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Human attitudes towards Sweden's large carnivores

– Attitudes among students of the Swedish University of Agricultural Sciences

Henrik Ekstrand

Biology and environmental sciences
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Faculty of Natural Resources and Agricultural Sciences
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Abstract

With a growing population of Sweden's large carnivores, brown bear (*Ursus arctos*), wolf (*Canis lupus*), lynx (*Lynx lynx*) and wolverine (*Gulo gulo*), conflicts may become more frequent, both between human and carnivore, and also human against human. Because of this, it becomes increasingly important to monitor people's attitudes towards large carnivores and get a view over how different factors affect how people value wildlife and management of wildlife. The aim of this study is to compare how different factors affect people's attitudes towards the large carnivores of Sweden. This was done by an investigating survey among the students of the Swedish University of Agricultural Sciences in Uppsala. It was found that students at SLU are generally positive to the conservation of Sweden's large carnivores. Respondents showed low avoidance of carnivore territory, which can indicate low fear of these species. The higher proportion of respondents would be willing to pay for the conservation of these carnivores. This positive attitude, in combination with SLU's environmental orientation, can be a positive indication for future conservation management of Sweden's large carnivores.

Keywords: Attitudes, carnivores, Sweden, SLU.

Table of contents

1 Introduction

With a growing population of Sweden's large carnivores, brown bear (*Ursus arctos*) lynx (*Lynx lynx*), wolf (*Canis lupus*) and wolverine (*Gulo gulo*), conflicts may become more frequent, both between humans and carnivores, and also human against human. Due to this, it becomes increasingly important to monitor people's attitudes towards large carnivores and get a view over how different factors affect how people value wildlife and management of wildlife (Ericsson et al. 2007). The conflicts between humans and large carnivores are complex and are influenced by such factors as: the distribution of the species over the land, experience or no experience with wildlife, usage of land and the cultural traditions of the local public (Gangaas et al. 2013). Socioeconomic variables, such as gender, age and income, may also affect people's attitudes (Johansson et al. 2012b).

One tool to measure the publics is their willingness to pay (WTP) for the conservation of large carnivores. The Swedish government spent about 56.5 million SEK in 2005 to cover cost of the predation done by large carnivores, to domesticated and semi-domesticated animals (Broberg & Brännlund 2008). This cost is indirectly paid for by taxpayers, due to the fact that the government is in charge for the management and conservation of Sweden's large carnivores (Johansson et al. 2012b). When a population of carnivores grow larger, the cost to mitigate the damage is expected to grow also (Broberg & Brännlund 2008). Widman & Elofsson (2018) found that a 1% increase in carnivore population density leads to a 0,3–0,4% increase in compensation cost. WTP can differ between individuals, depending on the different influences, as described above. People living in close vicinity of carnivores, and risking direct confrontation, tends to be less willing to pay for the conservation of these animals, compared to people living without risk of confrontation (Broberg & Brännlund 2008).

The fear of large carnivores also affects the WTP of people. Johansson et al. (2012b) found that people with self-reported fear of large carnivores were less likely to be

willing to pay, or would pay a lower amount, for the government's conservation plan for these animals. They also describe that the fear is originated from the fear of harm and pain, also that the fear of large carnivores is positively correlated – if one fears one of these carnivores it is likely that they also fear the other ones.

The aim of this study was to compare how different factors affect people's attitudes towards the large carnivores of Sweden. This was done by an investigating survey among the students on bachelor's level of the Swedish University of Agricultural Sciences (SLU) in Uppsala. SLU is a university with a broad verity of programmes, all with focus on developing knowledge of sustainable usage of biological land and water resources (Swedish University of Agricultural Sciences 2018). The students may end up in a deciding post, concerning the management of Sweden's large carnivores, or, at least, come across questions or problems caused by these animals. The comparing factors are; between the different programmes at SLU, growing up in an urban environment or growing up on the countryside and growing up in close or not close vicinity to large carnivores. These factors was analysed to see if they may affect which carnivore one least wants to come across, wants to see on a safe distance, WTP for each of the animals and which carnivore territory one was most likely to avoid.

2 Material and methods

A survey was made with the help of Google Forms. The survey consisted of ten questions, as seen in appendix 1 - survey. The questions were composed so one would get answers on which carnivore is the most popular or unpopular (question 5 appendix 1 – survey), the most unwanted carnivore one would want to come across in a land area (question 4 appendix 1 – survey) and if which carnivore one would avoid the most (question 10 appendix 1 – survey). WTP questions were made, for each carnivore (question 6-9 appendix 1 – survey), to get a measurable view over general positivity or negativity on the whole campus, in between programmes, in between urban and rural residents and in between people who had lived in close or not close vicinity to the carnivores. Question ten in the survey was a multiple-choice question, so one could for example avoid both a bear and a wolf territory, a lynx and a wolverine territory, etc. The questions were formulated with help from supervisors and classmates. The questions were reformulated two times before the survey that was sent. A pilot study was made to five classmates of the project writer, to see that the answers got registered in Google Forms. The survey was sent by email to all the programmes of bachelor's level at SLU in Uppsala, years 2015-2017, in the first question of the survey (appendix 1), and were open for five days. To send the survey only to bachelor's level was to limit the incoming data and because the project writer and head supervisor had more experience of programmes at this level. The answers became less frequent on the fourth day, so the decision was made to close the survey on the fifth day. The data was treated in Microsoft Excel and the factors: which programme you are studying, growing up in an urban environment or not and living in close vicinity to carnivores or not was compared to; which carnivore one least wanted to come across, wanted to see, WTP for each species and possible avoidance when sharing the same land-area. The answers were composed in diagrams, as seen in the results and appendix 2.

