An investigation of public opinion about the three species of large carnivores in Slovakia:

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wolf (*Canis lupus*)
and lynx (*Lynx lynx*)

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ABSTRACT

Knowledge of and attitudes towards the brown bear (*Ursus arctos*), grey wolf (*Canis lupus*) and Eurasian lynx (*Lynx lynx*) and their conservation and hunting management in Slovakia were assessed in 2003-04 by written questionnaire survey. The study aimed to identify what most influenced levels of acceptance, for example geographic region (relative carnivore abundance), socio-demographic factors, level of fear, knowledge and previous experience of large carnivores, perception of population size or particular carnivore species.

A self-administered questionnaire was prepared containing 50 items arranged in six sections: attitudes and perceptions; knowledge; management issues; sources of knowledge; personal experience; and socio-demographic factors. Most questions were measured on a 5-point Likert scale ranging from, for example, "very negative" to "very positive" or offered multiple choice responses. Questionnaires were distributed and collected personally in one region where large carnivores were present at relatively high densities (Liptovský Mikulás, 49.1% of all respondents) and in a second region where these species were rare or absent (Nové Mesto nad Váhom, 44.9% of all respondents). The target audience of the survey consisted of three distinct groups: residents 16 years and older (n=800), pupils aged 12-15 years (n=157) and woods people – shepherds/farmers, hunters/foresters and employees of mountain hotels (n=121). In addition, 30 tourists in the Liptovský Mikulás region and 70 shepherds/farmers in various other regions also completed the questionnaire.

Generally, respondents held neutral to positive attitudes toward large carnivores. The most accepted species was the lynx, the least accepted was the wolf. Fear seemed to be an important factor influencing attitude. Very fearful people had the most negative attitudes toward bears, wolves and lynx. Bears were rated most dangerous and were most feared. Residents aged 16-35, males and those living in towns were more positive toward large carnivores than their counterparts. Hunters/foresters and tourists had the most positive attitudes while shepherds were the most negative occupational group. Level of knowledge tended to be low. A positive correlation was found between knowledge and level of acceptance, except among those most affected by real or perceived damage (i.e. woods people). More than 90% of respondents indicated that they would like to learn more about large carnivores. Television was important in shaping respondents' perceptions and was the most preferred medium for obtaining information. Lack of education/information and problems with people were most often cited as important management issues. More than 65% of respondents thought that hunting should not be allowed in National Parks.

Key words: *Canis lupus*, Eurasian lynx, European brown bear, human dimensions, *Lynx lynx*, public opinion, Slovakia, *Ursus arctos*, wolf

SUMMARY OF MAIN FINDINGS

- The majority of respondents held **neutral to positive attitudes** toward large carnivores. The most accepted species was the lynx (48.9% of respondents had positive feelings toward this species) followed by the bear (43.3%) and, least of all, the wolf (33.0%).
- The vast majority of respondents (82.9%) supported the assertion that, **"Bears, wolves and lynx belong in the wild in Slovakia"**. Only 6.3% disagreed with this statement. Fewer people, but still a majority, agreed when asked if it is good that these animals are in Slovakia: 69.9% answered yes for lynx, 67.5% for bears and 57.6% for wolves.
- In a district where large carnivores were relatively abundant ("core area"), attitudes were significantly more negative toward bears and wolves (but not lynx) than in a district where they were rare or absent ("control area"). The observation that **lynx presence did not seem to influence attitudes** toward it can perhaps be explained by the fact that in Slovakia the lynx has relatively little affect on human activities compared to bears and wolves.
- Socio-demographic factors partially affected attitudes: **males were significantly more knowledgeable about and positive toward large carnivores** than females. **People over 60 years of age had the most negative attitudes** whereas those between 16 and 35 years of age had the most positive attitudes. **Attitudes were more negative in villages than in towns**. Higher levels of education tended to be associated with more positive attitudes but the differences were not statistically significant. In terms of occupation, foresters were the most positive and shepherds the most negative toward large carnivores.
- Of the four target groups sampled, the most positive was "tourists", followed by "residents" (over 16 years of age), "pupils" (12-15 years old) and "woods people" (shepherds, farmers, hunters, foresters, staff of mountain tourist facilities). Compared to the other target groups, **woods people most often had negative feelings** toward wolves (32.9% of woods people), considered there to be too many bears (43.5%) and wolves (42.2%) in Slovakia, thought that large carnivores cause a lot of damage (44.0%) and that wolves and lynx greatly reduce deer populations (43.1%) and caused the decline in numbers of Tatra chamois (30.3%).
- Fear seemed to be an important factor influencing attitude: 49.2% of all respondents indicated that they would be afraid to go into the woods if there were bears, 48.1% if there were wolves and 38.0% if there were lynx. **Very fearful people had the most negative attitudes**.
- **The bear was considered the most dangerous species** and was most feared. Two thirds of respondents (64.2%) answered that it is (very) dangerous and 55.9% thought so of wolves. The wild boar (40.7%) was more often rated dangerous than the lynx (32.7%). The danger of wolves and lynx was rated lower but that of bears higher in the core versus control area.
- Knowledge levels tended to be low: most respondents answered less than half the knowledge questions correctly. **More knowledge was associated with a greater degree of acceptance**, except among those most affected by large carnivores i.e. woods people. People in the control area were more knowledgeable than those in the core area.
- The majority of people (61.2%) thought that **compensation should be paid to farmers** whose livestock had been killed by large carnivores. **Only 30.2% knew that this was already being done**. There was less support for only compensating farmers who tried to protect their stock; nevertheless twice as many people agreed (48.2%) as disagreed (23.3%) with this idea.
- **Opinions were divided on where large carnivores should live**. About the same proportion of people agreed (38.0%) as disagreed (35.3%) with eliminating bears and wolves from areas where they kill livestock. Woods people were, unexpectedly, most often against this idea

(47.4% against versus 30.0% in favour). Substantially more people were against (46.5%) than were for (32.1%) the suggestion that carnivores should only live in restricted parts of Slovakia.

- Almost everyone included in the survey (89.6% overall, 96.5% in the core area) had heard of human food-conditioned or **"container bears"**, presumably thanks to frequent media reports. Although half (52.0%) knew that bears are likely to feed on refuse not stored properly, more people thought this happens due to a lack of natural food (47.5%) or because bears are "over-populated" (42.2%) than were aware that refuse can represent an easily accessible source of food (24.3%) and that some people entice bears by offering them food (22.3%).
- Despite a lack of recent **predatory attacks on humans** in Slovakia, around 10% of respondents thought that carnivores are dangerous to people when they are hungry. Substantial proportions of respondents believed that 1-10 people had been killed in Slovakia by bears (42.9% of respondents), wolves (29.0%) and even lynx (15.4%) during the decade prior to the survey. (There were no fatal attacks during this period.) The number of fatalities caused by bears was estimated significantly higher by people in the core area than by those in the control area.
- Most respondents held neutral to positive attitudes toward large carnivore management. A **lack of education/information** and problems with people were identified as the most important current issues. Over 90% of respondents wanted to learn more about large carnivores.
- The bear, the second most accepted of the three species overall, was nevertheless most often considered to be **"over-populated"** (by 27.6% of respondents, versus 19.2% for wolves and 7.6% for lynx). Although 40.9% of respondents in the core area (compared to 15.5% in the control area) thought there were too many bears and 9.7% considered an "over-population" of large carnivores to be the most important management problem, more of them underestimated the population size (31.9%) than overestimated it (10.7%).
- A quarter (26.6%) of respondents agreed that large carnivores cause a lot of damage in Slovakia compared to 42.7% who disagreed. **People in the core area rated damage lower** than people in the control area. However, those who had already experienced damage by bears, wolves or lynx were significantly less positive toward them than people who had not.
- More than three quarters (78.2%) of all participants, including 78.0% in the core area and 70.2% of woods people, agreed that **hunting of bears, wolves and lynx should be strictly regulated**. Over 71% agreed or tended to agree that National Parks (NPs) should be places where animals are protected year-round, a significantly higher proportion in the core area than in the control area. Two thirds (65.9%) thought that **hunting should not be allowed in NPs**. Even among woods people, slightly more disagreed (41.9%) than agreed (38.7%) with hunting in NPs.
- **Television** seemed to have most formed respondents' conceptions of bears, wolves and lynx. Hunters appeared to have more influence than conservationists in regard to information about large carnivores. More people in the control area (33.5%) than in the core area (20.8%) admitted that they had been influenced by **fairy tales** and legends. **Stories from childhood** were remembered as mostly positive for the bear, negative or mixed for the wolf and rare for the lynx. Most respondents (58.1%) wished to obtain more information via television or radio. Newspapers, magazines, excursions, leaflets the internet and books were also popular media.
- Wildlife watching was widespread, as were hiking and mushroom or berry picking; each was performed by over 40% of respondents. More than half the respondents would like to see a lynx (62.8%), bear (59.7%) or wolf (55.5%) in the wild. However, quite **a high proportion of people did not know how to behave appropriately** in an encounter with a large carnivore.
- Rather high proportions of people, significantly more in the core than in the control area, claimed to have already seen a bear (32.0%), wolf (25.0%) or lynx (18.6%) in the wild. **Those who said they had seen a bear had significantly more positive attitudes** toward this species than those who had not. There was no equivalent difference for the wolf or lynx.

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1. INTRODUCTION

The historical persecution of the brown bear (*Ursus arctos*), grey wolf (*Canis lupus*) and Eurasian lynx (*Lynx lynx*) was less successful in Slovakia than in most of the rest of Europe. Although they were almost eradicated during the period 1890-1930, natural recovery, aided by curbs on hunting, meant that by the late 1980s and early 1990s numbers of all three species were at their highest levels since the 19th century (Hell and Slamečka 1996, 1999, Hell *et al*. 2001). In addition, large carnivores were more widespread in the Western Carpathians than at any other time in the 20th century. This brought many people who had no previous experience of dealing with them into contact with carnivores (Rigg 2004).

As in other regions where humans coexist with carnivores, conflicts have arisen due to competition for wild ungulates and, especially where traditional preventive measures have been abandoned, predation on livestock (Kaczensky 2000). Many modern farmers and shepherds do not know how to protect their animals from attacks (Sillero in Rigg 2001). Large carnivore management is therefore more a socio-political issue than a biological one (e.g. Bath 2000).

Study of public opinion and knowledge or "human dimensions research" has become an important element of carnivore conservation management. Quantitative and/or qualitative approaches have been used to assess reactions to carnivores in several European countries, including in Austria (reviewed in Kaczensky 2003) Croatia (Cicnjak and Huber 1995, Bath and Majić 2001), France (Bath 2000), Italy (Dupré *et al*. 1998) Latvia (Andersone and Ozolins 2002), Slovenia (Kaczensky 2003), Switzerland (reviewed in Kaczensky 2003) and the United Kingdom (Bath and Farmer 2000).

Some individual studies that have compared regions or countries (e.g. Korenjak 1995) as well as separate studies that used a comparable quantitative methodology (cf. Bath 2000, Kaczensky *et al*. 2000, Bath and Majić 2001) have revealed important variation in attitudes, knowledge and levels of acceptance. Generally, lower levels of support for large carnivore presence have corresponded to recovering wolf populations in areas with high levels of damage and no recent tradition of carnivore-human coexistence. More support has typically been documented in areas with established bear and wolf populations and low levels of conflict. Attitudes can change considerably over time (see Fritts *et al*. 2003). Socio-demographic characteristics such as age, sex, education, employment and place of residence as well as knowledge and fear, have also been shown to be important factors influencing attitude to and acceptance of controversial wildlife species such as wolves, bears and lynx (Kaczensky 2003).

In Slovakia, where democracy is still in its infancy, the public is poorly informed about issues of wildlife conservation management, despite some recent efforts to increase participation (see Vančura 2002). Little research on public attitudes to carnivores has been published. Three limited studies were conducted in 1999-2000. Two of them were done by environmental activists in an area recently re-colonised by large carnivores along the Slovak-Czech border. The 132 respondents in the first of these surveys had mostly negative (44%) or neutral (44%) feelings about the presence of wolves, thought they could be a danger to people (63%) and tended to view them as "bloodthirsty" (38%) and "harmful" (36%). Equal numbers of people thought wolves are "shy" as thought they are "bold" (reviewed in Pačenovský and Gadó 2003)

The third study, although forming only part of a broader survey, was more robust. It was conducted by Focus agency, Centre for Social and Marketing Analysis, in early December 1999 (Focus 1999). Three items about wolves were included in a face-to-face interview

survey of public opinion and knowledge concerning nature conservation. Of 1,077 respondents in all counties (*kraje*) of Slovakia, 72% agreed with the statement that, "The presence of wolves in our forests is important for the healthy functioning of these forests". Far more respondents disagreed than agreed (50% versus 31% respectively) with the statement that, "Wolves in our country do more damage than good", whereas 55% of respondents agreed that, "The wolf, living in the wild, is dangerous to people." Answers more favourable to wolves tended to be given by men, by those between the ages of 35 and 44 and by those who had a university or secondary school education. More negative views on wolves were held by those over 45 years of age, by those with only primary school education, by those living in villages of between 2,000 and 5,000 inhabitants and by those living in north-east Slovakia (where wolf density was higher than in most of the rest of Slovakia).

The Slovak Wildlife Society planned an education programme on large carnivores for the period 2004-06, beginning with The B.E.A.R.S. Project: Bear Education, Awareness and Research in Slovakia. The goal was to reduce carnivore-human conflicts by improving knowledge of, in particular, bears and wolves and to increase awareness and use of preventive measures. It was hoped that this would lead to more tolerance, understanding and acceptance of large carnivores, hence supporting long-term conservation initiatives.

Before the education programme began, a detailed survey was conducted to investigate attitudes toward and knowledge about large carnivores among Slovak citizens. The survey, the results of which are presented in this report, was commissioned in order to provide important baseline data for the education programme. It had three additional goals: to act as an education tool in itself, through dissemination of an information leaflet to participants and publication of the results; to provide important data to wildlife managers; and to encourage increased public awareness of and involvement in wildlife conservation and management.

Data for this study were collected in two different study areas: 1) the core area, Liptovský Mikuláš, a district (*okres*) with high carnivore densities, relatively frequent conflicts and with an almost unbroken carnivore–human coexistence (although numbers of bears and wolves were much lower in the 1960-70s than during the study); and 2) the control area, Nové Mesto nad Váhom, a district where large carnivores were rare or absent and where damage by large carnivores was uncommon. Using a self-administered written questionnaire, the attitude and knowledge levels of three main target groups were surveyed in both districts:-

- local residents (16 years and older)
- pupils (12-15 years old)
- woods people (shepherds, farmers, hunters, foresters, staff of mountain tourist facilities)

Tourists in the Liptovský Mikulás district and shepherds/farmers in various other districts of Slovakia were also asked to complete the questionnaire.

Besides socio-demographic aspects and level of knowledge, other important factors likely to influence acceptance, such as fear, perception of population size and experience of damage, were also evaluated.

2. AIMS and HYPOTHESES

2.1. Key questions

The study sought to answer the following key questions:-

- What is the attitude and knowledge level of Slovak citizens concerning large carnivores?
- To what extent are large carnivores accepted in Slovakia?
- What is the relationship between attitude and knowledge?
- What are the main differences between the target groups and study areas in terms of knowledge, attitudes and opinions?
- To what extent is attitude explained by socio-demographic factors and are these factors more or less important than knowledge in explaining attitude?
- What is the perception of the danger and damage caused by large carnivores among the various target groups?
- Is there a correlation between fear of carnivores and attitude toward them?
- What is public opinion about large carnivore management in Slovakia and what would people like to change?
- How much public support is there for conservation, research and education activities?
- What sources of information most seem to influence people's attitudes?
- How interested are people in learning more about carnivores and in what form would they like to obtain information?
- On the basis of the results obtained, what are the best strategies for increasing acceptance of large carnivores and knowledge of, for example, actual levels of human-carnivore conflict, their causes, preventive measures and appropriate behaviour?

2.2. Expectations

Based on the semi-structured interviews, the authors' previous experience of attitudes toward and knowledge of large carnivores among the public in Slovakia and elsewhere, as well as published studies on human dimensions in wildlife management, a detailed set of expected results was compiled to serve as hypotheses to be tested and to guide the design of the questionnaire. Significant differences were anticipated in knowledge level and attitude between people living in a district where large carnivores were relatively numerous (the core study area) and people in a district where such animals were mostly absent (the control study area). There were also expected to be significant differences among target groups as well as in relation to socio-demographic aspects, knowledge level and previous experience with large carnivores.

More detailed expectations and hypotheses are summarised in the following paragraphs.

<u>Opinions and attitudes</u>

We expected most people to agree that large carnivores belong in the wild but that many, especially woods people, would think there are currently too many wolves and bears. The damage that large carnivores cause and carnivore-human conflicts would be perceived to be greater than they are in reality, especially among woods people and village residents. Attitudes would be most negative towards wolves and least negative towards lynx. Woods people (hunters and shepherds) would have the most negative attitudes of all target groups, especially towards wolves. The level of fear would be quite high in all groups except woods people (hunters). Wolves would be considered dangerous in winter and when they are hungry. Bears would also be thought

of as dangerous. Woods people (hunters and shepherds) would consider large carnivores, particularly wolves and bears, to be "over-populated". The general public would reflect this attitude to some extent and often cite hunters and the media as having formed their opinions on carnivores. Older people would have more negative attitudes toward wildlife and its conservation than pupils, who would be more positive. People who were told stories about large carnivores in their childhood would remember them as mostly negative toward wolves, positive or neutral about bears and that there were very few about lynx.

Knowledge

The general level of knowledge about large carnivores would be low. Woods people, especially hunters and foresters, would be most knowledgeable, but would exaggerate their numbers and the negative impacts they have on humans and human activities. Town residents and tourists would be least knowledgeable. Knowledge would be higher in the core area than in the study area. Few people would know how to behave appropriately when meeting a carnivore, particularly town residents and those in the control area. Almost everybody would have heard about "container bears" (human food-conditioned bears), but either would not know what causes bears to become human habituated and food-conditioned or would blame an "over-population" of bears and lack of natural food.

Attitudes to management

Woods people (hunters and shepherds) would be in favour of lethal control by shooting. They would be critical of conservation efforts and legal protection, seeing them as imposed from outside by politicians and inexperienced, out of touch bureaucrats in city offices, i.e. in Bratislava. They would favour less regulation of hunting and allowing hunting in National Parks. Village people would also be critical of protection measures. Town residents and pupils would be most in favour of legal protection and managing National Parks as refuges for wildlife. There would be more support for conservation and protection in the control area than in the core area.

Previous experience of large carnivores

Woods people would claim to have had most contact with large carnivores – sightings, damage caused, time spent in forest. The overall proportion of people suffering damage caused by bears would be fairly low in the core area and very low in the control area.

These young animals, taken from the mountains of central Slovakia by foresters, face spending the rest of their lives in captivity. They might have lost their mothers as a result of illegal hunting, or they may have been removed in the well-meaning but mistaken belief that they were orphans.

3. METHODS

Data collection took place from spring 2003 until spring 2004 and consisted of two phases, using first a qualitative and then a quantitative method. The quantitative method represents the main part of the study. Both the qualitative and the quantitative methods are presented here in detail.

3.1. Qualitative method

The qualitative method served essentially to determine important issues about the topic of the survey. A semi-structured interview was the method used.

Three hunters/foresters, two shepherds, a pupil and a resident of Liptovský Mikuláš district were interviewed by S. Beťková in March 2003. The interviews were taped and afterwards transcribed and translated from Slovak into English by S. Beťková and R. Rigg.

For this method, the interviewer had some prepared questions, but they were very general (listed in appendix I). The interviewee was allowed to lead the conversation. The aim of the interviews was to assess attitudes without introducing prejudices from the interviewer.

3.2. Quantitative method

A quantitative social sciences method, which is usually referred to as "survey research", was used as the main method to collect data in this study. The research instrument was a self-administered written questionnaire (see appendix III).

Questionnaire design, sample frame, sample size, sampling procedure, study areas and statistical evaluations are presented in detail below.

3.2.1. Questionnaire design

The implemented questionnaire was based on a research instrument developed by A. Bath, Memorial University, Newfoundland, Canada, and used by Wechselberger (2002), substantially revised and adapted to Slovak conditions. To identify potential problems, the questionnaire was pre-tested with nine people: four pupils, three residents, a teacher and a forester, all from Liptovský Mikuláš district. This resulted in several changes to improve the legibility and comprehensibility of the questionnaire by enlarging the size of pages and fonts, tidying up the layout and clarifying the wording of some questions and answers.

The final questionnaire (see appendix III) was printed as a booklet consisting of a single sheet of paper (Din A3) folded to create four printed pages (Din A4). At the top of the first page was a brief text explaining who was conducting the survey and why, plus stressing its anonymity. The research instrument itself consisted of 50 items: individual survey questions or statements for which we wanted to document the respondents' opinions. These items were organised into six sections. At the beginning of each section a brief guide to answering the questions was given. The six sections focused on the following aspects:-

1. attitude, value and belief of people about bears, wolves and lynx (10 questions)
2. knowledge about bears, wolves and lynx and their management (9 questions)
3. attitude toward bear, wolf and lynx management (11 questions)
4. sources of information and how important this issue is to people (4 questions)
5. previous personal experience with large carnivores in Slovakia (9 questions)
6. socio-demographic aspects (7 questions)

All attitudinal questions were measured on a 5-point Likert scale ranging from "very negative" to "very positive", "very bad" to "very good", "strongly disagree" to "strongly agree" or "very dangerous" to "always harmless". An "I do not know" option was not included, except for question I9. In addition to these multiple choice questions, the attitudinal sections also contained two open questions requesting short essay-type responses.

All knowledge items were of closed structure, offering multiple choice responses, but most of these items also offered an "I do not know" option (except questions II6, II8 and II9).

The majority of questions about sources of information, previous experience and socio-demographic aspects were also multiple choice questions, although the section on experience contained two open-ended items (V7 and V8).

3.2.2. Sample frame and sample sizes

A total of 1,178 completed questionnaires were included in the survey analysis. Data were gained directly from the respondents and are therefore primary data. Most of these respondents were from two study areas, Liptovský Mikuláš and Nové Mesto nad Váhom districts (see 3.2.4.). In both of these two study areas, three special target groups were chosen:-

1. residents over 16 years old (*n*=800)
2. pupils aged 12-15 year old (*n*=157)
3. woods people, i.e. shepherds, farmers, hunters, foresters and employees of mountain tourist facilities (*n*=121)

The same questionnaire about attitudes toward large carnivores was also presented to shepherds/farmers in other districts across Slovakia during farm visits to assess damage prevention measures and reported losses to large carnivores. The responses of these additional 70 shepherds and farmers have been evaluated within the present survey as part of the target group woods people, bringing the total sample size for this group up to *n*=191.

Additionally, in the core area (Liptovský Mikuláš district) there was a fourth target group:

4. tourists (*n*=30)

Table 3.1. Sample sizes of the various target groups and their proportion of total sample size (*n*=1,178)

Target groups	Core study area (Liptovský Mikuláš)		Control study area (Nové Mesto nad Váhom)		Other districts	
	n	**%**	***n***	**%**	***n***	**%**
1. residents	392	33.3	408	34.6	—	—
2. pupils	73	6.2	84	7.1	—	—
3. woods people	84	7.1	37	3.1	—	—
3. shepherds/farmers	—	—	—	—	70	5.9
4. tourists	30	2.5	—	—	—	—
Total	**579**[1]	**49.1**	**529**	**44.9**	**70**	**5.9**

[1] 549 (46.6%) excluding tourists.

3.2.3. Sampling procedures

The quantitative survey was conducted from April 2003 until January 2004. Several secondary school pupils ("distributors") helped in each study area. Different procedures were used for each target group. After they had returned the completed questionnaire, respondents were given a leaflet containing basic information about bear, wolf and lynx biology as well as brief advice on safety and damage prevention measures (see appendix IV).

Residents (16 years old and older)

Local residents were sampled by personally distributing questionnaires. Distributors used the third house/flat rule to select which residences to visit and handed the questionnaire to the person that opened the door or was seen in front of the house/flat. If people were not at home or refused to fill in the questionnaires, the next neighbouring house/flat was approached in the same way. The questionnaire was left for people to fill in and collected a few hours later. Respondents were asked to leave the questionnaire in front of the door if they had to leave before the distributor returned. In some cases, mainly involving elderly residents, distributors helped them by filling in their stated answers and/or by reading the questions out loud. Residents of towns (Liptovský Mikuláš and Liptovský Hrádok in the core area, Nové Mesto nad Váhom in the control area) and villages (Kráľova Lehota, Pribylina and Hybe in the core area, Hôrka nad Váhom, Podolie, Považany and Kalnica in the control area) were included. A few questionnaires (<10) were only partially completed and hence were discarded. The response rate (useable questionnaires only) for residents was >90%.

Pupils (between 12 and 15 years old)

One school each in the towns of Liptovský Mikuláš and Liptovský Hrádok in the core area and in Nové Mesto nad Váhom in the control area were visited. Children from surrounding villages also normally attended these schools. The survey was conducted in three classes from each study area with pupils aged between 12 and 15 years old. Due to this method a 100% return rate was achieved, although <10 of returned questionnaires were not included in the analysis because they had not been filled in seriously. Since the survey included several control questions, such unserious answers were easily distinguished. The response rate (useable questionnaires only) for pupils was therefore c.95%.

Woods people

Some hunters/foresters were included during the distribution of questionnaires among residents. To increase sample size, others known to the researchers or residents were approached throughout the data collection period. A class of students (aged 16-18 years) at the forestry school in Liptovský Hrádok was included: their teacher distributed and collected questionnaires. Shepherds/farmers usually completed the questionnaire during farm visits using the same procedure as those in other districts (see below). Staff of mountain tourist facilities were approached during the same period as tourists (see below). Overall response rate for woods people (useable questionnaires only) was c.75%. Hunters/foresters were the most reluctant to participate. The reason given by some of those who refused was that they did not want "to appear in a bad light".

Table 3.2. Composition of target group woods people by study area *(* both hunter and shepherd)*

Occupation	*n* respondents	
	core area	control area
hunters/foresters	29 + *1**	32 + *2**
shepherds/farmers	19 + *1**	3 + *2**
tourist facility staff	6	—
forestry school students	29	—
Total	84	37

Shepherds/farmers in other districts

Shepherds and farmers were asked to fill in the questionnaire during farm visits in summer-autumn 2003 to assess damage, prevention measures and reported losses to large carnivores. In many cases they required assistance to understand questions and/or fill

in their answers. A few questionnaires (<10) were only partially completed and hence were discarded. The response rate (useable questionnaires only) was more than 90% for this target group.

Tourists in Liptovský Mikuláš district

Questionnaires were administered to tourists visiting Nízke Tatry National Park during the last week of June 2003. Half (53.3%) were from various regions of Slovakia, a quarter (26.7%) were from the Czech Republic and the rest from other, mostly European, states. Groups of walkers were approached and the person with the next birthday was asked to fill in the questionnaire, in English or Slovak as appropriate. The response rate was close to 100%.

3.2.4. Study areas

3.2.4.1. Core study area

Liptovský Mikuláš district (*okres*) was selected as the core study area. This district had high carnivore densities, an almost unbroken history of carnivore–human coexistence and relatively frequent damage by bears and wolves. Liptovský Mikuláš district is situated in the north of Slovakia, in the middle of the Liptov basin, stretching mostly on the right bank of the river Váh (see figs. 3.1.-3.2.). It is surrounded by mountains: the Chočské vrchy mountains and Tatranský National Park to the north, Nízke Tatry National Park to the south. The district covers an area of 1,323km², representing 2.7% of the total area of Slovakia, and on 31.12.2003 it had 73,668 residents (c.87% of them 12 years or older), which was approximately 1.4% of the population of Slovakia. All three large carnivore species were found in this area during the study, with numbers estimated at 50-100 bears and perhaps 15-30 lynx and 30-40 wolves as of 31.3.2003 (see table 3.3.).

3.2.4.2. Control study area

Nové Mesto nad Váhom district (*okres*) was selected as the control study area. Large carnivores were at very low densities or were absent. Nové Mesto nad Váhom is situated in western Slovakia. Like the core area, it lies on the river Váh between upland areas: the Malé and Biele Karpaty hills lie to the west and north, Považský Inovec to the south-east (see figs. 3.1. and 3.3.). The district covers an area of 578km² (1.2% of Slovakia) and in 2003 it had 63,228 inhabitants (c.88% of them 12 years or older), which was 1.2% of Slovakia's total population (see table 3.3.).

Table 3.3. Overview of study areas. Data are census results for 2003-04 (employment data from 2001) from the Statistical Office of the Slovak Republic except numbers of carnivores, estimated by the authors

Parameter	Core study area Liptovský Mikuláš district		Control study area Nové Mesto nad Váhom district	
area	1,323km²	2.7% of Slovakia (SR)	578km²	1.2% of Slovakia (SR)
inhabitants	73,668	1.4% of SR population	63,228	1.2% of SR population
human population density	56/km²		109/km²	
people living in rural areas	32,591	44.2% of district total	32.123	50.8% of district total
people living in urban areas	41,077	55.8% of district total	31,105	49.2% of district total
employment in agriculture	2,633	c.6.9% of district total	1,814	c.5.6% of district total
unemployment rate	5,661	14.8% of workforce	4,716	14.5% of workforce
number of sheep	17,561	4.2% of national herd	781	0.2% of national herd
number of cattle	18,941	3.2% of national herd	6,300	1.1% of national herd
number of bears	50-100	c.10-15% of national total	c.0	c.0% of national total
number of wolves	30-40	c.10-15% of national total	c.0	c.0% of national total
number of lynx	15-30	c.5-10% of national total	c.0	c.0% of national total

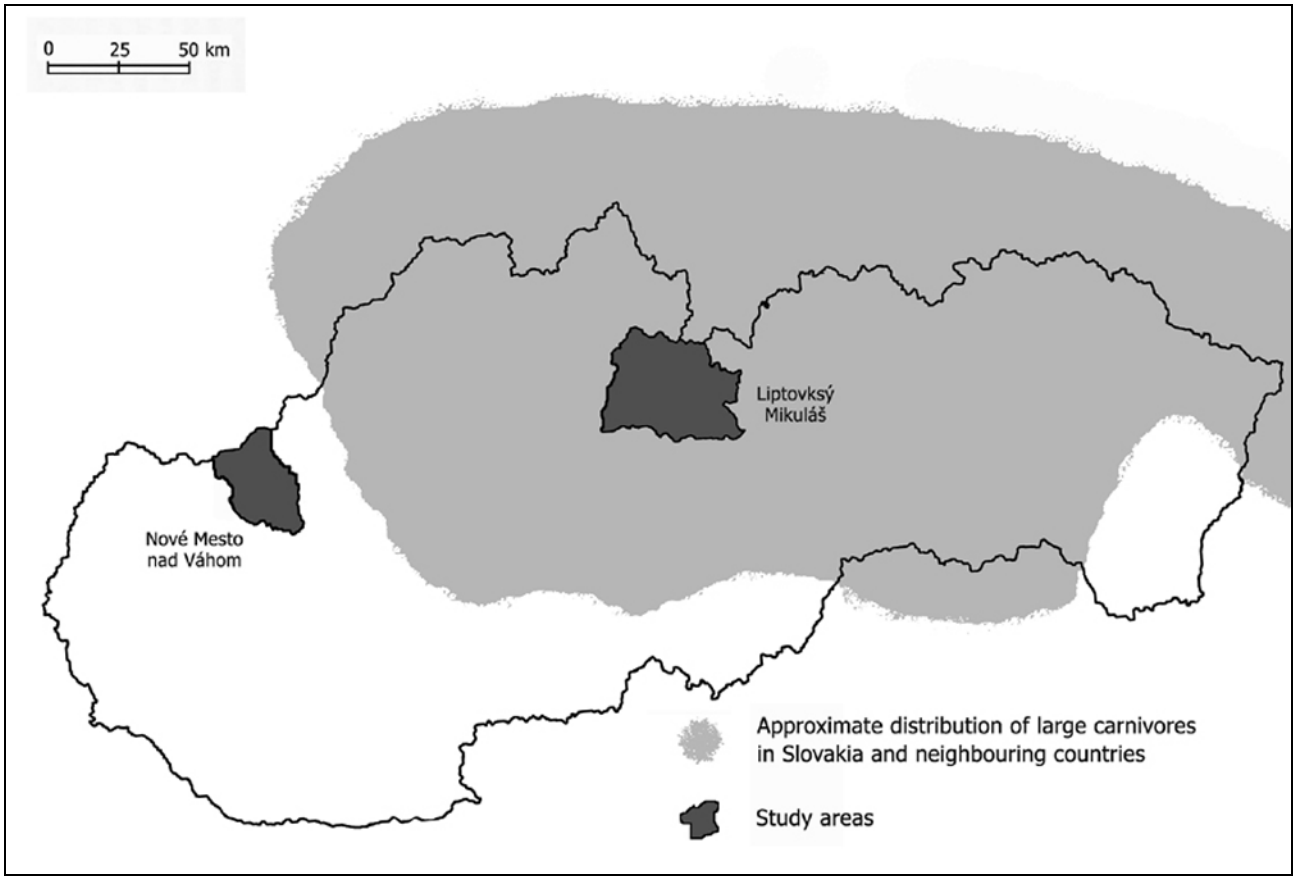

Figure 3.1. Locations of core and control study areas

3.2.5. Statistical evaluation

For the statistical analyses, data were entered into SPSS for Windows 10.0 (PC version). Analyses were conducted using two main types of test:-

- Pearson's chi-square test

  A chi-square test of association was used to test the null hypothesis that row and column variables were independent. A high χ^2 value and $P < 0.05$ indicated significant differences.

- Independent samples *t*-test (Mann-Whitney *U* test, Kruskal-Wallis *H* test)

  A *t*-test was used to test if two or more unrelated samples came from populations with the same median.

Figure 3.2. Typical large carnivore habitats of Liptovský Mikuláš district, the core study area.

Figure 3.3. Part of Nové Mesto nad Váhom district, the control study area, looking south-east.

4. RESULTS and DISCUSSION

4.1. Qualitative method: semi structured interviews

Only six of the seven interviews could be used for the evaluation. One participant, a retired shepherd, did not follow the questions and instead described an incident involving a bear from his time as a shepherd (see appendix II).

The opening question of the interview asked, **"What kind of predacious animals exist in Slovakia?"** All participants gave correct answers. Some of them could list a large number of carnivores (see appendix II).

"Which features does a bear have?" was the next question. The following statements represent the answers of the participants.

- Bears are very cautious (3)[2], shy (2) and peaceful (1) animals.
- Bears usually avoid humans, but in some critical situations they can also attack them (1).
- Bears are usually scared of humans (2) and do not attack them (1).
- They usually do not attack people but if they are disturbed they can attack (2).
- Females with cubs can be dangerous (2).
- Bears are more dangerous than wolves (1).

Answers to the question about the **features of wolves** were as follows:-

- Wolves are very shy (2) and cautious (2) animals.
- They usually avoid humans, but in some critical situations (for example if they are disturbed) they can also attack them (2).
- Wolves are also scared of humans, but are a bit more dangerous than bears (1).
- Wolves are more dangerous in packs (1) and attack more than bears (1).
- Wolves are insatiable bloody-thirsty animals (1).
- Wolves are much less dangerous than bears, because they are very shy (1).

Question 3 asked about the **interviewees' feelings toward bears and wolves**. None of them had really negative feelings toward bears. Two of them said their feelings were neither positive nor negative, two had quite good feelings and three mentioned that they were scared (especially of female bears with young). Opinions about wolves differed a lot. Two people had neutral attitudes toward wolves, one (the pupil) said that bears and wolves are nice, but wolves are not so kind. One interviewee (a hunter) called wolves "insatiable, bloody-thirsty animals". Two interviewees mentioned that they were scared of wolves and one of them said she was more scared of wolves than of bears. The person (a forester/hunter) who had experienced both good and bad situations with large carnivores said that with wolves it had always been okay.

Question 4 was: **"What does it mean to you personally to have bears in Slovakia?"** All the interviewees said that it is good to have bears in Slovakia, but four people also mentioned that there is a problem because:-

- At the moment they are "over-populated" (2);
- They cause damage (1);
- The interviewee was scared (1).

[2] The number in brackets is the number of people out of six who gave this answer.

Next the interviewees were asked if they saw any kinds of **problems concerning bears and wolves**. Their answers are listed below:-

- At the moment there are too many bears and wolves. This results in social conflict and territorial problems among bears and bear-human conflicts (1);
- There are no problems, but there should be less hunting (1);
- Wolves should be destroyed to a great extent – they have too many pups and destroy ungulates (1);
- There should be insurance for losses by wolves. They only pay for losses by bears: wolves did not used to live in Slovakia (1);
- I do not know much about this issue, but there are maybe too few bears and wolves. "Container bears" are also a problem, if they attack people (1);
- At the moment there are too many bears, shooting is only permitted up to 100 kg. Larger ones should also be allowed to be shot, so there is a balance (1);
- Wolves are difficult to hunt and there are a lot of wolves (the number is fluctuating). There should be a longer hunting season, because they can have 5-7 pups a year (1).

