$) and bears ($\chi^2=83.58$, all $p<0.001$). Respondents with higher educational background rarely supported lethal control of wolves, bears and lynx ($p\leq 0.002$). Lethal control was less supported by educated people ($p<0.001$ for all three species).

The comparison of data between surveys from 2003–2005 and 2009 shows that respondents' opinion (how many times lethal control was chosen from 5 possible options) became softer with respect to lynx ($M_{2005}=1.05$, $M_{2009}=0.97$; $Z=-2.42$, $p=0.015$) and wolves ($M_{2005}=1.29$, $M_{2009}=1.14$; $Z=-3.68$, $p<0.001$); in the case of bears the difference was statistically insignificant ($M_{2005}=0.99$, $M_{2009}=0.95$; $Z=-1.52$, $p=0.127$). Acceptance of lynx and bears did not change ($Z=-0.03$, $p=0.974$; $Z=-1.44$, $p=0.149$), and attitudes towards wolves became better ($Z=-2.28$, $p=0.022$). Thus, the public did not become more tolerant to the presence of carnivores near humans, but more people became against lethal control of carnivores, in particular wolves. The number of hunters is decreasing throughout the world, e.g. in Utah, USA (Bruskotter et al., 2007) or Japan (Igota, Suzuki, 2008); therefore, lethal control of wolves may be charged. A conflict from moral regulation aspects would pass to economic aspects because money spent on population control would have to be justified.

Attitude towards management of large mammal populations. Attitude towards management of large mammal populations is one of the key indicators to measure the carrying capacity of environment for these animals, when not only ecological, but also social (cultural) carrying capacity is being measured. A rather large part of respondents were for keeping European bison only in enclosed areas. The number of suggestions to reduce bison numbers was small (Fig. 8).

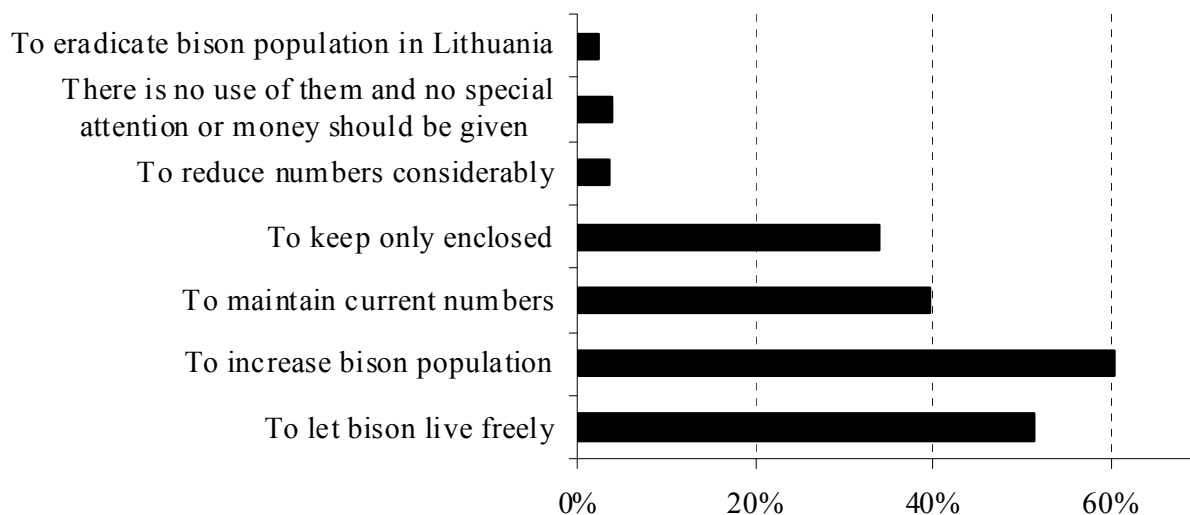


Figure 8. Respondents' attitudes towards management of European bison population.
8 pav. Respondentų požiūris į stumbrų populiacijos valdymą.

Many people were for increasing the population of European bison. 60.6% of them would like bison to live freely and 25.0% desire they are kept enclosed. From those who wanted to maintain the current number of bison, 46.1% offered to let bison live freely and 40.1% were for enclosure. From those who knew that European bison is an animal of our region, 55.2% offered to let bison live freely, and from those who did not know about bison, only 43.3% supported this idea ($\chi^2=10.19$, $p=0.001$). Such a large proportion of society willing to see bison only enclosed should cause concern for the future of free-living herds and rise doubts about public support of measures to take care of free-living bison and increase their numbers.

The brown bear received the strongest acceptance from Lithuanian inhabitants, followed by wolf and lynx (all $p<0.001$; Table 8). This could be linked with abundance: the smaller the population the easier it is to obtain public approval for the increase of the population. Compared with the results of the survey of 1997–1999 (Balčiauskas, Volodka, 2001) the number of people willing to reduce wolf numbers increased in Lithuania over the course of the past ten years.

Table 8. Changes in large carnivore populations acceptable to respondents (% of responses).
8 lentelė. Respondentams priimtini stambiųjų plėšrūnų populiacijų pokyčiai (atsakymų %).

Options	Public			Heads of sub-municipalities			Foresters		
	Bear	Lynx	Wolf	Bear	Lynx	Wolf	Bear	Lynx	Wolf
Eradication	3.1	2.6	2.8	0.0	0.0	0.0	1.9	0.8	0.0
Considerable reduction of numbers	7.2	7.4	10.7	2.4	2.4	7.0	1.9	0.0	0.8
Slight reduction of numbers	13.4	16.4	26.4	4.8	7.1	20.9	2.8	2.4	15.9
Maintenance of the same number	<u>44.8</u>	<u>44.1</u>	<u>43.7</u>	38.1	<u>42.9</u>	<u>62.8</u>	<u>40.2</u>	26.6	<u>66.7</u>
Slightly increase of numbers	22.0	21.7	12.2	<u>47.6</u>	40.5	9.3	33.6	<u>50.8</u>	15.9
Considerable increase of numbers	9.4	7.7	4.3	7.1	7.1	0.0	19.6	19.4	0.8

The number of Lithuanian respondents suggesting reduction of lynx numbers is greater than the number of such respondents in Estonia, Latvia and Poland ($\chi^2=18.87$, $p<0.001$; $\chi^2=75.32$, $p<0.001$; $\chi^2=44.49$, $p<0.001$). The number of Lithuanian respondents supporting the increase of lynx numbers is lower than the number of such respondents in Latvia or Poland ($\chi^2=13.62$, $p=0.002$; $\chi^2=27.57$, $p<0.001$), but does not differ in this respect from Estonia. The attitude of Lithuanians towards wolves is more negative than in Estonia, Latvia or Poland ($Z=-12.56$, $p<0.001$; $Z=-14.51$, $p<0.001$; $Z=-5.22$; $p<0.001$). Reduction of wolf numbers is more supported by Lithuanians than by Estonians, Latvians or Poles ($\chi^2=81.41$, $p<0.001$; $\chi^2=109.35$, $p<0.001$; $\chi^2=12.91$, $p<0.001$), and an increase is less supported by Lithuanians than by Estonians or Latvians ($\chi^2=40.37$, $p<0.001$; $\chi^2=51.80$, $p<0.001$). This is likely to be due to the damage they cause; besides, hunting is more restricted than in Estonia and Latvia, and no compensation for damage is paid, as is the case in Poland. Softer wolf hunting restrictions increase wolf acceptance (Ozoliņš, Andersone, 2000; Ozoliņš et al., 2010).