3 Results

A total number of 374 of roughly 1000 students answered the survey. As seen in figure 1 and figure 1.1 in appendix 2 – figures, the Veterinary programme (Veterinär) was the programme with the highest reply frequency of all respondents and the Sport and pet programme (Sport- och sällskapsdjur) had the lowest reply frequency, with zero replies. The programmes Energy Systems Engineering (Civilingenjör i energisystem), Environmental and Water Engineering (Civilingenjör i miljö- och vattenteknik) and Economics sustainable development (Ekonomi - hållbar utveckling) had relatively low reply frequency and can therefore not be considered a valid representation for these programmes (figure 1). The rest of the programmes had a relatively high reply frequency, ranging from 18 to 54 replies, and was, determined to be sufficient to be representative for these programmes and the results valid.

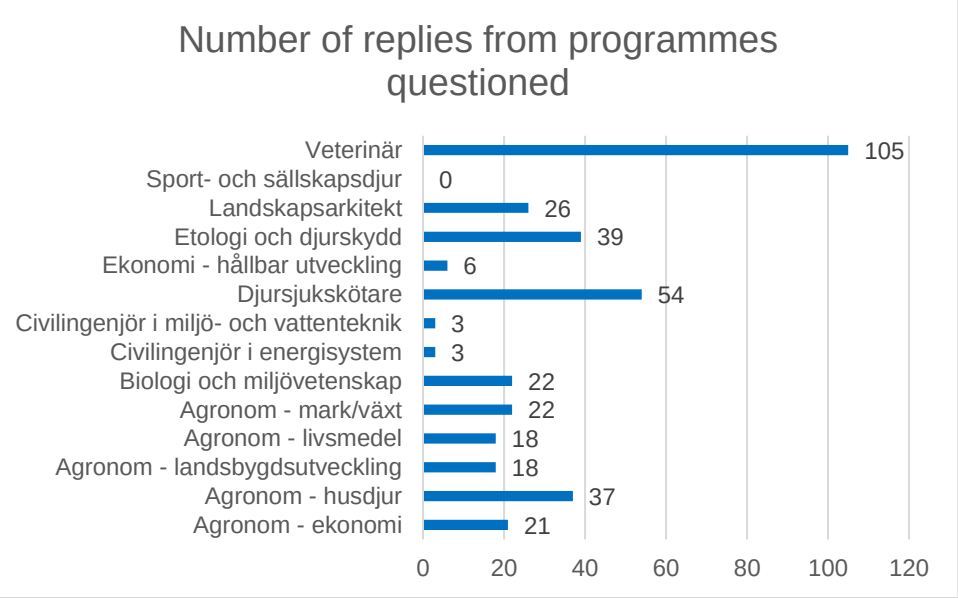


Figure 1. The total number of replies from all the programmes.

Of all the carnivores; bear was the one respondents least wanted to come across (figure 2 and figure 1.2 in appendix 2 – figures). Wolf came in second of the carnivore one least wanted to see, wolverine third and lynx fourth. Lynx was the most popular carnivore one wanted to see on a safe distance, bear the second most popular, wolf the third and wolverine the fourth (figure 3 & figure 1.3 in appendix 2 – figures). Of all respondents most would not avoid a land area occupied by a carnivore. Most respondents would avoid a bear territory, followed by wolf (figure 4 and figure 1.4 in appendix 2 – figures). Lynx and wolverine scored the lowest. On this question in the survey, students got the choice to choose multiple carnivores, meaning that one might avoid a bear territory as well as a wolf territory, or avoid all carnivore territories altogether.

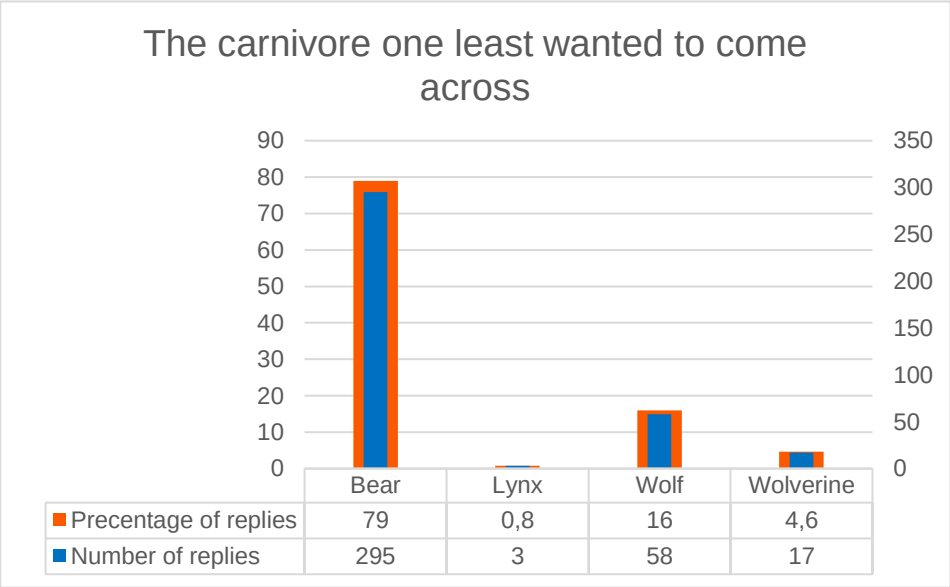


Figure 2. The total number and percentage, of answers from all the programmes, of the carnivore one wanted least to come across, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