The sixth and last question served essentially to learn about what people would do if they were in a position to change something about **bear and wolf management** in Slovakia. Their answers are listed below:-

- I would give more information to people, about animals' lives and how to behave (1);
- Lawmakers and woods people should work together (1);
- I would give territory to the animals and then I would leave them alone (1);
- Regular annual shooting of bears; radical decrease in numbers of wolves (1);
- Insurance for losses to wolves (1);
- More consideration of animals when going into the forest (1);
- Lengthen the hunting period for wolves, the number of wolves must be lower; hunting bears of all age levels, from young to old (1).

Almost 90% of Slovakia's c.350,000 sheep are in regions with large carnivores. Depredation, especially by wolves, is common and losses, although insignificant on a national scale, can be high locally.

4.2. Quantitative method: questionnaire survey

4.2.1. Socio-demographic characteristics

Overall, slightly more males (54.8%) than females (45.2%) participated in this survey. Approximately 13% of the respondents were pupils between the ages of 12 and 15 years, 19.3% were 16-20 year-olds and around half the participants were between 21 and 50 years old (24.7% were 21-35 years old and 26.2% were 36-50 years old). The proportion of people over 50 years old was c.15%.

Slightly less than one third (30.7%) of participants had only completed a basic level of education. More than half the respondents (54.3%) had also finished secondary school and 13.5% were university graduates.

Residents (*n*=800)

The target group "residents" were local people of the two study areas, aged 16 years and older. Around the same number of females as males were surveyed (see table 4.2.). Residents of villages (villages included in the survey had between 637 and 2,046 inhabitants in 2003) versus those of towns (between 8,111 and 32,966 inhabitants in 2003) were surveyed in approximately the same ratio as found in the respective district populations (see table 3.3.): 223 town versus 169 village residents from the core study area and 216 town versus 192 village residents from the control study area were included. Most of the surveyed residents had finished secondary school (see table 4.3.) and around 60% were between 21 and 50 years old (see table 4.1.).

Pupils (*n*=157)

All those in the target group "pupils" were between 12 and 15 years old and had a basic education. More females (58.6%) than males (41.4%) completed the questionnaire. Slightly more (53.5%) were in the control area than the core area.

Woods people (*n*=191)

Many (40.3%) of the surveyed woods people were between 36 and 50 years old (see table 4.1.). Only 6.8% of them were female, the vast majority (93.2%) being male. See table 4.3. for the education level of woods people surveyed. A total of 95 respondents, half (49.7%) this target group, were shepherds or farmers. Of these, 20 were in the core study area, five in the control study area and the rest in other districts of Slovakia. One third (31.9%) of the target group were hunters and/or foresters, approximately half of them (47.5%) in the core area and half in the control area. Three men were both hunters and shepherds/farmers: one in the core area and two in the control area. Twenty-nine respondents (15.2%) were 16-18 year-old students at the Liptovský Hrádok secondary school for foresters in the core study area. Only 3.1% of the target group (six people) were employees of mountain tourist facilities, all of them in the core study area (table 3.2.).

Tourists (*n*=30)

Almost half (46.7%) the tourists surveyed were between 21 and 35 years old and about a quarter were between 51 and 60 years old (see table 4.1.). More males (60.0%) than females (40.0%) completed the questionnaire. The percentage of university graduates was far higher among tourists compared to other target groups. Only 6.7% of the tourists had just a basic level of education (see table 4.3.).

Table 4.1. Age distribution of sample by target group

Age (years)	Residents	Pupils	Woods people	Tourists
12-15	—	100.0%	—	—
16-20	23.3%	—	22.0%	10.0%
21-35	30.8%	—	18.8%	46.7%
36-50	29.0%	—	40.3%	13.3%
51-60	10.3%	—	15.7%	26.7%
>60	6.8%	—	3.1%	3.3%

Table 4.2. Sex structure of sample by target group

Sex	Residents	Pupils	Woods people	Tourists
Female	51.9%	58.6%	6.8%	40.0%
Male	48.1%	41.4%	93.2%	60.0%

Table 4.3. Education level of sample by target group

Education	Residents	Pupils	Woods people	Tourists
Basic	18.4%	100.0%	33.5%	6.7%
Secondary	64.9%	—	59.7%	46.7%
University	16.8%	—	6.8%	46.7%

Table 4.4. Socio-demographic characteristics of samples (excluding tourists and shepherds/farmers from other districts) compared to population census results for 2001-02 from the Statistical Office of the Slovak Republic

	Core area		Control area	
	population census (excluding those less than 12 years old)	**sample** (*n*=549) (0.9% of population ≥ 12 years old)	**population census** (excluding those less than 12 years old)	**sample** (*n*=529) (0.9% of population ≥ 12 years old)
Age structure				
12-15	6.4%	13.3%	6.3%	15.9%
16-20	9.3%	21.1%	8.5%	21.0%
21-35	26.8%	20.9%	26.2%	29.1%
36-50	25.9%	29.3%	24.5%	20.8%
51-60	13.4%	10.2%	14.2%	7.8%
>60	18.2%	5.1%	20.3%	5.5%
Sex ratio				
Female	52.0%	49.5%	51.7%	46.3%
Male	48.0%	50.5%	48.3%	53.7%
Education				
Basic	55.8%	31.8%	59.2%	32.5%
Secondary	33.1%	53.2%	32.7%	55.2%
University	11.0%	15.0%	8.1%	12.3%
Occupation				
Hotel/restaurant	2.3%	4.8%	1.3%	0.9%
Teacher	5.0%	5.3%	2.4%	4.3%
Forestry	1.1%	3.5%	0.4%	1.5%
Housewife/maternity	2.7%	2.0%	2.7%	4.3%
Pensioner	23.3%	6.0%	24.9%	7.6%
Agriculture	3.0%	3.8%	2.8%	1.3%
Industry	26.3%	15.0%	31.2%	21.0%
Student/pupil	14.9%	34.9%	13.9%	39.5%
Other/unknown	21.4%	24.7%	20.4%	19.5%

4.2.2. Basic findings by item and sample group

4.2.2.1. Questions about attitude toward bears, wolves and lynx

An **"attitude toward large carnivores score"** was calculated using 13 items:-

- "Which answer best describes your feelings toward bears?"
- "Which answer best describes your feelings toward wolves?"
- "Which answer best describes your feelings toward lynx?"
- "That in Slovakia there are bears is good/bad/neither good nor bad?"
- "That in Slovakia there are wolves is good/bad/neither good nor bad?"
- "That in Slovakia there are lynx is good/bad/neither good nor bad?"
- "Bears, wolves and lynx belong in the wild in Slovakia."
- "Bears, wolves and lynx cause a lot of damage in Slovakia."
- "Wolves and lynx greatly reduce populations of deer."
- "Wolves and lynx caused the chamois decline."
- "A lot of livestock is killed by bears."
- "A lot of livestock is killed by wolves."
- "A lot of livestock is killed by lynx."

Table 4.5. Comparison of attitude score by target group, study area and place of residence

	TARGET GROUP				STUDY AREA		PLACE OF RESIDENCE		TOTAL
	residents	pupils	woods people	tourists	core area	control area	village	town	
ATTITUDE SCORE	3.54	3.52	3.42	4.00	3.56	3.54	3.46	3.60	3.53
TEST	Kruskal-Wallis *H* test: Qui²=21.63, sign. 0.000				Mann-Whitney *U* test: 148731,500; 0.464		Mann-Whitney *U* test: 152555,500; 0.001		

Participants of the survey generally held neutral to positive attitudes toward carnivores (mean score 3.53)[3]. *T*-tests were used to look for significant differences in attitude score between study areas, target groups and places of residence (town versus village). Significant differences were found between target groups and places of residence but not between study areas. Tourists had the most positive attitude toward large carnivores, followed by residents, pupils and woods people. People in towns had slightly but significantly more positive attitudes toward bears, wolves and lynx than those living in villages (see table 4.5.).

The first question of the questionnaire dealt with **feelings toward bears, wolves and lynx**. Most respondents of the survey had positive or neutral feelings toward these carnivores (see fig. 4.1.).

Our expectation that attitudes would be most negative toward wolves and least negative toward lynx was confirmed. About half the respondents (48.9%) had positive feelings and only 9.9% had negative feelings toward lynx, whereas almost a quarter (23.3%) had negative feelings and only 33.0% positive feelings toward the wolf. Three times more respondents had positive feelings toward bears (42.3%) than had negative feelings (14.2%). See table 4.11.

[3] A mean attitude score of 1 indicates strongly negative feelings, a score of 3 neutral and of 5 strongly positive feelings toward large carnivores.

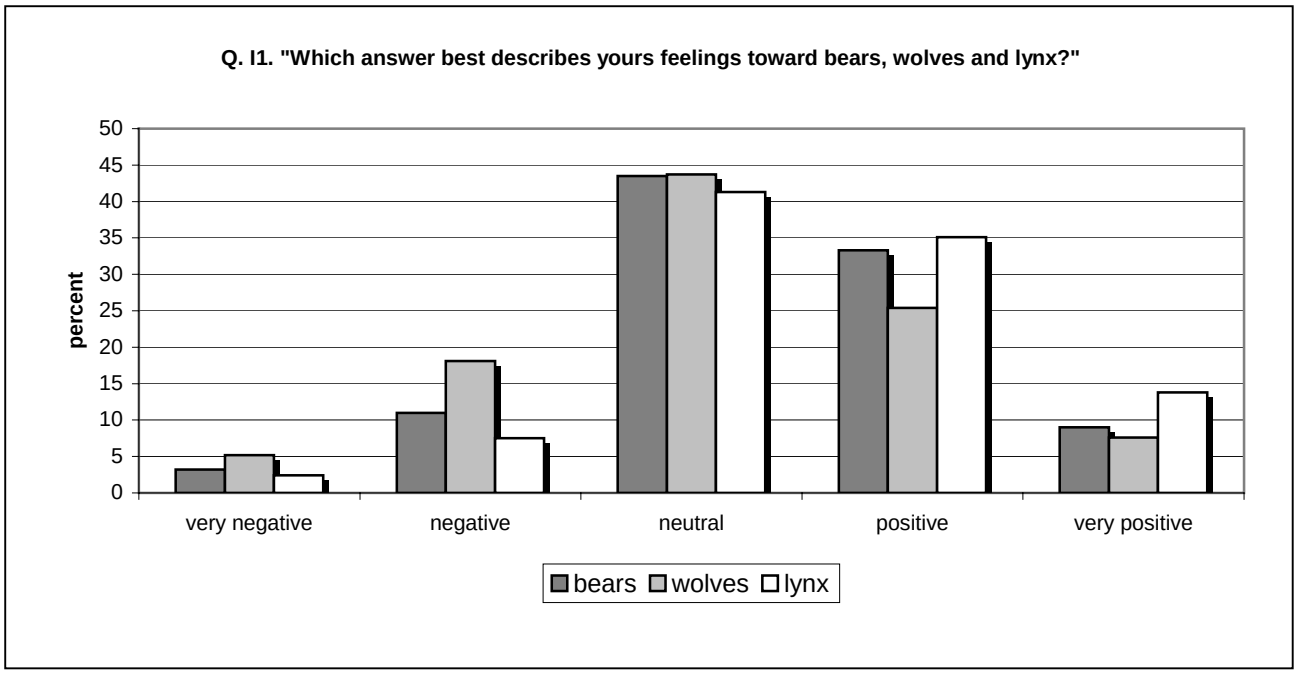

Figure 4.1. Respondents' feelings toward bears, wolves and lynx (all respondents combined)

Significant differences between study areas were found for bears and wolves, but not for lynx. People in the core area were more negative toward bears and wolves than people in the control area (see table 4.10.).

Our assumption that woods people[4] would have the most negative attitudes of all target groups was only partially confirmed (see table 4.11.). There were no significant differences among target groups for the questions regarding feelings toward bears and lynx, but significant differences among target groups were found for the question about feelings toward wolves (see fig. 4.2.). As assumed, woods people were the most negative target group: a third (32.9%) answered that they had negative feelings toward wolves. Nevertheless, equally as many (33.6%) woods people considered themselves to have positive feelings toward wolves compared to only 30.8% of residents who did. The target group tourists showed the most positive attitude toward all three carnivores.

From their answers to the next question, **"That in Slovakia there are bears, wolves and lynx is good, bad or neither good nor bad?"**, it seems that Slovaks are proud to have large carnivores in their country. The preferred animal was again the lynx, but this time as many as 69.9% said it is good to have lynx, 67.5% said it is good to have bears and 57.6% said it is good to have wolves in Slovakia. Between the two study areas, significant differences were found for bears, but not for wolves or lynx (see table 4.10.). Tourists were significantly more in favour of having bears, wolves and lynx in Slovakia than the other three target groups (see table 4.11.).

The vast majority of the respondents supported the assertion that, **"Bears, wolves and lynx belong in the wild in Slovakia".** Only 6.3% disagreed with this statement, whereas 82.9% agreed. The two study areas differed significantly, with more people agreeing in the core area (see table 4.10.).

[4] "Woods people" were shepherds, farmers, hunters, foresters and employees of mountain tourist facilities

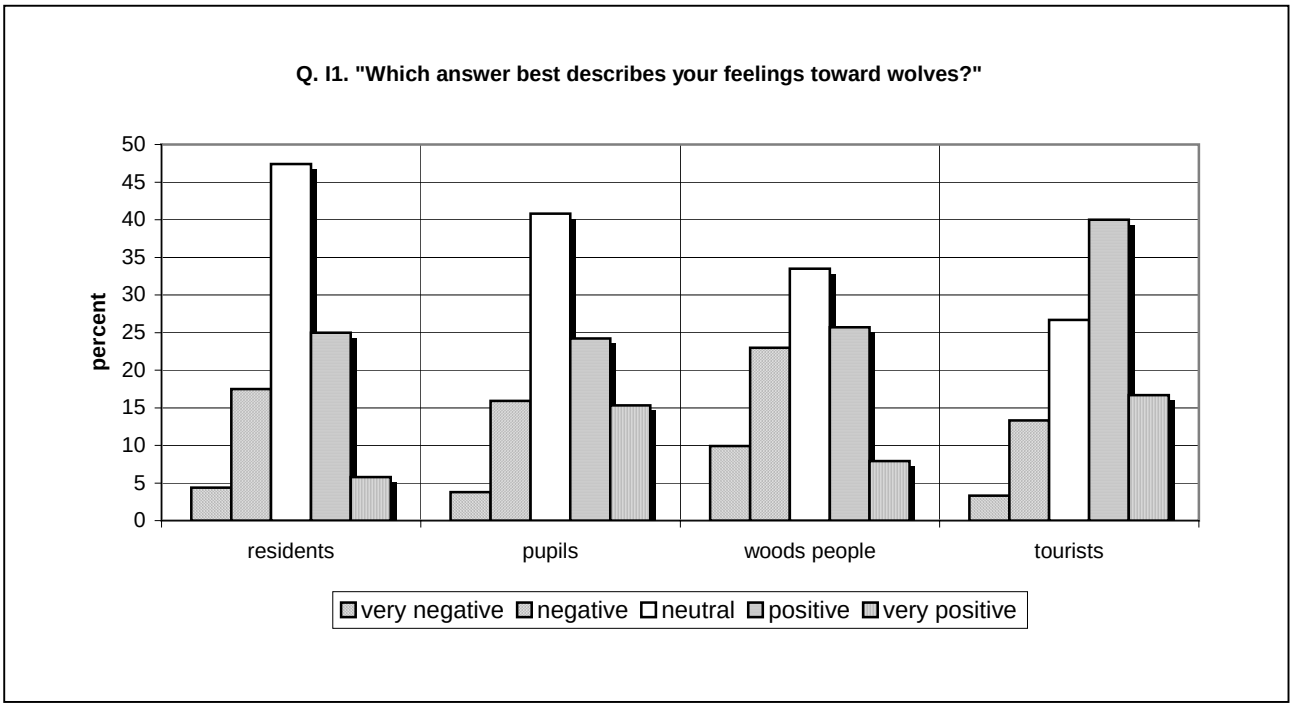

Figure 4.2. Respondents' feelings toward wolves by target group

Several items in the attitudes section of the questionnaire asked about people's perceptions of the **damage caused by large carnivores**. We expected perceptions of damage to be greater than actual damage, especially among woods people and village residents. To measure people's perception of damage caused by carnivores, a "damage score"[5] was calculated using six items:-

- "Bears, wolves and lynx cause a lot of damage in Slovakia."
- "Wolves and lynx greatly reduce populations of deer."
- "Wolves and lynx caused the chamois decline."
- "A lot of livestock is killed by bears."
- "A lot of livestock is killed by wolves."
- "A lot of livestock is killed by lynx."

The mean damage score of all respondents combined was 2.63, which means people thought that damage caused by large carnivores was medium to low. The Kruskal-Wallis *H* test found significant differences among target groups. The damage score of woods people (2.84) was the highest, but even this score is below the mid-point and thus woods people, too, rated the damage rather low. There were also significant differences between study areas and places of residence. People in the core area and people living in towns had significantly lower damage scores than people in the control area and village residents respectively (see table 4.6.).

Around a quarter (26.6%) of all respondents agreed that, **"Bears, wolves and lynx cause a lot of damage in Slovakia,"** while 42.7% disagreed with this statement. There was a significant difference between the two study areas for this item (see table 4.10.). Our expectation that woods people would have the most negative perception of damage caused by large carnivores was confirmed. This target group decided most often that carnivores cause a lot of damage (44.0%), followed by pupils (28.0%), residents (23.3%) and tourists (3.3%).

[5] A mean attitude score of 1 indicates that participants think carnivores do not cause damage or the damage is very low. A score of 5 means respondents think the damage that large carnivores cause is very high.

Table 4.6. Comparison of damage score by target group, study area and place of residence

	TARGET GROUP				STUDY AREA		PLACE OF RESIDENCE		TOTAL
	residents	pupils	woods people	tourists	core area	control area	village	town	
DAMAGE SCORE	2.57	2.71	2.84	2.24	2.56	2.65	2.72	2.65	2.63
TEST	Kruskal-Wallis *H* test: Qui²=26.29, sign. 0.000				Mann-Whitney *U* test: 141800,500; 0.037		Mann-Whitney *U* test: 152249,500; 0.001		

Very similar results were obtained for the statement, **"Wolves and lynx greatly reduce populations of deer,"** with which 26.4% agreed and 43.5% disagreed (all respondents combined). There was no significant difference between study areas, but there was among target groups. Again, woods people most often agreed with the statement (43.1%).

For the next item, **"Wolves and lynx caused the chamois decline,"** significant differences between study areas were found. Many participants in the control area (37.2%) had neutral opinions on this issue, whereas more than half the respondents in the core area (50.7%) disagreed and less than a quarter (23.5%) agreed (table 4.10.). The results for the target group woods people differed significantly compared to those of the other three target groups. Woods people most often agreed (30.3%), while 19.8% of pupils, 18.8% of residents and only 3.3% of the tourists thought that wolves and lynx caused the chamois decline. The reason(s) for a dramatic reduction in numbers of chamois in the Tatra Mountains in the final third of the 20th century are disputed, but one or more factors other than predation seem likely to have been involved (see Janiga and Švajda 2002).

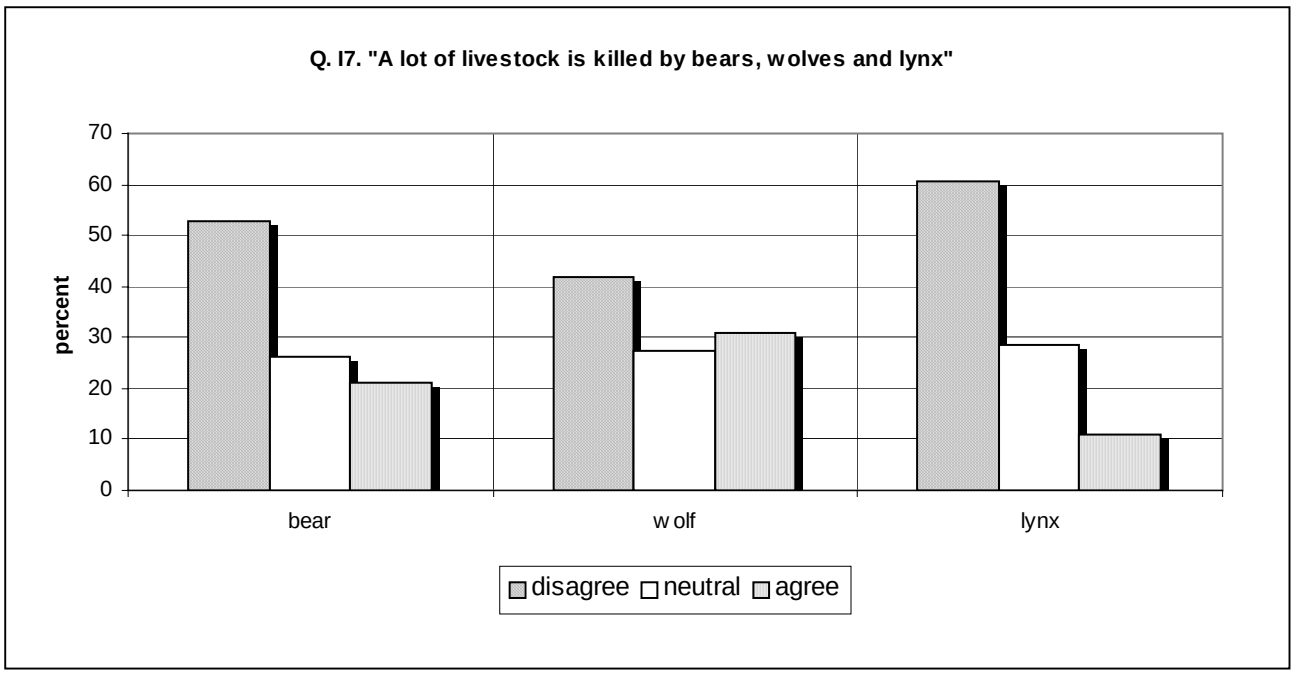

Figure 4.3. Respondents' perception of livestock killed by bears, wolves and lynx (all respondents combined)

The last item asking about damage was, **"A lot of livestock is killed by bears, wolves and lynx."** More people disagreed than agreed with this statement. Most respondents (60.5%) thought that lynx do not kill a lot of livestock. The figures for bears and wolves were 52.9% and 41.8% respectively (see fig 4.3.). Significant differences between study areas were found for wolves and lynx, but not for bears. People in the control area, perhaps influenced by the media, agreed significantly more often with the statement about wolves and lynx than participants in the core area.

The next item concerned the fear component. **"I would be afraid to go into the forest if there were bears, wolves or lynx."** About half the respondents were scared of bears (49.2%) and wolves (48.1%). Fewer (but still 38.0%) were afraid of lynx. Between a fifth and a quarter of respondents answered neutrally in each case (20.5% for bears, 21.5% for wolves and 24.3% for lynx). Respondents in the control area feared wolves and lynx significantly more than those in the core area: 54.1% of people in the control area versus 46.6% in the core area feared the wolf and 42.0% in the control area versus 37.8% in the core area feared the lynx. Fear of bears did not differ very much between the two areas: 51.3% of people in the core area and 51.0% of those in the control area said they would be afraid to go into the woods if bears were present.

Pupils were the most anxious target group. Over 60% of them answered that they would be afraid to go into the woods if there were bears or wolves and 50.9% would be afraid of lynx. Residents were a bit less fearful, but still over half of them were scared of bears and wolves. Woods people were, as expected, the least fearful target group. Nevertheless, 23.5% of them were scared of bears and 18.9% of wolves. The results of the target group tourists were surprising. They had similar results to woods people, perhaps because tourists in this area are people who spend lots of time in the countryside (see table 4.11.).

The next question asked about **respondents' perception of the danger of various animals**. According to the participants of this survey, bears are the most dangerous animals: 64.2% answered that bears are very dangerous or dangerous, whereas 55.9% said that wolves are very dangerous or dangerous. There were more participants who said that wild boar are dangerous than respondents who said that lynx are dangerous (see fig. 4.4.).

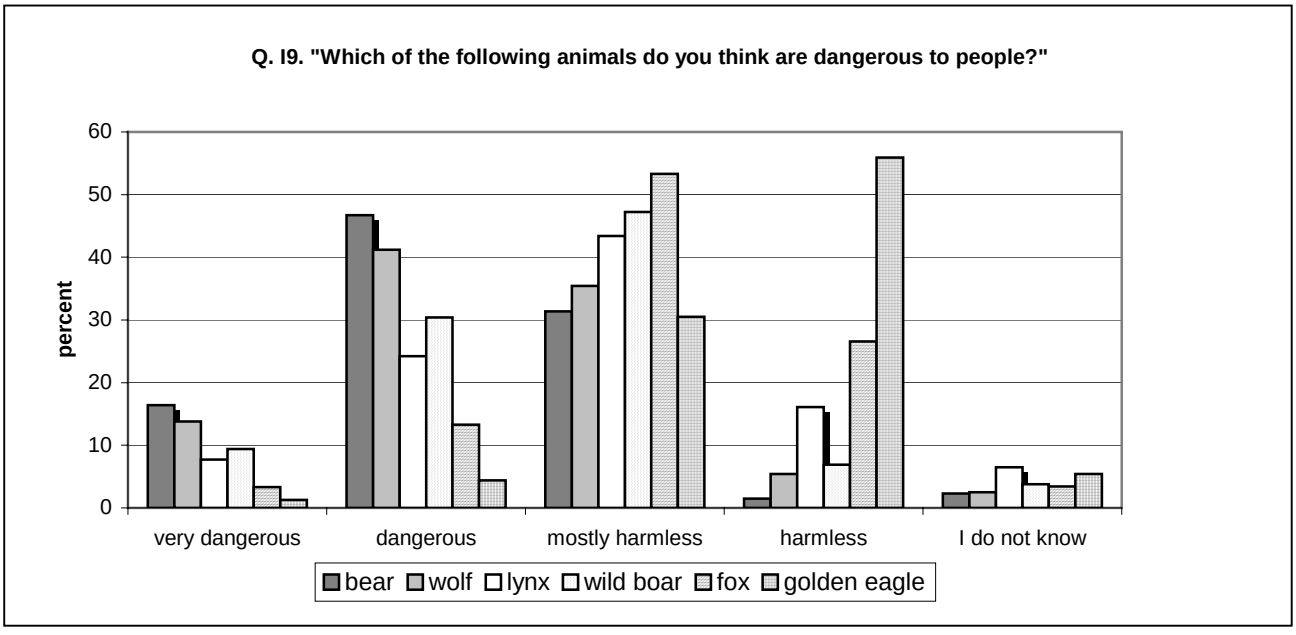

Figure 4.4. Respondents' perception of the danger of various animals (all respondents combined)

Significant differences between study areas were found for all animals except the wild boar. In the core area, people's perception of the danger was in almost all cases less than in the control area. The only exception (in addition to the wild boar) was the bear: significantly more people in the core area than in the control area rated the bear as dangerous or very dangerous (see table 4.10.), perhaps due to being aware of recent bear attacks on people in this part of Slovakia.

Significant differences were also found among target groups. All the animals were most frequently rated as dangerous by pupils, followed by residents. Woods people and tourists rated the danger lower than the other two target groups. Woods people rated bears and lynx more dangerous than did tourists, but tourists rated wolves more dangerous than did woods people (see table 4.11.).

The last question of the section on attitudes, perceptions and beliefs was an open question: **"In which situations are bears, wolves and lynx dangerous?"** Many respondents (33.0%) answered that "female bears protecting their young" can be dangerous. People in the core area (42.8%) significantly more often gave this answer than people in the control area (22.1%), suggesting more awareness of potentially dangerous situations. The second most frequently given answer for bears was that, "bears can be dangerous if they are hungry". Overall, 9.3% of the participants (7.7% in the core area versus 11.0% in the control area) believed that hungry bears are dangerous. Fewer people mentioned that bears are dangerous "if people have direct contact with them" (5.0%), "if the bear is injured or ill" (3.8%), "if the bear is surprised" (3.7%) or "if the bear is disturbed" (2.8%) (see table 4.7.).

Table 4.7. Responses given to the question, "In which situations are bears dangerous to humans?"

Answers given (*n*=1,078 respondents)	Frequency	
	n	**%**
1. if there is a mother with young/female protecting young	356	33.0
2. if the bear is hungry	100	9.3
3. if there is direct bear-human contact	54	5.0
4. if the bear is injured or ill	41	3.8
5. if the bear is surprised	40	3.7
6. if the bear is disturbed	30	2.8
7. if the bear feels in danger	21	1.9
8. if someone provokes the bear	21	1.9
9. if there is not enough food for bears	8	0.7
10. in every situation	6	0.6
11. if the bear is feeding	6	0.6
12. if the bear is close to human settlements	6	0.6
13. if the bear is rabid	4	0.4

The most frequently given answer (13.9%) for the question about when wolves might be dangerous was "if they are (very) hungry". Some respondents thought that wolves can also be dangerous "if they have pups" (7.2%) or "if they are in a pack" (6.4%). Fewer people (3.2%) thought that any "direct contact" with wolves can be dangerous and fewer again (2.0%) mentioned that "rabid wolves" are dangerous (see table 4.8.)

Table 4.8. Responses given to the question, "In which situations are wolves dangerous to humans?"

Answers given (*n*=1,078 respondents)	Frequency	
	n	**%**
1 if the wolf/wolves is/are (very) hungry	150	13.9
2 if there is a mother with young/female protecting young	78	7.2
3 if they are in a pack	69	6.4
4 if there is direct wolf-human contact	34	3.2
5 if the wolf/wolves is/are rabid	22	2.0
6 if the wolf/wolves feel(s) in danger	16	1.5
7 in winter or during a harsh winter	16	1.5
8 if the wolf/wolves is/are surprised	15	1.4
9 if the wolf/wolves is/are injured or ill	14	1.3
10 if the wolf/wolves is/are disturbed	11	1.0
11 in every situation	9	0.8
12 if there is not enough food for wolves	8	0.7

There were generally fewer answers given to the question about situations in which lynx might be dangerous to humans compared to the same question for bears and wolves. About the same number of respondents thought that lynx can be dangerous "if they are hungry" (7.0%) or "if they have kittens" and want to protect them (6.6%). Fewer people (3.2%) thought that "direct contact" with lynx is dangerous. All the other answers given to this question are listed in the table below (table 4.9).

Table 4.9. Responses given to the question, "In which situations are lynx dangerous to humans?"

Answers given (*n*=1,078 respondents)	Frequency	
	n	**%**
1. if the lynx is (very) hungry	75	7.0
2. if there is a mother with young/female protecting young	71	6.6
3. if there is direct lynx-human contact	32	3.0
4. if the lynx is injured or ill	18	1.7
5. if the lynx is surprised	16	1.5
6. if the lynx is rabid	12	1.1
7. if the lynx is disturbed	11	1.0
8. if the lynx feels in danger	9	0.8
9. if someone provokes the lynx	8	0.7
10. in every situation	7	0.6
11. if there is not enough food for lynx	5	0.5

Table 4.10. Results for the items concerning attitude toward bears, wolves and lynx by study area

"Which answer best describes your feelings toward bears?" (Q. I1)						
Study area	**negative**		**neutral**		**positive**	**Chi² value & sig. level**
Core area, n=549	4.6%	14.2%	42.3%	31.3%	7.7%	
Control area, n=529	1.5%	7.0%	45.4%	36.3%	9.8%	**X²=**25.31
Total, n=1,108	3.1%	10.6%	43.3%	33.8%	9.2%	**P=**0.000
"Which answer best describes your feelings toward wolves?" (Q. I1)						
Study area	**negative**		**neutral**		**positive**	**Chi² value & sig. level**
Core area, n=549	6.0%	20.9%	44.8%	22.0%	6.2%	
Control area, n=529	3.0%	14.4%	44.2%	29.1%	9.3%	**X²=**20.47
Total, n=1,108	4.5%	17.6%	44.0%	25.9%	7.9%	**P=**0.000
"Which answer best describes your feelings toward lynx?" (Q. I1)						
Study area	**negative**		**neutral**		**positive**	**Chi² value & sig. level**
Core area, n=549	3.1%	7.8%	37.5%	37.3%	14.2%	
Control area, n=529	1.3%	6.8%	43.7%	34.4%	13.8%	**X²=**7.381
Total, n=1,108	2.2%	7.2%	40.4%	35.8%	14.4%	**P=**0.117
"That in Slovakia there are bears is good/bad/neither good nor bad?" (Q. I2)						
Study area	**bad**		**neutral**		**good**	**Chi² value & sig. level**
Core area, n=549	2.2%	4.4%	25.3%	49.4%	18.8%	
Control area, n=529	0.2%	4.2%	27.4%	44.2%	24.0%	**X²=**14.37
Total, n=1,108	1.2%	4.2%	25.7%	46.8%	22.1%	**P=**0.006
"That in Slovakia there are wolves is good/bad/neither good nor bad?" (Q. I2)						
Study area	**bad**		**neutral**		**good**	**Chi² value & sig. level**
Core area, n=548	2.6%	8.4%	32.3%	41.4%	15.3%	
Control area, n=529	1.7%	8.1%	30.8%	38.8%	20.6%	**X²=**5.79
Total, n=1,107	2.1%	8.0%	30.9%	40.6%	18.4%	**P=**0.215
"That in Slovakia there are lynx is good/bad/neither good nor bad?" (Q. I2)						
Study area	**bad**		**neutral**		**good**	**Chi² value & sig. level**
Core area, n=548	1.1%	3.6%	22.8%	44.5%	27.9%	
Control area, n=529	0.6%	4.2%	26.7%	38.0%	30.6%	**X²=**6.14
Total, n=1,107	0.8%	3.8%	24.0%	41.6%	29.8%	**P=**0.189
"Bears, wolves and lynx belong in the wild in Slovakia." (Q. I3)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	1.3%	4.7%	7.7%	29.0%	57.4%	
Control area, n=529	1.3%	7.4%	12.9%	28.7%	49.7%	**X²=**13.22
Total, n=1,108	1.3%	6.0%	10.0%	28.3%	54.4%	**P=**0.01
"Bears, wolves and lynx cause a lot of damage in Slovakia." (Q. I4)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	10.4%	31.0%	29.7%	21.3%	7.7%	
Control area, n=529	11.5%	33.3%	33.6%	18.0%	3.6%	**X²=**11.49
Total, n=1,108	11.1%	32.7%	31.5%	19.2%	5.5%	**P=**0.022
"Wolves and lynx greatly reduce populations of deer." (Q. I5)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	14.0%	30.2%	30.6%	18.0%	7.1%	
Control area, n=529	11.7%	32.1%	29.9%	20.8%	5.5%	**X²=**3.65
Total, n=1,108	13.4%	31.1%	30.5%	18.9%	6.1%	**P=**0.455
"Wolves and lynx caused the chamois decline." (Q. I6)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	23.9%	26.8%	25.9%	16.2%	7.3%	
Control area, n=529	15.5%	28.4%	37.2%	15.1%	3.8%	**X²=**27.01
Total, n=1,108	19.7%	28.1%	31.5%	15.3%	5.5%	**P=**0.000
"A lot of livestock is killed by bears." (Q. I7)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	20.9%	34.4%	23.0%	17.5%	4.2%	
Control area, n=529	19.3%	30.8%	28.9%	16.6%	4.3%	**X²=**5.29
Total, n=1,108	19.9%	33.0%	26.3%	16.6%	4.2%	**P=**0.259
"A lot of livestock is killed by wolves." (Q. I7)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	13.5%	33.0%	24.6%	24.6%	4.2%	
Control area, n=529	11.5%	27.0%	30.1%	22.9%	8.5%	**X²=**15.22
Total, n=1,107	12.6%	30.1%	27.7%	23.4%	6.2%	**P=**0.004
"A lot of livestock is killed by lynx." (Q. I7)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	35.9%	32.3%	23.5%	6.0%	2.2%	
Control area, n=529	22.7%	31.8%	32.9%	10.2%	2.5%	**X²=**30.40
Total, n=1,107	29.4%	32.1%	28.4%	7.9%	2.3%	**P=**0.000

"I would be afraid to go into the forest if there were bears." (Q. I8)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	15.5%	15.5%	17.7%	24.2%	27.1%	
Control area, n=528	12.7%	12.3%	24.1%	25.6%	25.4%	**X²=**9.22
Total, n=1,107	14.3%	14.5%	20.8%	24.6%	25.9%	**P=**0.056

"I would be afraid to go into the forest if there were wolves." (Q. I8)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	16.9%	15.7%	20.8%	20.2%	26.4%	
Control area, n=529	11.9%	11.2%	22.9%	28.0%	26.1%	**X²=**16.10
Total, n=1,108	14.8%	13.9%	21.7%	23.9%	25.7%	**P=**0.003