From all **factors constructing attitudes towards carnivores**, the main factors were related to demographics and respondents' knowledge. Attitude was found to depend on the respondent's gender. Men better than women favoured European bison. Fewer women would like to see bison living freely or would support an increase in their numbers. More women supported enclosing bison (Table 9).

Table 9. Changes in European bison population accepted by men and women (% of supporters of statements).

9 lentelė. Vyrams ir moterims priimtini stumbrų populiacijų pokyčiai (pitarusių teiginiui %).

Statement	Men	Women	Reliability of difference
To let bison live freely	65.2	43.9	$\chi^2=35.23$, $p<0.001$
To increase the population	68.8	56.1	$\chi^2=12.83$, $p<0.001$
To maintain current numbers	39.0	39.8	$\chi^2=0.56$, NS
To keep only enclosed	28.2	37.0	$\chi^2=6.63$, $p<0.01$
To considerably reduce numbers	3.0	3.6	$\chi^2=0.27$, NS
There is no use of them and no special attention or money should be given	3.9	3.4	$\chi^2=0.13$, NS
To eradicate the population	3.0	1.7	$\chi^2=1.36$, NS

Men would stronger support increasing the populations of wolves ($Z=9.94$), lynx ($Z=-11.03$) and bears ($Z=-9.24$, all $p<0.001$). Increasing the number of wolves was suggested by 24.2% of men and 12.7% of women ($\chi^2=76.35$, $p<0.001$), and decrease by, respectively, 30.3 and 44.7% ($\chi^2=70.63$, $p=0.001$). 41.7% of men and 23.9% of women suggested an increase of lynx, and, respectively 19.2% and 30.0% suggested decrease. 40.8% of men and 26.7% of women suggested an increase of bears, and, respectively, 18.0% and 26.6% suggested decrease.

Attitude towards management of carnivore populations also depended on the age of respondents. Younger respondents more often suggested increase or maintenance of the current number of bear, wolf and lynx numbers, whereas older responders suggested a decrease (all $p<0.001$). Younger respondents also suggested increase or maintenance of the current number of bison numbers ($Z=-3.95$, $p<0.001$ and $Z=-2.33$, $p=0.019$).

Higher educated people more often suggested increasing or maintaining the current population of wolves ($\chi^2=110.2$), brown bears ($\chi^2=91.99$) and lynx ($\chi^2=87.24$, all $p<0.001$). The education of respondents who suggested bison living freely and of those who wished to keep them enclosed did not differ. Those who suggested maintenance of the same number of European bison were better educated ($Z=-2.97$, $p=0.003$).

Respondents' attitude towards population management also depended on the belief that carnivores are staying close to their living place. Karlsson and Sjöström (2007) propose that attitude towards wolves is even more influenced by the belief that they live in the vicinity than by the damage they cause. Respondents believing that wolves live nearby more often suggested hunting than those who recognised that they did not know about wolves living nearby ($Z=-4.07$, $p<0.001$). Such respondents more often suggested lethal control of lynx, too ($Z=-2.43$, $p<0.014$).

The attitude towards lynx population management by respondents who thought that lynx were encountered near their living places was more positive (Table 10) and reliably differed from the attitude of respondents who did not know about the presence of lynx (0.05) or though lynx did not live nearby ($p<0.05$). The situation with wolves was different: stricter population management measures were suggested by those who thought wolves were living nearby ($p<0.001$). It was found in Latvia that negative attitude towards large carnivores is due to real or perceived damage to animal husbandry and hunting (Andersone, Ozoliņš, 2004). Reduction of wolf numbers was mostly supported by respondents living in the region (Latgale) where wolf damage is the highest (Andersone, Ozoliņš, 2002).

Table 10. Population management suggestions according to respondents' belief that carnivores can be encountered in their living places (% of responses).

10 lentelē. Siūlymai populiacijos valdymui pagal respondentų įsitikinimą, ar aptinkami plėšrūnai jų gyvenamojoje vietoje (atsakymų %).

Statement		Number of bears			Number of lynx			Number of wolves		
		reduce	main-tain	in-crease	reduce	main-tain	in-crease	reduce	main-tain	in-crease
Are lynx encountered? opinion	No	23.6	43.5	32.9	25.6	46.7	27.7	39.5	43.8	16.7
	No	23.2	46.3	30.5	26.2	44.3	29.5	39.3	44.3	16.4
	Yes	23.5	39.0	37.5	24.7	39.9	35.4	38.5	41.8	19.7
Are wolves encountered? opinion	No	24.3	42.3	33.4	27.1	45.1	27.7	36.1	45.8	18.1
	No	23.6	46.3	30.1	26.7	45.2	28.1	35.2	45.7	19.0
	Yes	23.4	44.5	32.1	25.6	43.2	31.2	44.6	41.4	14.1

Respondents' opinion about European bison depended on their presence nearby. When people think that bison live near human settlements, they are ready to tolerate them ($\chi^2=76.28$, $p<0.001$) and suggest positive population management measures ($\chi^2=22.75$, $p=0.030$).

A positive attitude towards large mammals depends on the knowledge about them (Bath et al., 2008). Respondents with better knowledge of the number of carnivores showed better acceptance of wolves ($\chi^2=31.89$, $p=0.007$) and bears ($\chi^2=30.97$, $p=0.008$) close to their living places; the difference was not reliable for lynx ($\chi^2=21.16$, $p=0.131$). Support of lethal control measures did not depend on it.

Only 1.5% of respondents who knew the exact number of European bison in Lithuania suggested considerably decreasing their numbers (4.5% did not know, $\chi^2=4.54$, $p=0.033$). Better knowledge of the numbers of bison was demonstrated by those who suggested letting bison live freely and increasing their population, compared to those who did not suggest same ($Z=-2.70$, $p=0.007$; $Z=-2.73$, $p=0.006$). People having poorer knowledge of bison more frequently suggested keeping them enclosed ($Z=-4.58$), reducing their numbers ($Z=-4.32$) or even eradicating them ($Z=-4.95$, all $p<0.001$).

Fear conditioned offers to reduce the number of lynx ($\chi^2=349.42$), bears ($\chi^2=210.08$) and wolves ($\chi^2=219.72$, all $p<0.001$). Respondents filled with fear more often suggested lethal control measures (respectively, $\chi^2=97.21$; $\chi^2=79.48$ and $\chi^2=99.78$, all $p<0.001$).

Expected financial loss aroused antagonism towards large carnivores and caused suggestions to reduce their populations ($\chi^2=130.66$ for bear; $\chi^2=148.54$ for lynx; $\chi^2=127.60$ for wolf, all $p<0.001$), irrespective of the fact that damage is made only by wolves. These people more often suggested using lethal control measures (respectively, $\chi^2=74.32$, $p<0.001$; $\chi^2=82.41$, $p<0.001$; $\chi^2=105.02$, $p<0.001$).