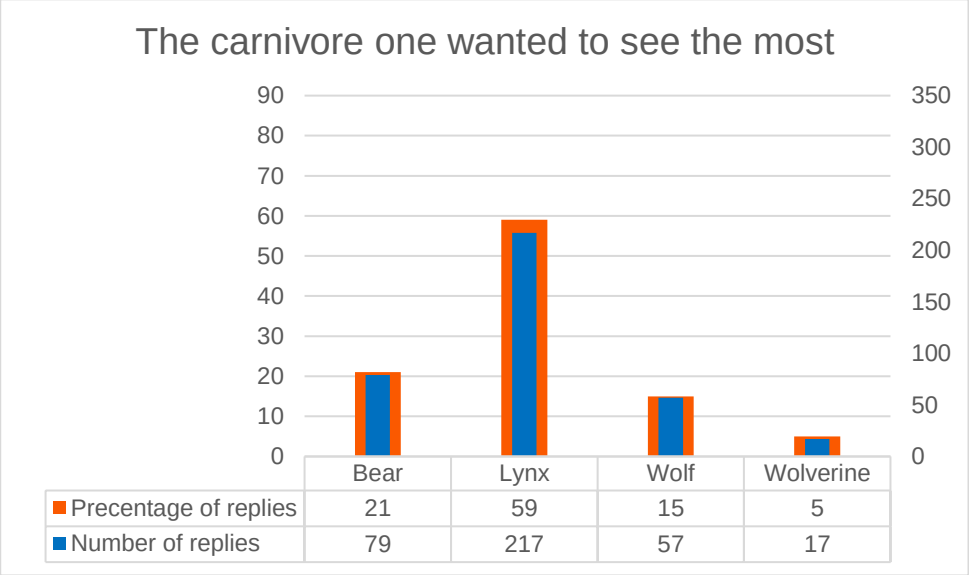


Figure 3. The total number and percentage, of answers from all the programmes, of the carnivore one wanted to see the most, on a safe distance, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

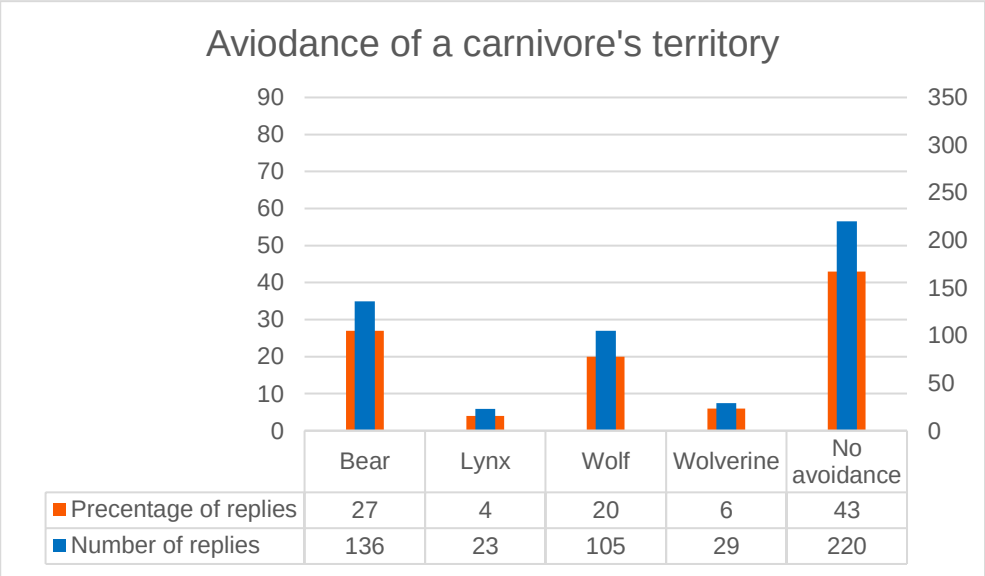


Figure 4. The total number and percentage, of answers from all the programmes, if one would avoid being in an area where a carnivore may be present, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure. This is a multiple-choice question, so one could for example avoid both a bear and a wolf territory, a lynx and a wolverine territory, etc.

Most of the respondents were positive to pay for the conservation of these carnivores. Lynx was the carnivore that the highest percentage of respondents were willing to pay for the conservation of, closely followed by bear, then wolf, then wolverine (figure 5 & 6).

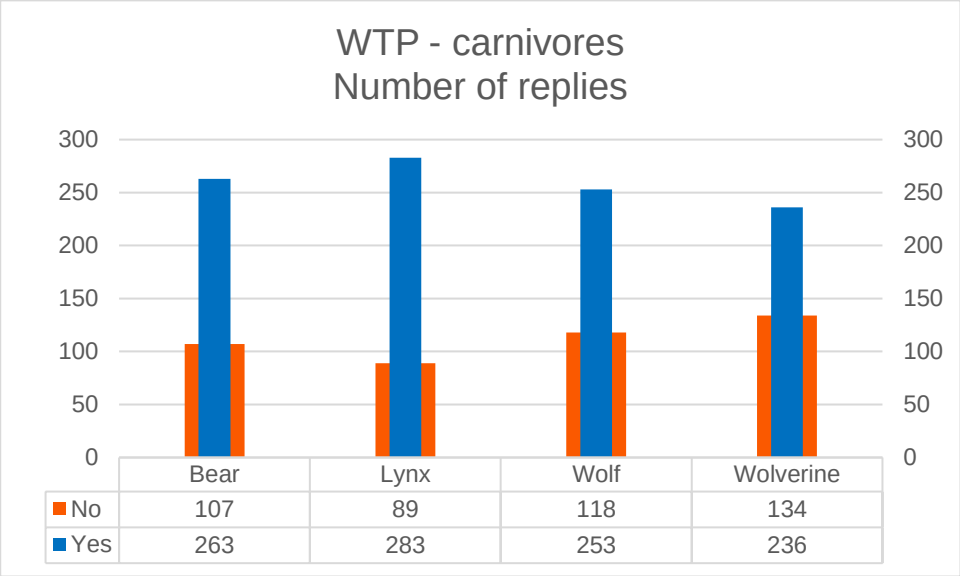


Figure 5. The total number, of answers from all the programmes, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The total number is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