"I would be afraid to go into the forest if there were lynx." (Q. I8)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=549	24.6%	16.8%	20.8%	16.9%	20.9%	
Control area, n=529	16.8%	13.2%	28.0%	21.6%	20.4%	**X²=**18.83
Total, n=1,108	21.3%	15.3%	24.2%	19.0%	20.3%	**P=**0.001

"Do you think bears are dangerous to humans?" (Q. I9)						
Study area	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Core area, n=547	17.6%	53.0%	27.4%	0.7%	1.3%	
Control area, n=529	16.1%	41.6%	36.9%	1.9%	3.6%	**X²=**23.96
Total, n=1,106	16.5%	47.4%	32.4%	1.4%	2.4%	**P=**0.000

"Do you think wolves are dangerous to humans?" (Q. I9)						
Study area	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Core area, n=548	11.7%	42.7%	38.0%	6.2%	1.5%	
Control area, n=528	17.4%	42.2%	33.0%	3.6%	3.8%	**X²=**17.34
Total, n=1,106	14.2%	42.4%	35.6%	5.2%	2.5%	**P=**0.002

"Do you think lynx are dangerous to humans?" (Q. I9)						
Study area	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Core area, n=544	5.9%	26.1%	43.0%	19.7%	5.3%	
Control area, n=528	10.4%	25.4%	44.7%	11.7%	7.8%	**X²=**20.13
Total, n=1,102	7.9%	25.2%	43.8%	16.5%	6.5%	**P=**0.000

"Do you think wild boar are dangerous to humans?" (Q. I9)						
Study area	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Core area, n=540	10.2%	36.1%	45.2%	5.4%	3.1%	
Control area, n=527	10.4%	28.7%	49.5%	6.6%	4.7%	**X²=**8.10
Total, n=1,097	10.2%	32.5%	47.0%	6.3%	4.0%	**P=**0.088

"Do you think foxes are dangerous to humans?" (Q. I9)						
Study area	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Core area, n=541	2.6%	13.7%	54.9%	26.8%	2.0%	
Control area, n=528	4.5%	14.4%	56.1%	19.9%	5.1%	**X²=**15.64
Total, n=1,099	3.5%	13.8%	54.9%	24.3%	3.5%	**P=**0.004

"Do you think golden eagles are dangerous to humans? (Q. I9)"						
Study area	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Core area, n=540	0.2%	4.1%	28.0%	63.3%	4.4%	
Control area, n=527	2.3%	5.5%	37.8%	48.0%	6.3%	**X²=**32.43
Total, n=1,097	1.3%	4.6%	32.4%	56.2%	5.4%	**P=**0.000

Table 4.11. Results for the items concerning attitude toward bears, wolves and lynx by target group

"Which answer best describes your feelings toward bears?" (Q. I1)						
Target group	**negative**		**neutral**		**positive**	**Chi² value & sig. level**
Residents, n=800	3.6%	11.0%	44.4%	33.1%	7.9%	
Pupils, n=157	1.3%	7.6%	47.8%	31.2%	12.1%	
Woods people, n=191	3.1%	14.1%	38.7%	35.6%	8.4%	
Tourists, n=30	3.3%	10.0%	26.7%	33.3%	26.7%	**X²=**23.15
Total, n=1,178	3.2%	11.0%	43.5%	33.3%	9.0%	**P=**0.027
"Which answer best describes your feelings toward wolves?" (Q. I1)						
Target group	**negative**		**neutral**		**positive**	**Chi² value & sig. level**
Residents, n=800	4.4%	17.5%	47.4%	25.0%	5.8%	
Pupils, n=157	3.8%	15.9%	40.8%	24.2%	15.3%	
Woods people, n=191	9.9%	23.0%	33.5%	25.7%	7.9%	
Tourists, n=30	3.3%	13.3%	26.7%	40.0%	16.7%	**X²=**44.60
Total, n=1,178	5.2%	18.1%	43.7%	25.4%	7.6%	**P=**0.000
"Which answer best describes your feelings toward lynx?" (Q. I1)						
Target group	**negative**		**neutral**		**positive**	**Chi² value & sig. level**
Residents, n=800	2.1%	7.8%	43.0%	35.0%	12.1%	
Pupils, n=157	1.9%	7.6%	40.8%	32.5%	17.2%	
Woods people, n=191	4.2%	6.8%	35.1%	37.7%	16.2%	
Tourists, n=30	0.0%	3.3%	36.7%	33.3%	26.7%	**X²=**15.15
Total, n=1,178	2.4%	7.5%	41.3%	35.1%	13.8%	**P=**0.233
"That in Slovakia there are bears is good/bad/neither good nor bad?" (Q. I2)						
Target group	**bad**		**neutral**		**good**	**Chi² value & sig. level**
Residents, n=800	1.4%	4.8%	27.5%	46.1%	20.3%	
Pupils, n=157	0.6%	3.8%	26.1%	47.8%	21.7%	
Woods people, n=191	1.6%	6.8%	25.7%	43.5%	22.5%	
Tourists, n=30	0.0%	0.0%	3.3%	46.7%	50.0%	**X²=**23.22
Total, n=1,178	1.3%	4.8%	26.4%	45.9%	21.6%	**P=**0.026
"That in Slovakia there are wolves is good/bad/neither good nor bad?" (Q. I2)						
Target group	**bad**		**neutral**		**good**	**Chi² value & sig. level**
Residents, n=799	2.0%	8.8%	32.4%	39.7%	17.1%	
Pupils, n=157	3.2%	9.6%	28.7%	40.1%	18.5%	
Woods people, n=191	3.1%	11.0%	31.4%	36.6%	17.8%	
Tourists, n=30	0.0%	0.0%	6.7%	56.7%	36.7%	**X²=**21.09
Total, n=1,177	2.3%	9.0%	31.1%	39.7%	17.9%	**P=**0.049
"That in Slovakia there are lynx is good/bad/neither good nor bad?" (Q. I2)						
Target group	**bad**		**neutral**		**good**	**Chi² value & sig. level**
Residents, n=799	0.9%	3.9%	25.8%	41.6%	27.9%	
Pupils, n=157	0.6%	6.4%	25.5%	38.9%	28.7%	
Woods people, n=191	0.5%	6.3%	24.6%	38.2%	30.4%	
Tourists, n=30	0.0%	0.0%	0.0%	50.0%	50.0%	**X²=**19.10
Total, n=1,177	0.8%	4.5%	0.8%	40.9%	29.0%	**P=**0.086
"Bears, wolves and lynx belong in the wild in Slovakia." (Q. I3)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	1.8%	6.8%	11.4%	30.0%	50.1%	
Pupils, n=157	0.0%	5.1%	8.3%	27.4%	59.2%	
Woods people, n=191	1.0%	3.7%	5.8%	28.3%	61.3%	
Tourists, n=30	0.0%	3.3%	3.3%	10.0%	83.3%	**X²=**27.35
Total, n=1,178	1.4%	5.9%	9.8%	28.9%	54.0%	**P=**0.007
"Bears, wolves and lynx cause a lot of damage in Slovakia." (Q. I4)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	12.6%	33.5%	30.8%	17.9%	5.3%	
Pupils, n=157	5.7%	33.1%	33.1%	24.8%	3.2%	
Woods people, n=191	6.3%	20.9%	28.8%	31.4%	12.6%	
Tourists, n=30	16.7%	53.3%	26.7%	3.3%	0.0%	**X²=**61.36
Total, n=1,178	10.8%	31.9%	30.6%	20.6%	6.0%	**P=**0.000
"Wolves and lynx greatly reduce populations of deer." (Q. I5)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	14.4%	31.6%	30.8%	18.6%	4.6%	
Pupils, n=157	7.0%	31.2%	35.0%	20.4%	6.4%	
Woods people, n=190	9.5%	25.3%	22.1%	28.4%	14.7%	
Tourists, n=30	30.0%	30.0%	40.0%	0.0%	0.0%	**X²=**62.57
Total, n=1,177	13.0%	30.5%	30.2%	20.0%	6.4%	**P=**0.000

"Wolves and lynx caused the chamois decline." (Q. I6)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	19.9%	28.5%	32.9%	13.9%	4.9%	
Pupils, n=157	21.7%	24.8%	33.8%	16.6%	3.2%	
Woods people, n=191	13.1%	22.5%	34.0%	20.4%	9.9%	
Tourists, n=30	16.7%	46.7%	33.3%	0.0%	3.3%	**X²=**29.56
Total, n=1,178	18.9%	27.5%	33.2%	14.9%	5.4%	**P=**0.003
"A lot of livestock is killed by bears." (Q. I7)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	20.1%	32.8%	25.0%	17.6%	4.5%	
Pupils, n=157	21.0%	35.0%	29.9%	10.2%	3.8%	
Woods people, n=190	16.3%	32.6%	25.3%	21.6%	4.2%	
Tourists, n=30	13.3%	46.7%	40.0%	0.0%	0.0%	**X²=**20.79
Total, n=1,177	19.5%	33.4%	26.1%	16.8%	4.2%	**P=**0.054
"A lot of livestock is killed by wolves." (Q. I7)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	12.8%	31.3%	28.1%	22.3%	5.6%	
Pupils, n=156	10.3%	26.3%	21.2%	32.1%	10.3%	
Woods people, n=190	11.6%	25.3%	26.3%	28.4%	8.4%	
Tourists, n=30	13.3%	30.0%	43.3%	10.0%	3.3%	**X²=**23.38
Total, n=1,176	12.2%	29.6%	27.3%	24.2%	6.6%	**P=**0.025
"A lot of livestock is killed by lynx." (Q. I7)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	28.4%	33.1%	29.1%	7.5%	1.9%	
Pupils, n=156	20.5%	30.8%	30.8%	13.5%	4.5%	
Woods people, n=190	34.7%	28.4%	24.2%	9.5%	3.2%	
Tourists, n=30	30.0%	33.3%	36.7%	0.0%	0.0%	**X²=**22.83
Total, n=1,176	28.4%	32.1%	28.7%	8.4%	2.4%	**P=**0.029
"I would be afraid to go into the forest if there were bears." (Q. I8)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	10.5%	13.6%	21.9%	26.4%	27.5%	
Pupils, n=157	10.2%	14.0%	14.6%	26.1%	35.0%	
Woods people, n=191	39.8%	17.3%	19.4%	14.1%	9.4%	
Tourists, n=30	20.0%	33.3%	20.0%	13.3%	13.3%	**X²=**140.67
Total, n=1,177	15.5%	14.8%	20.5%	24.0%	25.2%	**P=**0.000
"I would be afraid to go into the forest if there were wolves." (Q. I8)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	10.5%	13.5%	22.9%	26.4%	26.8%	
Pupils, n=157	9.6%	11.5%	17.2%	22.9%	38.9%	
Woods people, n=190	44.2%	16.8%	20.0%	10.5%	8.4%	
Tourists, n=30	26.7%	30.0%	16.7%	20.0%	6.7%	**X²=**178.96
Total, n=1,177	16.2%	14.2%	21.5%	23.2%	24.9%	**P=**0.000
"I would be afraid to go into the forest if there were lynx." (Q. I8)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=800	16.5%	15.5%	26.1%	20.6%	21.3%	
Pupils, n=157	14.0%	14.6%	20.4%	21.0%	29.9%	
Woods people, n=190	50.0%	14.7%	20.5%	8.4%	6.3%	
Tourists, n=30	40.0%	23.3%	20.0%	10.0%	6.7%	**X²=**135.18
Total, n=1,177	22.2%	15.5%	24.3%	18.4%	19.6%	**P=**0.000
"Do you think bears are dangerous to humans?" (Q. I9)						
Target group	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Residents, n=800	17.9%	45.4%	32.6%	1.3%	2.9%	
Pupils, n=156	15.4%	62.8%	20.5%	0.0%	1.3%	
Woods people, n=189	14.8%	43.9%	36.5%	3.2%	1.6%	**X²=**36.50
Tourists, n=30	3.3%	46.7%	43.3%	6.7%	0.0%	**P=**0.000
Total, n=1,175	16.7%	47.5%	31.9%	1.5%	2.4%	
"Do you think wolves are dangerous to humans?" (Q. I9)						
Target group	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Residents, n=800	15.1%	42.6%	36.3%	2.8%	3.3%	
Pupils, n=157	17.8%	57.3%	22.3%	2.5%	0.0%	
Woods people, n=189	7.9%	26.5%	45.5%	18.0%	2.1%	**X²=**122.60
Tourists, n=30	3.3%	40.0%	40.0%	16.7%	0.0%	**P=**0.000
Total, n=1,176	14.0%	41.9%	36.0%	5.5%	2.6%	

"Do you think lynx are dangerous to humans?" (Q. I9)						
Target group	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Residents, n=797	8.3%	26.5%	45.8%	12.8%	6.6%	
Pupils, n=157	10.8%	35.7%	36.3%	6.4%	10.8%	
Woods people, n=187	4.8%	11.2%	44.9%	35.8%	3.2%	**X²=**115.18
Tourists, n=30	0.0%	6.7%	43.3%	43.3%	6.7%	**P=**0.000
Total, n=1,171	7.9%	24.8%	44.3%	16.4%	6.7%	

"Do you think wild boar are dangerous to humans?" (Q. I9)						
Target group	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Residents, n=792	9.7%	32.8%	48.2%	4.7%	4.5%	
Pupils, n=156	16.7%	38.5%	37.8%	3.2%	3.8%	
Woods people, n=188	3.7%	17.6%	59.6%	18.6%	0.5%	**X²=**95.41
Tourists, n=30	6.7%	33.3%	36.7%	16.7%	6.7%	**P=**0.000
Total, n=1,166	9.6%	31.1%	48.4%	7.0%	3.9%	

"Do you think foxes are dangerous to humans?" (Q. I9)						
Target group	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Residents, n=794	3.8%	14.5%	57.7%	20.0%	4.0%	
Pupils, n=157	2.5%	15.9%	56.7%	21.0%	3.8%	
Woods people, n=188	3.2%	6.9%	35.1%	54.3%	0.5%	**X²=**111.75
Tourists, n=30	0.0%	6.7%	33.3%	56.7%	3.3%	**P=**0.000
Total, n=1,169	3.4%	13.3%	53.3%	26.6%	3.4%	

"Do you think golden eagles are dangerous to humans?" (Q. I9)						
Target group	**very dangerous**	**dangerous**	**mostly harmless**	**harmless**	**I do not know**	**Chi² value & sig. level**
Residents, n=791	1.1%	4.9%	34.5%	53.6%	5.8%	
Pupils, n=157	2.5%	6.4%	36.9%	47.1%	6.4%	
Woods people, n=188	0.5%	2.1%	15.4%	78.7%	3.2%	**X²=**60.28
Tourists, n=30	3.3%	0.0%	16.7%	73.3%	6.7%	**P=**0.000
Total, n=1,166	1.3%	4.5%	31.3%	57.3%	5.5%	

4.2.2.2. Questions about knowledge of bears, wolves and lynx

A **"knowledge score"** was calculated using six items:-

- "Presently, how many bears are there in Slovakia?"
- "Presently, how many wolves are there in Slovakia?"
- "Presently, how many lynx are there in Slovakia?"
- "What is the average number of wolves in a pack in Slovakia?"
- "What is the average weight of an adult male bear?"
- "In Slovakia, are farmers paid money for livestock killed by bears?"

Table 4.12. Comparison of knowledge score by target group, study area and place of residence

	TARGET GROUP				STUDY AREA		PLACE OF RESIDENCE		TOTAL
	residents	pupils	woods people	tourists	core area	control area	village	town	
KNOWLEDGE SCORE	3.84	3.14	4.41	4.01	3.81	3.88	3.93	3.76	3.85
TEST	Kruskal-Wallis *H* test: Qui²=20.82, sign. 0.000				Mann-Whitney *U* test: 142811,000; 0.829		Mann-Whitney *U* test: 163286,000; 0.169		

The mean knowledge score for all respondents combined was 3.85[6], which means that most people could answer less than half the knowledge questions correctly. *T*-tests were used to look for significant differences between study areas, target groups and places of residence (town versus village). See table 4.12. No significant differences between study areas or places of residence were observed. However, the Kruskal-Wallis *H* test detected significant differences among target groups. Pupils were least knowledgeable about large carnivores (3.14), followed by residents (3.84) and tourists (4.01). As expected, woods people (4.41) were most knowledgeable. See table 4.12.

The first question of this section dealt with **respondents' perception of the population sizes of bears, wolves and lynx**. They were offered a choice of four answers (0, 1-500, 501-1,000, >1,000) or they could indicate "I do not know". About a quarter of the respondents chose the "I do not know" option for all three carnivores (see table 4.15.).

At the time of the study there were thought to be about 600-800 bears, mostly in central and northern forested mountain areas (see Rigg and Baleková 2003). Slightly less than one third (31.2%) of the people taking part in the survey knew that "there are 501-1,000 bears in Slovakia", whereas 39.0% of participants underestimated and only 7.5% overestimated the population size (see fig. 4.5.). Significant differences were found between the two study areas. As expected, more people in the core area (36.6%) than in the control area (28.9%) answered correctly. There were more participants in the core area (10.7%) than in the control area (4.7%) who overestimated the population size. Conversely, fewer people in the core area than in the control area underestimated (31.9% versus 44.8% of respondents respectively). See table 4.14.

[6] A knowledge score of 0 indicates that no question was answered correctly, a score of 5 means that half the questions were answered correctly and a score of 10 means every question was answered correctly.

Significant differences were also found among target groups. Surprisingly, pupils (36.9%) most often answered this question correctly, followed by residents (30.8%), woods people (29.3%) and tourists (23.3%). Half the tourists and 37.2% of the woods people surveyed underestimated the likely number of bears in Slovakia (see table 4.15.).

Slightly more participants in the survey (36.2%) knew the right population size of wolves, when they indicated that, "there are presently 1-500 wolves in Slovakia" (see fig. 4.5.). There were probably between 150 and 300 wolves in Slovakia's Carpathian Mountains during the study (Rigg 2004), mostly in central, northern and eastern regions. The difference between study areas was again significant, but in this case there were more people in the control area than in the core area (40.5% versus 34.5% respectively) who answered correctly.

Around 37% of residents, woods people and tourists correctly estimated the population of wolves (see table 4.15.), whereas only 27.4% of pupils answered correctly.

More than half the respondents (53.6%) knew that, "at present there are 1-500 lynx in Slovakia." (see fig. 4.5.). There were likely to be approximately 300 individuals in Slovakia during the study (Hell *et al.* 2004), their distribution being similar to that of wolves. Pearson's χ^2 value also showed significant differences between study areas. As with bears, the core area once again had more correct responses (59.1%) for this item, but the lynx population size was more often overestimated in the control area.

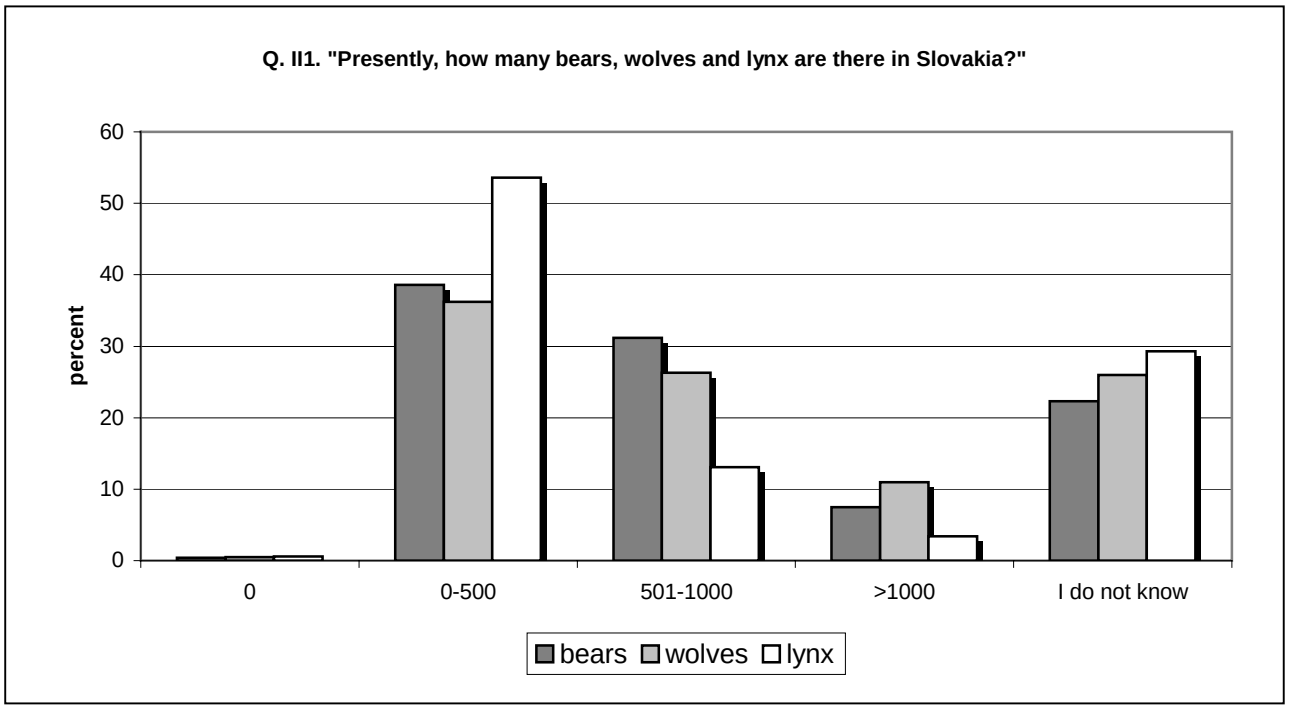

Figure 4.5. Respondents' perception of the population sizes of bears, wolves and lynx (all respondents combined)

Many correct responses were given to the question, **"What is the average number of wolves in a pack in Slovakia?**" (2-7, 8-15, 16-20, >20, "I do not know"). More than half the participants (51.0%) were familiar with the correct answer, which was 2-7 (Voskár 1993). About a third (32.2%) overestimated the size of a pack (see table 4.15.) and 16.8% chose the "I do not know" option. People in the core area (56.4%) significantly more often knew the size of a wolf pack than people in the control area (45.6%). See table 4.14. The difference was also significant by target group. Woods people (69.5%) most often knew the right answer, followed by residents (50.2%), tourists (40.0%) and pupils (35.0%).

The next question dealt with the size of bears: **"What is the average weight of an adult bear?"** (<100kg, 101-300kg, 301-500kg, >500kg, "I do not know"). The brown bear is Europe's largest terrestrial carnivore. Adult males generally weigh 150-350kg and females 80-200kg (Hell and Sabadoš 1995).

Almost half the participants (45.8%) responded correctly (101-300kg). Very few people (2.0%) underestimated but many (40.1%) overestimated the weight of an adult male bear, while 12.1% chose the "I do not know" option. People in the core area (48.3%) significantly more often knew the right answer than those in the control area (40.8%). See table 4.14. As with the previous item, this one was also most often answered correctly by woods people (71.1%). Other target groups more often overestimated the weight of bears. Less than half of them, 44.0% of residents, 33.3% of tourists and 26.8% of pupils, knew the right answer (see table 4.15.).

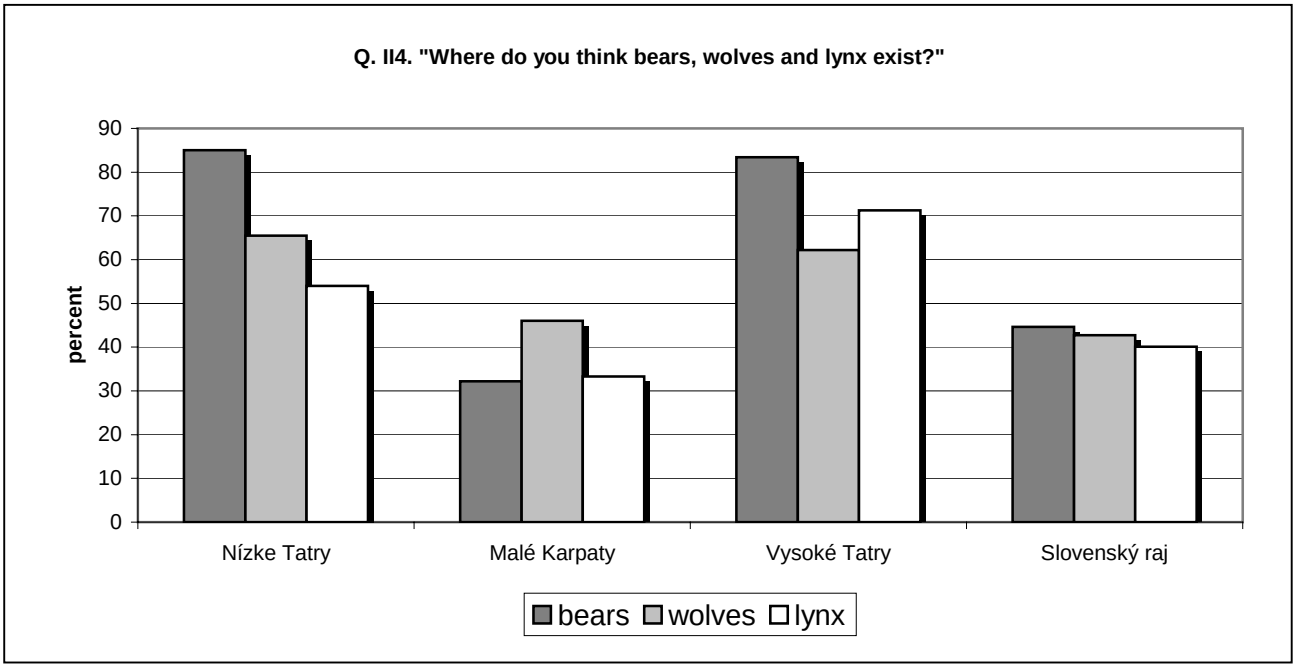

Figure 4.6. Respondents' perception of the presence of large carnivores in different areas of Slovakia (all respondents combined)

Question 4 in the knowledge section asked about the **presence of bears, wolves and lynx in various mountain ranges** of Slovakia: Nízke Tatry[7], Malé Karpaty[8], Vysoké Tatry[9] and Slovenský raj[10] (see fig. 4.6.). Bears, wolves and lynx were regularly present in all these mountain ranges during the study except the Malé Karpaty, where they were absent or occurred only sporadically (Kaštier 2004).

Most people (85.0%) knew that there were bears in the **Nízke Tatry**, which are partly in the core study area. Fewer respondents (65.5%) knew about the presence of wolves and fewer again (54.0%) about the existence of lynx in this area. The difference between study areas was significant for bears and wolves, but not for lynx. Almost all participants (92.8%) in the core area knew that bears exist in the Nízke Tatry compared to 74.6% of people in the control area. About 20% fewer people in the control area than in the core area knew about the existence of wolves in the Nízke Tatry. Woods people and tourists significantly more often knew about the existence of large carnivores in this area than pupils and residents (see table 4.15.).

[7] Low Tatras
[8] Small Carpathians
[9] High Tatras
[10] Slovak Paradise

The results for the **Vysoké Tatry** were similar, but more people (71.3%) knew about the presence of lynx in these mountains (see table 4.15.). The differences between study areas were less but still significant for all three species. Again, people in the core area more often knew the right answer and, again, woods people and tourists were significantly more familiar with the existence of large carnivores in the Vysoké Tatry than pupils and residents (see table 4.15.).

A smaller number of participants were aware that large carnivores also occur in **Slovenský raj**. About 40% knew that bears, wolves and lynx were present in this area (see table 4.15.). Significant differences by target group were discovered (see table 4.15.). The difference by study area was only significant for bears (see table 4.14.).

The mountain range considered for the purposes of this study to be free of large carnivores, the **Malé Karpaty**, was not thought by the respondents to be absolutely carnivore-free. Two thirds (67.8%) knew that there were no bears, 66.7% that there were no lynx and 54.0% knew that no wolves were resident in the Malé Karpaty.

"What do you think is the main diet of bears, wolves and lynx?" was the next question of this section (see fig. 4.7.). Participants in the survey were given the choice of seven different options and were asked to mark all that were correct.

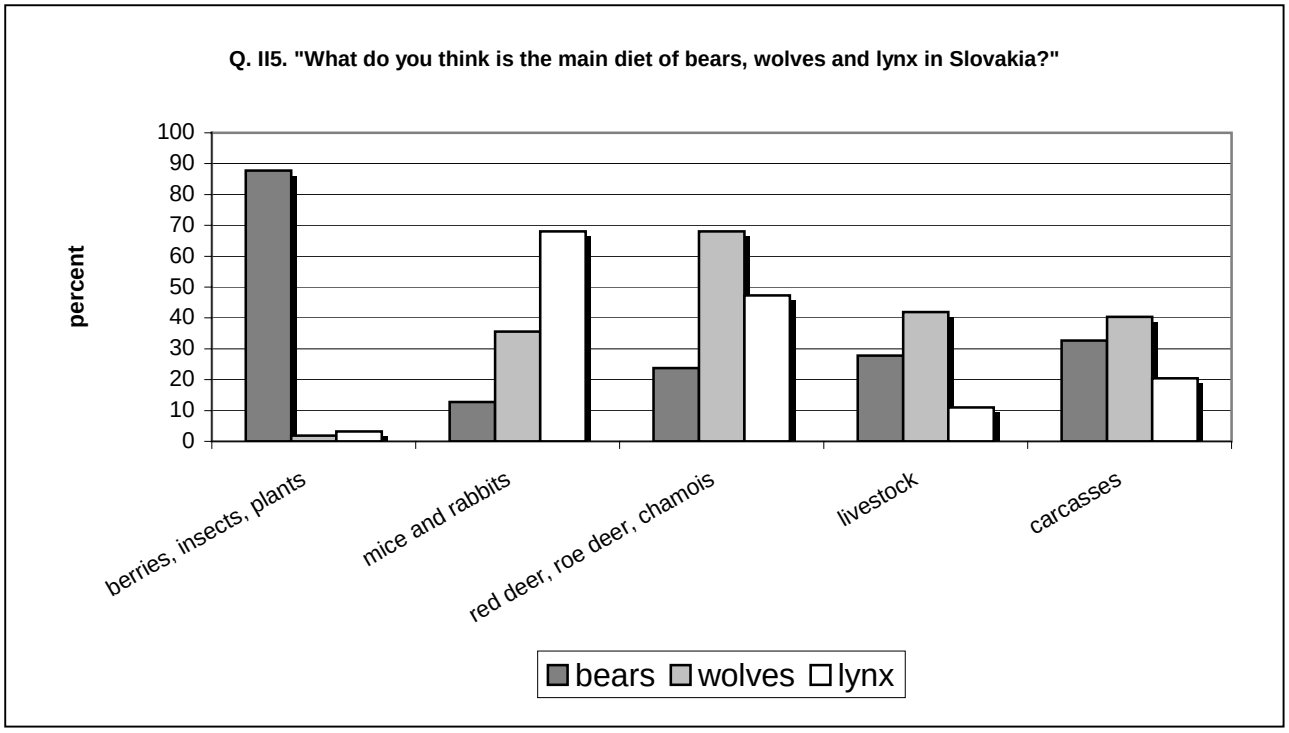

Figure 4.7. Respondents' perception of the main diet of bears, wolves and lynx (all respondents combined)

Most people (87.8%) knew that berries, insects and plants are **the main diet of bears**. Fewer participants (32.7%) responded that carcasses belong among their most important food items. Brown bears, although members of the Order Carnivora, are omnivores. It has been estimated that in some areas, including in Slovakia's Tatra Mountains, >80% of their diet consists of plant material (Jamnický 1988, Baláž 2002, Rigg 2004). The diet usually shows a high degree of seasonal variation, mainly dependent on relative availability and nutritional value of food items. In spring, winter-killed ungulates are important. During the vegetation growth period, brown bears in central Europe as elsewhere eat mostly grasses/sedges and herbage. Berries are a very important food item from summer to autumn. Various insects, particularly ants and wasps, are also

frequently consumed. Many other items are fed on without necessarily constituting the "main diet". Predation on livestock usually causes only minor losses. Woods people most often knew the correct answers, followed by residents, tourists and pupils (see table 4.15.). No significant differences by study area were found except for mice/rabbits (table 4.14.).

Many participants (68.0%) knew that wild ungulates (mostly red deer, wild boar and roe deer) form **the main diet of wolves** in Slovakia (Kolenka 1997, Rigg and Finďo 2000, Strnádová 2000, 2002, Finďo 2002, Rigg and Gorman in press). A substantial proportion of participants thought carcasses (40.4%), mice and rabbits (35.6%) and livestock (41.9%) form the main diet of wolves and thus indicated wrong answers. Wolves feed on all these items in Slovakia but rodents, lagomorphs and livestock each constitute <5% of biomass consumed. Significant differences by study area and target group were found. People in Liptovský Mikuláš district more often knew the right answer than people in Nové Mesto nad Váhom district (see table 4.14.). In addition, more woods people and tourists than pupils and residents answered correctly (table 4.15.).

About half the respondents (47.3%) knew that roe deer form **the staple diet of lynx** in Slovakia. More participants (68.1%) indicated that mice and hares are major food items (see table 4.15.). Small mammals are important for some lynx populations. Their contribution to the diet of lynx in Slovakia is unknown because no substantial quantitative study has been conducted (see Hell *et al.* 2004 for a review). Around 11% of respondents thought that livestock belong to their main diet and thus indicated a wrong answer: predation on livestock by lynx was very rare during the study (Rigg 2004). Significant differences by target group were observed. Significantly more woods people (62.7%) knew that roe deer forms the lynx's main diet than did residents (45.0%), tourists (44.4%) or pupils (39.6%). Tourists (85.2%), pupils (70.1%) and residents (70.0%) thought that mice and rabbits were part of the main diet of lynx, whereas fewer woods people (56.5%) thought so. No significant differences by study area were observed (see table 4.14.).

"Around how many people were killed in Slovakia in the last 10 years by bears, wolves and lynx?" was the next question of the knowledge section.

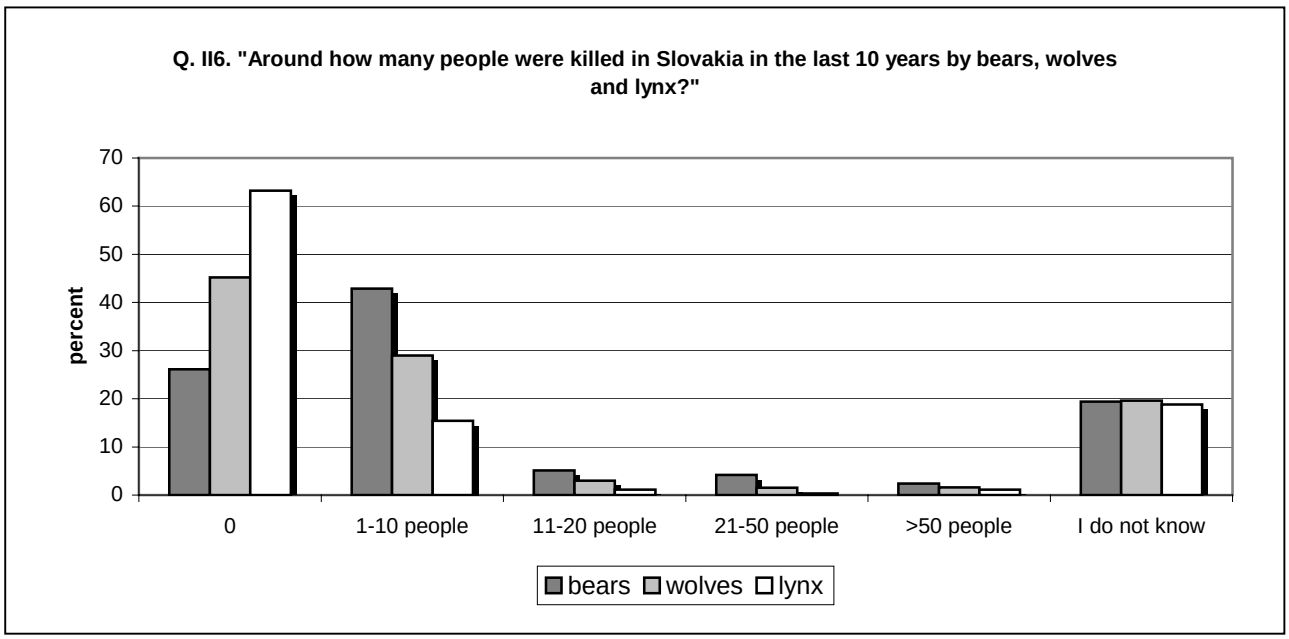

Figure 4.8. Respondents' perception of people killed by bears, wolves and lynx in Slovakia during the period 1993-2003 (all respondents combined)

Perhaps surprisingly, there had been no single proven case of a person being killed by a bear, wolf or lynx in Slovakia for more than 100 years, although there are a few historical accounts of fatal infections with rabies (Hell and Slametka 1999, Hell *et al*. 2001, Rigg and Baleková 2003). Each year, around 5-10 people are seriously injured by bears in Slovakia. Wolves and lynx are very cautious and normally avoid humans (Linnell *et al*. 2002).