Latent factors. Alongside with demographic factors and knowledge, respondents' acceptance of lethal measures to manage large mammal populations also depended upon latent factors. People who suggested lethal control measures for carnivores only in certain situations (killing livestock, killing pets, or posing a threat to humans) may be considered fairly rational. Respondents who did not tolerate large carnivores suggested their eradication both in case they lived close to human settlements and at a distance. Those who never suggested lethal measures supported conservation of carnivores.

Table 11. Relationship between the population management method suggested by respondents and basic human values. Differences ($p<0.05$ according to Mann-Whitney test) between segments are indicated by indexes (i – to maintain, p – to increase).

11 lentelė. Respondentų siūlomo populiacijų valdymo būdo ryšys su bendrosiomis žmogiškosiomis vertybėmis. Skirtumai ($p<0,05$ pagal Mano-Vitnio kriterijų) tarp segmentų nurodyti indeksais (i – išlaikyti, p – padidinti).

Suggestion		Self-direction	Universalism	Benevolence	Tradition
Bear	Reduce (at least slightly)	4.13 ^p	4.66	3.68 ^{ip}	4.01 ^{ip}
	Maintain the current number	4.09	4.70	3.55 ^p	3.81 ^p
	Increase (at least slightly)	4.06	4.69	3.44	3.67
Lynx	Reduce (at least slightly)	4.12 ^p	4.66	3.66 ^{ip}	3.98 ^{ip}
	Maintain the current number	4.09	4.71	3.54 ^p	3.81 ^p
	Increase (at least slightly)	4.05	4.69	3.44	3.68
Wolf	Reduce (at least slightly)	4.11	4.70	3.62 ^{ip}	4.00 ^{ip}
	Maintain the current number	4.08	4.69	3.50	3.74 ^p
	Increase (at least slightly)	4.05	4.67	3.49	3.60

Basic human values. Respondents of traditional views were found to have no tolerance to carnivores (Table 11). Self-direction conditioned negative attitude towards an increase of carnivore populations (except for wolves). Benevolence (concern about other persons' welfare) influenced the willingness to reduce populations of carnivores.

Acceptance of the number of European bison in Lithuania was also restricted by tradition. Lithuanian people suggesting a decrease in bison numbers had traditional views ($p < 0.05$). Those suggesting an increase in bison numbers were distinguished by greater universalism ($p < 0.05$).

Environmental beliefs. Assessment of respondents' biocentrism-anthropocentrism according to the New Ecological Paradigm showed that more biocentric people more strongly favoured an increase of populations of all carnivores, and biocentrism of those who suggested a reduction in the number of carnivores was lower (Table 12).

Table 12. Biocentrism (NEP scale score) in respondent groups according to the suggested carnivore population management method. M – mean, s^2 – dispersion. Upper indices show difference between groups in lines ($p < 0.001$) from i – maintain, p – increase. Difference between means according to Tukey HSD test, $p < 0.05$.

12 lentelė. Biocentriškumo balai (pagal NEP) respondentų grupėse pagal siūlomą plėšrūnų populiacijų valdymo būdą. Lentelėje M – vidurkis, s^2 – dispersija. Viršutiniai indeksai nurodo skirtumą tarp grupių eilutėse ($p < 0,001$) nuo i – išlaikyti, p – padidinti. Vidurkių skirtumai pagal Tukey HSD kriterijų, $p < 0,05$.

Species	To reduce numbers		To maintain the current number		To increase numbers	
	M	s^2	M	s^2	M	s^2
Bear (F=110.11, $p < 0.001$)	27.24 ^{ip}	14.26	28.86 ^p	14.02	29.88	15.37
Lynx (F=93.257, $p < 0.001$)	27.55 ^{ip}	14.42	28.88 ^p	14.20	29.92	15.33
Wolf (F=62.449, $p < 0.001$)	27.98 ^{ip}	14.74	29.16 ^p	14.53	29.90	16.08

Biocentrism of respondents who suggested European bison living freely was higher (NEP scale score – 29.06, for those who did not suggest – 28.34, $p = 0.035$). Respondents with lower biocentrism suggested maintaining the current number of bison (M=28.20 M=29.05, $p < 0.02$) or keeping them enclosed (M=27.64 and M=29.25, $p < 0.001$). Those who suggested eradication of bison were distinguished by the lowest biocentrism (M=24.81, for those who did not suggest M=28.8, $p < 0.001$).

The most biocentric respondents were found to avoid suggesting lethal control measures for any carnivore species. Hunting of lynx was most frequently suggested by respondents with the lowest biocentrism (Table 13).

Table 13. Biocentrism (M, NEP scale score) in respondent groups according to the number of suggestions of lethal control of carnivores. Differences of means are assessed according to Tukey HSD test, $p < 0.05$. Indexes show difference between groups ($p < 0.05$).

13 lentelė. Biocentriškumo balai (M, pagal NEP) respondentų grupėse pagal letalios kontrolės plėšrūnams siūlymų skaičių. Vidurkių skirtumai įvertinti pagal Tukey HSD kriterijų, $p < 0,05$. Indeksai nurodo skirtumą tarp grupių ($p < 0,05$).

Species		Number of lethal control suggestions out of 5 possible options					
		0	1	2	3	4	5
Bear (F=42.14, $p < 0.001$)	M	29.71 ¹²³⁴⁵	28.59 ³⁴⁵	28.03 ⁴	27.41	26.14	26.24
	s^2	14.72	13.10	16.25	15.04	11.15	12.57
Lynx (F=38.70, $p < 0.001$)	M	29.68 ¹²³⁴⁵	28.55 ³⁴	28.22 ⁴	27.56 ⁴	25.88	25.27
	s^2	14.90	13.65	15.34	15.19	10.52	8.02
Wolf (F=40.03, $p < 0.001$)	M	29.75 ¹²³⁴⁵	28.61 ³⁴	28.22 ⁴	27.74 ⁴	26.54	26.13
	s^2	14.88	13.78	16.12	14.89	11.63	12.98

Thus, human attitudes towards large mammals are conditioned by their attitudes towards nature. Such relationship was also detected in other research where biocentrism conditioned more favourable attitude towards carnivores (Bjerke, Kaltenborn, 1999) or an attitude with certain reservations (Kaltenborn et al., 1998).

Wildlife value orientations. Respondents' wildlife valuations and their influence on respondents' attitude towards carnivores were assessed. The general tendency was – better wildlife valuation led to more favourable wildlife population management suggestions. In every case, respondents who suggested reducing carnivore numbers were characterised by lower scores of wildlife protection and appreciation (Table 14).

Table 14. Relationship between wildlife value orientations (M, scale scores) and suggestions for carnivore population management. Differences in lines according to Mann-Whitney test, $p < 0.05$.

14 lentelė. Priklausomybė tarp gyvūnijos vertinimo orientacijų (M, balai) ir siūlymų plėšrūnų populiacijų valdymui. Skirtumai eilutėse nurodyti pagal Manio-Vitnio kriterijų, $p < 0,05$.