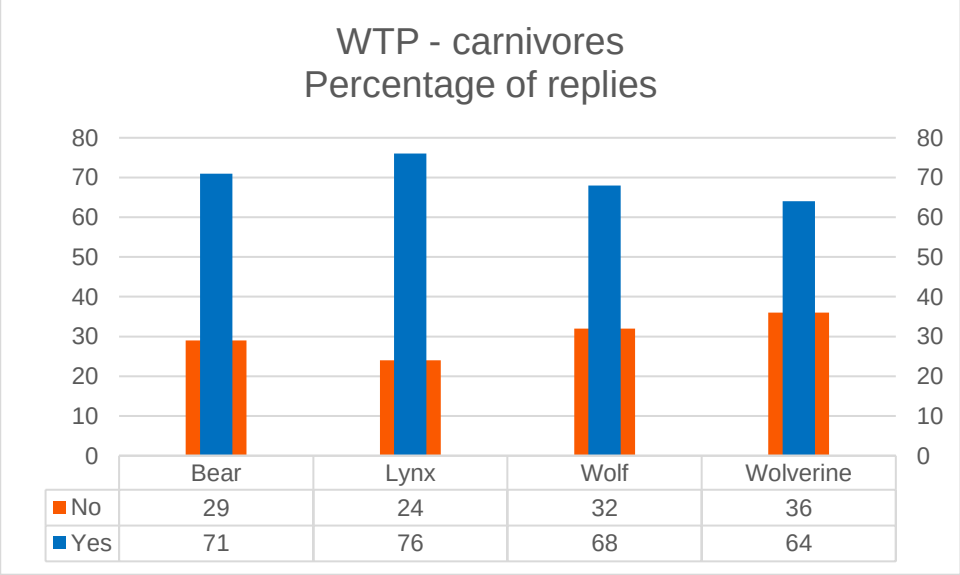
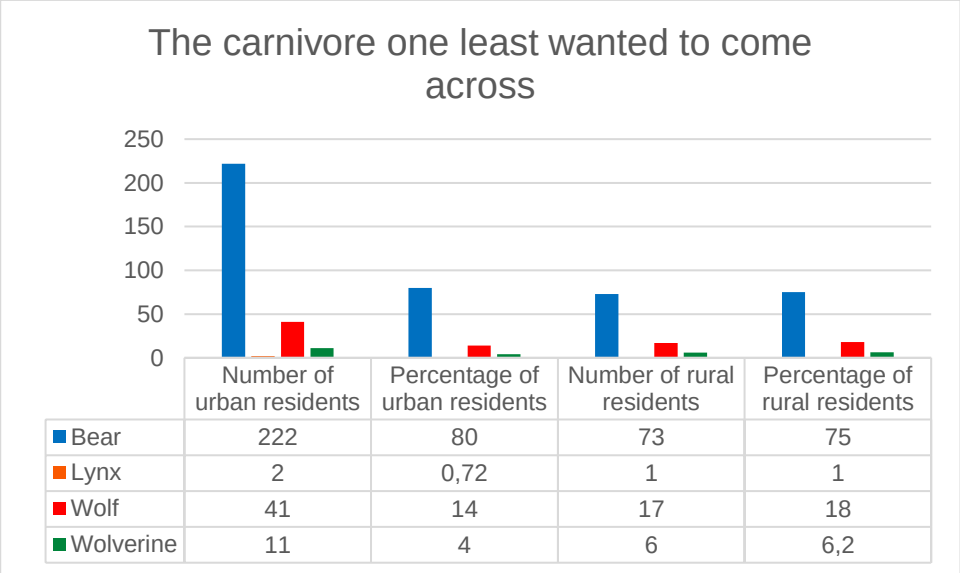


Figure 6. The percentage, of answers from all the programmes, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay.

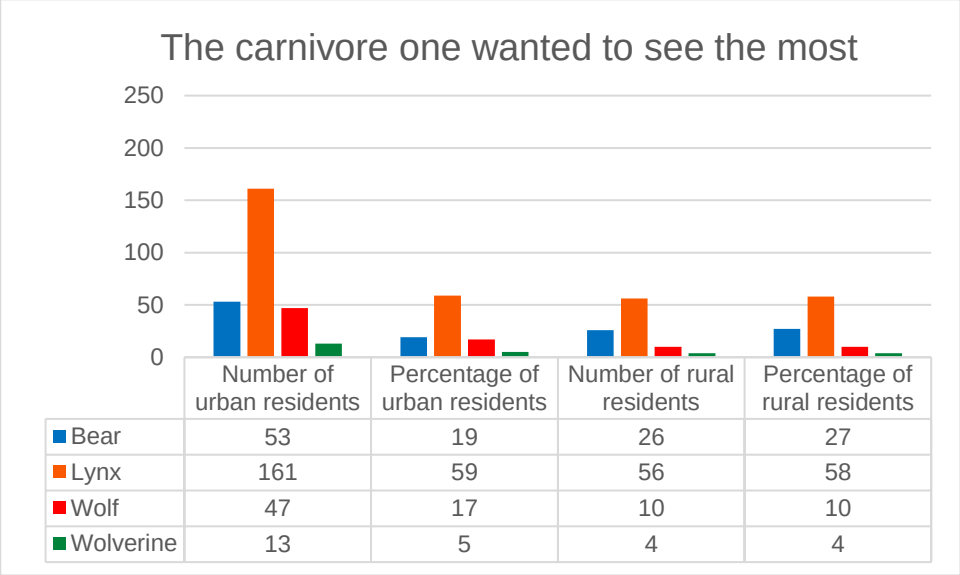
The percentage is on the y-axis, WTP for the carnivore is on the x-axis and a descriptive table is on the bottom of the figure.