Most participants thought that either no one or 1-10 people had been killed by carnivores in Slovakia in the last 10 years (see fig. 4.8.). Only about a quarter (26.1%) thought that no one had been killed by a bear, 42.9% thought 1-10 people had been killed and 5.1 % of all participants in the survey estimated that 11-20 people had been killed by a bear in Slovakia in the last 10 years (see table 4.15.). More people (45.2%) believed that no one had been killed by a wolf, 29.0% thought that 1-10 people had been killed and 3% thought 11-20 people had been killed by a wolf in Slovakia in the last 10 years. Regarding the lynx, again, more respondents (63.2%) thought that no one had been killed and 15.4% supposed that 1-10 people had been killed by a lynx in Slovakia in the last 10 years (see table 4.15.).

Significant differences by study areas were only found for bears. People in the core area estimated the number of fatalities caused by bears higher than people in the control area (see table 4.14.).

Pearson's χ^2 value also showed significant differences between woods people and the other three target groups (see table 4.15.). Significantly more woods people answered that no one had been killed by a bear than the other three target groups. Interestingly, woods people most often chose the "I do not know" option. Significant differences by target group were also found for wolves (see table 4.15.). Tourists (53.3%) significantly more often knew the right answer than the other three target groups. This result is probably influenced by the bad reputation that the wolf has among woods people.

The next question asked about carnivore management. "**In Slovakia, are farmers paid money for livestock killed by bears?"** The right answer, yes, was chosen by 30.2% of all participants. Fewer respondents (23.5%) thought that no compensation was paid for losses and many people (46.2%) chose the "I do not know" option. Significant differences by study area and target group were found (see tables 4.14. and 4.15). Woods people and tourists significantly more often knew about compensation than pupils and residents.

Most people (89.6%) **had already heard about "container bears"**. As assumed, participants in the core area (96.5%) had significantly more often heard about "container bears" than people in the control area (83.9%). No significant differences by target groups were found.

The next question asked about **reasons why "container bears" arise**. The participants were asked to mark all the statements which they thought were true. The choice of answers given for this item in the questionnaire are listed in table 4.13.

Table 4.13. Choice of answers for the question, "What are the reasons why bears become container bears?"

Answers offered in questionnaire	Evaluation
they do not have enough natural food	incorrect
people encourage bears by offering food	correct
it is an easily accessible source of food for bears	correct
bears are over-populated	incorrect
rubbish is not stored properly	correct
other	—

Human habituation and food-conditioning of bears has been studied extensively in relation to human safety by Herrero (1985, 2002). More than half the participants in the present survey (52.0%) knew that one of the reasons why bears become container bears is that "rubbish is not stored properly". Only a quarter (24.3%) agreed that "rubbish is an easily accessible source of food for bears" and fewer still (22.3%) knew that bears can become container bears if "people encourage bears by offering food". These results show that there is a huge demand for awareness since the problem with container bears can only be solved with the help of local residents. That educational work is required is also supported by the following results: almost half the respondents (47.5%) think that bears become container bears because they "do not have enough natural food" and 42.2% think it is because "they are over-populated".

Significantly more people in the core area than in the control area thought the reasons include that "people encourage bears by offering food" (31.4% versus 12.6% respectively) and "bears do not have enough natural food" (52.4% versus 43.1%).

Significant differences by target group were found for all answers except "it is an easily accessible source of food for bears" (see table 4.15.).

A "container bear" (human food conditioned and partially human habituated) photographed by an employee of a hotel in Nízke Tatry National Park, partially within the core study area. Nuisance bears are a favourite subject of the press. Their occurrence is usually explained by hunters as due to "over-population" of bears.

Table 4.14. Results for the items concerning knowledge about bears, wolves and lynx by study area (correct answers are those with a shaded background)

"Presently, how many bears are there in Slovakia?" (Q. II1)						
Study area	**0**	**1-500**	**501-1,000**	**>1,000**	**I do not know**	**Chi² value & sig. level**
Core area, n=579	0.7%	31.9%	36.6%	10.7%	20.0%	
Control area, n=529	0.2%	44.8%	28.9%	4.7%	21.4%	**X²=**31.08
Total, n=1,108	0.4%	38.2%	31.4%	7.5%	22.5%	**P=**0.000

"Presently, how many wolves are there in Slovakia?" (Q. II1)						
Study area	**0**	**1-500**	**501-1,000**	**>1,000**	**I do not know**	**Chi² value & sig. level**
Core area, n=578	0.9%	34.5%	26.5%	12.8%	25.4%	
Control area, n=529	0.0%	40.5%	26.3%	8.9%	24.4%	**X²=**11.24
Total, n=1,107	0.5%	36.2%	26.1%	11.2%	26.1%	**P=**0.024

"Presently, how many lynx are there in Slovakia?" (Q. II1)						
Study area	**0**	**1-500**	**501-1,000**	**>1,000**	**I do not know**	**Chi² value & sig. level**
Core area, n=578	0.9%	59.1%	9.1%	2.0%	28.8%	
Control area, n=529	0.2%	49.5%	18.3%	5.1%	26.8%	**X²=**31.52
Total, n=1,107	0.6%	53.6%	13.0%	3.4%	29.4%	**P=**0.000

"What is the average number of wolves in a pack in Slovakia?" (Q. II2)						
Study area	**2-7**	**8-15**	**16-20**	**>20**	**I do not know**	**Chi² value & sig. level**
Core area, n=576	56.4%	25.1%	1.8%	0.5%	16.1%	
Control area, n=529	45.6%	28.0%	7.8%	1.5%	17.2%	**X²=**29.51
Total, n=1,105	51.3%	26.4%	4.5%	1.2%	16.5%	**P=**0.000

"What is the average weight of an adult male bear?" (Q. II3)						
Study area	**<100 kg**	**101-300 kg**	**301-500 kg**	**>500 kg**	**I do not know**	**Chi² value & sig. level**
Core area, n=577	1.3%	48.3%	34.6%	6.9%	9.0%	
Control area, n=529	2.1%	40.8%	31.0%	11.2%	14.9%	**X²=**19.33
Total, n=1,106	1.9%	46.1%	31.4%	8.5%	12.2%	**P=**0.002

"Where do you think bears exist?" (Q. II4) (% of respondents who answered yes)				
Study area	**Nízke Tatry**	**Malé Karpaty**	**Vysoké Tatry**	**Slovenský raj**
Core area, n=544	92.8%	33.2%	86.0%	46.8%
Control area, n=492	74.6%	28.5%	80.9%	39.6%
Total, n=1,036	84.6%	31.0%	83.5%	44.2%
Significant level	*0.000*	*0.108*	*0.029*	*0.022*

"Where do you think wolves exist?" (Q. II4) (% of respondents who answered yes)				
Study area	**Nizke Tatry**	**Malé Karpaty**	**Vysoké Tatry**	**Slovenský raj**
Core area, n=544	73.8%	43.2%	67.0%	43.2%
Control area, n=492	53.2%	46.3%	54.5%	37.9%
Total, n=1,036	65.4%	45.9%	62.2%	42.9%
Significant level	*0.000*	*0.319*	*0.000*	*0.090*

"Where do you think lynx exist?" (Q. II4) (% of respondents who answered yes)				
Study area	**Nízke Tatry**	**Malé Karpaty**	**Vysoké Tatry**	**Slovenský raj**
Core area, n=544	53.0%	32.1%	73.8%	39.2%
Control area, n=492	51.8%	31.4%	67.9%	37.4%
Total, n=1,036	53.7%	32.8%	71.2%	39.9%
Significant level	*0.695*	*0.831*	*0.041*	*0.547*

"What do you think is the main diet of bears in Slovakia?" (Q. II5) (% of respondents who answered yes)					
Study area	**berries, insects, plants**	**mice, rabbits**	**red & roe deer, chamois**	**livestock**	**carcasses**
Core area, n=544	89.7%	9.0%	21.6%	26.7%	33.2%
Control area, n=492	86.5%	18.7%	26.7%	29.5%	32.4%
Total, n=1,036	87.8%	12.8%	24.2%	27.8%	32.9%
Significant level	*0.114*	*0.000*	*0.058*	*0.232*	*0.790*

"What do you think is the main diet of wolves in Slovakia?" (Q. II5) (% of respondents who answered yes)					
Study area	**berries, insects, plants**	**mice, rabbits**	**red & roe deer, chamois**	**livestock**	**carcasses**
Core area, n=544	1.7%	31.7%	70.0%	39.2%	38.7%
Control area, n=492	2.1%	40.7%	63.8%	42.2%	41.3%
Total, n=1,036	1.9%	35.1%	67.9%	42.1%	40.7%
Significant level	*0.643*	*0.003*	*0.039*	*0.346*	*0.392*

"What do you think is the main diet of lynx in Slovakia?" (Q. II5) (% of respondents who answered yes)					
Study area	**berries, insects, plants**	**mice, rabbits**	**red & roe deer, chamois**	**livestock**	**carcasses**
Core area, n=544	2.6%	69.3%	46.9%	6.6%	15.4%
Control area, n=492	4.1%	68.9%	44.3%	12.7%	25.2%
Total, n=1,036	3.1%	67.6%	47.4%	11.2%	20.5%
Significant level	*0.208*	*0.875*	*0.625*	*0.001*	*0.000*

"Around how many people were killed in Slovakia in the last 10 years by bears?" (Q. II6)							
Study area	**0**	**1-10**	**11-20**	**21-50**	**>50**	**I do not know**	**Chi² value & sig. level**
Core area, n=453	26.9%	55.8%	5.5%	7.7%	4.0%	18.0%	
Control area, n=439	34.4%	53.1%	7.5%	3.2%	1.8%	19.7%	**X²=**17.64
Total, n=892	30.6%	54.5%	6.5%	5.5%	2.9%	18.8%	**P=**0.001

"Around how many people were killed in Slovakia in the last 10 years by wolves?" (Q. II6)							
Study area	**0**	**1-10**	**11-20**	**21-50**	**>50**	**I do not know**	**Chi² value & sig. level**
Core area, n=450	55.6%	36.9%	3.6%	2.2%	1.8%	18.9%	
Control area, n=436	53.9%	38.3%	4.4%	1.6%	1.8%	19.1%	**X²=**41.62
Total, n=886	54.7%	37.6%	4.0%	1.9%	1.8%	19.0%	**P=**0.905

"Around how many people were killed in Slovakia in the last 10 years by lynx?" (Q. II6)							
Study area	**0**	**1-10**	**11-20**	**21-50**	**>50**	**I do not know**	**Chi² value & sig. level**
Core area, n=450	81.6%	15.8%	0.9%	0.4%	1.3%	18.6%	
Control area, n=442	72.6%	24.0%	2.0%	0.2%	1.1%	18.0%	**X²=**28.15
Total, n=892	77.1%	19.8%	1.5%	0.3%	1.2%	18.3%	**P=**0.301

"In Slovakia. are farmers paid money for livestock killed by bears?" (Q. II7)				
Study area	**yes**	**no**	**I do not know**	**Chi² value & sig. level**
Core area, n=578	30.8%	26.5%	42.7%	
Control area, n=529	29.3%	20.0%	50.7%	**X²=**8.64
Total, n=1,107	30.0%	23.6%	46.4%	**P=**0.013

"Have you heard about container bears?" (Q. II8)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=579	96.5%	3.5%	
Control area, n=529	83.9%	16.1%	**X²=**49.12
Total, n=1,108	89.6%	10.4%	**P=**0.000

"What are the reasons why bears become container bears?" (Q. II9)					
Study area	**not enough natural food**	**people offering food**	**easily accessible food**	**bears are over-populated**	**rubbish not stored properly**
Core area, n=544	52.4%	31.4%	26.3%	42.6%	53.5%
Control area, n=492	43.1%	12.6%	21.7%	41.5%	53.5%
Total, n=1,036	47.6%	22.3%	24.4%	41.8%	51.5%
Significant level	*0.003*	*0.000*	*0.088*	*0.585*	*0.990*

Table 4.15. Results for the items concerning knowledge about bears. wolves and lynx by target group (correct answers are those with a shaded background)

"Presently, how many bears are there in Slovakia?" (Q. II1)						
Target group	**0**	**1-500**	**501-1,000**	**>1,000**	**I do not know**	**Chi² value & sig. level**
Residents, n=800	0.4%	41.1%	30.8%	5.6%	22.1%	
Pupils, n=157	1.3%	24.8%	36.9%	14.6%	22.3%	
Woods people, n=191	0.0%	37.2%	29.3%	9.4%	24.1%	
Tourists, n=30	0.0%	53.3%	23.3%	6.7%	16.7%	**X²=**33.17
Total, n=1,178	0.4%	38.6%	31.2%	7.5%	22.3%	**P=**0.001

"Presently, how many wolves are there in Slovakia?" (Q. II1)						
Target group	**0**	**1-500**	**501-1,000**	**>1,000**	**I do not know**	**Chi² value & sig. level**
Residents, n=799	0.5%	37.7%	25.5%	9.8%	26.5%	
Pupils, n=157	0.6%	27.4%	32.5%	12.7%	26.8%	
Woods people, n=191	0.5%	37.2%	23.0%	15.7%	23.6%	
Tourists, n=30	0.0%	36.7%	36.7%	3.3%	23.3%	**X²=**16.22
Total, n=1,177	0.5%	36.2%	26.3%	11.0%	26.0%	**P=**0.182

"Presently, how many lynx are there in Slovakia?" (Q. II1)						
Target group	**0**	**1-500**	**501-1,000**	**>1,000**	**I do not know**	**Chi² value & sig. level**
Residents, n=799	0.5%	54.6%	13.3%	3.0%	28.7%	
Pupils, n=157	1.3%	43.9%	18.5%	3.8%	32.5%	
Woods people, n=191	0.5%	57.6%	7.3%	4.7%	29.8%	
Tourists, n=30	0.0%	53.3%	16.7%	3.3%	26.7%	**X²=**15.76
Total, n=1,177	0.6%	53.6%	13.1%	3.4%	29.3%	**P=**0.202

"What is the average number of wolves in a pack in Slovakia? (Q. II2)						
Target group	**2-7**	**8-15**	**16-20**	**>20**	**I do not know**	**Chi² value & sig. level**
Residents, n=797	50.2%	26.2%	4.3%	1.1%	18.2%	
Pupils, n=157	35.0%	38.2%	8.9%	1.3%	16.6%	
Woods people, n=190	69.5%	17.4%	2.1%	1.6%	9.5%	
Tourists, n=30	40.0%	26.7%	6.7%	0.0%	26.7%	**X²=**54.33
Total, n=1,174	51.0%	26.4%	4.6%	1.2%	16.8%	**P=**0.000

"What is the average weight of an adult male bear?" (Q. II3)						
Target group	**<100kg**	**101-300**	**301-500**	**>500**	**I do not know**	**Chi² value & sig. level**
Residents, n=798	1.9%	44.0%	33.2%	8.4%	12.5%	
Pupils, n=157	1.3%	26.8%	37.6%	18.5%	15.9%	
Woods people, n=190	2.6%	71.1%	18.4%	0.5%	7.3%	
Tourists, n=30	3.3%	33.3%	46.7%	6.7%	10.0%	**X²=**101.26
Total, n=1,175	2.0%	45.8%	31.7%	8.4%	12.1%	**P=**0.000

"Where do you think bears exist?" (Q. II4) % of respondents who answered yes				
Target group	**Nízke Tatry**	**Malé Karpaty**	**Vysoké Tatry**	**Slovenský raj**
Residents, n=737	84.3%	30.2%	84.2%	41.4%
Pupils, n=152	78.3%	34.2%	76.3%	44.1%
Woods people, n=176	91.5%	36.4%	86.4%	55.7%
Tourists, n=28	100.0%	50.0%	82.1%	60.7%
Total, n=1,093	85.0%	32.2%	83.4%	44.6%
Significant level	*0.001*	*0.068*	*0.071*	*0.002*

"Where do you think wolves exist?" (Q. II4) % of respondents who answered yes				
Target group	**Nízke Tatry**	**Malé Karpaty**	**Vysoké Tatry**	**Slovenský raj**
Residents, n=736	61.7%	46.7%	59.6%	38.6%
Pupils, n=152	59.2%	42.1%	52.0%	40.1%
Woods people, n=176	86.4%	45.5%	81.8%	63.1%
Tourists, n=28	67.9%	50.0%	60.7%	35.7%
Total, n=1,092	65.5%	46.0%	62.2%	42.7%
Significant level	*0.000*	*0.731*	*0.000*	*0.000*

"Where do you think lynx exist?" (Q. II4) % of respondents who answered yes				
Target group	**Nízke Tatry**	**Malé Karpaty**	**Vysoké Tatry**	**Slovenský raj**
Residents, n=736	52.3%	30.6%	70.9%	36.3%
Pupils, n=152	42.1%	30.9%	61.2%	32.9%
Woods people, n=176	69.3%	43.8%	81.3%	60.8%
Tourists, n=28	67.9%	42.9%	75.0%	46.4%
Total, n=1,092	54.0%	33.3%	71.3%	40.1%
Significant level	*0.000*	*0.005*	*0.001*	*0.000*

"What do you think is the main diet of bears in Slovakia?" (Q. II5) % of respondents who answered yes					
Target group	**berries. insects. plants**	**mice, rabbits**	**red & roe deer, chamois**	**livestock**	**carcasses**
Residents, n=745	89.4%	16.0%	23.6%	28.5%	31.4%
Pupils, n=147	76.9%	6.8%	26.5%	21.8%	21.8%
Woods people, n=183	90.2%	4.9%	24.6%	30.1%	48.1%
Tourists, n=28	85.7%	10.7%	10.7%	28.6%	25.0%
Total, n=1,103	87.8%	12.8%	23.8%	27.8%	32.7%
Significant level	*0.000*	*0.000*	*0.345*	*0.349*	*0.000*

"What do you think is the main diet of wolves in Slovakia?" (Q. II5) % are respondents who said yes					
Target group	**berries, insects, plants**	**mice, rabbits**	**red & roe deer, chamois**	**livestock**	**carcasses**
Residents, n=728	1.9%	37.7%	64.2%	42.4%	40.4%
Pupils, n=144	2.1%	29.9%	68.8%	34.0%	34.0%
Woods people, n=180	1.7%	28.9%	82.2%	47.2%	47.2%
Tourists, n=28	0.0%	53.6%	71.4%	35.7%	28.6%
Total, n=1,080	1.9%	35.6%	68.0%	41.9%	40.4%
Significant level	*0.891*	*0.012*	*0.000*	*0.099*	*0.057*

"What do you think is the main diet of lynx in Slovakia?" (Q. II5) % are respondents who said yes					
Target group	**berries, insects, plants**	**mice, rabbits**	**red & roe deer, chamois**	**livestock**	**carcasses**
Residents, n=691	3.2%	70.0%	45.0%	10.0%	21.6%
Pupils, n=134	3.0%	70.1%	39.6%	10.4%	13.4%
Woods people, n=177	2.8%	56.5%	62.7%	16.4%	21.5%
Tourists, n=27	7.4%	85.2%	44.4%	3.7%	14.8%
Total, n=1,029	3.2%	68.1%	47.3%	11.0%	20.4%
Significant level	*0.650*	*0.001*	*0.000*	*0.059*	*0.151*

"Around how many people were killed in Slovakia in the last 10 years by bears?" (Q. II6)							
Target group	**0**	**1-10**	**11-20**	**21-50**	**>50**	**I do not know**	**Chi² value & sig. level**
Residents, n=800	25.6%	44.6%	5.6%	4.9%	2.9%	16.4%	
Pupils, n=157	23.6%	45.2%	3.8%	4.5%	0.6%	22.3%	
Woods people, n=191	30.9%	33.5%	3.7%	1.0%	2.1%	28.8%	
Tourists, n=30	23.3%	43.3%	6.7%	3.3%	0.0%	23.3%	**X²=**31.29
Total, n=1,178	26.1%	42.9%	5.1%	4.2%	2.4%	19.4%	**P=**0.008

"Around how many people were killed in Slovakia in the last 10 years by wolves?" (Q. II6)							
Target group	**0**	**1-10**	**11-20**	**21-50**	**>50**	**I do not know**	**Chi² value & sig. level**
Residents, n=800	44.9%	30.9%	3.4%	1.8%	2.3%	16.9%	
Pupils, n=157	42.7%	29.9%	3.2%	1.3%	0.0%	22.9%	
Woods people, n=191	47.6%	22.5%	1.6%	0.5%	0.5%	27.2%	
Tourists, n=30	53.3%	16.7%	0.0%	3.3%	0.0%	26.7%	**X²=**27.91
Total, n=1,178	45.2%	29.0%	3.0%	1.5%	1.6%	19.6%	**P=**0.022

"Around how many people were killed in Slovakia in the last 10 years by lynx?" (Q. II6)							
Target group	**0**	**1-10**	**11-20**	**21-50**	**>50**	**I do not know**	**Chi² value & sig. level**
Residents, n=800	63.6%	16.6%	1.4%	0.4%	1.5%	16.5%	
Pupils, n=157	63.1%	14.0%	0.6%	0.6%	0.0%	21.7%	
Woods people, n=191	62.8%	11.0%	0.0%	0.0%	0.5%	25.7%	
Tourists, n=30	56.7%	16.7%	3.3%	0.0%	0.0%	23.3%	**X²=**20.94
Total, n=1,178	63.2%	15.4%	1.1%	0.3%	1.1%	18.8%	**P=**0.139

"In Slovakia, are farmers paid money for livestock killed by bears?" (Q. II7)				
Target group	**yes**	**no**	**I do not know**	**Chi² value & sig. level**
Residents, n=799	27.3%	20.8%	51.9%	
Pupils, n=157	27.4%	33.1%	39.5%	
Woods people, n=191	43.5%	27.7%	28.8%	
Tourists, n=30	40.0%	20.0%	40.0%	**X²=**21.08
Total, n=1,177	30.2%	23.5%	46.2%	**P=**0.000

"Have you heard about container bears?" (Q. II8)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=800	90.5%	9.5%	
Pupils, n=157	83.4%	16.6%	
Woods people, n=190	91.1%	8.9%	
Tourists, n=30	90.0%	10.0%	**X²=**7.55
Total, n=1,177	89.6%	10.4%	**P=**0.056

"What are the reasons why bears become container bears?" (Q. II9)					
Target group	**not enough natural food**	**people offering food**	**easily accessible food**	**bears are over-populated**	**rubbish not stored properly**
Residents, n=760	44.6%	21.6%	24.7%	46.2%	54.3%
Pupils, n=156	61.5%	14.7%	22.4%	25.0%	44.9%
Woods people, n=180	48.3%	31.7%	24.4%	37.8%	45.0%
Tourists, n=27	40.7%	22.2%	22.2%	59.3%	74.1%
Total, n=1,123	47.5%	22.3%	24.3%	42.2%	52.0%
Significant level	*0.001*	*0.002*	*0.932*	*0.000*	*0.192*

4.2.2.3. Questions about attitude toward bear, wolf and lynx management

A **"management score"** was calculated using the following ten items:-

- "In Slovakia there are too many bears."
- "In Slovakia there are too many wolves."
- "In Slovakia there are too many lynx."
- "Bears and wolves should only live in restricted parts of Slovakia."
- "Hunting of bears, wolves and lynx should be strictly regulated."
- "Hunting in National Parks should be allowed."
- "National Parks should be areas where all animals are protected all year round."
- "Bears and wolves should be eliminated from areas where they kill livestock."
- "It is necessary to give people more information about bears, wolves and lynx."
- "More research is needed on bears, wolves and lynx.

Table 4.16. Comparison of management score by target group, study area and place of residence

	TARGET GROUP				STUDY AREA		PLACE OF RESIDENCE		TOTAL
	residents	pupils	Woods people	tourists	core area	control area	Village	town	
MANAGEMENT SCORE	3.69	3.78	3.46	4.08	3.63	3.72	3.59	3.75	3.67
TEST	Kruskal-Wallis *H* test: Qui²=50,37, sign. 0.000				Mann-Whitney *U* test: 141522,500; 0.000		Mann-Whitney *U* test: 142836,000; 0.159		

Participants of the survey generally held neutral to positive attitudes toward large carnivore management (3.67)[11]. *T*-tests were used to look for significant differences between study areas, target groups and places of residence (town versus village). Tourists had significantly more positive attitudes toward large carnivore management (4.08) than the other three target groups (see table 4.16.). The two study areas also differed significantly. People in the control area were more positive (3.72) than people in the core area (3.63). No significant difference was found between places of residence (see table 4.16.).

The first item of the management section was: **"In Slovakia there are too many bears, wolves and lynx"**. We assumed that most people would of course agree that large carnivores belong in the wild, but many would think there are currently too many bears and wolves. However, there were more respondents who disagreed than agreed with this statement for all three large carnivores in Slovakia. The species most commonly regarded as too numerous was the bear (27.6% of all respondents), followed by the wolf (19.2%) and lynx (7.6%). See fig. 4.9.

Significant differences by study area were registered for all three carnivores. The difference between the two areas was greatest for bears. A greater proportion of people in the core area (40.9%) than in the control area (15.5%) considered there to be too many bears. There were also more people in the core area who said there are too many wolves in Slovakia (22.7%). Surprisingly, people in the control area more often agreed that there were too many lynx (see table 4.18.).

[11] A mean attitude score of 1 indicates strongly positive, a score of 3 neutral and of 5 strongly negative attitudes toward large carnivore management.

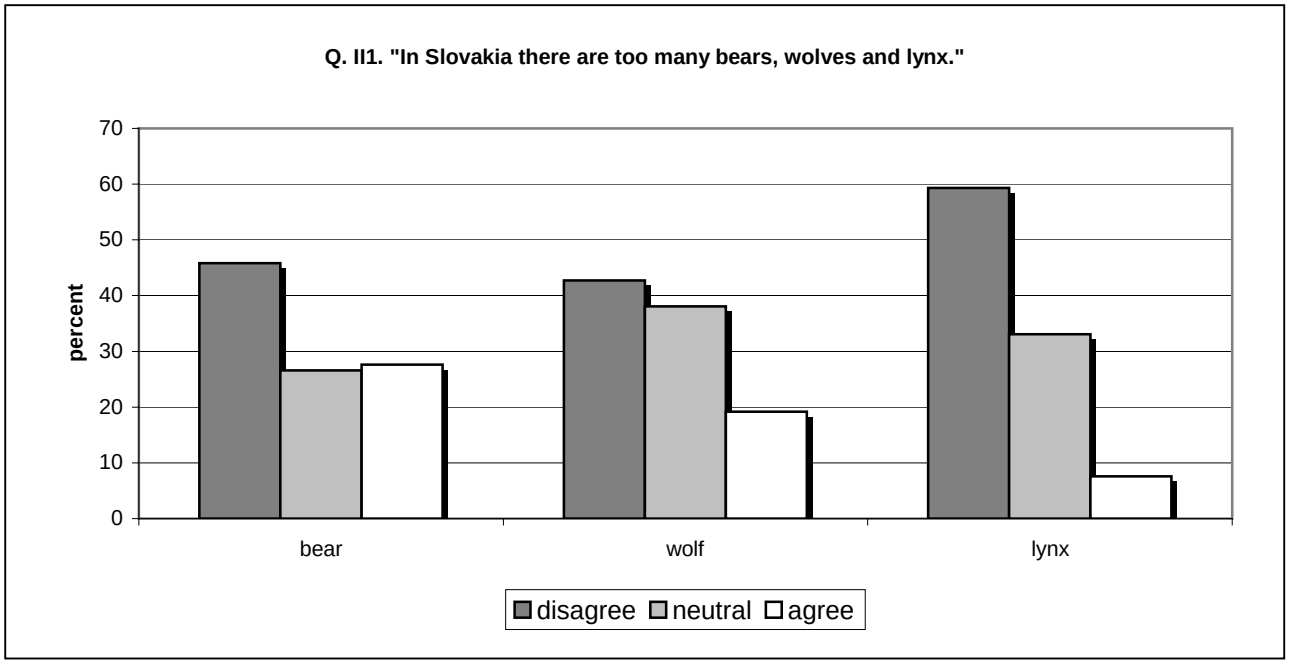

Figure 4.9. Respondents' perception of bear, wolf and lynx "over-population" (all respondents combined)

We expected that many woods people, in particular, would be of the opinion that bears and wolves are "over-populated" and our results confirmed this expectation. The difference between target groups was significant for bears and wolves: 43.5% of woods people agreed that, "There are too many bears in Slovakia" compared to 25.9% of residents, 20.4% of pupils and only 6.9% of tourists (see fig.4.10.). A similar proportion of woods people (42.2%) agreed that there are too many wolves (see table 4.19.). Interestingly, only 53.9% of woods people disagreed that there are too many lynx.

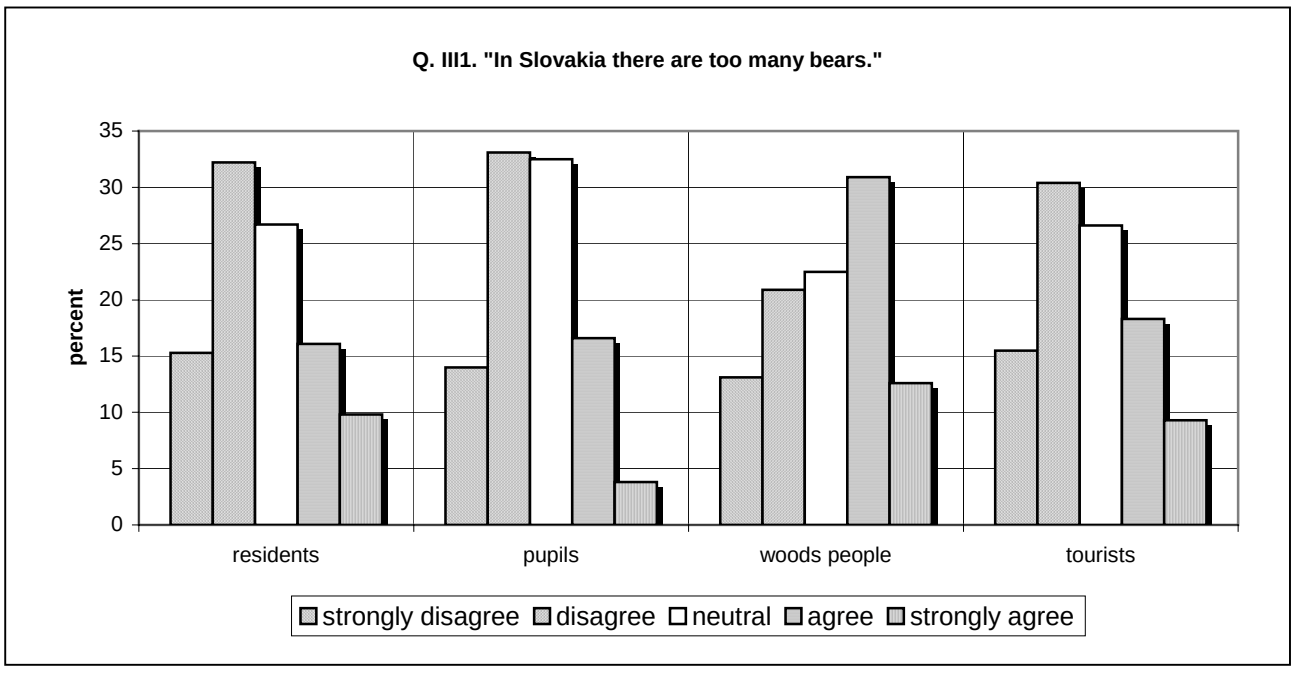

Figure 4.10. Respondents' perception of bear "over-population" by target group

"Bears and wolves should only live in restricted parts of Slovakia" was the next item, with which 46.5% of all respondents in the survey disagreed or strongly disagreed and 32.1% agreed or strongly agreed. People in the core area disagreed significantly more often with this statement than respondents in the control area (see table 4.18.). Significant differences by target group were also found. Tourists (72.4%) most often disagreed, followed by woods people (52.4%), residents (44.7%) and pupils (43.9%).

Prior to 2003, compensation was only paid for damage caused by bears. From 1st January 2003 a new law on nature and landscape protection introduced compensation for damage caused by other protected species, including the wolf and lynx. Most people (61.2%) in the present survey agreed that, **"Money should be paid to farmers whose livestock is killed by bears, wolves and lynx"** (see table 4.19.). There was no significant difference between study areas. Residents and pupils gave similar responses to each other, as did woods people and tourists. As anticipated, woods people were most often (76.7%) in favour of compensation payments, followed by tourists (72.4%). Fewer, but still over half the pupils (58.6%) and residents (57.7%) also thought that money should be paid to farmers whose livestock is killed by large carnivores.

Fewer people (48.2%) agreed that, **"Money should only be paid to farmers who tried to protect their livestock"**. Surprisingly, woods people significantly more often agreed with this statement (61.3%) than the other three target groups (see table 4.19.). No significant differences between sample areas were observed.

The following four items dealt with **hunting of large carnivores**.

A large majority of participants in the survey agreed that, **"Hunting of bears, wolves and lynx should be strictly regulated"**: 78.2% agreed compared to only 9.9% who disagreed with this statement. Respondents from the control area were significantly more in favour of strictly regulating hunting of bears, wolves and lynx than people in the core area (see table 4.18.). The result for woods people differed significantly to those for the other three target groups. Although fewer of them agreed with the statement compared to the target groups, nevertheless a very substantial majority of them (70.2%) thought that hunting of large carnivores should be strictly regulated (see table 4.19.).

The next two items illustrate the influence of how questions are posed. The statements "**Hunting in National Parks should be allowed**" and "**National Parks should be areas where all animals are protected all year round**" ask about the same point in two different ways. The answers obtained to these statements of course complemented each other, but did not entirely overlap.

There were more respondents (21.2%) who agreed that "Hunting in National Parks should be allowed" than people who disagreed (16.3%) that "National Parks should be areas where all animals are protected all year round". The two study areas differed significantly. Somewhat unexpectedly, people in the core area significantly more often agreed that National Parks should be areas where animals are protected all year round than people in the control area (see table 4.18.). These two items received similar results for the target groups residents and tourists (see fig. 4.11.). All other combinations were significantly different (see table 4.19.). Pupils strongly supported (89.8%) a hunting ban in National Parks, followed by residents (67.0%) and tourists (65.5%). Perhaps surprisingly, although more than a third (38.7%) of woods people thought, as we expected them to, that hunting in National Parks should be allowed, more of them (41.9%) thought it should not.

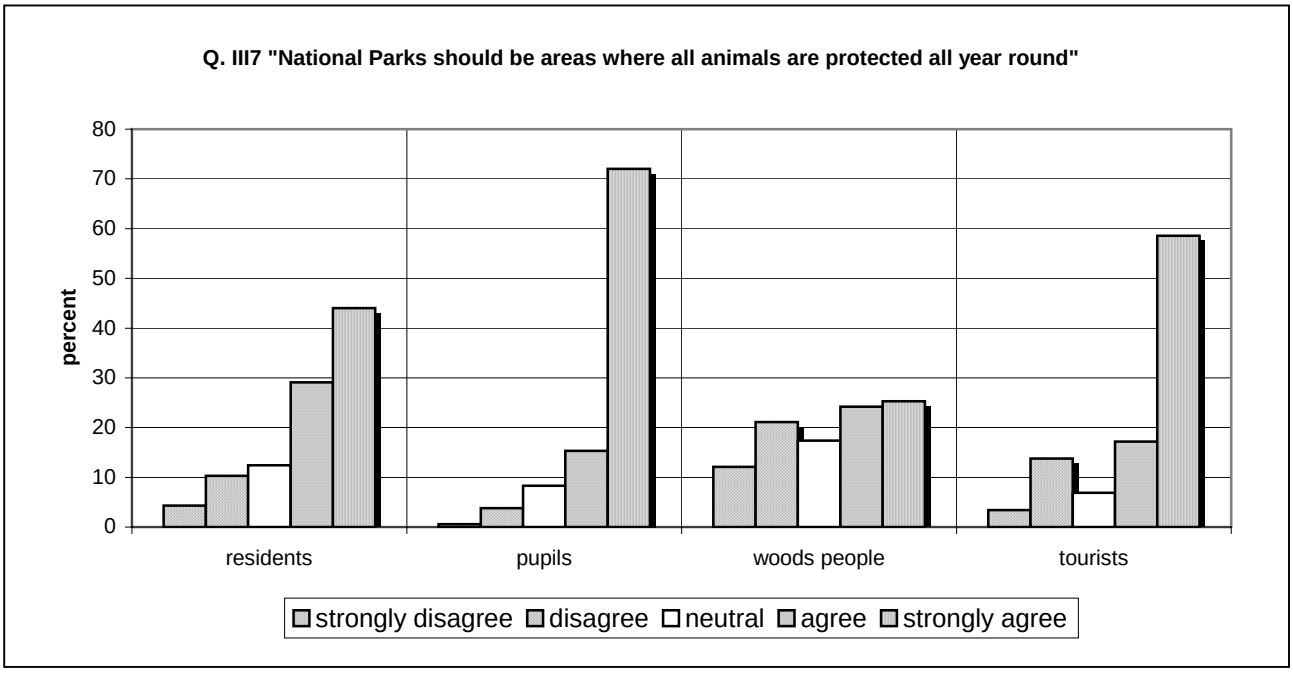

Figure 4.11. Respondents' attitude toward the protection of animals in National Parks by target group

The last item about hunting of large carnivores was, "**Bears and wolves should be eliminated from areas where they kill livestock**". There were about the same proportions of people who agreed (38.0%) as disagreed (35.3%) with this statement, and about a quarter (26.7%) had a neutral attitude on this issue. There was no significant difference between control and core areas (see table 4.1.), but there was among target groups. Tourists (72.4%) were most often against eliminating bears and wolves that kill livestock followed, unexpectedly, by woods people. Half the target group woods people (47.4%) disagreed and only 30.0% agreed that bears and wolves should be eliminated from areas where they kill livestock. Among residents, 38.8% agreed. Unexpectedly, almost half the surveyed pupils (47.8%) also agreed (see table 4.19.) and so this target group had the most negative attitude toward large carnivores on this issue.