Species	Wildlife protection-use			Wildlife appreciation		
	To reduce numbers	To maintain current numbers	To increase numbers	To reduce numbers	To maintain current numbers	To increase numbers
	M	M	M	M	M	M
Bear	2.91 ^{ip}	3.09	3.10	4.03 ^{ip}	4.15 ^p	4.31
Lynx	2.96 ^{ip}	3.07	3.06	4.03 ^{ip}	4.16 ^p	4.33
Wolf	2.88 ^{ip}	3.11 ^p	3.23	4.09 ^{ip}	4.20 ^p	4.34

Respondents who suggested increasing European bison population in Lithuania were more against wildlife use compared to those who did not suggest the same ($Z = -3.76$, $p < 0.001$).

Table 15. The influence of two wildlife value orientations on suggestions for European bison population management (M, scale scores). Statistically reliable differences (Mann-Whitney test, $p < 0.05$) in bold.

15 lentelė. Dviejų vertybinių orientacijų įtaka pasiūlymams stumbro populiacijos valdymui (M, balai). Statistiškai patikimi skirtumai (Manio-Vitnio kriterijus, $p < 0,05$) paryškinti.

Management measures	Protection-use				Appreciation			
	Do not suggest		Suggest		Do not suggest		Suggest	
	M	s	M	s	M	s	M	s
To let live freely	2.90	0.74	2.95	0.78	4.02	0.62	4.24	0.58
To increase population	2.79	0.70	3.02	0.78	3.97	0.60	4.23	0.59
To maintain current numbers	3.01	0.79	2.80	0.70	4.19	0.60	4.04	0.61
To keep only enclosed	2.96	0.78	2.85	0.72	4.22	0.57	3.97	0.66
To considerably reduce numbers	2.93	0.76	2.86	0.76	4.14	0.60	3.76	0.67
There is not use of bison and no special attention or money is needed	2.94	0.76	2.60	0.71	4.15	0.59	3.58	0.88
To eradicate in Lithuania	2.93	0.76	2.75	0.63	4.14	0.60	3.56	0.92

Wildlife appreciation determined the choice of bison population management methods. Respondents who suggested letting bison live freely had higher wildlife appreciation ($Z = -5.10$, $p < 0.001$; $Z = -6.50$, $p < 0.001$). Respondents who suggested other

bison management variants had lower wildlife appreciation (Table 15). It should be noted that a group who suggested eradication of bison was the least homogenous according to wildlife appreciation.

Research into the effect of wildlife value orientations on the attitude towards lethal control in specific situations demonstrated that the attitude towards lethal control was influenced by both orientations (Table 16). Respondents with the strongest sense of wildlife appreciation and protection were against wildlife eradication. Those who do not value wildlife agreed with eradicating carnivores in case they are close to human settlements, cause damage, or pose threat to human life.

Table 16. Mean scores of respondents' WVO. Differences are according to Mann-Whitney test, ($p < 0.05$).

16 lentelė. Vidutiniai respondentų laukinės gyvūnijos vertinimo (GVO) balai. Skirtumai nurodyti pagal Manio-Vitnio kriterijų, ($p < 0,05$).

WVO		Never shooting	If there is threat to respondent's		Causes harm or is nearby	Shooting in any case	
			Safety	Property			
			0	1			2
Protection-use	Lynx	3.25 ¹²³⁴⁵	2.93 ²³⁴⁵	2.84 ³⁴	2.72	2.60	2.58
	Bear	3.25 ¹²³⁴⁵	2.93 ²³⁴⁵	2.84 ⁴	2.74 ⁴	2.55	2.52
	Wolf	3.29 ¹²³⁴⁵	2.97 ²³⁴⁵	2.85 ³⁴	2.71	2.57	2.66
Appreciation	Lynx	4.28 ¹²³	4.13 ³⁴	4.09 ⁴	4.02	3.81	3.94
	Bear	4.28 ¹²³⁴⁵	4.14 ³⁴	4.08 ⁴	4.01 ⁴	3.78	3.94
	Wolf	4.29 ¹²³⁴⁵	4.14 ³⁴	4.14 ³⁴	4.03	3.88	3.95

Wildlife appreciation orientation, rather than protection-use orientation, has a greater effect on the attitude towards mammal population management. Zinn et al. (1998) found that people who were the greatest proponents of wildlife protection did not support eradication of pumas, coyotes or beavers even if they caused damage to humans. Such protectors of wildlife are opponents to scientists.

Value orientations are notably more resistant to outside effects than specific valuations (Manfredo et al., 2003; Bath, 2005). The significance of the effect of value orientations is especially important for public acceptance of management measures because it allows perceiving how difficult it can be to change the respondent's opinion (position on one or another issue). Only the elucidation of positions does not provide such a possibility (Whittaker et al., 2006).

Economic factors, disturbance and fear. Beliefs that European bison disturb, cause damage, or fear of bison influenced all suggestions for bison population management. Those who supported these statements did not suggest increasing or allowing bison live freely, but they supported measures restricting bison freedom and reducing their numbers (Table 17).

Only 12.5% of respondents who suffered damage from European bison and 51.7% of those who did not were for allowing bison to live freely. Respondents whose acquaintances suffered damage from bison were also more often against an increase of bison population ($\chi^2=5.50$, $p=0.019$). Increasing of bison numbers was suggested by 50.3% of respondents who had read about bison damage and by 62.4% of those who had not read about damage ($\chi^2=7.24$, $p=0.007$). Increase of bison numbers was suggested by 66.9% of respondents who did not know about bison damage and by 53.9% of those who

knew about damage ($\chi^2=14.81$, $p<0.001$). People who do not know about bison damage rarer suggested maintaining the current numbers of bison and keeping them only enclosed ($\chi^2=4.86$, $p<0.05$). Respondents whose relatives suffered damage suggested reducing bison numbers more often than other respondents (16.7% and 3.3%; χ^2 (Y.C.)=5.64, $p=0.017$). The same respondents more often stated that there is no use of bison and they deserve no special attention or money (16.7% and 3.4%; χ^2 (Y.C.)=5.34, $p=0.021$). People who did not hear about bison damage rarer stated that bison are unnecessary (1.7% and 5.6%; $\chi^2=9.10$, $p=0.003$).

Table 17. Effect of three latent factors (fear, disturbance, and damage) on acceptance of European bison population management measures (* - $p<0.005$, ** - $p<0.001$).

17 lentelė. Trijų latentinių veiksnių (baimės, trukdymo ir nuostolių) įtaka stumbrų populiacijos valdymo priemonių priimtinumui (* - $p<0,005$, ** - $p<0,001$).