The results for whether one had grown up in an urban environment or rural environment showed similar results to the results for all programmes, in the sense of that bear was the carnivore one wanted to come across the least, lynx was the carnivore on wanted to see the most and willingness to pay outweighed if one was not willing to pay for the conservation of carnivores (figure 7-11). There was no big gap between respondents that grown up in an urban environment or rural environment, except for the willingness to pay for the conservation of wolves, where respondents had grown up in a rural environment had a higher percentage that where less willing to pay, compared to urban residents (figure 11). If one may had lived in close vicinity did not show any major difference between respondents that had lived close to carnivores, not close to carnivores or they who did not know if they lived close to carnivores. There were no major differences comparing to the answers from all the programmes (figure 12-16).



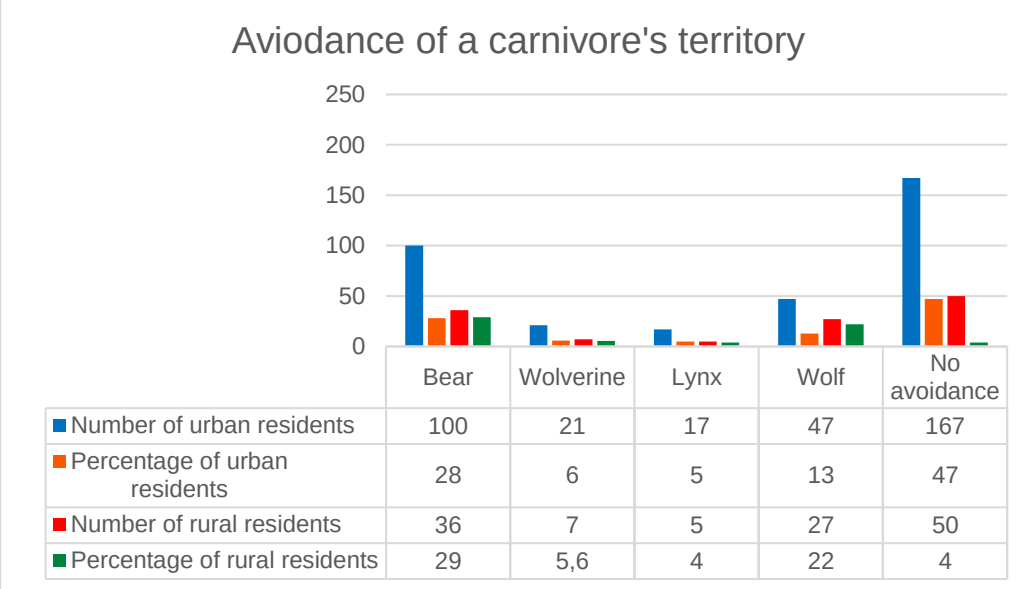
	Number of urban residents	Percentage of urban residents	Number of rural residents	Percentage of rural residents
Bear	222	80	73	75
Lynx	2	0,72	1	1
Wolf	41	14	17	18
Wolverine	11	4	6	6,2

Figure 7. The total number and percentage, of answers from respondents that grew up in an urban or rural environment, of the carnivore one wanted least to come across, with total number on the y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.



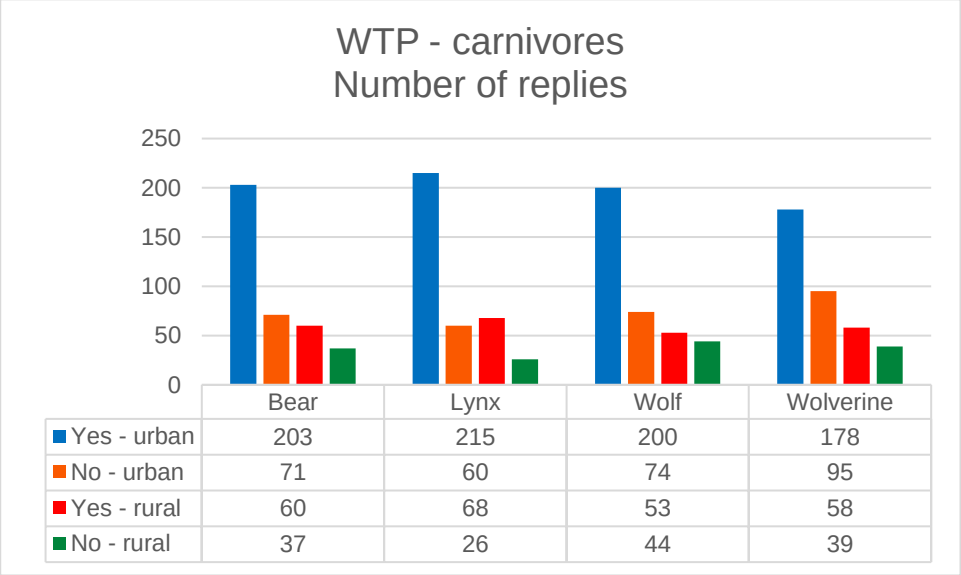
	Number of urban residents	Percentage of urban residents	Number of rural residents	Percentage of rural residents
Bear	53	19	26	27
Lynx	161	59	56	58
Wolf	47	17	10	10
Wolverine	13	5	4	4

Figure 8. The total number and percentage, of answers from respondents that grew up in an urban or rural environment, of the carnivore one wanted to see the most, with total number on the y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.