Encouragingly for education initiatives, most people (84.6%) agreed that, **"It is necessary to give people more information about bears, wolves and lynx"**. Almost all (90.5%) respondents in the core area are convinced that information about carnivores is important, compared to 77.7% of the respondents living in the control area. Pearson's chi-square value revealed significant differences. Woods people (93.7%) agreed significantly more often than the other target groups that information about large carnivores is necessary (see table 4.19.).

The majority of respondents (64.1%) also thought that, **"More research is needed on bears, wolves and lynx".** No significant difference between study areas was observed (see table 4.18.). Tourists (71.4%) agreed significantly more often than the other target groups that research on large carnivores is needed (see table 4.19.).

The last question of the management section was an open question: **"In your opinion, what is the most important issue concerning bear, wolf and lynx management in Slovakia?"** The responses of this question are listed in table 4.17. The most frequently given answers were "(lack of) education/information" and "problems with people". Either one or the other of these answers was given by 14.1% of all respondents and another 6.1% cited related issues ("ignorance of people", "tourists do not know how to behave", "misconceptions and

myths"). "Poachers/illegal hunting" were for 5.7% of all respondents the most important matter. A substantial proportion (9.7%) of respondents in the core area thought "over-population" was an important issue, whereas only three out of 529 respondents in the control area thought so. In contrast, 4.0% of control area respondents thought the most important problem was "low numbers of these animals" whereas only eight out of 549 respondents of the core area agreed. Other frequently given responses were: "lack of food" (4.8%) "lack of habitat" (3.5%) and "danger to people (of being attacked)" (3.7%).

Table 4.17. Responses given to the question, "What is the most important issue concerning large carnivore management?"

Answers given (*n*=1,078 respondents)	**Frequency**	
	n	**%**
1. (lack of) education/information	87	8.1
2. (problems with) people	65	6.0
3. poachers/ illegal hunting	61	5.7
4. "over-population" of large carnivores	55	5.1
5. lack of natural food for carnivores	52	4.8
6. danger to people (of being attacked)	40	3.7
7. lack of natural habitat for carnivores	38	3.5
8. ignorance of people	32	3.0
9. low numbers of carnivores	31	2.9
10. conservation of animals and habitat	25	2.3
11. damage	22	2.0
12. human intervention	21	1.9
13. tourism (too many tourists, they do not know how to behave)	19	1.8
14. misconceptions, myths	14	1.3
15. regulations (numbers, hunting), legislation	13	1.2
16. conflicts of interest	12	1.1
17. fear	11	1.0
18. they should live in determined territories	6	0.6

Table 4.18. Results for the items concerning attitude toward bear, wolf and lynx management by study area

"In Slovakia there are too many bears." (Q. III1)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	10.1%	25.5%	25.3%	23.7%	15.4%	
Control area, n=529	21.2%	35.3%	28.0%	12.1%	3.4%	**X²=**107.72
Total, n=1,077	15.5%	30.4%	26.6%	18.3%	9.3%	**P=**0.000
"In Slovakia there are too many wolves." (Q. III1)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	12.7%	25.0%	39.7%	16.8%	5.9%	
Control area, n=529	19.8%	31.0%	37.6%	9.5%	2.1%	**X²=**40.71
Total, n=1,077	15.7%	27.0%	38.1%	14.8%	4.4%	**P=**0.000
"In Slovakia there are too many lynx." (Q. III1)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=547	33.7%	31.3%	30.0%	3.0%	2.1%	
Control area, n=529	25.9%	30.1%	34.4%	7.2%	2.5%	**X²=**15.87
Total, n=1,076	28.9%	30.5%	33.1%	5.4%	2.2%	**P=**0.003
"Bears and wolves should only live in restricted parts of Slovakia." (Q. III2)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=545	26.3%	27.7%	15.5%	19.7%	10.8%	
Control area, n=529	16.3%	23.6%	26.7%	22.7%	10.8%	**X²=**30.46
Total, n=1,074	21.1%	25.4%	21.4%	21.6%	10.5%	**P=**0.000
"Money should be paid to farmers whose livestock is killed by bears, wolves or lynx." (Q. III3)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=547	4.5%	7.6%	25.5%	33.2%	29.2%	
Control area, n=529	4.7%	11.2%	27.4%	31.8%	25.0%	**X²=**5.74
Total, n=1,076	4.5%	8.9%	25.3%	32.7%	28.5%	**P=**0.219
"Money should only be paid to farmers who tried to protect their livestock." (Q. III4)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=546	13.4%	11.8%	29.2%	24.0%	21.6%	
Control area, n=529	8.7%	12.9%	30.1%	23.6%	24.8%	**X²=**7.36
Total, n=1,075	10.8%	12.5%	28.4%	24.2%	24.0%	**P=**0.118
"Hunting of bears, wolves and lynx should be strictly regulated." (Q. III5)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	3.6%	7.5%	10.9%	32.8%	45.2%	
Control area, n=529	1.5%	6.2%	13.0%	25.9%	53.3%	**X²=**14.80
Total, n=1,077	2.7%	7.1%	11.9%	30.2%	48.0%	**P=**0.005
"Hunting in National Parks should be allowed." (Q. III6)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	40.0%	21.8%	13.9%	15.3%	9.0%	
Control area, n=529	51.4%	21.2%	11.0%	9.8%	6.6%	**X²=**17.94
Total, n=1,077	44.1%	21.8%	12.9%	13.2%	8.0%	**P=**0.001
"National Parks should be areas where all animals are protected all year round." (III7)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=546	6.4%	14.3%	12.3%	23.7%	43.3%	
Control area, n=529	3.4%	7.6%	12.5%	27.8%	48.8%	**X²=**20.34
Total, n=1,075	5.0%	11.2%	12.5%	26.1%	45.1%	**P=**0.000
"Bears and wolves should be eliminated from areas where they kill livestock." (Q. III8)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=547	12.5%	26.9%	27.3%	21.7%	11.6%	
Control area, n=529	9.5%	22.1%	27.0%	29.3%	12.1%	**X²=**8.27
Total, n=1,076	11.0%	24.3%	26.7%	26.0%	12.0%	**P=**0.082
"It is necessary to give people more information about bears, wolves and lynx." (Q. III9)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=548	0.9%	1.6%	7.3%	26.5%	63.8%	
Control area, n=529	0.9%	4.9%	16.4%	29.9%	47.8%	**X²=**42.32
Total, n=1,077	0.9%	3.1%	11.3%	28.8%	55.8%	**P=**0.000
"More research is needed on bears, wolves and lynx." (Q. III10)						
Study area	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Core area, n=547	2.3%	5.6%	25.7%	34.1%	32.3%	
Control area, n=528	2.8%	4.9%	31.6%	31.3%	29.4%	**X²=**5.06
Total, n=1,075	2.4%	5.5%	27.8%	33.6%	30.7%	**P=**0.282

Table 4.19. Results for the items concerning attitude toward bear, wolf and lynx management by target group

"In Slovakia there are too many bears." (Q. III1)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	15.3%	32.2%	26.7%	16.1%	9.8%	
Pupils, n=157	14.0%	33.1%	32.5%	16.6%	3.8%	
Woods people, n=191	13.1%	20.9%	22.5%	30.9%	12.6%	
Tourists, n=29	44.8%	27.6%	20.7%	3.4%	3.4%	**X=**58.50
Total, n=1,176	15.5%	30.4%	26.6%	18.3%	9.3%	**P=**0.000
"In Slovakia there are too many wolves." (Q. III1)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	15.6%	29.4%	40.2%	11.6%	3.1%	
Pupils, n=157	19.1%	26.1%	38.2%	14.6%	1.9%	
Woods people, n=191	11.0%	14.7%	31.9%	30.4%	12.0%	
Tourists, n=29	31.0%	44.8%	20.7%	0.0%	3.4%	**X=**100.65
Total, n=1,176	15.7%	27.0%	38.1%	14.8%	4.4%	**P=**0.000
"In Slovakia there are too many lynx." (Q. III1)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=798	28.7%	32.1%	32.5%	4.4%	2.4%	
Pupils, n=157	33.1%	22.9%	33.1%	8.3%	2.5%	
Woods people, n=191	23.0%	30.9%	37.2%	7.3%	1.6%	
Tourists, n=29	48.3%	24.1%	24.1%	3.4%	0.0%	**X=**19.46
Total, n=1,175	28.9%	30.5%	33.1%	5.4%	2.2%	**P=**0.078
"Bears and wolves should only live in restricted parts of Slovakia." (Q. III2)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=796	19.8%	24.9%	22.1%	22.5%	10.7%	
Pupils, n=157	21.0%	22.9%	18.5%	22.3%	15.3%	
Woods people, n=191	24.6%	27.7%	20.9%	19.9%	6.8%	
Tourists, n=29	34.5%	37.9%	20.7%	3.4%	3.4%	**X=**20.00
Total, n=1,173	21.1%	25.4%	21.4%	21.6%	10.5%	**P=**0.67
"Money should be paid to farmers whose livestock is killed by bears, wolves or lynx." (Q. III3)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	4.0%	10.1%	28.2%	29.8%	27.9%	
Pupils, n=157	10.8%	8.9%	21.7%	36.3%	22.3%	
Woods people, n=189	2.1%	4.2%	16.9%	39.7%	37.0%	
Tourists, n=29	0.0%	6.9%	20.7%	48.3%	24.1%	**X=**47.92
Total, n=1,174	4.5%	8.9%	25.3%	32.7%	28.5%	**P=**0.000
"Money should only be paid to farmers who tried to protect their livestock." (Q. III4)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=797	10.0%	13.3%	30.9%	23.7%	22.1%	
Pupils, n=157	17.2%	8.3%	29.9%	22.3%	22.3%	
Woods people, n=191	9.4%	14.1%	15.2%	26.7%	34.6%	
Tourists, n=29	6.9%	3.4%	41.4%	31.0%	17.2%	**X=**39.52
Total, n=1,174	10.8%	12.5%	28.4%	24.2%	24.0%	**P=**0.000
"Hunting of bears, wolves and lynx should be strictly regulated." (Q. III5)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	2.5%	6.5%	10.9%	29.4%	50.7%	
Pupils, n=157	1.3%	5.1%	16.6%	22.9%	54.1%	
Woods people, n=191	4.2%	12.6%	13.1%	39.8%	30.4%	
Tourists, n=29	6.9%	0.0%	6.9%	27.6%	58.6%	**X=**44.69
Total, n=1,176	2.7%	7.1%	11.9%	30.2%	48.0%	**P=**0.000
"Hunting in National Parks should be allowed." (Q. III6)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	42.8%	24.2%	13.0%	12.5%	7.5%	
Pupils, n=157	80.9%	8.9%	3.8%	1.9%	4.5%	
Woods people, n=191	20.9%	20.9%	19.4%	26.2%	12.6%	
Tourists, n=29	34.5%	31.0%	17.2%	6.9%	10.3%	**X=**152.74
Total, n=1,176	44.1%	21.8%	12.9%	13.2%	8.0%	**P=**0.000
"National Parks should be areas where all animals are protected all year round." (Q. III7)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=798	4.3%	10.3%	12.4%	29.1%	44.0%	
Pupils, n=157	0.6%	3.8%	8.3%	15.3%	72.0%	
Woods people, n=190	12.1%	21.1%	17.4%	24.2%	25.3%	
Tourists, n=29	3.4%	13.8%	6.9%	17.2%	58.6%	**X=**111.38
Total, n=1,174	5.0%	11.2%	12.5%	26.1%	45.1%	**P=**0.000

"Bears and wolves should be eliminated from areas where they kill livestock." (Q. III8)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	9.1%	24.0%	28.0%	26.4%	12.4%	
Pupils, n=157	6.4%	18.5%	27.4%	31.8%	15.9%	
Woods people, n=190	21.1%	26.3%	22.6%	21.6%	8.4%	
Tourists, n=29	20.7%	51.7%	13.8%	10.3%	3.4%	**X=**52.80
Total, n=1,175	11.0%	24.3%	26.7%	26.0%	12.0%	**P=**0.000
"It is necessary to give people more information about bears, wolves and lynx." (Q. III9)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=799	0.9%	3.8%	12.9%	28.5%	53.9%	
Pupils, n=157	1.9%	1.9%	12.1%	32.5%	51.6%	
Woods people, n=191	0.5%	1.0%	4.7%	30.4%	63.4%	
Tourists, n=29	0.0%	6.9%	6.9%	6.9%	79.3%	**X=**29.19
Total, n=1,176	0.9%	3.1%	11.3%	28.8%	55.8%	**P=**0.004
"More research is needed on bears, wolves and lynx." (Q. III10)						
Target group	**disagree**		**neutral**		**agree**	**Chi² value & sig. level**
Residents, n=797	2.0%	4.6%	27.7%	33.0%	32.6%	
Pupils, n=157	5.1%	3.8%	31.8%	34.4%	24.8%	
Woods people, n=191	2.1%	11.0%	25.1%	36.6%	25.1%	
Tourists, n=28	0.0%	3.6%	25.0%	25.0%	46.4%	**X=**28.15
Total, n=1,173	2.4%	5.5%	27.8%	33.6%	30.7%	**P=**0.005

The use of free-ranging, sheep-socialised livestock guarding dogs can reduce losses of livestock to wolves and bears. This young Slovenský čuvač male, photographed in 2004, was being raised with a flock of sheep in eastern Slovakia as part of the Slovak Wildlife Society's project Protection of Livestock and Conservation of Large Carnivores.

4.2.2.4. Questions about sources of information

We wanted to assess, "**What had formed the respondents' conception of bears, wolves and lynx?"** Respondents reported that their conceptions of large carnivores had mostly been formed by television (66.2% of respondents), books and leaflets (45.8%), school (39.9%) and newspapers/magazines (37.1%). See table 4.21. and fig. 4.12.

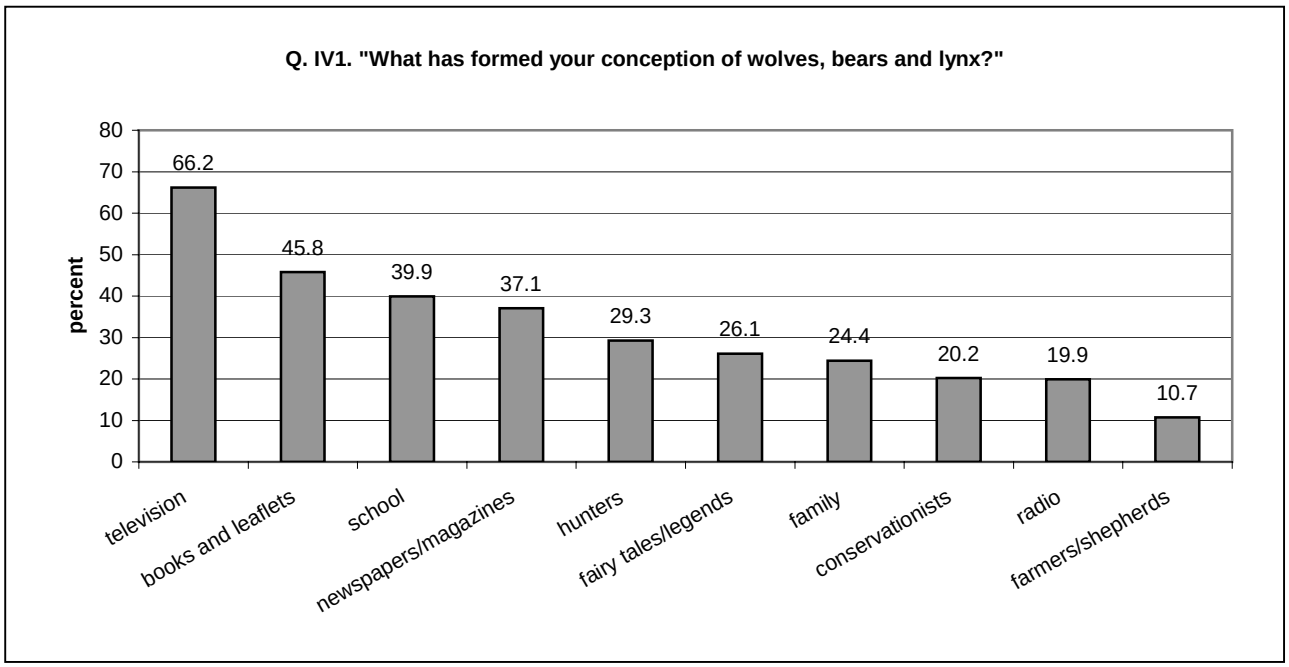

Figure 4.12. What has formed respondents' conception of wolves, bears and lynx (all respondents combined)

The differences by study areas were not significant for the responses television, books and leaflets, radio, newspapers/magazines and family (see table 4.20.). There were significantly more people in the control area (33.5%) than in the core area (20.8%) who said their conception was formed by fairy tales/legends. In Liptovský Mikuláš district, people's conception of bears, wolves and lynx was significantly more often formed by hunters, conservationists, school and farmers/shepherds than in Nové Mesto nad Váhom district (see table 4.15.).

Residents' and pupils' conceptions of bears, wolves and lynx were mostly formed by TV (69.8% and 74.5% respectively), books and leaflets (48.3% and 36.9% respectively), school (41.4% and 39.5%, respectively) and newspapers/magazines (37.4% and 35.0% respectively).

Woods people stated that hunters (48.7%) had most formed their conception of large carnivores, followed by TV (46.1%), books and leaflets (41.4%) and school (30.4%).

School (63.3%) was most important for tourists. TV (56.7%) was also important for this target group, as were books and leaflets (56.7%) as well as newspapers/magazines (53.3%). See table 4.21.

The question that was more important for the management of the education programme about large carnivores in Slovakia, planned for the period June 2003 until June 2006, ran as follows: **"In what form would you like to obtain information?"** (see fig 4.13.).

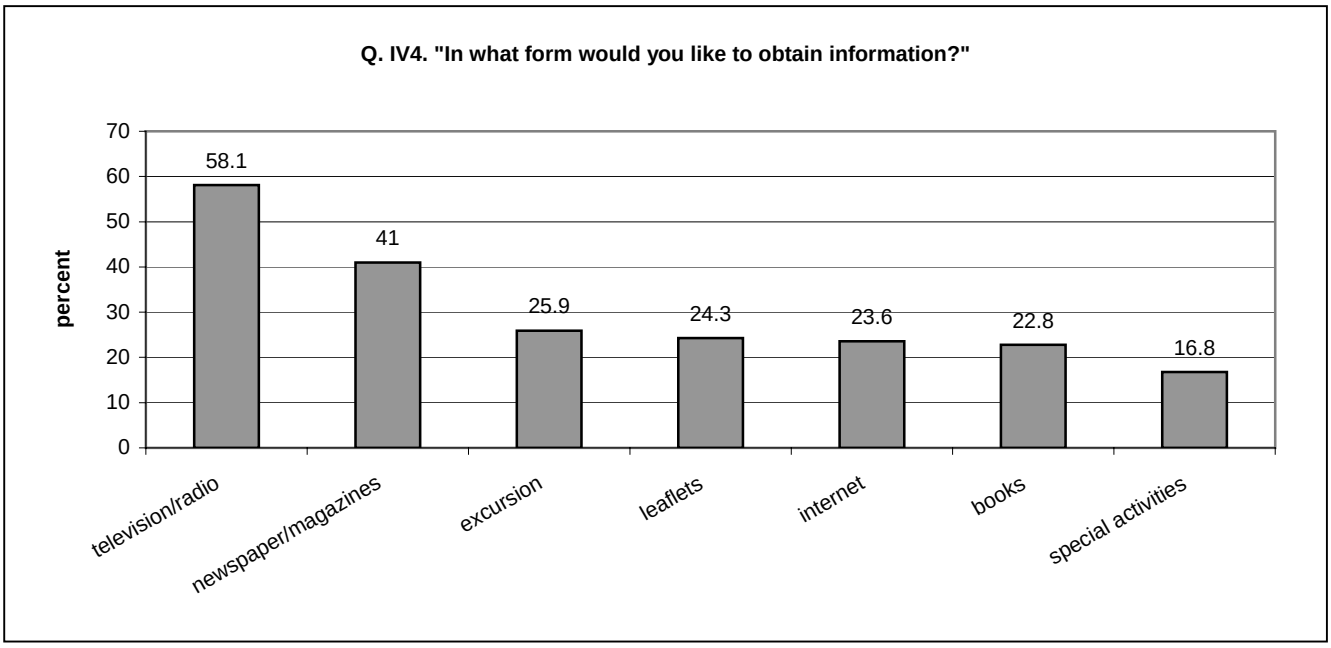

Figure 4.13. Respondents' requests to obtain information about bears, wolves and lynx (all respondents combined)

Most respondents wished to obtain information via TV/radio (58.1%) and newspapers/magazines (41.0%). About a quarter of all participants would like to have information about carnivores via excursions (25.9%), leaflets (24.3%), the internet (23.6%) and books (22.8%). Special activities (16.8%) were less important. See fig. 4.13.

No significant differences were found between study areas except for the responses TV/radio (61.7% core area, 53.5% control area) and newspapers/magazines (43.9% core area, and 36.5% control area).

All four target groups stated that their favourite media to obtain information about large carnivores are television and radio (see table 4.21.). Residents, woods people and tourists also like to gain information from newspapers and magazines. Pupils (24.8%) are less interested in information from newspapers; they prefer excursions (48.4%) and the internet (31.8%). The target group tourists is also interested in information from the internet. Residents also think leaflets (27.3%) are a good medium for information about carnivores (see fig. 4.14.).

Participants of the survey were also asked **if they were interested in learning more about bears, wolves and lynx**. Most respondents (91.7%) were interested (57.7% answered yes, 34.0% answered somewhat). Only 8.3% were not interested in learning more about large carnivores. People in the core area were slightly but significantly more interested than people in the control area (see table 4.20.). The target groups tourists (73.3% said yes) and woods people (73.0%) showed significantly greater interest in carnivores than pupils (57.1%) and residents (53.7%).

"Have you heard of The B.E.A.R.S. Project (Bear Education, Awareness and Research in Slovakia?)" was a control question. It was not possible for the participants to know about this project because it had not been publicly launched before the survey was conducted. Nevertheless, 6.4% of all participants said they had already heard about this project and a further 6.0% said they had somewhat heard about it. This result should be taken into consideration if the survey is repeated after the project. No significant differences by study areas and target groups were discovered (see tables 4.20. and 4.21).

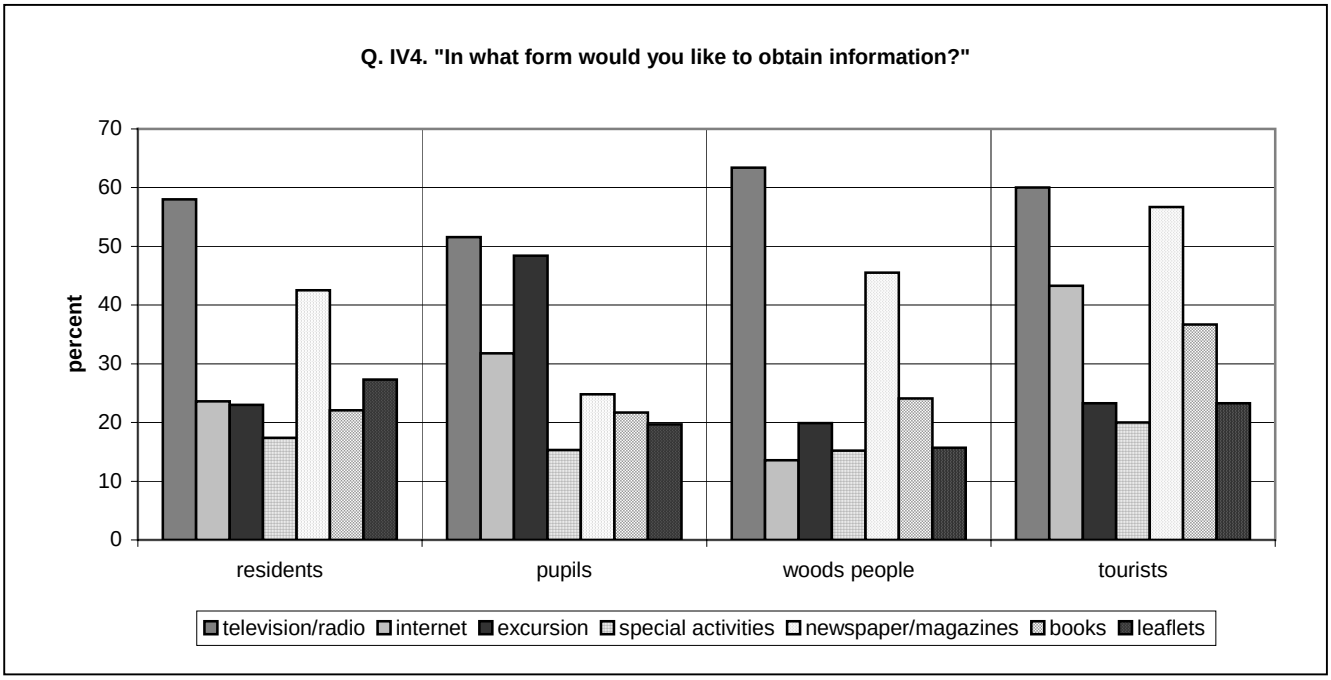

Figure 4.14. Respondents' requests to obtain information about bears, wolves and lynx by target group

Bears often feature on television and in newspapers. They are also used to advertise various companies, establishments and products, as seen on this billboard advertisement in the core study area. The way in which they are portrayed reveals something about how bears are perceived and/or might also have some influence on the people seeing such images.

Table 4.20. Results for the items concerning sources of information about bears, wolves and lynx by study area

"What has formed your conception of wolves, bears and lynx?" (Q. IV1)										
Study area	**TV**	**books/ leaflets**	**fairytales/ legends**	**hunters**	**radio**	**conserva-tionists**	**school**	**newspapers/ magazines**	**farmers/ shepherds**	**family**
Core area, n=549	68.5%	46.6%	20.8%	36.1%	21.3%	26.8%	47.4%	39.5%	13.3%	26.3%
Control area, n=529	68.8%	45.9%	33.5%	23.8%	19.8%	14.9%	35.3%	34.0%	5.7%	23.4%
Total, n=1,078	68.6%	46.3%	27.0%	30.1%	20.6%	21.0%	41.5%	36.8%	9.6%	25.1%
Significant level	*0.910*	*0.819*	*0.000*	*0.000*	*0.553*	*0.000*	*0.000*	*0.061*	*0.000*	*0.207*

"Are you interested in learning more about bears, wolves and lynx?" (Q. IV2)				
Study area	**yes**	**no**	**somewhat**	**Chi² value & sig. level**
Core area, n=542	60.9%	6.3%	32.8%	
Control area, n=528	51.3%	9.8%	38.8%	**X²=**11.28
Total, n=1,070	56.2%	8.0%	35.8%	**P=**0.004

"Have you heard of The B.E.A.R.S. Project (Bear Education, Awareness and Research in Slovakia)?" (Q. IV3)				
Study area	**yes**	**no**	**somewhat**	**Chi² value & sig. level**
Core area, n=546	5.1%	88.1%	6.8%	
Control area, n=529	7.2%	87.0%	5.9%	**X²=**2.245
Total, n=1,075	6.1%	87.5%	6.3%	**P=**0.325

"In what form would you like to obtain information?" (Q. IV4)							
Study area	**TV / radio**	**internet**	**excursion**	**special activities**	**newspapers/ magazines**	**books**	**leaflets**
Core area, n=549	61.7%	23.5%	29.5%	16.8%	43.9%	23.5%	24.6%
Control area, n=529	53.5%	24.8%	25.3%	18.1%	36.5%	22.3%	25.9%
Total, n=1,078	57.7%	24.1%	27.5%	17.4%	40.3%	22.4%	25.2%
Significant level	*0.006*	*0.627*	*0.124*	*0.548*	*0.027*	*0.642*	*0.621*

Table 4.21. Results for the items concerning sources of knowledge about bears, wolves and lynx by target group

"What has formed your conception of wolves, bears and lynx?" (Q. IV1)										
Target group	**TV**	**books/ leaflets**	**fairytales/ legends**	**hunters**	**radio**	**conserva-tionists**	**school**	**newspapers/ magazines**	**farmers/ shepherds**	**family**
Residents, n=800	69.8%	48.3%	29.3%	24.6%	21.8%	19.0%	41.4%	37.4%	8.9%	25.8%
Pupils, n=157	74.5%	36.9%	22.3%	29.9%	20.4%	28.0%	39.5%	35.0%	5.7%	27.4%
Woods people, n=191	46.1%	41.4%	15.2%	48.7%	11.5%	17.8%	30.4%	35.1%	22.5%	14.1%
Tourists, n=30	56.7%	56.7%	33.3%	26.7%	23.3%	26.7%	63.3%	53.3%	10.0%	36.7%
Total, n=1,178	66.2%	45.8%	26.1%	29.3%	19.9%	20.2%	39.9%	37.1%	10.7%	24.4%
Significant level	*0.000*	*0.020*	*0.000*	*0.000*	*0.016*	*0.043*	*0.002*	*0.258*	*0.000*	*0.002*

"Are you interested in learning more about bears, wolves and lynx?" (Q. IV2)				
Target group	**yes**	**no**	**somewhat**	**Chi² value & sig. level**
Residents, n=794	53.7%	9.7%	36.6%	
Pupils, n=156	57.1%	2.6%	40.4%	
Woods people, n=189	73.0%	7.4%	19.6%	
Tourists, n=30	73.3%	6.7%	20.0%	**X²=**19.77
Total, n=1,169	57.7%	8.3%	34.0%	**P=**0.000

"Have you heard of The B.E.A.R.S. Project (Bear Education, Awareness and Research in Slovakia)?" (Q. IV3)				
Target group	**yes**	**no**	**somewhat**	**Chi² value & sig. level**
Residents, n=799	5.8%	88.7%	5.5%	
Pupils, n=155	4.5%	85.2%	10.3%	
Woods people, n=191	11.0%	83.2%	5.8%	
Tourists, n=30	3.3%	96.7%	0.0%	**X²=**7.296
Total, n=1,175	6.4%	87.6%	6.0%	**P=**0.063

"In what form would you like to obtain information?" (Q. IV4)							
Target group	**TV / radio**	**internet**	**excursion**	**special activities**	**newspapers/ magazines**	**books**	**leaflets**
Residents, n=800	58.0%	23.6%	23.0%	17.4%	42.5%	22.1%	27.3%
Pupils, n=157	51.6%	31.8%	48.4%	15.3%	24.8%	21.7%	19.7%
Woods people, n=191	63.4%	13.6%	19.9%	15.2%	45.5%	24.1%	15.7%
Tourists, n=30	60.0%	43.3%	23.3%	20.0%	56.7%	36.7%	23.3%
Total, n=1,178	58.1%	23.6%	25.9%	16.8%	41.0%	22.8%	24.3%
Significant level	*0.177*	*0.000*	*0.000*	*0.796*	*0.000*	*0.286*	*0.004*

4.2.2.5. Questions about previous experience with bears, wolves and lynx

When asked **how often they go to the forest**, 15.9% of participants in the survey stated that they go almost daily. About a quarter went at least once a week (25.7%) or once a month (23.9%) and around a third went more seldom (34.5%). Significant differences were found both between study areas and among target groups. People in the core area stated that they were significantly more often in the forest than people in the control area (see table 4.26.). Naturally, the target group woods people spent more time in the forest than the other three target groups. Tourists were significantly more often in the forest than residents and pupils (see table 4.27.).

Hiking, wildlife watching and mushroom or berry picking were the most popular **activities usually pursued in the forest**; hunting and fishing were least common (fig. 4.15. and table 4.27.). Respondents from Liptovský Mikuláš district significantly more often than people from Nové Mesto nad Váhom district picked mushrooms and berries, went skiing and fished (see table 4.26.). Tourists more often went biking, hiking and skiing than the other three target groups. Woods people, of course, more often hunted than the other three target groups and pupils and residents more often picked mushrooms and berries than woods people or tourists (see table 4.27.).

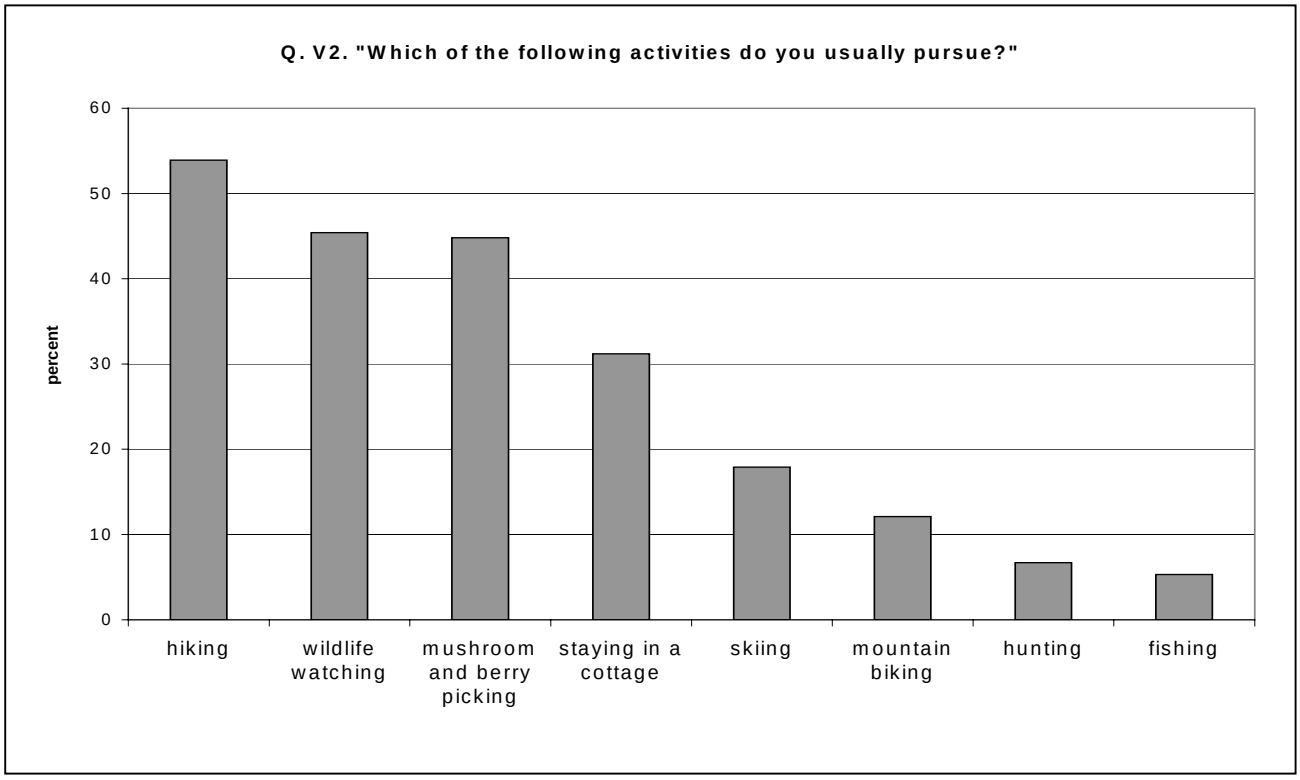

Figure 4.15. Activities of the respondents (all respondents combined)

The next question asked about the **sightings that participants had had of bears, wolves and lynx**. Nearly a third of respondents claimed to have already **seen a bear** (32.0%), exactly a quarter said they had **seen a wolf** and 18.6% said they had already **seen a lynx** in the wild. As would be expected, the people surveyed in the core area had significantly more often claimed to have seen large carnivores than those from the control area (see table 4.26.). Also not surprisingly, woods people significantly more often said they had seen bears, wolves and lynx than the other three target groups. Tourists had significantly more often seen a bear and a wolf than pupils and residents (see table 4.27.).