Management measures	Fear		Disturbance		Damage	
	Do not suggest	Suggest	Do not suggest	Suggest	Do not suggest	Suggest
To let living freely	2.95**	2.50	3.27*	3.13	2.94**	2.58
To increase population	2.92**	2.59	3.37**	3.09	2.98**	2.61
To maintain current numbers	2.69	2.76	3.16	3.27*	2.74	2.79
To keep only enclosed	2.53	3.09**	3.10	3.40**	2.60	3.06**
To considerably reduce numbers	2.69	3.67**	3.18	3.72*	2.74	3.38**
There is no use of bison and no special attention or money should be given	2.69	3.54**	3.18	3.76**	2.74	3.29*
To eradicate in Lithuania	2.70	3.45*	3.18	3.85**	2.74	3.39*

Trust in sources of information. Public awareness is a very important part of conservation of nature, including large mammals. We have analysed what sources of information turned out to be the most reliable for respondents. Information about large carnivores is more reliable for the public if it is disclosed by scientists (Fig. 9). 58.0% of respondents completely trusted and 31.4% partially trusted scientists on the issues related to large carnivores (respectively, 61.7% and 29.4% on the issues related to European bison). Other reliable sources of information were officers of state forest services (84.8% and 80.7%) and experienced hunters (77.1% and 70.4%). The lowest trust was expressed to the Seimas (parliament) members and local politicians.

Respondents showed greater trust in scientists informing on European bison than in foresters, acquaintances, non-governmental environmental organisations ($Z=-10.87$; $Z=-10.69$; $Z=-13.35$, all $p<0.001$) or other sources. People trusted foresters more than press, environmental NGOs or experienced hunters (all $p<0.001$).

People suggesting reduction of carnivore abundance showed less trust in institutional sources (Table 18). People suggesting reduction of wolf numbers showed greater trust in local sources of information.

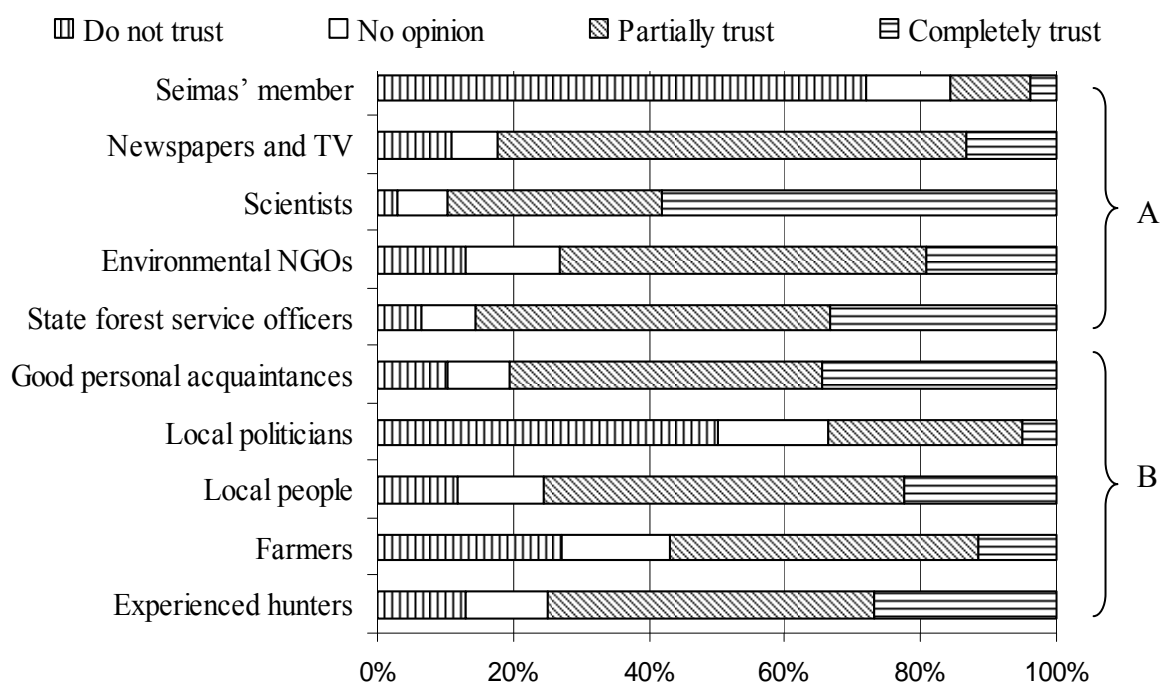


Figure 9. Public trust in sources of information about large carnivores. A – institutional; B – informal/local.

9 pav. Visuomenės pasitikėjimas informacijos apie stambiuosius plėšrūnus šaltiniais. A – instituciniai B – neformalūs/vietiniai.

Those who suggested European bison allowing living freely and increasing their numbers did not trust local sources of information ($Z=-2.59$, $p=0.001$; $Z=-2.62$, $p=0.009$), but local sources of information were more trusted by those who suggested maintaining current numbers of bison ($Z=-2.22$, $p=0.025$) and keeping them enclosed ($Z=-2.12$, $p=0.34$; $Z=-2.03$, $p=0.041$).

Table 18. Public trust in sources of information about large carnivores (M – mean scores) with respect to attitude towards population management. Differences according to Mann-Whitney test, $p<0.05$.

18 lentelė. Visuomenės pasitikėjimas informacijos apie stambiuosius plėšrūnus šaltiniais (M, balai) priklausomai nuo požiūrio į populiacijų valdymą. Skirtumai pagal Manio-Vitnio kriterijų, $p<0,05$.

Species	Institutional trust / formal / scientific knowledge			Local trust / informal / lay knowledge		
	Reducing numbers M	Maintaining current numbers M	Increasing numbers M	Reducing numbers M	Maintaining current numbers M	Increasing numbers M
Bear	2.91 ^{ip}	3.08	3.11	2.61	2.64 ^p	2.58
Lynx	2.93 ^{ip}	3.09	3.11	2.61	2.64	2.60
Wolf	3.01 ^{ip}	3.10	3.06	2.64 ^p	2.62	2.56

Assessment of damage cause by large carnivores. This research confirmed that public tolerance towards wildlife, approval of their population management measures and acceptance of animals depend upon damage they cause and even upon perceived losses. Therefore, data on damage caused by European bison and large carnivores were collected.

Inhabitants of northwest Lithuania were found to remember wolf damage to household rather well as it was related to losses incurred. Inhabitants who merely heard of damage considerably overestimated carnivore activities – increased the number of events and of persons suffered, old events (e.g. which took place before 5–15 years) were taken as having occurred recently, in particular if they heard about events that occurred in other villages. All who suffered considered wolves responsible for the damage, and when asked if other animals could do that, three persons indicated wild dogs and one a lynx, as he stated seeing it several days before the event.

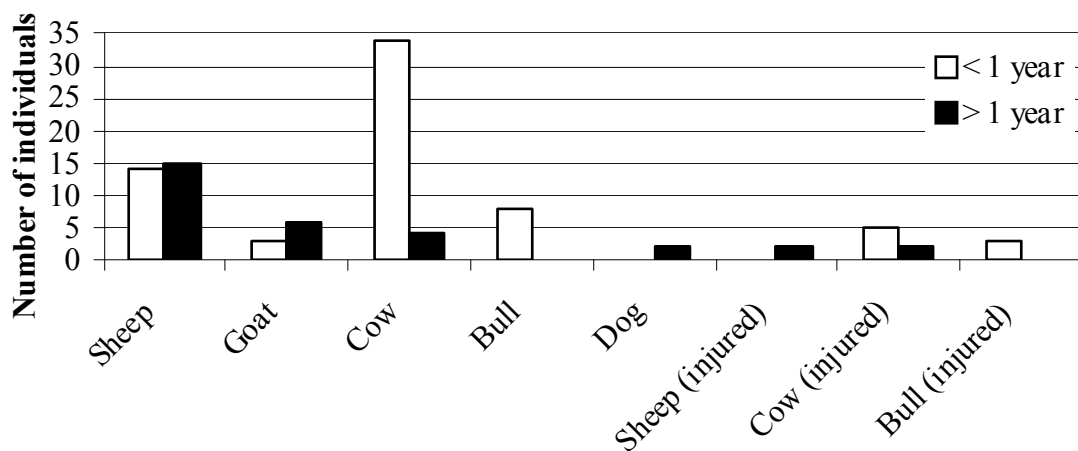


Figure 10. Number of domestic animals killed and injured by wolves in northwest Lithuania in 2006–2009.