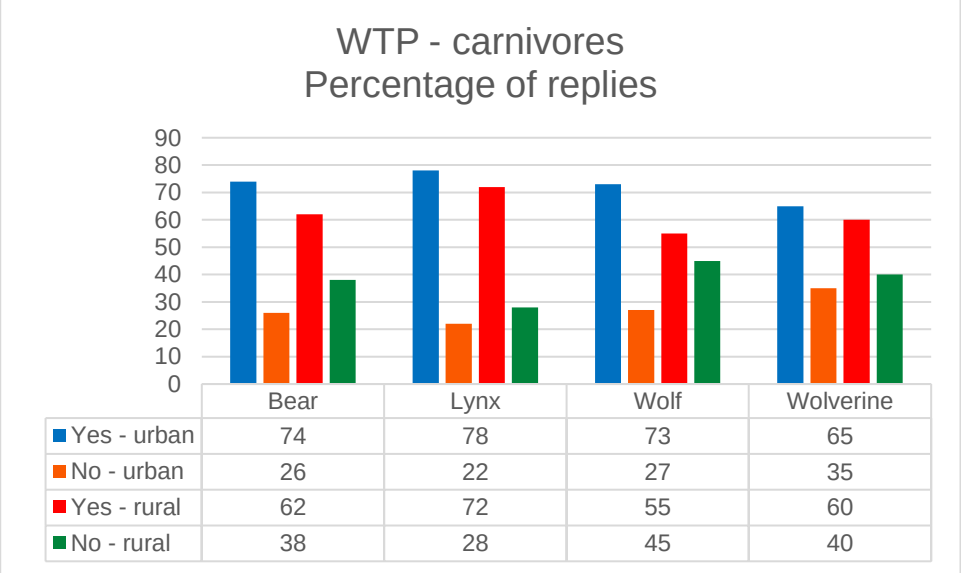
	Bear	Wolverine	Lynx	Wolf	No avoidance
Number of urban residents	100	21	17	47	167
Percentage of urban residents	28	6	5	13	47
Number of rural residents	36	7	5	27	50
Percentage of rural residents	29	5,6	4	22	4

Figure 9. The total number and percentage of answers, of answers from respondents that grew up in an urban or rural environment, if one would avoid being in an area where a carnivore may be present, with total number on the y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.



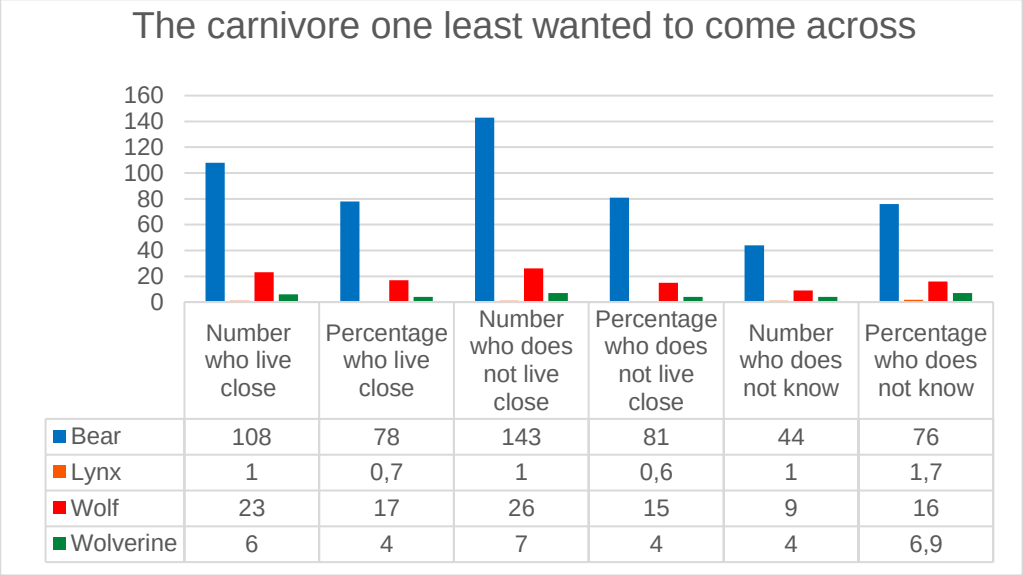
	Bear	Lynx	Wolf	Wolverine
Yes - urban	203	215	200	178
No - urban	71	60	74	95
Yes - rural	60	68	53	58
No - rural	37	26	44	39

Figure 10. The total number, of answers from respondents that grew up in an urban or rural environment, of the carnivore one was willing to pay for the conservation of. “Yes” is that you are willing to pay and “No” is that you are not willing to pay. The total number is on the y-axis, WTP for the carnivore is on the x-axis and a descriptive table is on the bottom of the figure.