Many participants **would like to see bears, wolves and lynx in the wild**. The species that people would most like to see was the lynx (62.8% of respondents), followed by the bear (59.7%) and the wolf (55.5%). Around three-quarters of woods people wanted to see bears, wolves and lynx, significantly more than the other three target groups. About 65% of pupils and tourists wanted to see a large carnivore and around 55% of residents stated that they would like to see a bear, wolf or lynx in the wild (see table 4.27.).

Very few participants reported that they **had already shot a bear, wolf or lynx**: 0.9%, 1.4% and 0.8% respectively. Woods people and tourists significantly more often claimed to have shot a bear or wolf than pupils and residents (see table 4.27.). Pearson's χ^2 value did not show significant differences between study areas (see table 4.26.).

Damage by bears, wolves or lynx had apparently been experienced by 11.3% of all respondents. Significantly more people in the core area (16.4%) than in the control area (2.6%) said they or their family had already experienced damage by these carnivores. Woods people (26.5%) had significantly more often experienced damage than tourists (16.7%), who in turn more often mentioned damage than either residents (8.7%) or pupils (5.8%). See table 4.27. The most frequently reported forms of damage were livestock (mostly sheep) killed (3.8% of all participants) and apiaries damaged or destroyed (3.2%). Other types of damage mentioned are listed in table 4.22.

Table 4.22. Respondents' reports of damage caused by large carnivores

Answers given (*n*=1,078 respondents)	Frequency	
	n	**%**
1. livestock killed (mostly sheep)	41	3.8
2. apiary damaged/destroyed	35	3.2
3. property (e.g. cottage) damaged	12	1.1
4. person attacked by bear	2	0.2
5. garden or fruit (plum) tree damaged	2	0.2
6. aviary damaged	1	0.1

The next item asked, **"How would you react if you saw a bear, wolf or lynx?"** This question was not included in early copies of the questionnaire and so there were fewer potential respondents (*n*=710) compared to other items. Many people admitted that "I do not know" how they would react if the saw a bear (13.2% of respondents), wolf (15.2%) or lynx (16.6%). Some wrote that they could not say because, "it would depend on the specific circumstances" (*n*=24). The responses for the three carnivores were generally very similar and all the answers given are listed in tables 4.23. to 4.25.

There were about the same number of respondents who said they would "silently move away" (10.8% for bear, 8.6% for wolf and 7.6% for lynx) as would "run away" (9.9%, 8.6% and 6.5% respectively) if they saw a bear, a wolf or a lynx. (Three people specified that they would "run downhill" to get away from a bear if they saw one.) Slightly fewer people said they would "watch" the animals if they saw them. More people would watch a lynx (9.0% of all respondents) than a wolf (6.9%) or bear (5.8%). Quite a lot of respondents answered that they would "stay motionless", "act silently" or would "be scared".

Four participants said that they would "shoot" a wolf if they saw it. The responses for the lynx were most positive. Eight respondents said they would not do anything special ("nothing"), another eight would "take a picture" and ten people said they would "be (very) happy".

Table 4.23. Responses given to the question, "How would you react if you saw a bear?"

Answers given (*n*=710 respondents)	Frequency	
	n	**%**
1. I do not know	94	13.2
2. I would (silently) move away	77	10.8
3. I would run away	70	9.9
4. I would stay motionless	42	5.9
5. I would watch the bear (from a distance)	41	5.8
6. I would act silently	31	4.4
7. I would be scared	26	3.7
8. I would panic	22	3.1
9. I would lie down	22	3.1
10. I would climb a tree	20	2.8
11. I would shout	18	2.5
12. I would pretend to be dead	14	2.0
13. I would hide	8	1.1
14. I would not provoke the bear	6	0.8
15. I would take a picture	3	0.4
16. I would be happy/excited/smile	3	0.4
17. I would shoot it	1	0.1

Table 4.24. Responses given to the question, "How would you react if you saw a wolf?"

Answers given (*n*=710 respondents)	Frequency	
	n	**%**
1. I do not know	108	15.2
2. I would (silently) move away	61	8.6
3. I would run away	61	8.6
4. I would watch the wolf (from a distance)	49	6.9
5. I would be scared	34	4.8
6. I would act silently	27	3.8
7. I would climb a tree	23	3.2
8. I would stay motionless	17	2.4
9. I would shout	12	1.7
10. I would panic	11	1.5
11. I would not provoke the wolf	7	1.0
12. I would try not to panic	7	1.0
13. I would hide	5	0.7
14. I would shoot it	4	0.6
15. I would chase the wolf away	4	0.6
16. I would take a picture	3	0.4
17. nothing	3	0.4
18. I would be happy	2	0.3
19. I would make a fire	2	0.3
20. I would attack/suffocate it	2	0.3
21. I would defend myself with a stick	2	0.3

Table 4.25. Responses given to the question, "How would you react if you saw a lynx?"

Answers given (*n*=710 respondents)	Frequency	
	n	**%**
1. I do not know	118	16.6
2. I would watch the lynx (from a distance)	64	9.0
3. I would (silently) move away	54	7.6
4. I would run away	46	6.5
5. I would act silently	35	4.9
6. I would be scared	32	4.5
7. I would stay motionless	18	2.5
8. I would panic	11	1.5
9. I would be (very) happy	10	1.4
10. I would climb a tree	9	1.3
11. I would shout/startle it/chase it away	8	1.1
12. nothing	8	1.1
13. I would take a picture	8	1.1
14. I would pick up/defend myself with a stick	3	0.4
15. I would shoot it	1	0.1

The last question in the section on previous experience of large carnivores asked, **"If in childhood you were told true stories about bears, wolves and lynx, how were they described?"** (see fig. 4.16. and table 4.27.). Significant differences by study area were found for the question about bears and wolves. Stories about bears and wolves from people in Liptovský Mikuláš district were significantly more negative than the stories from people in Nové Mesto nad Váhom district (see table 4.26.). Significant differences among target groups were also observed (see table 4.27.).

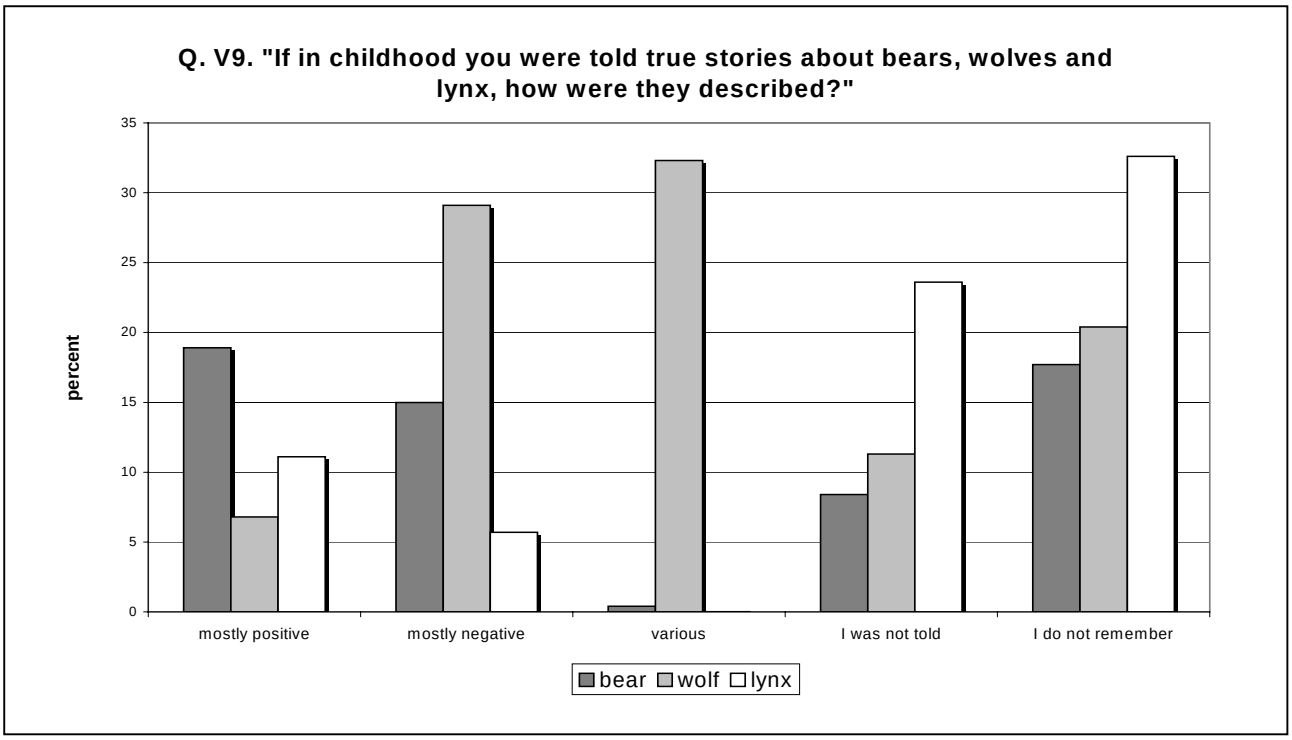

Figure 4.16. Respondents' recollection of true bear, wolf and lynx stories from their childhood (all respondents combined)

Table 4.26. Results for the items concerning experience with bears, wolves and lynx by study area

"How often do you go to the forest?" (Q. V1)					
Study area	**almost daily**	**at least once a week**	**once a month**	**more seldom**	**Chi² value & sig. level**
Core area, n=547	17.2%	31.8%	23.6%	27.4%	
Control area, n=529	4.7%	21.0%	27.6%	46.7%	**X²=**78.41
Total, n=1,106	11.1%	26.5%	25.6%	36.9%	**P=**0.000

"Which of the following activities do you usually pursue?" (Q. V2)								
Study area	**mushroom, berry picking**	**mountain biking**	**wildlife watching**	**hiking**	**skiing**	**staying in a cottage**	**hunting**	**fishing**
Core area, n=549	58.8%	13.3%	48.8%	54.6%	20.9%	35.0%	6.9%	3.6%
Control area, n=529	34.4%	11.0%	45.4%	57.5%	15.5%	31.0%	6.8%	7.6%
Total, n=1,078	46.8%	12.2%	47.1%	56.0%	18.3%	33.0%	6.9%	5.6%
Significant level	*0.000*	*0.241*	*0.257*	*0.412*	*0.021*	*0.270*	*0.940*	*0.005*

"Have you ever seen a bear in the wild?" (Q. V3)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=549	41.9%	58.1%	
Control area, n=529	18.9%	81.1%	**X²=**67.04
Total, n=1,078	30.6%	69.4%	**P=**0.000

"Have you ever seen a wolf in the wild?" (Q. V3)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=548	30.7%	69.0%	
Control area, n=529	10.6%	89.4%	**X²=**68.29
Total, n=1,077	20.8%	79.0%	**P=**0.000

"Have you ever seen a lynx in the wild?" (Q. V3)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=545	18.5%	80.9%	
Control area, n=529	12.7%	87.1%	**X²=**8.09
Total, n=1,074	15.6%	84.0%	**P=**0.018

"Would you like to see a wild bear?" (Q. V4)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=535	57.6%	42.2%	
Control area, n=528	60.0%	40.0%	**X²=**1.60
Total, n=1,063	58.8%	41.1%	**P=**0.450

"Would you like to see a wild wolf?" (Q. V4)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=535	55.5%	44.3%	
Control area, n=528	54.4%	45.6%	**X²=**1.159
Total, n=1,063	54.9%	45.0%	**P=**0.560

"Would you like to see a wild lynx?" (Q. V4)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=538	64.9%	35.1%	
Control area, n=528	60.0%	40.0%	**X²=**2.65
Total, n=1,066	62.5%	37.5%	**P=**0.103

"Have you ever shot a bear in Slovakia?" (Q. V5)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=548	1.1%	98.9%	
Control area, n=529	0.6%	99.4%	**X²=**1.85
Total, n=1,077	0.8%	99.2%	**P=**0.397

"Have you ever shot a wolf in Slovakia?" (Q. V5)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=548	1.8%	98.2%	
Control area, n=529	1.1%	98.9%	**X²=**1.83
Total, n=1,077	1.5%	98.5%	**P=**0.401

"Have you ever shot a lynx in Slovakia?" (Q. V5)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=546	1.1%	98.9%	
Control area, n=529	0.6%	99.4%	**X²=**1.87
Total, n=1,075	0.8%	99.2%	**P=**0.393

"Have you or your family ever experienced damage by bears, wolves or lynx?" (Q. V6)			
Study area	**yes**	**no**	**Chi² value & sig. level**
Core area, n=544	16.4%	83.6%	
Control area, n=529	2.6%	97.4%	**X²=**58.60
Total, n=1,073	9.6%	90.4%	**P=**0.000

"If in childhood you were told true stories about bears, how were they described? (Q. V9)						
Study area	**mostly positive**	**mostly negative**	**various**	**I was not told**	**I do not remember**	**Chi² value & sig. level**
Core area, n=541	19.6%	21.4%	40.9%	5.2%	12.9%	
Control area, n=529	18.9%	7.9%	35.7%	12.7%	24.8%	**X²=**71.73
Total, n=1,070	19.3%	14.8%	38.3%	8.9%	18.8%	**P=**0.000

"If in childhood you were told true stories about wolves, how were they described?" (Q. V9)						
Study area	**mostly positive**	**mostly negative**	**various**	**I was not told**	**I do not remember**	**Chi² value & sig. level**
Core area, n=541	5.2%	36.2%	31.1%	9.2%	18.3%	
Control area, n=529	8.3%	21.7%	30.1%	14.6%	25.3%	**X²=**35.77
Total, n=1,070	6.7%	29.1%	30.6%	11.9%	21.8%	**P=**0.000

"If in childhood you were told true stories about lynx, how were they described?" (Q. V9)						
Study area	**mostly positive**	**mostly negative**	**various**	**I was not told**	**I do not remember**	**Chi² value & sig. level**
Core area, n=541	10.7%	6.3%	25.3%	24.4%	33.3%	
Control area, n=529	11.3%	4.7%	24.8%	23.6%	35.5%	**X²=**1.77
Total, n=1,070	11.0%	5.5%	25.0%	24.0%	34.4%	**P=**0.778

Table 4.27. Results for the items concerning experience with bears, wolves and lynx by target group

"How often do you go to the forest?" (Q. V1)					
Target group	**almost daily**	**at least once a week**	**once a month**	**more seldom**	**Chi² value & sig. level**
Residents, n=798	5.4%	23.6%	28.6%	42.5%	
Pupils, n=157	7.0%	31.2%	27.4%	34.4%	
Woods people, n=191	67.0%	27.2%	3.1%	2.6%	**X²=**499.62
Tourists, n=30	16.7%	43.3%	13.3%	26.7%	**P=**0.000
Total, n=1,176	15.9%	25.7%	23.9%	34.5%	

"Which of the following activities do you usually pursue?" (Q. V2)								
Target group	**mushroom, berry picking**	**mountain biking**	**wildlife watching**	**hiking**	**skiing**	**staying in a cottage**	**hunting**	**fishing**
Residents, n=800	47.8%	11.5%	44.6%	57.6%	17.8%	33.3%	0.0%	4.9%
Pupils, n=157	49.0%	12.7%	49.0%	59.9%	20.4%	29.9%	2.5%	5.7%
Woods people, n=191	30.4%	10.5%	47.1%	29.3%	12.0%	23.6%	38.2%	6.3%
Tourists, n=30	36.7%	33.3%	36.7%	80.0%	46.7%	33.3%	6.7%	6.7%
Total, n=1,178	44.8%	12.1%	45.4%	53.9%	17.9%	31.2%	6.7%	5.3%
Significant level	*0.000*	*0.004*	*0.535*	*0.000*	*0.000*	*0.124*	*0.000*	*0.843*

"Have you ever seen a bear in the wild?" (Q. V3)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=800	26.4%	73.6%	
Pupils, n=157	24.2%	75.8%	
Woods people, n=188	60.6%	39.4%	**X²=**88.65
Tourists, n=30	43.3%	56.7%	**P=**0.000
Total, n=1,175	32.0%	68.0%	

"Have you ever seen a wolf in the wild?" (Q. V3)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=800	15.8%	84.2%	
Pupils, n=157	18.5%	81.5%	
Woods people, n=189	67.2%	32.8%	**X²=**226.01
Tourists, n=30	40.0%	60.0%	**P=**0.000
Total, n=1,176	25.0%	75.0%	

"Have you ever seen a lynx in the wild?" (Q. V3)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=797	12.5%	87.5%	
Pupils, n=157	13.4%	86.6%	
Woods people, n=189	48.7%	51.4%	**X²=**140.19
Tourists, n=30	16.7%	83.3%	**P=**0.000
Total, n=1,173	18.6%	81.4%	

"Would you like to see a wild bear?" (Q. V4)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=791	54.1%	45.9%	
Pupils, n=154	66.9%	33.1%	
Woods people, n=179	77.7%	22.4%	**X²=**44.20
Tourists, n=28	64.3%	35.7%	**P=**0.000
Total, n=1,152	59.7%	40.3%	

"Would you like to see a wild wolf?" (Q. V4)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=790	49.1%	50.9%	
Pupils, n=155	65.2%	34.8%	
Woods people, n=172	75.6%	24.4%	**X²=**53.927 **P=**0.000
Tourists, n=28	60.7%	39.3%	
Total, n=1,145	55.5%	44.5%	

"Would you like to see a wild lynx?" (Q. V4)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=792	58.2%	41.8%	
Pupils, n=156	69.9%	30.1%	
Woods people, n=176	76.1%	23.9%	**X²=**24.19 **P=**0.000
Tourists, n=28	67.9%	32.1%	
Total, n=1,152	62.8%	37.2%	

"Have you ever shot a bear in Slovakia?" (Q. V5)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=800	0.0%	100.0%	
Pupils, n=156	1.3%	98.7%	
Woods people, n=189	3.7%	96.3%	**X²=**28.78 **P=**0.000
Tourists, n=30	3.3%	96.7%	
Total, n=1,175	0.9%	99.1%	

"Have you ever shot a wolf in Slovakia?" (Q. V5)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=800	0.4%	99.6%	
Pupils, n=156	1.9%	98.1%	
Woods people, n=189	5.3%	94.7%	**X²=**0.000 **P=**28.168
Tourists, n=30	3.3%	96.7%	
Total, n=1,175	1.4%	98.6%	

"Have you ever shot a lynx in Slovakia?" (Q. V5)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=798	0.1%	99.9%	
Pupils, n=156	1.3%	98.7%	
Woods people, n=189	3.2%	96.8%	**X²=**20.64 **P=**0.002
Tourists, n=30	0.0%	100.0%	
Total, n=1,173	0.8%	99.2%	

"Have you or your family ever experienced damage by bears, wolves or lynx?" (Q. V6)			
Target group	**yes**	**no**	**Chi² value & sig. level**
Residents, n=797	8.7%	91.3%	
Pupils, n=156	5.8%	94.2%	
Woods people, n=189	26.5%	73.5%	**X²=**55.52 **P=**0.000
Tourists, n=30	16.7%	83.3%	
Total, n=1,172	11.3%	88.7%	

"If in childhood you were told true stories about bears, how were they described? (Q. V9)						
Target group	**mostly positive**	**mostly negative**	**various**	**I was not told**	**I do not remember**	**Chi² value & sig. level**
Residents, n=792	19.1%	15.3%	37.6%	9.3%	18.7%	
Pupils, n=157	19.7%	12.7%	40.8%	5.7%	21.0%	
Woods people, n=191	17.3%	13.1%	49.7%	7.3%	12.6%	**X²=**21.55 **P=**0.043
Tourists, n=29	20.7%	31.0%	37.9%	3.4%	6.9%	
Total, n=1,169	18.9%	15.0%	40.0%	8.4%	17.7%	

"If in childhood you were told true stories about wolves, how were they described?" (Q. V9)						
Target group	**mostly positive**	**mostly negative**	**various**	**I was not told**	**I do not remember**	**Chi² value & sig. level**
Residents, n=792	6.8%	29.9%	30.3%	12.0%	21.0%	
Pupils, n=157	8.9%	22.9%	30.6%	10.8%	26.8%	
Woods people, n=191	4.7%	28.8%	41.9%	9.4%	15.2%	**X²=**23.67 **P=**0.023
Tourists, n=30	10.0%	43.3%	33.3%	6.7%	6.7%	
Total, n=1,170	6.8%	29.1%	32.3%	11.3%	20.4%	

"If in childhood you were told true stories about lynx, how were they described?" (Q. V9)						
Target group	**mostly positive**	**mostly negative**	**various**	**I was not told**	**I do not remember**	**Chi² value & sig. level**
Residents, n=792	10.6%	5.9%	25.3%	24.9%	33.3%	
Pupils, n=157	12.1%	3.8%	24.2%	22.3%	37.6%	
Woods people, n=191	12.6%	7.3%	36.1%	17.3%	26.7%	**X²=**21.36 **P=**0.045
Tourists, n=30	10.0%	0.0%	26.7%	36.7%	26.7%	
Total, n=1,170	11.1%	5.7%	26.9%	23.6%	32.6%	

4.2.3. Factors affecting attitudes toward carnivores and their management

Assessing possible factors that affect attitude toward species as well as their management is very important for successful wildlife management. In the following sections, possible influences on the attitudinal score are presented by:-

- geographical region (relative carnivore abundance)
- carnivore species
- socio-demographic factors (age, sex, education, occupation, place of residence)
- experience
- perceived danger and fear
- perception of population size
- knowledge

4.2.3.1. Geographical region (relative carnivore abundance)

Differences of the various scores by study area (Liptovský Mikuláš versus Nové Mesto nad Váhom districts) were presented in detail in previous sections. Illustrations of a summary of these findings are given in figures 4.17. to 4.19.

Overall, attitude toward large carnivores did not differ significantly by sample area (fig. 4.17.). The mean attitude score in both areas was 3.54: neutral to positive. But people in the control area rated wolves and lynx more dangerous and were more afraid of them than were people in the core area who, in contrast, rated bears more dangerous (table 4.10.).

Previous studies have found that people in a carnivore-free area tended to be more positive about an increase of bears, wolves and lynx than people in a carnivore area (Szinovatz 1997). Attitudes have also been found to be more positive among urban residents (Zimmerann *et al*. 2001). The presence of carnivores therefore seems to affect peoples' attitude toward them negatively. In the present study this was confirmed for the bear and wolf but not lynx (table 4.10.).

Attitude toward large carnivore management differed significantly between the two study areas (see fig. 4.18.). People in the core area were significantly more negative toward large carnivore management issues than people in the control area. Nevertheless, people in both areas had neutral to positive attitudes toward large carnivore management. The mean management score of the core area was 3.63 compared to 3.72 in the control area.

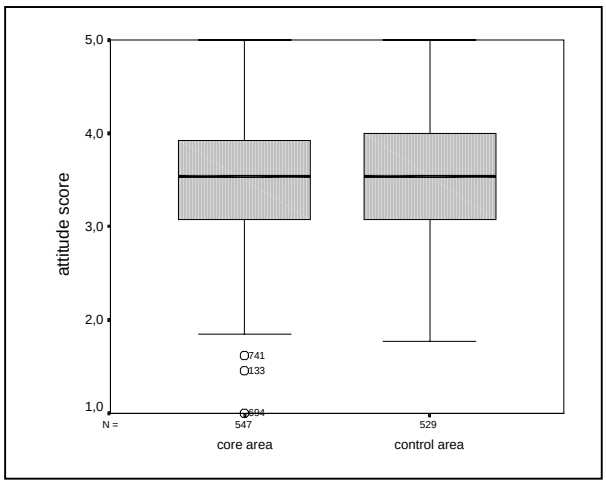

Figure 4.17. Attitude to large carnivores score by geographical region
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

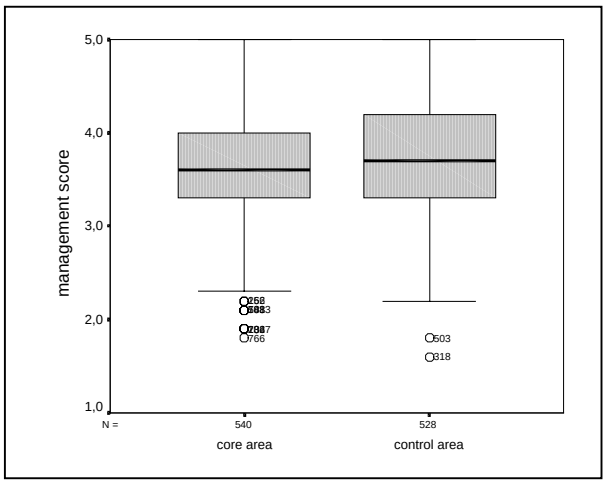

Figure 4.18. Attitude to management score by geographical region
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Knowledge about large carnivores was also found to differ significantly by geographical region (see fig. 4.19.). Surprisingly, people in the control area were more knowledgeable than people in the core area.

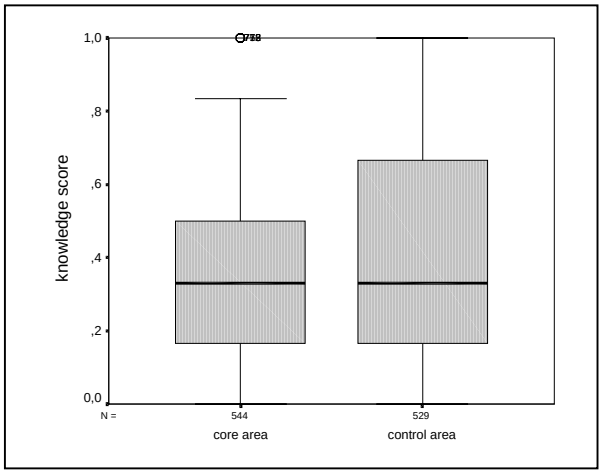

Figure 4.19. Knowledge score by geographical region
Mean knowledge score: 0.0.. no question was answered correctly, 0.5.. half the questions were answered correctly, 1.0.. all answered correctly

4.2.3.2. Carnivore species

This section assesses possible differences in attitude by species. This was already partly discussed in previous sections and so here only a summary and illustration of the findings will be given.

Attitude scores always fell within the range from 2.0 (negative, disagree) to 4.0 (positive, agree) and so, to illustrate any differences more clearly, the extreme values have been omitted from the *y*-axis in each of the following figures.

The first figure (fig. 4.20.) shows respondents' feelings toward each of the large carnivore species. A Kendall *W* test found significant differences among the three species. Respondents' feelings were most positive toward lynx (3.51), followed by bears (3.34) and lastly wolves (3.12). However, the means of all three species were above neutral (tended to positive).

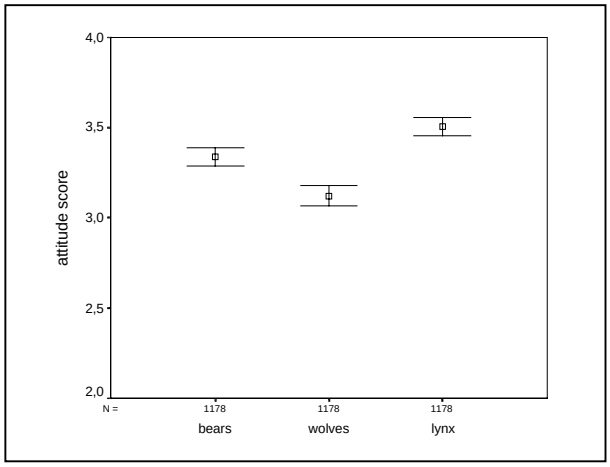

Figure 4.20. Respondents' feelings toward bears, wolves and lynx
Mean attitude score: 2.. negative, 3..neutral, 4.. positive

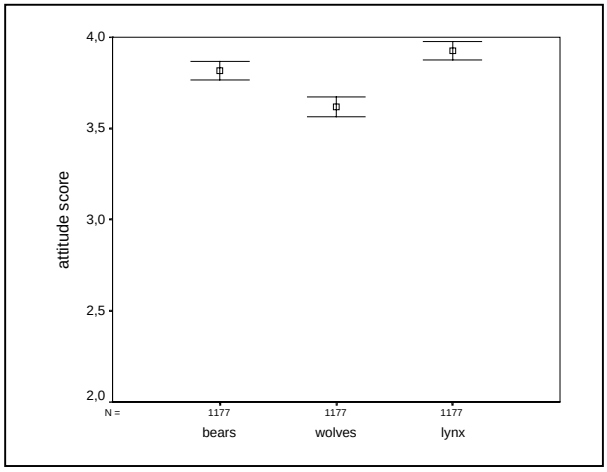

Figure 4.21. Respondents' attitude toward the existence of bears, wolves and lynx in Slovakia
Mean attitude score: 2.. bad, 3..neither good nor bad, 4.. good

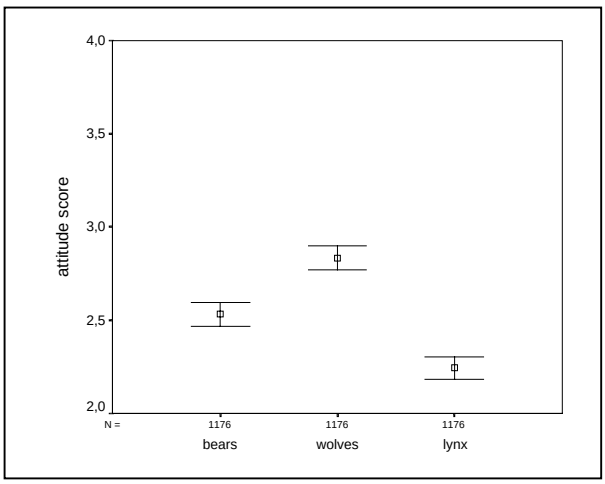

Figure 4.22. Respondents' perception of livestock killed by bears, wolves and lynx
"A lot of livestock is killed by bears, wolves and lynx."
Mean attitude score: 2.. disagree, 3..neutral, 4.. agree

When respondents were asked about the existence of large carnivores in Slovakia, their answers followed the same pattern as in the previous item (see figure 4.21.), but were even more positive. Again, significant differences by species were found. Mean attitude scores were 3.93 for lynx, 3.82 for bears and 3.62 for wolves.

Respondents of this survey did not think that a lot of livestock is killed by large carnivores (fig. 4.22.), but they had the impression that most livestock is killed by wolves (2.83), less by bears (2.53) and least by lynx (2.24), which is correct (Rigg 2004). The Kendall *W* test again discovered significant differences by species.

Significant differences by species were also found for the question, "I would be afraid to go into the forest if there are bears, wolves and lynx." Fear is an important factor affecting attitude toward large carnivores (see section 4.2.3.5.) but apparently it is not the only important aspect. As already mentioned, the least accepted animal is the wolf, but the most feared animal is the bear. Respondents are least afraid of lynx (2.98), followed by wolves (3.26) and bears (3.29). See fig. 4.23.

The results of the perception of the danger of each species corresponded to the previous question. Bears were rated most dangerous (2.25), followed by wolves (2.41) and lynx (2.98) (see fig. 4.24.). Significant differences by species were again found.

Figure 4.25. shows differences by species for reactions to the statement, "In Slovakia, there are too many bears, wolves and lynx." Significantly more people agreed that there are too many bears in Slovakia (2.76) than agreed that there are too many wolves (2.65) or lynx (2.22).

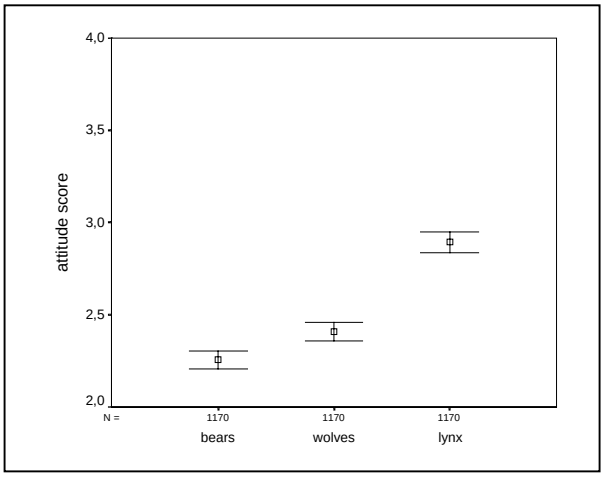

Figure 4.24. Respondents' perception of the danger of bears, wolves and lynx
Mean attitude score: 2.. dangerous, 3.. mosty harmless, 4.. always harmless

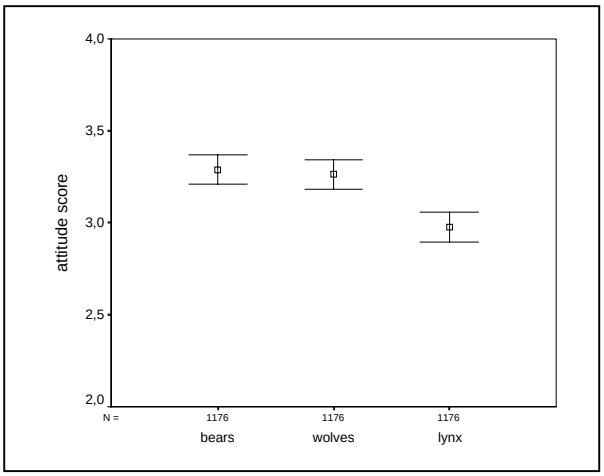

Figure 4.23. Respondents' fear of bears, wolves and lynx
"I would be afraid to go into the forest if there are bears, wolves and lynx."
Mean attitude score: 2.. disagree, 3.. neutral, 4.. agree

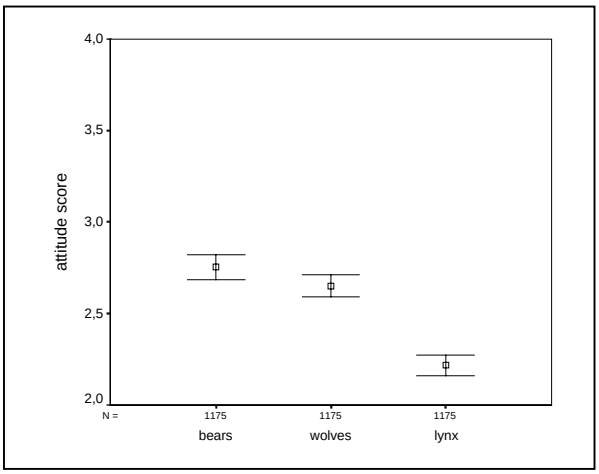

Figure 4.25. Respondents' perception of the population sizes of bears, wolves and lynx
"In Slovakia there are too many bears, wolves and lynx"
Mean attitude score: 2.. disagree, 3.. neutral, 4.. agree

4.2.3.3. Socio-demographic factors

Several studies have shown that socio-demographic factors affect public attitudes toward animals. Generally, older people, women, poorly educated people, rural people and farmers have more negative attitudes than their counterparts (Zimmermann *et al*. 2001). In this section, the following socio-demographic factors are presented in detail:-

- ❖ age
- ❖ sex
- ❖ occupation
- ❖ education
- ❖ place of residence

Age

Studies have shown that young adults are significantly more likely to express interest and concern for animals than are other age groups, especially the elderly (Kellert 1993).

The present study found that in Slovakia older people (those over 60 years old) also had significantly more negative attitudes toward large carnivores than people less than 50 years old. Figure 4.26. shows that participants aged between 16 and 35 years old had the most positive attitudes toward bears, wolves and lynx. Pupils' attitudes (12-15 years) were slightly more negative. Positive attitudes decreased from the age of 36 upwards. People over 60 years of age had the most negative attitudes toward large carnivores.

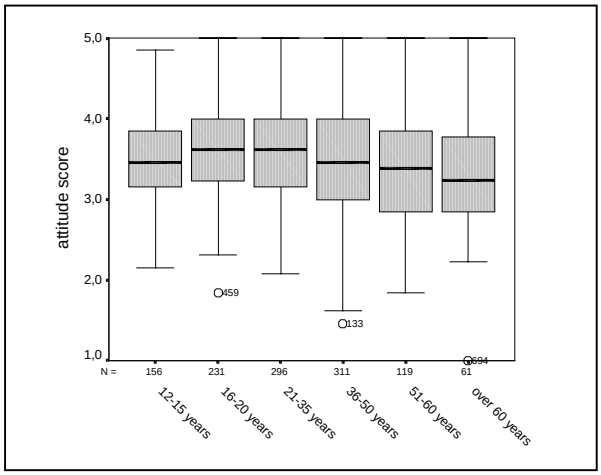

Figure 4.26. Attitude levels by respondents' age
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Sex

According to Kellert and Berry (1987), *"Gender is among the most important demographic factors in determining attitudes toward animals in our society"*. These authors found that men were more knowledgeable about animals, especially threatened and endangered species, than women. Women tended to be more concerned about domesticated animals, aesthetically appealing species and evolutionarily "higher" animals (Czech *et al*. 2001).

In this survey, 54.8% of respondents were male and 45.2% were female. Fig. 4.27. shows that attitudes of male respondents (3.58) were significantly more positive than attitudes of female respondents (3.46).