10 pav. Vilkų papjautų ir sužalotų naminių gyvūnų skaičius Lietuvos šiaurės vakarų dalyje 2006–2009 metais.

In total, 66 cases of damage were recorded in 2006–2009. 12 cattle and dogs were injured and 86 killed. Most damage was recorded in Skuodas (17), Telšiai (22) and Kretinga (12) districts (Fig. 2). Most often wolves killed heifers and sheep (Fig. 10.).

Wolves most frequently killed domestic animals in towards the end of summer: July (24.2% of all cases recorded), August (34.8%), September (24.2%). From 1 (53 cases) to 6–12 (by one case) cattle per event were injured or killed.

Wolves almost always attacked at night, occasionally in the morning (6 cases) or late in the evening (3 cases). Most frequently, wolves killed livestock not far from the forest (Fig. 11). A lot of damage was made in bushy areas or places with multiple drainage canals. Wolves were not frightened by roads or buildings. More damage was made in the places between larger forests and water bodies or rivers.

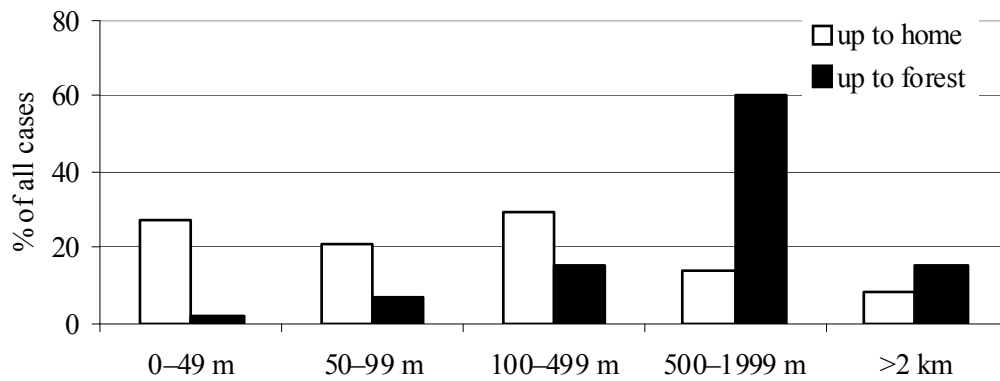


Figure 11. Distance from wolf attack place up to the forest or farmstead.
11 pav. Atstumas nuo vilkų užpuolimo vietos iki miško ir iki sodybos.

Respondents in northwest Lithuania did not keep dogs as security from wolves; only several indicated keeping dogs against foxes. Only in some places a shepherd permanently looked after animals. In four households, part of the livestock was covered by insurance; other farmers who suffered did not have insurance. Livestock attacked were kept loosely near their homes. At night, 58.3% of farmers left their livestock in pastures, 22.2% kept them in fenced areas, 11.1% brought them nearer to home, 8.3% kept them in cattle-sheds. Due to a shortage of money, no measures against predators were applied on farms. No damage was recorded in large farms engaged in breeding.

The indicated assessment of damage is minimal as not all cases are known. Four suffered did not agree to be questioned as they did not expect compensation all the same. Some denied having suffered damage and obviously avoided to disclose the event. Some farmers were not found at home and they did not fill in questionnaires left. One farmer did not open the door though he was at home.

CONCLUSIONS

1. In Lithuania, 79.9–85.3% of respondents had positive attitudes towards the presence of European bison, wolves and lynx. However, 47–71.8% of respondents considered these animals acceptable only in case they were not closer than 10 km from their living places. 77.6% of the public were scared of lynx, no less than of wolves, irrespective of their smaller size, solitary way of living, and no damage to livestock husbandry.

2. The exact size of European bison and carnivore populations knew 23.2–68.5% of respondents, and 25.6–52.3% of those who did not know thought the populations were more abundant. In particular, the number of carnivores was overestimated by respondents from areas with more frequent cases of damage. Threat and biological features of carnivores were mostly overestimated by women. Knowledge of large mammals was better among inhabitants of small settlements.

3. The attitudes of heads of sub-municipalities and the public towards large carnivores were similar, but heads of sub-municipalities showed stronger support for the application of lethal control measures for wolves; foresters had a better knowledge of the number of carnivores in the country, and were less afraid of them, and displayed an exclusively positive attitude towards lynx.

4. European bison were found to be more acceptable for the public than wolves, lynx or brown bears. More than 60% of respondents suggested increasing the European bison population, and 51% suggested letting them live freely in the wild. 16–32% of respondents supported an increase in the number of carnivores in Lithuania.

5. The choice of measures for management of large carnivore populations mostly depends on their behaviour and size of perceived damage. Ca. 25% of respondents considered unacceptable even those carnivores which lived at a distance from humans, 75% did not accept their presence nearby human settlement, and >80% did not tolerate killing of livestock and pets and posing a threat to humans.

6. Transferring carnivores to other places was the most frequently offered measure for management of carnivore populations, though in Lithuania this measure is unreal due to the absence of suitable habitats. Difference of opinion was found with respect to lethal control of carnivores: 44.7% of respondents (urban inhabitants in particular) did not suggest such measure even if carnivores pose a threat to humans, whereas residents of villages and farmsteads supported wolf hunting.

7. The main factors forming public opinion on large mammals were fear for respondent's own or family's security or property, insufficient awareness, and perceived financial losses related to the presence of large mammals in the vicinity. Respondents' attitude towards population management depends upon wildlife appreciation. People with a low degree of anthropocentrism suggested increasing and maintaining the current numbers of carnivores as well as increasing the number of European bison and letting bison live freely. The mostly negative attitude towards an increase of large mammal populations was demonstrated by women, people with lower educational background, those who fear that they might incur damage, and inhabitants of smaller settlements.

8. The social carrying capacity for large mammals can be increased through activities of scientists and foresters (as they are mostly trusted by the society) with target groups of the society.

9. A total of 66 wolf damage cases (98 cattle, sheep, goats and dogs killed or injured) were recorded in the northwest part of Lithuania between 2006–2009. 91.3% of people who suffered damage did not have insurance coverage or use any security measures against predators. Only eight cases of damage caused by European bison were disclosed. 49.2% of respondents did not know about bison damage. Press information on damage by European bison was found to lower positive attitudes toward the species.