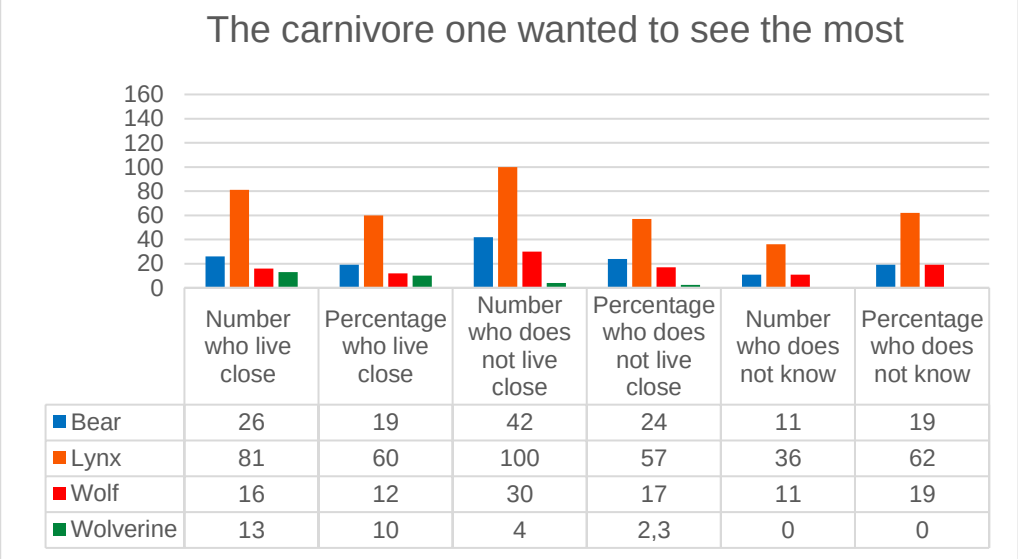
	Bear	Lynx	Wolf	Wolverine
Yes - urban	74	78	73	65
No - urban	26	22	27	35
Yes - rural	62	72	55	60
No - rural	38	28	45	40

Figure 11. The percentage, of answers from respondents that grew up in an urban or rural environment, of the carnivore one was willing to pay for the conservation of. “Yes” is that you are willing to pay and “No” is that you are not willing to pay. The percentage is on the y-axis, WTP for the carnivore is on the x-axis and a descriptive table is on the bottom of the figure.



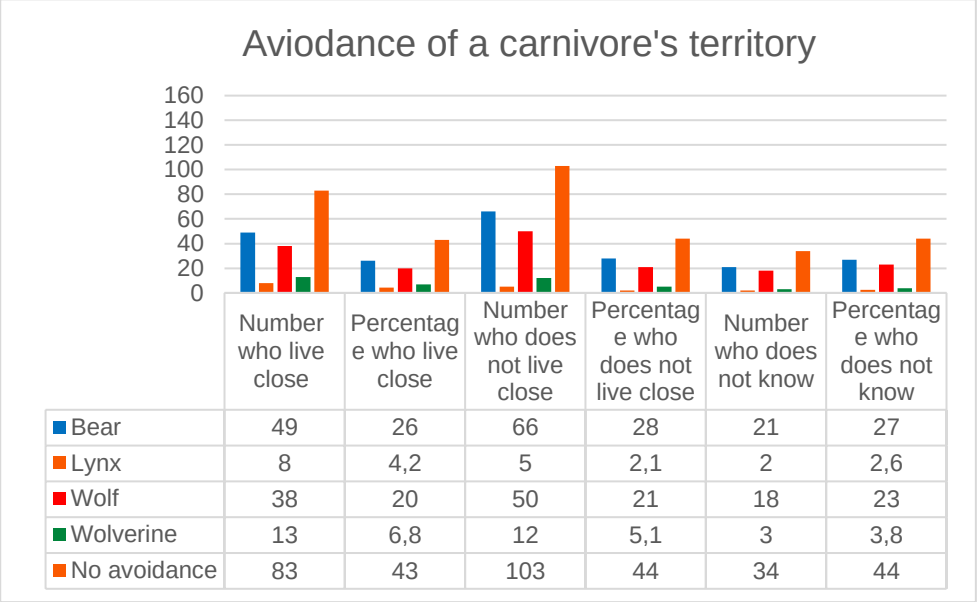
	Number who live close	Percentage who live close	Number who does not live close	Percentage who does not live close	Number who does not know	Percentage who does not know
Bear	108	78	143	81	44	76
Lynx	1	0,7	1	0,6	1	1,7
Wolf	23	17	26	15	9	16
Wolverine	6	4	7	4	4	6,9

Figure 12. The total number and percentage, of answers from respondents that may have lived in close vicinity to carnivores, of the carnivore one wanted least to come across, with total number on the y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.



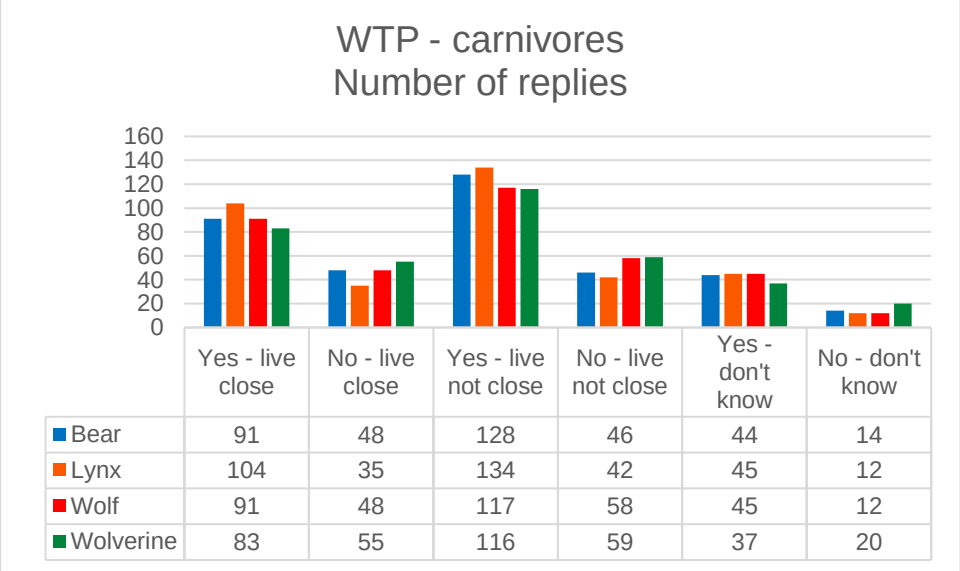
	Number who live close	Percentage who live close	Number who does not live close	Percentage who does not live close	Number who does not know	Percentage who does not know
Bear	26	19	42	24	11	19
Lynx	81	60	100	57	36	62
Wolf	16	12	30	17	11	19
Wolverine	13	10	4	2,3	0	0