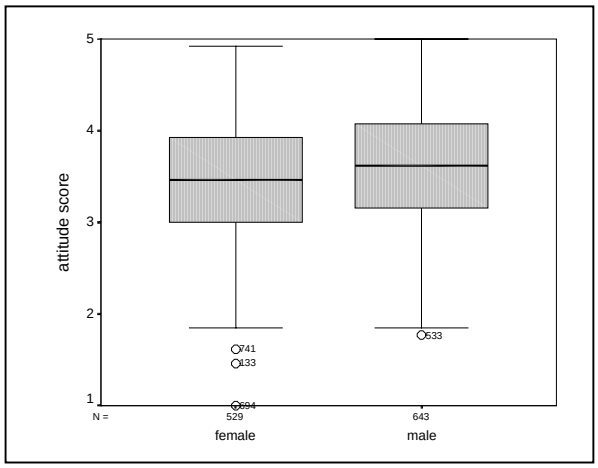

Figure 4.27. Attitude levels by respondents' sex
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

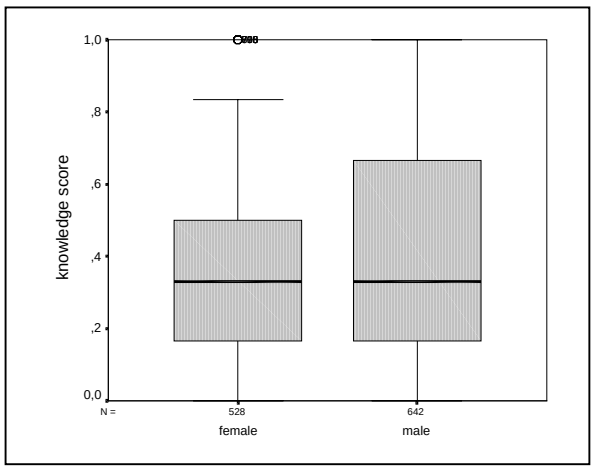

Figure 4.28. Knowledge levels by sex
Mean knowledge score: 0 .. no questions answered correctly, 0.5 .. half answered correctly, 1.0 .. all answered correctly

Figure 4.28. shows that male respondents, with a score of 4.2, were also significantly more knowledgeable than females (score 3.4).

Sex and age combined

A more detailed analysis should help to clarify the relations between sex, age and attitude toward large carnivores.

Figure 4.29. shows the sex distributions of various age classes in the sample. Males dominated all age classes except the youngest, pupils aged 12-15 years old (58.6% females and 41.4% males).

Considering that males generally have more positive attitudes toward large carnivores, figure 4.26. can be explained as follows: usually young adults have the most positive attitude toward animals, but due to the high number of females sampled aged 12-15 years, the attitude score of this class toward large carnivores was more negative than that of people between 16 and 35 years.

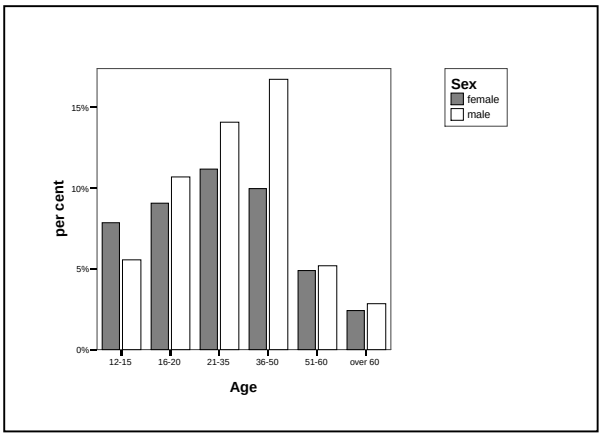

Figure 4.29. Distribution of respondents' age and sex

Figure 4.30. shows how attitude toward bears, wolves and lynx is related to sex and age. Male respondents have more positive attitudes toward carnivores than females in all age classes. Figure 4.30. also shows that, when the sexes are differentiated, 16-20 year old participants again had the most positive attitudes toward bears, wolves and lynx, but the difference is not significant.

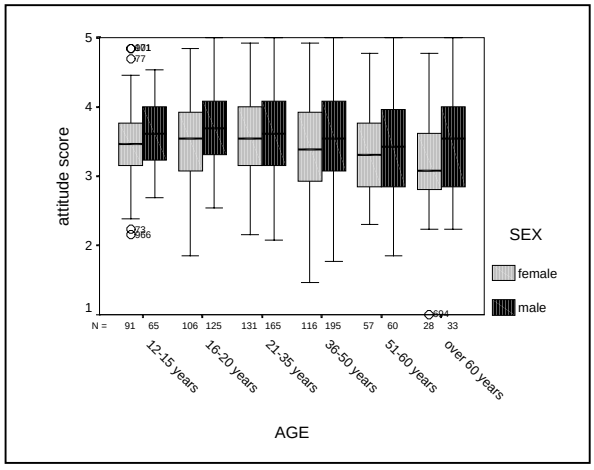

Figure 4.30. Attitude levels by respondents' age and sex
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Education

It has been shown in previous studies that poorly educated people had more negative attitudes than people with higher levels of education (Kellert 1994).

An increase in positive attitudes toward large carnivores among people with higher levels of education was also found in the present study, but the differences between education levels were not significant (see fig. 4.31.).

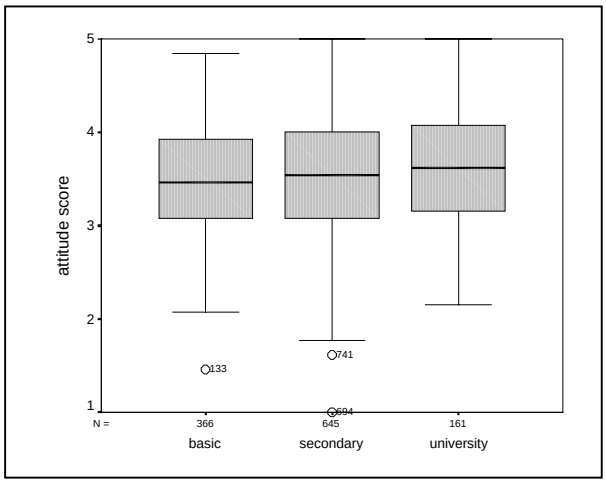

Figure 4.31. Attitude levels by respondents' education
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Occupation

Occupation can also be an important factor influencing attitude toward bears, wolves and

lynx. In the present study, the most positive occupational group was, surprisingly, foresters with a mean attitude score of 3.78, followed by students/pupils (3.58), industry and housewives (each 3.56). Shepherds (3.22) had the most negative attitude toward bears, wolves and lynx (see fig. 4.32.).

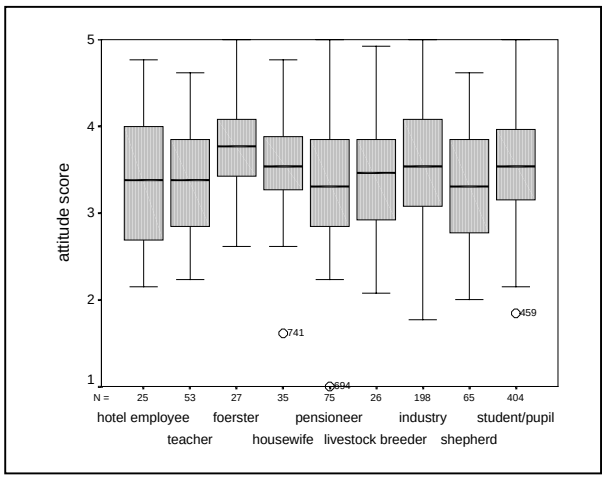

Figure 4.32. Attitude levels by respondents' occupation
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Place of residence

The hypothesis that rural people have more negative attitudes toward wild animals was supported by the findings of the present study. People living in towns with more than 8,000 inhabitants had significantly more positive attitudes (score 3.59) than those in villages with <2,100 inhabitants (3.46). See fig. 4.33.

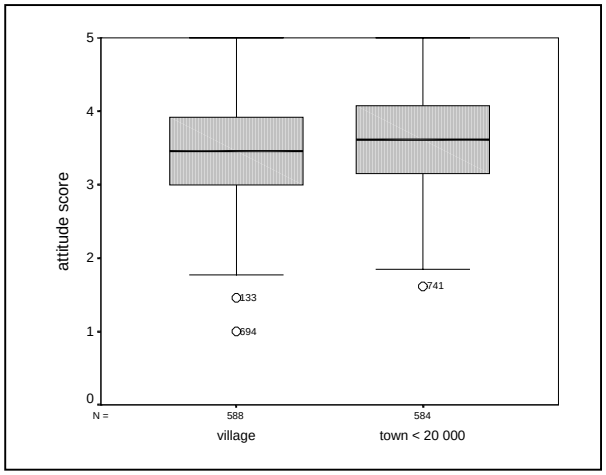

Figure 4.33. Attitude levels by respondents' place of residence
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

4.2.3.4. Experience

Various activities and experiences can also influence peoples' attitude toward large carnivores.

Frequency of going into forest

Peoples' attitude toward bears, wolves and lynx was analysed in relation to their frequency of going into forested areas (see fig. 4.34.).

People who were almost daily in forest (score 3.44) and people who went there more seldom than once a month (3.46) had similar attitudes toward bears, wolves and lynx. The most positive attitudes were found among respondents who went to forested areas at least once a week (3.64) or once a month (3.56). Pearson's χ^2 value showed significant differences between people going into forests more seldom than once a month and people who were there at least once a week or once a month.

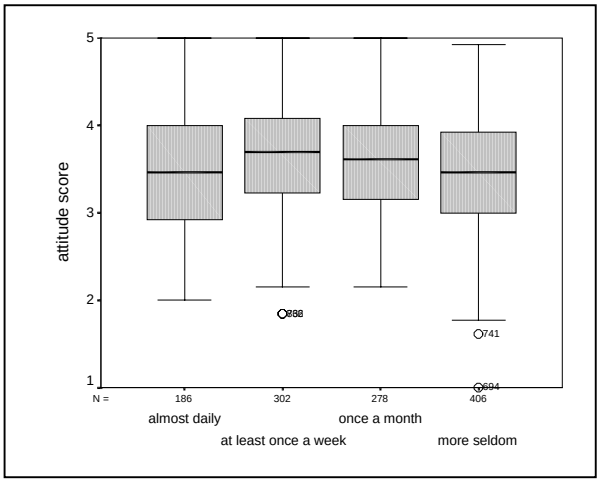

Figure 4.34. Attitude levels by respondents' frequency of going to forest
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Activities

Participants in the survey were asked about the activities they usually pursued. These activities will now be analysed in relation to peoples' attitudes.

People who picked berries and mushrooms, mountain bikers, wildlife watchers, hikers and

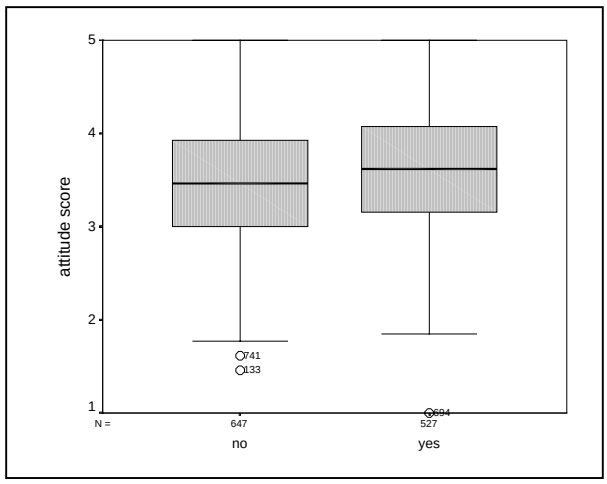

Figure 4.35. Attitude levels of berry/mushroom pickers versus non-berry/mushroom pickers
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

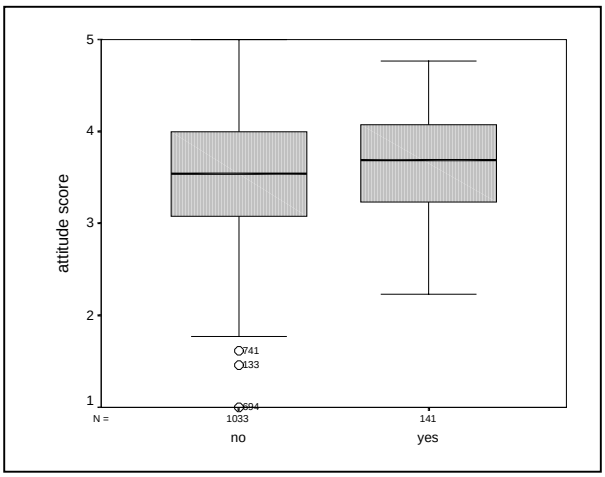

Figure 4.36. Attitude levels of mountain bikers versus non-mountain bikers
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

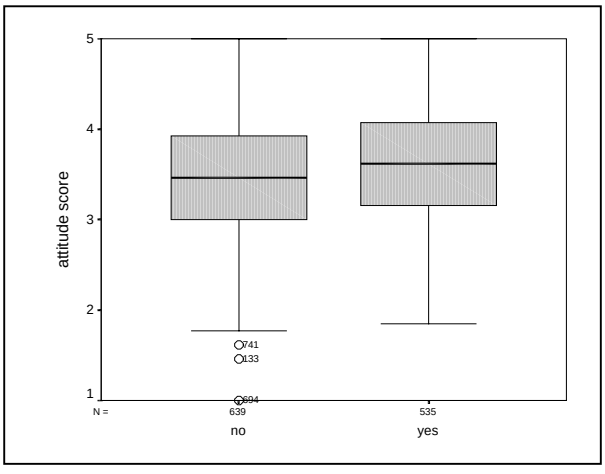

Figure 4.37. Attitude levels of wildlife watchers versus non-wildlife watchers
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

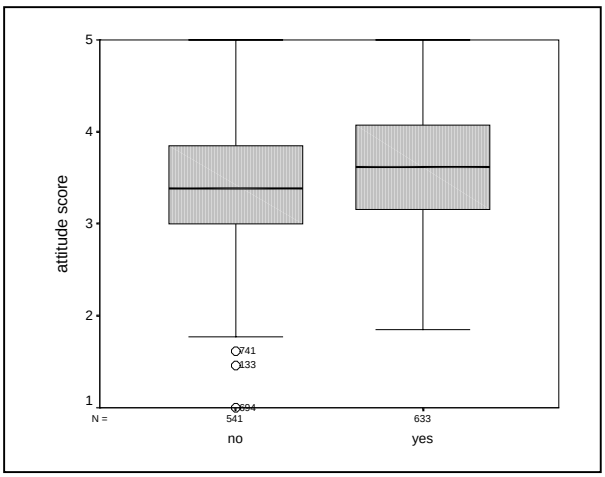

Figure 4.38. Attitude levels of hikers versus non-hikers
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

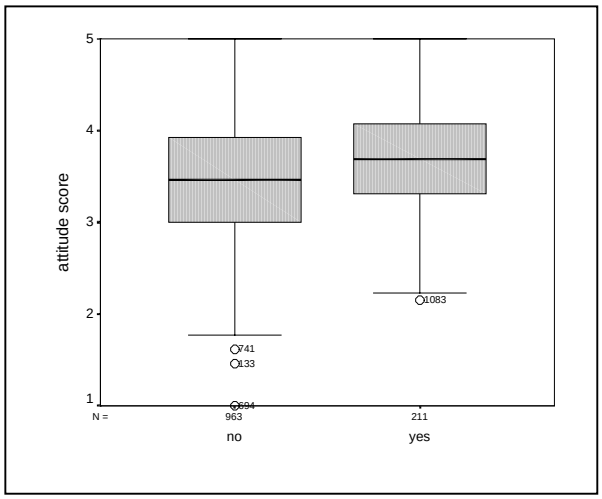

Figure 4.39. Attitude levels of skiers versus non-skiers
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

skiers had significantly more positive attitudes toward large carnivores than their counterparts (see figs. 4.35. to 4.39.). No significant differences in attitude score were found for fishing and staying at a cottage or, perhaps most surprisingly, between the score of hunters versus that of non-hunters.

Sightings

Attitude toward bears, wolves and lynx seemed also to be related to the sightings respondents had had. A third (32.0%) of respondents said they had seen a bear, a quarter (25.0%) reported having seen a wolf and almost a fifth (18.6%) claimed to have

seen a lynx in the wild. Respondents who said they had already seen a bear had significantly more positive attitudes than people who had not (see fig. 4.40.). No significant differences were found between attitudes of people who said they had seen a wolf or lynx compared to those who said they had not.

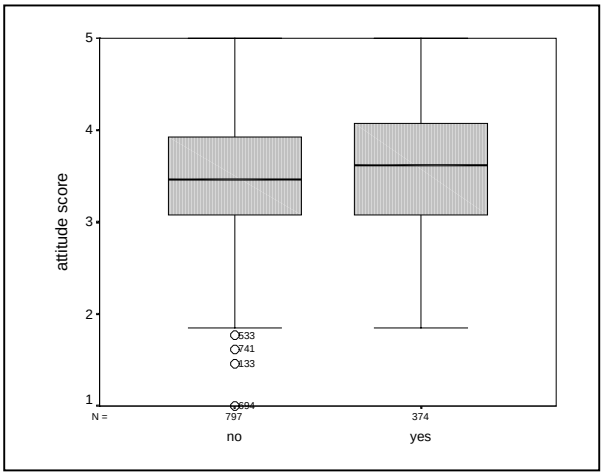

Figure 4.40. Attitude levels by respondents' sightings of bears
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Damage

Respondents of the survey who had already experienced damage by bears, wolves or lynx had significantly more negative attitudes than people who had not (see fig. 4.41.).

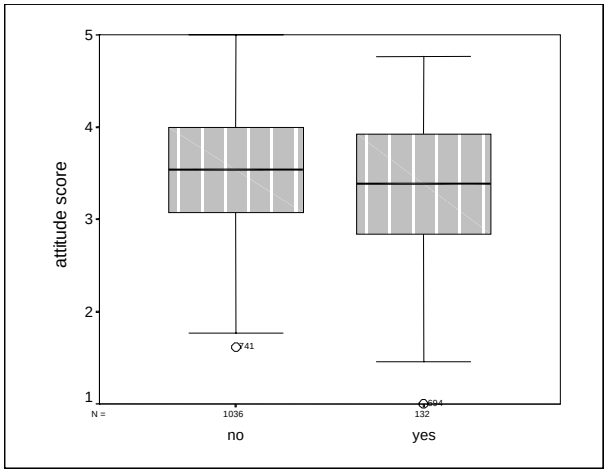

Figure 4.41. Attitude levels by experience of damage caused by bears, wolves and lynx
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

4.2.3.5. Perceived danger and fear

Several studies have explored attitudes toward large carnivores in relation to the perceived danger of these animals (Kellert 1994).

Figure 4.42. shows how respondents of the present survey in Slovakia rated the danger of the three species. Bears were rated most dangerous, followed by wolves and lynx. Around 65% of people thought that bears are either very dangerous or dangerous, around 55% thought wolves are (very) dangerous and approximately one third believed that lynx are (very) dangerous.

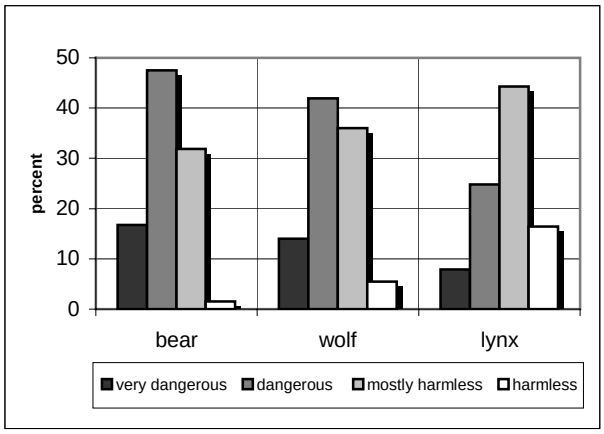

Figure 4.42. Respondents' perception of the danger of large carnivores (all respondents combined)

The following figures (4.43. to 4.45.) show that people's ratings of the danger presented by large carnivores is related to their attitudes toward them.

Participants who rated bears, wolves and lynx very dangerous animals had the most negative attitudes toward them. Attitudes of people who said bears, wolves and lynx are mostly harmless were significantly more positive. Although respondents who believed bears and wolves to be always harmless seemed to have more negative attitudes than respondents who thought they are mostly harmless, Pearson's χ^2 value did not detect a significant difference. Participants who said that lynx are always harmless had significantly more positive attitudes than people who said lynx are mostly harmless.

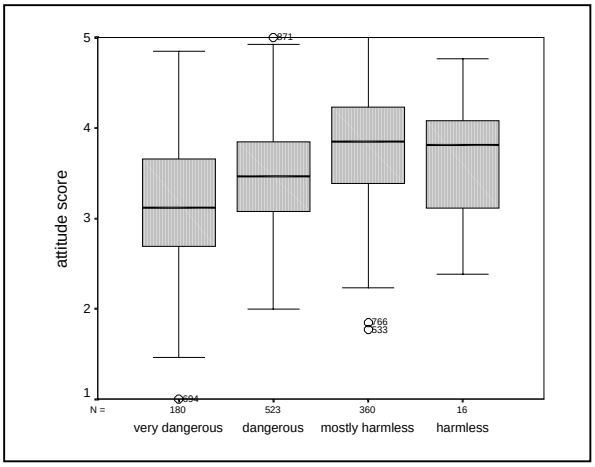

Figure 4.43. Attitude levels by respondents' perception of the danger of bears
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

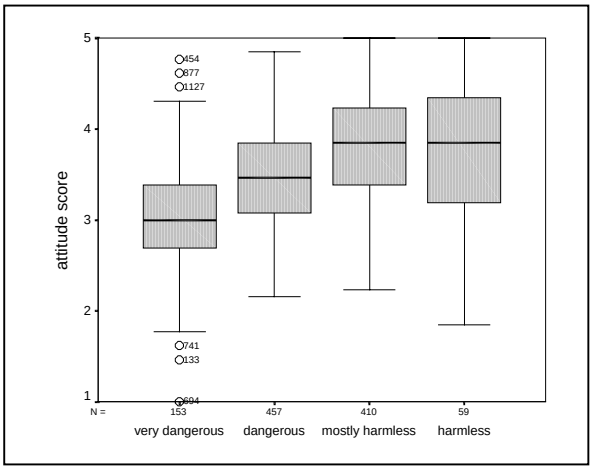

Figure 4.44. Attitude levels by respondents' perception of the danger of wolves
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

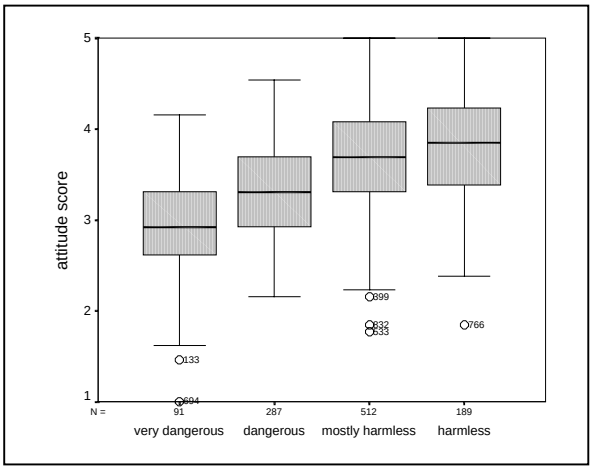

Figure 4.45. Attitude levels by respondents' perception of the danger of lynx
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

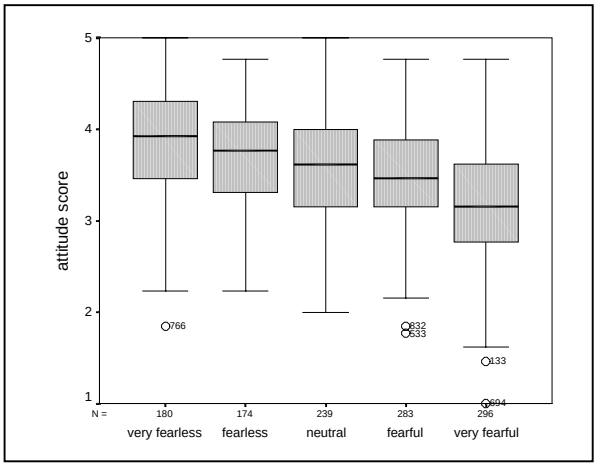

Figure 4.46. Attitude levels by respondents' fear of bears.
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

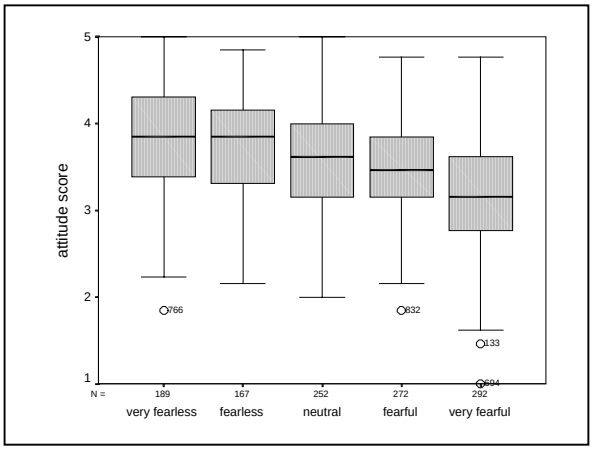

Figure 4.47. Attitude levels by respondents' fear of wolves.
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

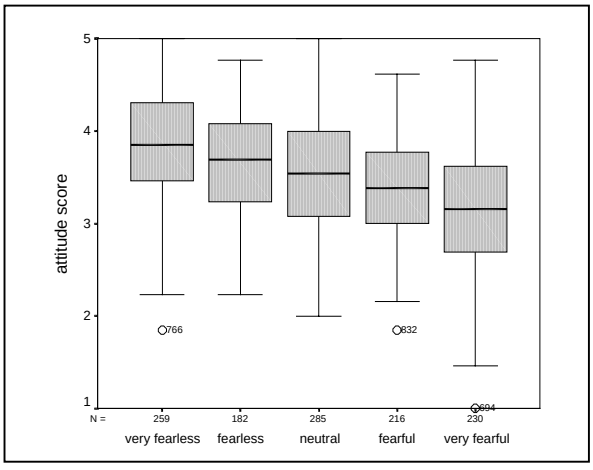

Figure 4.48. Attitude levels by respondents' fear of lynx.
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

The next item to be examined in relation to peoples' attitude was, "I would be afraid to go into the forest if there are bears, wolves or lynx". Very fearless people had the most positive attitudes and very fearful people the most negative attitudes toward all three species (see figs. 4.46. to 4.48.). Significant differences in attitude between fearful and fearless people were found.

4.2.3.6. Perception of population size

Another crucial question was, "How many bears, wolves and lynx do you think live in Slovakia?" The proportions of participants who underestimated, overestimated or correctly estimated population sizes of large carnivores were shown in fig. 4.5. on page 29.

In the following section, perceptions of population sizes are analysed in relation to peoples' attitudes. Figures 4.49. to 4.51. show the relationship between attitude and perception of population size.

Other studies have shown that people who underestimated population size had the most positive attitudes toward the species while those who overestimated had the most negative attitudes (Szinovatz 1997). The findings of the present survey do not support this conclusion. No significant differences in attitude were observed among people who overestimated, underestimated or correctly estimated. People who knew the population size of the animals always had the most positive attitude, but the differences were not significant.

Responses to the statement, "In Slovakia there are too many bears, wolves and lynx", were also analysed in relation to peoples' attitude. People who agreed that there are too many bears, wolves and lynx in Slovakia had significantly more negative attitudes than people who disagreed with this statement. The exception were people who strongly agreed that there are too many lynx in Slovakia, who had significantly more positive attitudes than people who agreed with the statement (see figs. 4.52. to 4.54.).

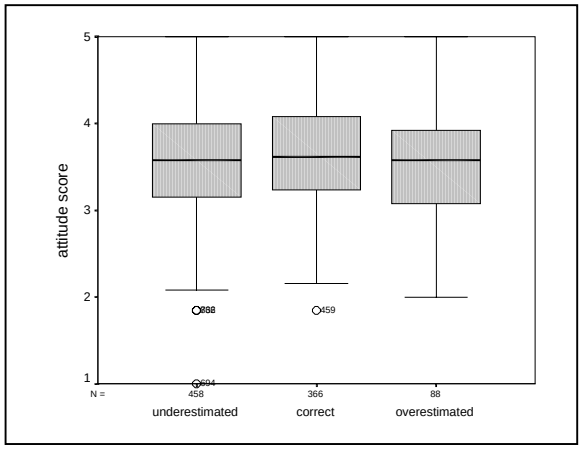

Figure 4.49. Attitude levels by respondents' perception of the population size of bears
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

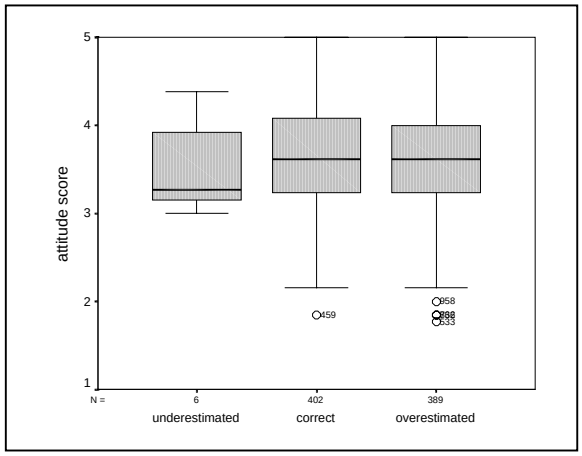

Figure 4.50. Attitude levels by respondents' perception of the population size of wolves
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

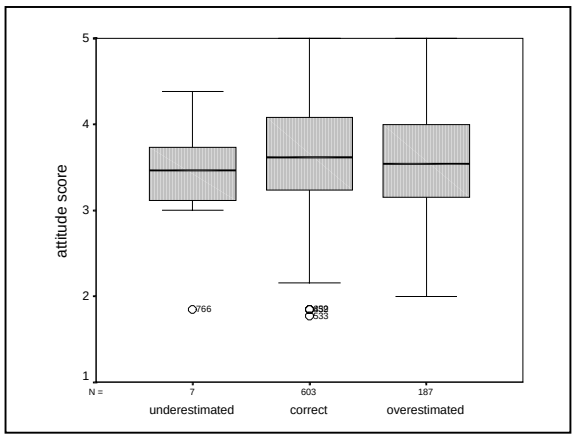

Figure 4.51. Attitude levels by respondents' perception of the population size of lynx
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

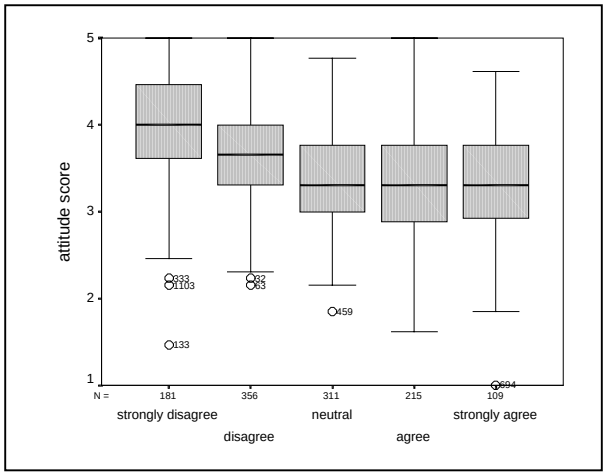

Figure 4.52. Attitude levels by response to Q. III1, "There are too many bears in Slovakia."
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

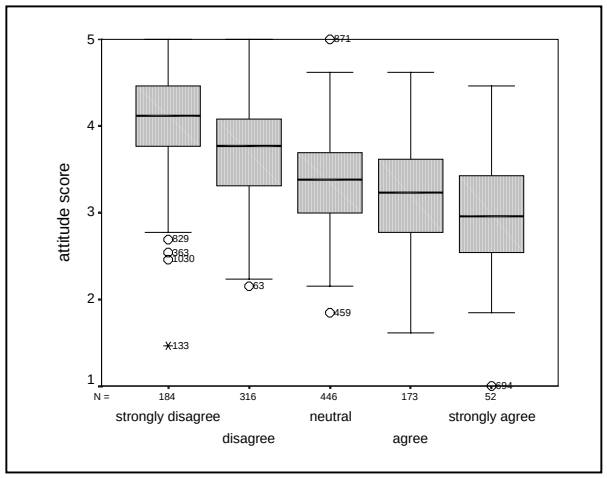

Figure 4.53. Attitude levels by response to Q. III1, "There are too many wolves in Slovakia."
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

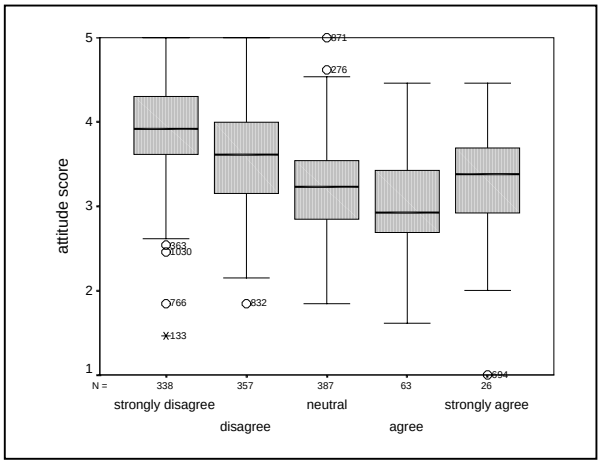

Figure 4.54. Attitude levels by response to Q. III1, "There are too many lynx in Slovakia."
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

4.2.3.7. Knowledge

Knowledge and attitude can be relatively independent dimensions of wildlife perception (Kellert 1994). A higher level of knowledge could result in a higher acceptance of a particular species (Wechselberger 2002) but it could also serve to reinforce and rationalize existing attitudes. For example, Zimmermann *et al*. (2001) stated that people with negative attitudes may keep themselves better informed.

Figure 4.55. shows the relationship of attitude to correct answers given by respondents in the present survey. The attitudes of participants who could not answer any of the questions or who could only answer one were very similar.

An increase in positive attitudes can be observed with increasing number of correct responses from none up to five questions answered correctly. The difference in attitude with each additional question answered correctly was only significant for the step from one to two questions answered correctly. Positive attitude decreased between five and six correct responses and the difference was again significant.

A comparison of knowledge and attitude between the different target groups was also made (cf. figs. 4.56. and 4.57.).

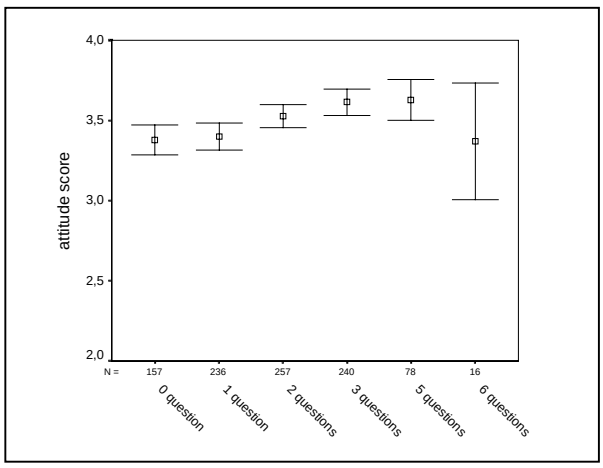

Figure 4.55. Attitude levels by respondents' knowledge
Mean attitude score: 1.. strongly negative, 3.. neutral, 5.. strongly positive

Woods people were, as expected, the most knowledgeable group (0.44) but they were also the least positive one (3.42). Tourists (0.41) were more knowledgeable than residents (0.38) or pupils (0.31) and overall they were the most positive target group (4.0).

According to this survey, positive attitudes toward large carnivore only decrease with more knowledge when people are directly affected, e.g. farmers, shepherds and foresters. Generally, more knowledge is associated with a greater degree of acceptance.