SANTRAUKA

Darbo aktualumas. Stambieji žinduoliai – stumbras (*Bison bonasus*), rudasis lokys (*Ursus arctos*), vilkas (*Canis lupus*) ir lūšis (*Lynx lynx*) yra autochtoninės Lietuvos faunos dalis. Šių rūšių gausumas ir paplitimas Europoje keitėsi. Daug kur šie gyvūnai nebegyvena, o stumbrui buvo kilusi grėsmė išnykti net kaip rūšiai. Susirūpinimą šiomis rūšimis įrodo jų pripažinimas su bioįvairovės apsauga susijusiuose tarptautiniuose susitarimuose. Visuomenės žinios, patirtis, požiūris ir nuomonės šių žvėrių valdymo klausimais labai skiriasi. Didėjant gyvūnų populiacijoms, daugėja jų daromos žalos, todėl – ir negatyviai nusiteikusių žmonių. Tarp interesų grupių kyla konfliktų, kurie nenaudingi nei žmonėms, nei gyvūnams. Tokių rūšių populiacijų valdyme, siekiant suprasti konfliktinę situaciją arba planuojant veiksmus, yra naudojama „kultūrinės palaikymo talpos“ sąvoka. Būtent ji, o ne aplinkos ekologinė talpa yra ribojantis veiksnys. Visuomenės požiūris į gyvūnus yra esminis veiksnys, priimant populiacijų apsaugą ar eksploatavimą reglamentuojančius teisinius dokumentus, nes be visuomenės palaikymo reali apsauga neįmanoma. Stambieji žinduoliai atkreipia žmonių dėmesį, todėl palanki visuomenės nuomonė jų atžvilgiu ar piliečių veiklos suvaržymų toleravimas yra vienintelis koegzistencijos su šiais žvėrimis garantas.

Daugelis Europos valstybių sureagavo į daugkartines Berno konvencijos tarybos rekomendacijas sukurti stambiųjų plėšrūnų valdymo planus. Lietuvoje dėl įvairių priežasčių tokie planai dar neparengti (Balčiauskas, 2002). Visuomenės nuomonės ištyrimas ir jos įvertinimas valdant populiacijas yra pripažintas visose aukštą gerovės lygį pasiekusiose šalyse. Lietuvoje tokių duomenų surinkimas, analizė ir žmonių nuomonės keitimo rekomendacijos yra esminės gyvybingoms stumbro, vilko ir lūšies populiacijoms palaikyti.

Darbo tikslas – įvertinti Lietuvos visuomenės žinias ir nuomonę apie stambiuosius žinduolius (stumbrą, rudąjį lokį, vilką ir lūšį) ir jų apsaugą.

Uždaviniai:

1. Įvertinti Lietuvos visuomenės žinias, įsitikinimus ir nuomonę apie stambiuosius žinduolius – stumbrą, rudąjį lokį, vilką ir lūšį.
2. Nustatyti visuomenės, seniūnų ir miškininkų požiūrių į stambiuosius plėšrūnus skirtumus.
3. Apibendrinti nuomones apie stambiųjų žinduolių populiacijų apsaugos ir valdymo priemones ir jų taikymą.
4. Išsiaiškinti nuomonę lemiančius veiksnius ir jų taikymo galimybes praplečiant socialinę talpą (priimtinumą stambiesiems žinduoliams).

Mokslinis naujumas. Tai pirmasis disertacinis darbas Baltijos šalyse, kompleksiškai vertinantis retų stambiųjų žinduolių apsaugos problemas taikant socioekologinių tyrimų (angl. „human dimensions of wildlife“) principus ir formatą. Tokių tyrimų, apibendrinamų ne ataskaita ar moksliniu straipsniu, beveik nėra ir visoje Europoje. Pirmą kartą išanalizuotas visuomenės nuomonės pokytis per 10 metų laikotarpį. Taip pat tai viena iš pirmųjų apklausų kurios metu ištirtos visuomenės žinios apie stumbrus ir nuomonė apie jų apsaugos problemas. Šis tyrimas apimtimi (respondentų skaičiumi) yra didžiausias Europoje. Tyrimas duoda pagrindą visuomenės

nuomonei formuoti tiek stambiųjų žinduolių priimtimumo, tiek ir jų populiacijų valdymo bei apsaugos klausimais.

Mokslinė ir praktinė darbo reikšmė. Lietuvoje iki šiol nebuvo gimtąja kalba pateikto darbo, kuriame ne tik išdėstomi socioekologinio tyrimo rezultatai, bet ir aptariama jų surinkimo ir analizės metodika. Išsami informacija apie vilkų daromą žalą šiaurės vakarų Lietuvoje ir jos aplinkybes leis tiksliau įvertinti šių plėšrūnų žalos mastą visoje šalyje. Atlikta daugiamatė respondentų apklausų duomenų analizė leido išskirti esminius veiksnius, nuo kurių priklauso vilkų, lūšių ir stumbrų vertinimas. Darbo išvados suteikia metodinį pagrindą ne tik retų stambiųjų žinduolių, bet ir visos biologinės įvairovės apsaugos priemonėms planuoti. Tyrimo rezultatai suteikia galimybių aplinkosauginių ir nevyriausybinų organizacijų veiklai, efektyvinant rūšių apsaugą ir išvengiant konfliktų su visuomene arba mažinant jų mastą. Taip šis darbas prisideda prie Lietuvos tarptautinių įsipareigojimų gamtosaugoje įvykdymo.

Ginami teiginiai:

1. Iš visų retų stambiųjų žinduolių Lietuvos visuomenė mažiausiai toleruoja plėšrūnus, ypač, kai jie gyvena arti žmonių ir kai jų elgesys kelia grėsmę žmonėms ar jų turtui.
2. Stambiųjų plėšrūnų (lūšies ir vilko) priimtimumas visuomenėje labiausiai priklauso nuo demografinių veiksnių (lyties, gyvenamosios vietos, išsilavinimo) ir numanomo jų galimos žalos dydžio.
3. Labai svarbūs stambiųjų žinduolių priimtimumui yra latentiniai veiksniai (respondentų biocentriškumas ir bendrosios žmogiškosios vertybės). Tradiciškumas, laisvės vertinimas ir dosnumas sąlygoja neigiamą požiūrį į stambiuosius žinduolius, biocentriškumas – teigiamą.
4. Lūšių apsaugai didžiausią reikšmę turi jų nepriimtimumas visuomenei dėl nepagrįstos baimės. Reguluojant vilkų populiaciją labai svarbu jų daroma žala, nepalanki kaimo gyventojų nuomonė ir miesto gyventojų pasipriešinimas letaliai populiacijos kontrolei.
5. Plėšrūnų priimtimumas mažiausias plačiojoje visuomenėje, didesnis – tarp seniūnų ir didžiausias – tarp miškininkų.
6. Stumbrų buvimas Lietuvoje visuomenėje vertinamas palankiai, bet konfliktų gali kilti sprendžiant klausimą dėl šių gyvūnų laikymo būdo – aptvaruose ar laisvėje bei jų reintrodukcijos kitose vietose.

Rezultatų pristatymas ir aprobavimas. Darbo rezultatai pristatyti penkiose tarptautinėse mokslinėse konferencijose Estijoje, Latvijoje ir Lietuvoje. Paskelbti keturi straipsniai recenzuojamuose mokslo leidiniuose.

Darbo struktūra. Darbą sudaro: įvadas, literatūros apžvalga, medžiaga ir metodai, šeši rezultatų ir penki jų aptarimo skyriai, išvados, rekomendacijos, literatūros sąrašas, du priedai.

Išvados:

1. Stumbrų, vilkų ir lūšių buvimą Lietuvoje teigiamai vertina 79,9–85,3% respondentų. Tačiau 47–71,8% apklaustųjų šie žvėrys priimtini tik tuo atveju, jei nepriartėtų arčiau kaip 10 km atstumu nuo jų gyvenamosios vietos. 77,6% visuomenės lūšių bijo ne mažiau nei vilkų, nepaisant jų mažesnio dydžio, laikymosi pavieniui ir žalos gyvulių augintojams nedarymo.

2. Teisingą stumbrų ir plėšrūnų populiacijos dydį žinojo 23,2–68,5% respondentų, o 25,6–52,3% nežinojusiųjų manė, kad jos yra gausesnės. Ypač plėšrūnų skaičių padidina respondentai iš tų vietovių, kur dažnesni žalos atvejai. Grėsmę ir biologines plėšrūnų ypatybes labiausiai pervertina moterys. Mažų gyvenviečių gyventojų žinios apie stambiuosius žinduolius yra tikslesnės.

3. Seniūnų ir visuomenės nuomonė apie stambiuosius plėšrūnus yra panaši, tik seniūnai labiau palaiko letalios kontrolės priemonių taikymą vilkams, o miškininkai žymiai geriau žino plėšrūnų skaičių šalyje, jų mažiau bijo, pasižymi išskirtinai palankiu požiūriu į lūšis.

4. Nustatyta, kad stumbrai yra priimtinesni visuomenei negu vilkai, lūšys ir lokiai. Gausinti stumbrų populiaciją siūlo daugiau kaip 60%, leisti jiems gyventi laisvėje – 51% respondentų. Už plėšrūnų skaičiaus didinimą Lietuvoje pasisako 16–32% respondentų.

5. Stambiųjų plėšrūnų populiacijų valdymo priemonių pasirinkimas labiausiai priklausė nuo jų elgesio ir numanomų nuostolių dydžio. Netgi nuošaliai nuo žmonių besilaikantys plėšrūnai yra nepriimtini apie 25% respondentų, o jų buvimas netoli gyvenviečių nepriimtinas apie 75%, galvijų ir šunų pjovimas bei grėsmės žmonėms kėlimas – >80% apklaustųjų.

6. Dažniausiai siūloma plėšrūnų populiacijų valdymo priemonė yra jų perkėlimas kitur, nors Lietuvoje tai nerealu dėl buveinių stokos. Dėl letalios plėšrūnų populiacijų kontrolės nuomonės išsiskiria: 44,7% apklaustųjų (ypač miesto gyventojų) tokių priemonių nesiūlo net plėšrūnams keliant grėsmę žmogui, o kaimų ir vienkiemų gyventojai vilkų medžioklę pateisina.

7. Svarbiausi visuomenės nuomonę apie stambius žinduolius formuojantys veiksniai yra baimė dėl savo ir šeimos saugumo arba turto, nepakankamos žinios, numanomi finansiniai nuostoliai dėl šių gyvūnų buvimo netoliese. Respondentų požiūrį į populiacijų valdymą lemia nematerialus gyvūnijos vertinimas. Mažiausiai antropocentiškai žmonės siūlo didinti arba išlaikyti esamą plėšrūnų skaičių, o stumbrų skaičių didinti ir leisti jiems gyventi laisvėje. Nepalankiausiu požiūriu į stambiųjų žinduolių populiacijų didinimą pasižymi moterys, mažiau išsilavinę, bijantys, kad patirs žalos, žmonės ir mažesnių gyvenviečių gyventojai.

8. Padidinti socialinę talpą stambiesiems žinduoliams galima, mokslininkams ir miškininkams (nes jais labiausiai pasitikima) dirbant su tikslinėmis visuomenės grupėmis.

9. 2006–2009 m. Lietuvos šiaurės vakarų dalyje išaiškinti 66 vilkų padarytos žalos atvejai (papjauti arba sužeisti 98 galvijai, avys, ožkos ir šunys). 91,3% nuostolių patyrusių gyventojų buvo neapdraudę galvijų ir nenaudojo jų apsaugos nuo plėšrūnų priemonių. Stumbrų žalos atvejų išaiškinta tik aštuoni ir kad 49,2% apklaustųjų apie stumbrų daromą žalą nėra girdėję. Nustatyta, kad spaudoje pateikiamos žinios apie stumbrų žalą mažina teigiamą jų vertinimą.

LIST OF PUBLICATIONS ON THE SUBJECT OF THE DISSERTATION

1. Balčiauskas, L., Volodka, H., **Kazlauskas, M.** 2007. Wolf conservation and acceptance: comparison of South East Lithuania and North East Poland. Cross – Border Cooperation in Researches of Biological Diversity. *Acta Biologica Universitatis Daugavpiliensis* Suppl. 1: 20–27.
2. **Kazlauskas, M.** 2008. Restoration of European Bison in Lithuania Considering the European Context. *Jaunųjų mokslininkų darbai* 19(3): 61–64.
3. Balčiauskas, L., **Kazlauskas, M.** 2008. Wolf numbers and public acceptance in different regions of Lithuania. *Acta Biologica Universitatis Daugavpiliensis* 8(1): 95–100.
4. Balčiauskas, L., **Kazlauskas, M.**, Randveer, T. 2010. Lynx acceptance across south-north gradient in Poland, Lithuania and Estonia. *Estonian Journal of Ecology* 59(1): 52–61.

ABSTRACTS OF PRESENTATIONS

1. Balčiauskas, L., Volodka, H., **Kazlauskas, M.** Wolf conservation and acceptance: comparison of South East Lithuania and North East Poland. 4th International Conference Research and Conservation of Biological Diversity in Baltic Region. 2007 04 25–27, Daugavpils, Latvia.
2. **Kazlauskas, M.** Restoration of European Bison in Lithuania Considering the European Context. International Scientific Conference Actuality and Perspectives of Natural Science. 2008 05 15–16, Šiauliai, Lithuania.
3. Balčiauskas, L., **Kazlauskas, M.** Regional differences in wolf numbers and public acceptance in Lithuania. The International Scientific Conference of Daugavpils University. 2008 05 15–17, Daugavpils, Latvia.
4. Balčiauskas, L., **Kazlauskas M.**, Randveer, T. Lynx acceptance across south-north gradient in Poland, Lithuania and Estonia. 7th Baltic Theriological Conference. 2008 10 1–5, Lėpanina, Estonia.
5. **Kazlauskas, M.**, Balčiauskas, L. Public Attitude towards the wolf and lynx management in different regions of Lithuania. 51st International Scientific Conference of Daugavpils University. 2009 04 15–18, Daugavpils, Latvia.

CURRICULUM VITAE

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