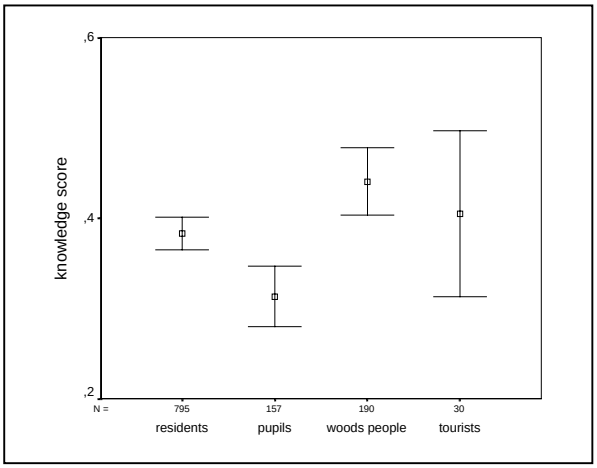

Figure 4.56. Knowledge levels by target group
Mean knowledge score: 0.2.. two questions answered correctly, 0.4.. four questions were answered correctly, 0.6.. six questions were answered correctly

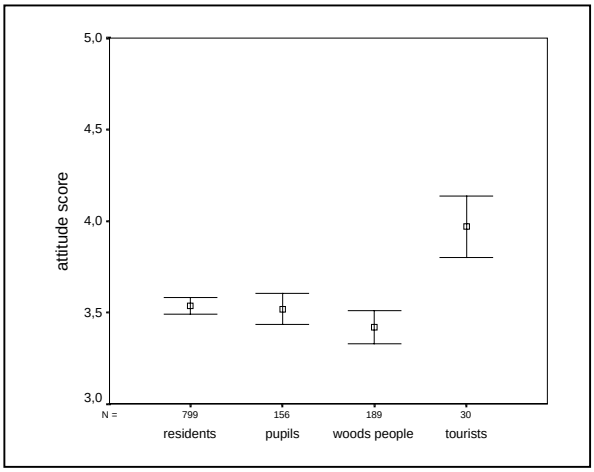

Figure 4.57. Attitude levels by target group
Mean attitude score: 3.. neutral, 4.. positive, 5.. strongly positive

Although tradition was not specifically identified in the present study in connection with opinions, children are influenced by their parents and so to some extent attitudes are "inherited". (Photo from L. Revúce.)

5. CONCLUSIONS

Overall, participants of the survey held neutral to positive attitudes toward large carnivores. This result can be considered as satisfactory but also as capable of improvement. Around half the respondents had positive feelings toward lynx and c.40% toward bears but only one third had positive feelings toward wolves. The most accepted animal of the survey was the lynx, the least accepted was the wolf, all within the neutral to positive range of the scale.

Socio-demographic factors partially affected attitudes toward large carnivores: males were significantly more knowledgeable about and positive toward large carnivores than females. People over 60 years of age had the most negative attitudes toward large carnivores, whereas those between 16 and 35 years of age had the most positive attitudes. An increase was found in positive attitudes toward large carnivores among people with a higher level of education, but the differences in attitudes among education levels were not significant. The most positive occupational group was, surprisingly, foresters. Shepherds had the most negative attitudes toward bears, wolves and lynx. People in the core area were more negative toward bears and wolves than people in the control area. Town residents had more positive attitudes toward large carnivores than people in villages. The most positive target group was "tourists", followed by "residents", "pupils" and "woods people".

Fear was one of the important factors affecting attitude toward large carnivores. Around half the participants were scared of bears and wolves and 38% were scared of lynx. People in the control area feared the wolf and the lynx more than people in the core area. Pupils were the most anxious target group. Very fearless people had the most positive attitudes and very fearful people the most negative attitudes toward bears, wolves and lynx. Bears were rated most dangerous and were also most feared by the respondents. Quite a lot of people thought that bears (9.3% of respondents), wolves (13.9%) and lynx (7.0%) are dangerous to people when hungry.

Knowledge levels were rather low. Most participants in the survey could answer less than half the knowledge questions correctly. Pupils were least knowledgeable about large carnivores. Surprisingly, people in the control area were significantly more knowledgeable than people in the core area. Positive attitudes toward large carnivores were only found to decrease with more knowledge among those most directly affected, i.e. woods people. Generally, more knowledge was associated with greater acceptance.

People in the core area were significantly more negative toward large carnivore management issues than people in the control area but both areas had neutral to positive attitudes toward large carnivore management. According to the participants of this survey, the most important issues concerning bear, wolf and lynx management in Slovakia are a lack of education/information and problems with people. The next most important issue for the respondents in the core area was a perceived "over-population" of bears. Nevertheless the damage caused by large carnivores was rated by the respondents of this survey as medium to low. People in the core area rated the damage lower than people in the control area. Respondents of the survey who had already experienced damage by bears, wolves or lynx were significantly less positive than people who had not.

Television seemed to have most formed conceptions of bears, wolves and lynx. Most respondents of all target groups wanted to obtain more information via television. Residents, tourists and woods people would also like to learn from newspapers/magazines. Pupils were interested in excursions and the internet while tourists favoured books and the internet. Residents preferred leaflets as a source of information.

Implications for management

The results of this survey show that in general there is widespread public support for current management policies of the State Nature Conservancy in Slovakia in relation to large carnivores. The main shortcoming identified by respondents was insufficient information.

The vast majority of respondents (82.9%) agreed that bears, wolves and lynx belong in the wild in Slovakia. More than three quarters (78.2%) of all participants, including 78.0% in the core area and 70.2% of woods people, agreed that hunting of bears, wolves and lynx should be "strictly regulated". During the study, bears could only be hunted by exception within a quota set at 10% of the estimated population, lynx were fully protected all year round and wolves could only be legally hunted from 1st November to 15th January, but with no quota.

The majority of people (61.2%) thought that compensation should be paid to farmers whose livestock had been killed by large carnivores. There was less support for only compensating farmers who had used preventive measures; nevertheless twice as many people agreed (48.2%) as disagreed (23.3%) with this idea. About the same proportion of people agreed (38.0%) as disagreed (35.3%) with eliminating bears and wolves from areas where they kill livestock. Act No. 543/2002 on Nature and Landscape Protection, valid from 1/1/03, extended state-paid compensation to cover damage caused by the wolf and several other protected species (previously only livestock and beehives damaged by bears had been compensated) and to some extent made payment of compensation conditional on the use of appropriate preventive measures.

During the present study, both hunting and commercial forestry were legally conducted in National Parks in Slovakia. Over 71% of respondents in the survey agreed or tended to agree that National Parks should be places where all animals are protected throughout the year. Two thirds (65.9%) thought that hunting should not be allowed in National Parks. Interestingly, a significantly higher proportion of people in the core area than in the control area were in favour of National Parks providing havens for wildlife. Even among woods people, slightly more disagreed (41.9%) than agreed (38.7%) with hunting in National Parks. These findings strongly suggest that broad-based public support could be anticipated for a ban on hunting in Slovakia's National Parks.

Recommendations for education programmes

Participants most often cited a lack of education/information as the most important problem in current management of large carnivores in Slovakia. Around 85% thought that people need to be given more information about bears, wolves and lynx and over 90% would themselves like to learn more.

The following specific recommendations are made for any future education programmes on large carnivores in Slovakia:-

- Shepherds, the occupational group with the most negative attitude toward large carnivores and at the same time closely involved with these species and their habitats, should be a priority;
- As it is currently the least accepted large carnivore species, education programmes should focus on the wolf;
- Children should be educated about carnivores in school, girls should be targeted and an emphasis needs to be placed on overcoming fear;
- There is a need for balanced information regarding the likely danger of large carnivores to humans, preventive measures and how to behaviour during encounters;
- Television is an important medium to reach all target groups;
- Articles in newspapers and magazines should mainly reach the target groups residents and woods people;
- A website with information and interesting links would help to reach particularly tourists and pupils.

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Robin Rigg
Svetlana Beťková

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In Slovakia, as in many other areas of the world, their killing of livestock (above) and competition with hunters for ungulates result in wolves being intensively hunted.

The three wolves in the photograph below (taken in 1998 by a participant in the hunt) were shot in Nízke Tatry National Park. Six years later, four wolves from one pack were legally shot in the same Park's buffer zone by one hunting club in a single weekend, resulting in international protest but no change in the law: unlimited numbers of wolves can be shot, even within National Parks, from 1st November to 15th January.

Appendices

I. Semi-structured interview protocol
II. Semi-structured interview transcripts
III. Written questionnaire
IV. Information leaflet

Appendix I. Semi-structured interview protocol

The interviewer (S. Beťková) had six pre-prepared questions for which she sought answers during the interviews. These are given below, with brief remarks on the purpose of each question. Seven people were interviewed: three foresters/hunters, two shepherds, a local resident and a pupil. Transcripts of their answers are given in appendix II together with a brief socio-demographic profile for each of the interviewees.

Q. 1. What kind of predacious animals do you think exist in Slovakia?

[This question is important to determine the "knowledge level" of the interviewee.]

Q. 2. Which characteristics, features and attributes do bears/wolves have?

Q. 3. What kind of feelings appear if you think about bears/wolves?

[Questions 2 and 3 should reveal the general attitude towards large carnivores.]

Q. 4. What does it mean to you personally to have bears/wolves in Slovakia?

[This question may lead interviewees to specific issues affecting them personally.]

Q. 5. Do you see any problems concerning bears/wolves in Slovakia?

Q. 6. If you worked for the authorities and could decide about bear/wolf management, what would you change?

[Questions 5 and 6 should lead the interviewee to think about problem solving.]

Ecotourists on a Slovak Wildlife Society "Wolves, Bears & Eagles" holiday, during which they tracked a pack of wolves in the core study area and saw one of them. The income that ecotourists generate and their enthusiasm for wildlife might influence local people's attitudes to carnivores.

Appendix II. Semi-structured interview transcripts

Professional forester, 29 years old, male, university educated, hunts

Q. 1. "A predator is an animal that hunts other animals. There are stoat, marten, fox, bigger ones like wolf, lynx, bear. Also some kinds of birds: raven, eagle, falcon, hawk."

Q. 2. "It's a very broad question. It depends on how well we know these two kinds of animals. According to my experience they are both very shy, they avoid humans but of course they are predators living on hunting, in some critical situations they can attack a human. Characteristic features, for sure they are very cautious, they have very well developed senses: sight and smell. They are not animals that look for a human with the aim of attacking him. When there were such cases of attacks they were caused by people's carelessness."

Q. 3. "I have had a chance to meet a wolf or bear only indirectly, not personally. However I don't have the impression they would be dangerous for my existence and I am happy they exist in Slovakia, I am proud of it. Because for sure they belong to nature and they are important members in its chain. Maybe somebody can get goose-pimples if he hears of them. This can come from the ideas of the fairy-tales we learned as children ... as these animals have certain qualities there. But I take them as part of the fauna. I don't have any negative or positive relationship to emphasise them over other animals."

Q. 4. "I am very happy there are bears in Slovakia if I compare it to the other countries of "civilised" Europe, where they exterminated those predators like bear, lynx, wolf in a very inhuman way (poison, iron traps ...). In our country if we consider hunting it's not possible to shoot all the animals, it's not our aim. If there is a problem that the population of some is very low (for example bears) then year-round protection is accepted. Now it is the opposite situation at the moment."

Q. 5. "There is a higher number of them in Slovakia than we can manage, both wolves and bears. That's why there are some social conflicts among bears and territorial problems and also more contacts with people. Maybe it is connected with the feature that the bear is not only a hunter but also a herbivore so he eats bilberries, raspberries and in case people exploit nature too much there are conflicts like that. As for problems with wolves, they were protected all year round not long ago. They spread into almost all mountainous ranges in Slovakia. They cause big losses of ungulates in some areas. They behave not as consumers but as predators. I know about one case where 19 red deer were killed. It was caused by so much snow that deer feeding at a feeding site couldn't escape. However, the wolves didn't eat them. This is one of the problems but for sure not the only or fundamental one."

Q. 6. "The first thing would be to give people more real information and knowledge of the lives of wild animals – bears and wolves – so that they know how they can get into trouble with them and how to get out of it. The next problem, I can say as a hunter, is that lawmakers who put limits on our work don't listen to our needs, experience or knowledge. They should solve specific problems in a specific situation for example in the case of a rabid wolf or a bear used to feeding on human food leftovers. Not to put strict unchangeable laws so that people whose everyday work is in this field can't then solve it."

Student, 14 years old, male, primary school educated, does not hunt

Q. 1. "I think in Slovakia there are predators such as wolves, bears, occasionally we can find a lynx, wild cats, foxes; if mentioning also birds there are eagles, falcons, ravens ... I don't remember more … and pike from fish."

Q. 2. "Characteristic feature of bear – it is mainly a herbivore, if it has cubs with it, it

can be dangerous. Otherwise it is scared of man, doesn't attack him. Wolves – in my opinion they are always in packs, they are a bit more dangerous than bears but also scared of man, they shouldn't harm us ... if we don't follow and don't look for them too much."

Q. 3. "If I think of the bear or wolf it depends on for example if it is a movie it matters what kind of film it is. But mainly I have a feeling they are quite kind animals … wolves not so much but bears yes."

Q. 4. "That bears are in Slovakia, it is good because they were almost exterminated (I don't know in which year), so that they still live is good. Wolves were hunted, some people don't like them ... There were some attacks on humans, I have heard ... but nothing serious … so I don't mind them."

Q. 5. "I don't see any problem ... only they shouldn't be hunted so much because they might die out. And I don't know where we can import them from then ..."

Q. 6. "The change should be to give the wild animals some territory like mountains or a few hundreds of hectares to live there but I don't think we should take care of them more, because it is not natural for them then."

Retired shepherd, 77 years old, male, probably primary school educated, does not hunt

[This man did not follow, or perhaps did not understand, the questions, and instead described an incident from when he worked as a shepherd in which he met a bear.]

"That time we got down to the lower meadow and fell asleep. The bear came during the night. I wasn't the main shepherd yet ... I woke up the mate: "Ďuro, wake up!" – "What?" – "The bear is here!" I am saying. There were young sheep that didn't give milk yet and the bear was sitting close to them like a king. I am saying: "Get axes, sticks, whatever to scare him away." Because the bear can throw rocks with its back feet if disturbed ... We had a dog called Čučo" tied up at the back but the bear came from the front side. We untied him later ... It could be only about 11 at night when he came ... sitting and waiting to grab something. But he wasn't successful. With the other shepherds we made him run away. He didn't come back until morning so we were comfortable. Then we went to look around, found nothing then with Čučo freely running around."

Retired forester, male, university educated, hunts

Q. 1. "It's mainly wolf, lynx, bear."

Q. 2. "The bear is actually a peaceful animal. It has its negatives; when a female has young it can be quite dangerous. That's why it's necessary at that time to behave very carefully, not to shout or make sudden movements because a female can be aggressive. The wolf is an insatiable, blood-thirsty animal. There are so many now that they make huge damages. They kill ungulates, red deer and roe deer and wild boar. We also had some cases this winter. We know there are two quite big packs. According to the scientific literature, a wolf needs two or three kilograms of meat a day and you can imagine that it's a large number of animals killed."

Q. 3. "Thinking of the bear, we shouldn't react aggressively. To avoid meeting him people can talk aloud if going into such an area. Thinking of the wolf, it's necessary to do something with him nationwide, because in maybe 5 or 10 years it will difficult to find any other animals here. They are so over-populated and aggressive that even if they don't need to eat they kill animals. There are many articles in the scientific literature about it, where specialists say there are going to be too many wolves in 5 or 10 years."

Q. 4. "The bear belongs to the forest. It is a predator, but mainly it cleans up dead animals, which is necessary, otherwise some illness or disease could be transferred."

Q. 5. "As for bears, what I said before applies. As for wolves, I am unambiguously in favour of destroying them to a great extent, because during the time of pup-raising when the

female has young, a strong one can have from 6 up to 12 pups and it's a rapid rise and with this also the destruction of ungulates grows."

Q. 6. "For bears regular annual shooting is necessary, of course within reasonable limits and concerning wolves a radical decrease is necessary. The number is intolerable. The law says that they are protected for most of the year, unfortunately, and some hunting clubs of the State Forests have permission for shooting but it is not enough. They say there are about 180 wolves here, I think it is a funny number, I think there are many more."

Shepherd (since 1984), between 36 and 50 years old, male, primary school educated, does not hunt

Q. 1. "Well, mostly there are wolves and bears. Every year they kill some sheep (last July wolves killed about four)."

Q. 2. "The wolf is more dangerous in packs. It kills more than it can eat when it enters the sheepfold. Wolves attack more than bears. They are more shy, hiding behind trees, always looking for something to catch. Bears we can also see in the daytime or in the Tatras at garbage containers or around cottages, but they don't attack if you don't disturb them."

Q. 3. "You know, they can attack or not. I've seen wolves and bears. When we guarded the sheep, a bear entered the sheepfold. I shone a torch at it and it jumped over me. I was really scared. A person is scared, you know we can't keep guns there to protect ourselves."

Q. 4. "They say bears and wolves clean the forest. It's nice to see them in the forest when they don't cause damage."

Q. 5. "When they cause damage to sheep, insurance companies don't want to pay for wolf damages, only for bears. Wolves didn't used to be in Slovakia before."

Q. 6. "The state should also pay for damage by wolves. A bear can be killed by a forester but we only use fire, we don't have any guns. I don't think it would be good to keep guns because something could happen. We don't know yet what's going to happen with entering the EU. They asked for some samples of milk and cheese from us, to milk by machine, but I don't think it's safe for the sheep, they can get an infection. We can't use wooden containers, but only plastic ones, but wooden ones were never harmful to anybody."

Local resident, 28 years old, female, university educated (economics), does not hunt

Q. 1. "There are the wolf, fox, some birds – eagle, I guess."

Q. 2. "I think they are both afraid of humans in a normal situation, but if disturbed they attack (it hasn't happened to me, but I have heard of it)."

Q. 3. "If I think of a bear, I don't know what I would do. I have seen bear footprints, not wolves' yet (but I don't think I would recognise them). When we saw bear footprints we just went in a different direction or we used whistles or the bells of our bikes to let it know we were there. I am more scared of wolves than bears."

Q. 4. "Well, I like those animals, I mean bears, especially young cubs, so I am happy they are here in Slovakia, but I would be scared to meet them. I think it's good they are here."

Q. 5. "I don't know much about it. They say there are less of them and there are problems when bears wake up early in spring, they go to take food from garbage containers, so they might attack people close to dwellings."

Q. 6. "Well, I don't know what to change. Maybe we should be more considerate of them when going to the forest, not to pick so much of their food such as berries and mushrooms, so that they have enough to eat."

Professional forester, between 36 and 50 years old, male, secondary school educated, hunts

Q. 1. "Our largest predator is the bear, then, or it can be said bear, lynx and wolf, because

the lynx was here earlier than the wolf. And then wild cat and fox. The wolf was native to Slovakia but was exterminated during the Second World War."

Q. 2. "The characteristics of the bear in our conditions are that it is mostly a nocturnal predator, in recent times when it has increased in number (possibly it is connected with this) it has also become a daytime predator. Strong individuals which control their territory push out the weaker ones, and these also use the day to find food and a person can meet them at any time of day. The wolf, in contrast to the bear, is much less dangerous because it is very shy and it is even a problem to meet it. I have met wolves 6 or 7 times, but it was always by chance when I am in the hills. Each of these predators is very cautious. If we want to attract them to a bait, for example, and if there was a cow which died and before was treated, a bear will not touch it, because it has a very good sense of smell. The same for the wolf. Another feature is that of course, because it is a predator, it lives on meat. Some years ago there were some publications about the wolf, that it lives on mice or grasshoppers; of course it's not true, it was just to defend the wolf. It takes its tax, it's made like that: if it wants to survive, it must hunt."

Q. 3. "I can say different things about my feelings, because I was in good and bad situations. When I met wolves it was always okay, because when a wolf notices a person it tries to escape. With bears it is worse, a bear can stand up to resist and the worst is when a female is with young. They are really mixed feelings that I have. When a person actually meets a bear, it then really depends on both of them. Some say to run, sometimes it's not possible, I don't know, the legs get heavier and they don't work."

Q. 4. "The bear is a native predator in our country, it has been living here for many years in mountainous parts of Slovakia. I am in favour of having bears, but today there are a lot of them. Two or three bears went to the fields for maize, so there are really a lot of them in these areas ... Jánska Valley, Čierný Váh, Malužina, in these areas, there are a lot. I'm saying, just because a big or old bear keeps his territory, and these young individuals are pushed out and they don't have a chance to be in his territory. If they meet him, he can kill them, the weaker ones. There are a lot of them and they become container bears, cottage owners feed them and so on. If they allowed more shooting so that, I guess, the main bears were left and these young ones shot, it would have some meaning. Conservationists are against it and so there are problems with it. Bears, I'm saying, belong to the mountains, yes, but not so many. Some old families told me that in the past there was just one bear in the dwarf pine, where there were sheep, cows, everything out, but they knew that it was there and it didn't cause such damage. When something died it took it. It isn't a problem to see a bear today. It's enough to walk around there, they go to gardens and break branches, collect fruit. It isn't good to feed them. The bear, as all predators, or every animal, should look after itself, alone. Man shouldn't interfere in that. When red deer are fed, for example, with hay and such, it's different. But the bear and such predators are then concentrated into one area and lose the instinct to be able to feed themselves and wait for what they get or find, such as containers, garbage cans and garbage dumps. They get used to having easy access to food. When a person appears close by, the bear thinks it is his prey, and so it defends that garbage or whatever. The bear belongs to the mountains and not near to people. It's people's mistake."

Q. 5. "The problem is probably that there are a lot of those young bears, and shooting is permitted up to 100 kg. They should also allow shooting larger ones, so that there is a balance, because if we shoot all the young ones and only old ones are left, it will not be good, there should be a balance. So about wolves, it is difficult to hunt the wolf. It can be drawn to a bait, but I'm saying it is very cautious. We have cases when we hunted wolves, baits were left, we went to the hide at night, wolves went around, they came to our tracks, sensed us, and didn't come till morning. We left the hide, and when we

returned later they had eaten everything. So they are clever. Another thing is that the wolf, or these predators, are colour-blind, they don't distinguish colours, they see black and white. It means they see very well at a distance. The wolf is a very good observer, and it can remember very well, it has a photographic memory. When it passes through once, it remembers exactly how everything was, and if it comes a second time and there is some change, for example you move something from one side to the other, it is afraid, it knows it wasn't like that before, and immediately it tries to find out why it's like that. The bear doesn't mind, if it's hungry it goes along it's route. If it finds some prey in the spring, it saves it and if something is left over it returns later directly to it. Perhaps it's because the bear has been hunted less and so has no natural enemies, man also no, so it goes directly. I think there are a lot of wolves. Numbers fluctuate, first up, then down, it changes, also the numbers of ungulates. While there are a lot of ungulates, the wolf finds food easily and so multiplies. Then there can be some disease, which is common, so the number falls, or they hunt all the animals, they have nothing, the pack must divide, to look further afield, the weaker ones die, and so, maybe. So a balance always exists in nature, but I allow myself to say that there are enough wolves. As we were used to before, the wolf wasn't here and when it appeared 15 years ago it was a rarity: wolf tracks, to see a wolf, everybody wanted to see a wolf but it wasn't easy, there were few of them. Now there are packs of 7-8 members, 2-3 members, various, here or there, they are operating, always hunting, we see them in winter in the snow, we track them and there are always killed animals. So the wolf is here, it would be good to limit its activity or to give a longer hunting period. Those 2 months or how long are they hunted are relatively little because the wolf has a high reproductive ability. Although it has young once a year, it can have 5-7 young, quite enough."

Q. 6. "What to change, so to lower the numbers a little or to lengthen the hunting period. And for bears I would say to hunt from young to old, all age levels, not only to say up to 100 kg shooting bears. It should also involve older bears. For wolves I say the same, to lengthen the hunting period, it is a predator, first it's here then it's there, it is difficult to hunt it, it's not like a bear that runs like a clock, it's very cautious. When it over-populates, it's bad, it can cause damage. When the numbers are manageable it's okay."

Appendix III. Written questionnaire



The Slovak Wildlife Society
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info@slovakwildlife.org
www.slovakwildlife.org

Dear respondent,

Thank you for filling in this questionnaire about your feelings towards bears, wolves and lynx. We greatly appreciate it. Your opinions towards carnivores are important whether positive, neutral or negative as we are trying to document the range of attitudes.

Your individual answers are confidential and so we encourage you to voice your opinion. Please answer all the questions, but do not take too long over this: it is not an exam! The questionnaire should represent your real opinion.

With regards,

Maria Wechselberger, Robin Rigg and Svetlana Beťková

I. We would like to inquire as to your attitude towards bears, wolves and lynx. Please circle the number or mark the answer that best describes your opinion.

1. Which answer best describes your feelings towards **bears, wolves and lynx**?

	very negative	negative	neutral	positive	very positive
bears	1	2	3	4	5
wolves	1	2	3	4	5
lynx	1	2	3	4	5

	very bad	bad	neither good nor bad	good	very good
2. That in Slovakia there are **bears** is:	1	2	3	4	5
wolves	1	2	3	4	5
lynx	1	2	3	4	5

	strongly disagree	disagree	neutral	agree	strongly agree
3. **Bears**, **wolves** and **lynx** belong in the wild in Slovakia.	1	2	3	4	5
4. **Bears**, **wolves** and **lynx** cause a lot of damage in Slovakia.	1	2	3	4	5
5. **Wolves** and **lynx** greatly reduce populations of deer.	1	2	3	4	5
6. **Wolves** and **lynx** caused the chamois decline.	1	2	3	4	5
7. A lot of livestock is killed by **bears**	1	2	3	4	5
wolves	1	2	3	4	5
lynx	1	2	3	4	5
8. I would be afraid to go into the forest if there are **bears**	1	2	3	4	5
wolves	1	2	3	4	5
lynx	1	2	3	4	5

9. Which of the following animals do you think are dangerous to humans?

	very dangerous	dangerous	mostly harmless	always harmless	I don't know
bear	**1**	**2**	**3**	**4**	**5**
wolf	**1**	**2**	**3**	**4**	**5**
lynx	**1**	**2**	**3**	**4**	**5**
wild boar	**1**	**2**	**3**	**4**	**5**
fox	**1**	**2**	**3**	**4**	**5**
golden eagle	**1**	**2**	**3**	**4**	**5**

10. If you answered very dangerous or dangerous, in which situations are they dangerous to man?

bears: _____
wolves: _____
lynx: _____

II. The next questions ask about your knowledge about bears, wolves and lynx. Please circle the response that best describes your opinion or fill in the blanks.

1. Presently in Slovakia there are:

bears	□ 0	□ 1-500	□501-1000	□ >1000	□ I don't know
wolves	□ 0	□ 1-500	□501-1000	□ >1000	□ I don't know
lynx	□ 0	□ 1-500	□501-1000	□ >1000	□ I don't know

2. What is the average number of **wolves** in a pack in Slovakia?

□ 2-7 □ 8-15 □ 16-20 □ >20 □ I don't know

3. What is the average weight of an adult male **bear**?

□ <100 kg □ 101-300 kg □ 301-500 kg □ >500 kg □ I don't know

4. Where do you think they exist:

	bears	**wolves**	**lynx**
Nízke Tatry			
Malé Karpaty			
Vysoké Tatry			
Slovenský Raj			
I don't know			

5. What do you think is the main diet of **bears**, **wolves** and **lynx** in Slovakia?

	bears	**wolves**	**lynx**
berries, insects, plants			
mice and rabbits			
red deer, roe deer, chamois			
livestock			
carcasses			
other			
I don't know			

6. Around how many people were killed in Slovakia in the last 10 years by:

bears _____ **wolves** _____ **lynx** _____

7. In Slovakia, are farmers paid money for livestock killed by **bears**?

□ yes □ no □ I don't know

8. Have you heard about "container **bears**"?

□ yes □ no

9. What are the reasons why **bears** become "container bears"?

□ they do not have enough natural food
□ people encourage bears by offering food
□ it is an easily accessible source of food for bears
□ bears are overpopulated
□ rubbish is not stored properly
□ other _____

III. What is your opinion about bear, wolf and lynx management in Slovakia? Please circle the response that best describes your opinion.

	strongly disagree	disagree	neutral	agree	strongly agree
1. In Slovakia there are too many **bears**	**1**	**2**	**3**	**4**	**5**
wolves	**1**	**2**	**3**	**4**	**5**
lynx	**1**	**2**	**3**	**4**	**5**
2. **Bears** and **wolves** should only live in restricted parts of Slovakia.	**1**	**2**	**3**	**4**	**5**
3. Money should be paid to farmers whose livestock is killed by **bears**, **wolves** or **lynx.**	**1**	**2**	**3**	**4**	**5**
4. Money should only be paid to farmers who tried to protect their livestock.	**1**	**2**	**3**	**4**	**5**
5. Hunting of **bears**, **wolves** and **lynx** should be strictly regulated.	**1**	**2**	**3**	**4**	**5**
6. Hunting in national parks should be allowed.	**1**	**2**	**3**	**4**	**5**
7. National parks should be areas where all animals are protected all year round.	**1**	**2**	**3**	**4**	**5**
8. **Bears** and **wolves** should be eliminated from areas where they kill livestock.	**1**	**2**	**3**	**4**	**5**
9. It is necessary to give people more information about **bears**, **wolves** and **lynx**.	**1**	**2**	**3**	**4**	**5**
10. More research is needed on **bears**, **wolves** and **lynx**.	**1**	**2**	**3**	**4**	**5**

11. In your opinion, what is the most important issue concerning **bear, wolf** and **lynx** management in Slovakia?

_____

IV. Please mark all that apply concerning your prior knowledge about bears, wolves and lynx.

1. What has formed your conception of **wolves, bears** and **lynx**?
(Mark with a cross all that apply)

□ television □ books/leaflets □ fairytales/legends □ hunters □ radio □ conservationists
□ school □ newspapers/magazines □ farmers/shepherds □ family □ other _____

2. Are you interested in learning more about **bears, wolves** and **lynx**?

□ yes □ no □ somewhat

3. Have you heard of The B.E.A.R.S. Project (Bear Education, Awareness and Research in Slovakia)?

□ yes □ no □ somewhat

4. In what form would you like to obtain information?

□ television and radio □ internet □ excursions □ special activities
□ newspapers/magazines □ books □ leaflets □ other _____

V. We would like to learn about your experience with bears, wolves and lynx in Slovakia. Please circle the response or check the answer that best describes your opinion.

1. How often do you go to the forest?
   □ almost daily □ at least once a week □ once a month □ more seldom
2. Which of the following activities do you usually pursue?
   □ berry/mushroom picking □ mountain biking □ wildlife watching □ hiking □ skiing
   □ staying at a cottage □ hunting □ fishing □ other _____

		yes	no
3. Have you ever seen in the wild a	**bear** ?	**1**	**2**
	wolf ?	**1**	**2**
	lynx ?	**1**	**2**
4. Would you like to see a wild	**bear** ?	**1**	**2**
	wolf ?	**1**	**2**
	lynx ?	**1**	**2**
5. Have you ever shot in Slovakia a	**bear** ?	**1**	**2**
	wolf ?	**1**	**2**
	lynx ?	**1**	**2**
6. Have you or your family ever experienced damage by **bears, wolves** or **lynx**?		**1**	**2**

7. If yes, what damage did these animals cause? _____
8. How would you react if you saw a
   bear ? _____
   wolf ? _____
   lynx ? _____
9. If in childhood you were told true stories about animals, how were they described:

bears ?	□ mostly positive	□ mostly negative	□ various	□ I wasn't told	□ I don't remember
wolves ?	□ mostly positive	□ mostly negative	□ various	□ I wasn't told	□ I don't remember
lynx ?	□ mostly positive	□ mostly negative	□ various	□ I wasn't told	□ I don't remember

VI. This final section will help us to learn more about the respondents of this survey. Your answers will be grouped together with those of others and will not be individually identifiable. All information is confidential. Please circle or fill in the correct information.

1. How old are you?
   □ 12-15 □ 16-20 □ 21-35 □ 36-50 □ 51-60 □ over 60
2. Are you □ female or □ male ?
3. Your occupation is:
   □ hotel employee □ teacher □ forester □ housewife □ pensioner
   □ livestock breeder □ industry □ shepherd □ student/pupil □ other _____
4. If you are a livestock breeder, what kind of animals do you have?
   □ sheep / goats □ horses □ cows □ pigs □ other _____
5. What education have you completed?
   □ basic □ secondary □ university
6. Do you live in a village or a town?
   □ village □ town <20000 inh. □ town >20000 inh. □ other _____
7. Which district do you live in? _____

Thank you for your cooperation. Please feel free to write any comments in the space below.

Appendix IV. Information leaflet

Bears, wolves & lynx

Basic facts on large carnivores in Slovakia

Are carnivores dangerous to humans?

Perhaps surprisingly, there has been no single proven case of a person being killed by a bear, wolf or lynx in Slovakia for more than 100 years, although there are a few reports of fatal infection with rabies. Each year around 5-15 people are injured by bears. In many of these cases the bear is reacting in self-defence, when it is surprised by a sudden close encounter, has cubs or is defending a food source. Individuals which have learned to associate humans with food are also dangerous. Wolves and lynx are very cautious and normally avoid humans.

How to avoid problems with carnivores

Nuisance bears: In their search for food, bears can be attracted to a variety of human-originating sources of food: refuse, campsites, beehives, orchards, etc. When seen near a hotel or cottage, a bear might look cute and seem to behave like a dog, but it is still a wild animal. Some bears which had learned to obtain food from people later injured someone and had to be shot, so please *never feed bears!* To avoid problems with bears, food and refuse must be well-secured and beehives/orchards protected with, for example, electric fences.

Predation on livestock: Livestock lack natural anti-predator adaptations and so are easy prey for carnivores. Sheep in mountain areas are particularly vulnerable. Nevertheless, <0.3% of all sheep in Slovakia are killed by wolves and bears per year. The state pays compensation for proven damage. The level of damage to livestock is not related to the number of predators: even one wolf (or dog) can kill a lot of sheep if they are left unprotected. Good quality electric fences and/or properly raised livestock guarding dogs such as the Slovenský čuvač can reduce losses.

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The Slovak Wildlife Society

We are a not-for-profit non-governmental organisation established in 1998. Our goal is to help ensure the long-term survival of threatened species and to conserve their habitats in Slovakia. We take an integrated approach to solutions for sustainable co-existence with people. Since 2000 we have assisted farmers to protect their livestock from carnivores using livestock guarding dogs. We run wildlife holidays to show local people that they can benefit from the presence of bears, wolves and lynx in their area.

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Bear

The brown bear (*Ursus arctos*) is Europe's largest predator; adult males generally weigh 140-320 kg and females 100-200 kg. Although the bear is a carnivore, it's diet also includes grass, berries, fruit, seeds and insects. The brown bear is not a very good hunter, but it feeds on carcasses and is able to catch small animals and sometimes fawns. It has an excellent sense of smell and good hearing. At present there are thought to be 600-800 bears in the forested mountain areas of central and northern Slovakia.

Bears breed in May-July but the young are not born until the winter, when the female is in her den. They weigh just 0.4 kg at birth. A female has 1-4 cubs per litter, which stay with her for up to 3.5 years. Bears have a low food intake in spring which increases through to the autumn in preparation for winter. Hibernation lasts 3-7 months. During this period a female with young loses up to 40% of her body weight. Brown bears can live for more than 30 years in the wild.

• Are there too many bears in Slovakia?

Bears live mostly solitary lives (apart from females with cubs). Occasionally they gather at seasonally abundant food sources such as an orchard, maize field or hunters' feeding site. Bears are attracted to these places from long distances, so it can wrongly appear that everywhere around is full of bears!

Wolf

The wolf (*Canis lupus*) has undeservedly gained a bad reputation due mainly to fairy tales and legends. People think of it as a cruel and dangerous killer. In reality, from 2 to 8 wolves live in family-based groups and share the care of their pups. Each pack hunts in a territory of 100 to 300 km^2. Their prey are mostly red deer and wild boar, more than 60% of those caught being weak, old or young individuals. Many hunts end in failure, some in injury.

Wolves' howling serves several purposes: it is a message to others that "this territory is occupied", a method to reunite the pack and a ritual. The dominant "alpha" pair usually limits the number of young in a pack to a single litter per year, which has 3-7 pups. Many do not survive their first winter. Young wolves face a choice between staying subordinate in their natal pack or dispersing to unknown lands.

• Are wolves "over-populated"?

In the 1970s the wolf was almost eradicated from Slovakia by hunting, trapping and poisoning. Partial legal protection allowed a natural growth in population to 150-350 wolves in central and eastern areas. However, numbers have now been falling for several years and density is lower than elsewhere in the Carpathians. They are still legally hunted from 1st Nov. to 15th Jan., during which time about 90-120 are shot each year.

Lynx

The Eurasian lynx (*Lynx lynx*) is the third largest predator in Europe, after the brown bear and the wolf. It is the largest native European cat. An adult lynx weighs 12-35 kg and is 60-70 cm tall at the shoulder. Roe deer form its staple diet, as well as hares, mice and birds.

The breeding season is from February to mid-April. Usually 2-3 kittens are born in late May. During the first two months the male brings food for his partner. The young stay with their mother until the next mating season. At least half of them die before reaching adulthood. Lynx can be found, like wolves and bears, mainly in extensive mixed forests and rocky mountains. This carnivore has been little studied in our country and so we do not know much about it. There are thought to be at most 300-400 lynx in Slovakia. They are fully protected by law.

• Did lynx cause the decline of Tatra chamois?

Predators and their prey have evolved over millions of years and the relationships between them are complex. By consistently removing weaker individuals a predator effectively improves the overall quality of its prey populations. Chamois are natural prey of lynx. There is no evidence that predation by the lynx (or wolf) caused the reduction in numbers of chamois in the Tatras.


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