Figure 13. The total number and percentage, of answers from respondents that may have lived in close vicinity to carnivores, of the carnivore one wanted to see the most, with total number on the y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.



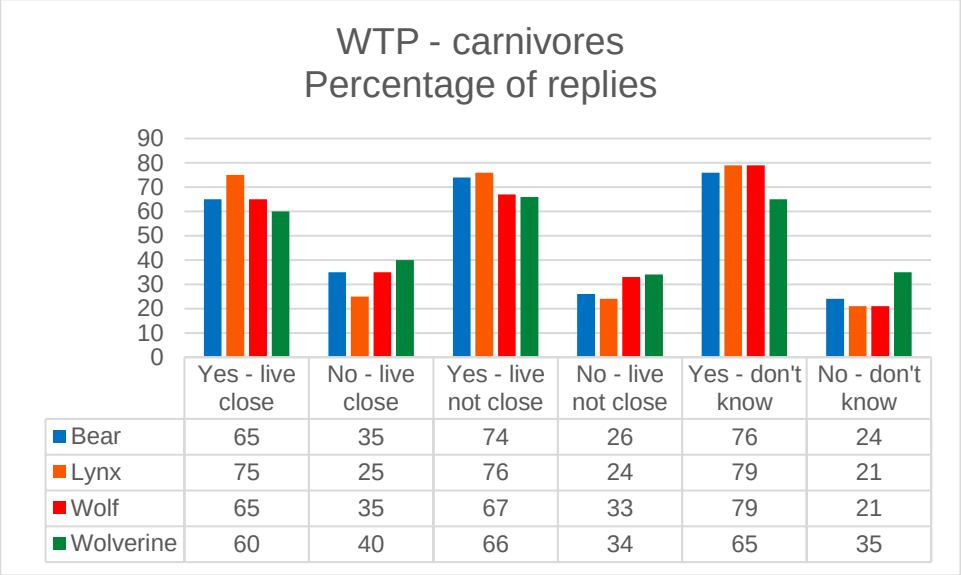
	Number who live close	Percentage who live close	Number who does not live close	Percentage who does not live close	Number who does not know	Percentage who does not know
Bear	49	26	66	28	21	27
Lynx	8	4,2	5	2,1	2	2,6
Wolf	38	20	50	21	18	23
Wolverine	13	6,8	12	5,1	3	3,8
No avoidance	83	43	103	44	34	44

Figure 14. The total number and percentage, of answers from respondents that may have lived in close vicinity to carnivores, if one would avoid being in an area where a carnivore may be present, with total number on the y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.



	Yes - live close	No - live close	Yes - live not close	No - live not close	Yes - don't know	No - don't know
Bear	91	48	128	46	44	14
Lynx	104	35	134	42	45	12
Wolf	91	48	117	58	45	12
Wolverine	83	55	116	59	37	20

Figure 15. The total number, of answers from respondents that may have lived in close vicinity to carnivores, of the carnivore one was willing to pay for the conservation of. “Yes” is that you are willing to pay and “No” is that you are not willing to pay. The total number is on the y-axis, WTP for the carnivore is on the x-axis and a descriptive table is on the bottom of the figure.



	Yes - live close	No - live close	Yes - live not close	No - live not close	Yes - don't know	No - don't know
Bear	65	35	74	26	76	24
Lynx	75	25	76	24	79	21
Wolf	65	35	67	33	79	21
Wolverine	60	40	66	34	65	35

Figure 16. The percentage, of answers from respondents that may have lived in close vicinity to carnivores, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The percentage is on the y-axis, WTP for the carnivore is on the x-axis and a descriptive table is on the bottom of the figure.

Some programmes answers deviated from the general attitude towards carnivores on SLU. The Agricultural programme - Economics (Agronom – ekonomi) would avoid a wolf territory more and a bear territory as much as no avoidance of carnivore territory (figure 17), in difference to the answers from all the programmes (figure 4). Agronom – ekonomi was also the only programme that had the higher number and percentage who were not willing to pay for any of the four carnivores (figure 18 & 19). The Agriculture – Rural Development programme (Agronom – landsbygdsutveckling) wanted to see bear just as much as lynx and wolverine more than wolf. They would also avoid a bear territory as much as no avoidance of carnivore territory (figure 20 & 21). The Agriculture – Food Science programme (Agronom – livsmedel) would avoid a bear territory more and wolf territory as much as no avoidance of a carnivore territory and an equal number was not willing to pay for the conservation of wolverine to those who were willing to pay (figure 22-24). The Veterinary nurse programme (Djursjukskötare) would avoid a bear territory more than a wolf territory (figure 25). The Ethology and Animal Welfare programme (Etologi och djurskydd) wanted to see wolf more than bear (figure 26). The Landscape Architecture programme (Landskapsarkitekt) had a higher number and percentage that was not willing to pay for the conservation of wolverine than those who were willing to pay (figure 28). *Veterinär* wanted to see wolf more than bear (figure 29

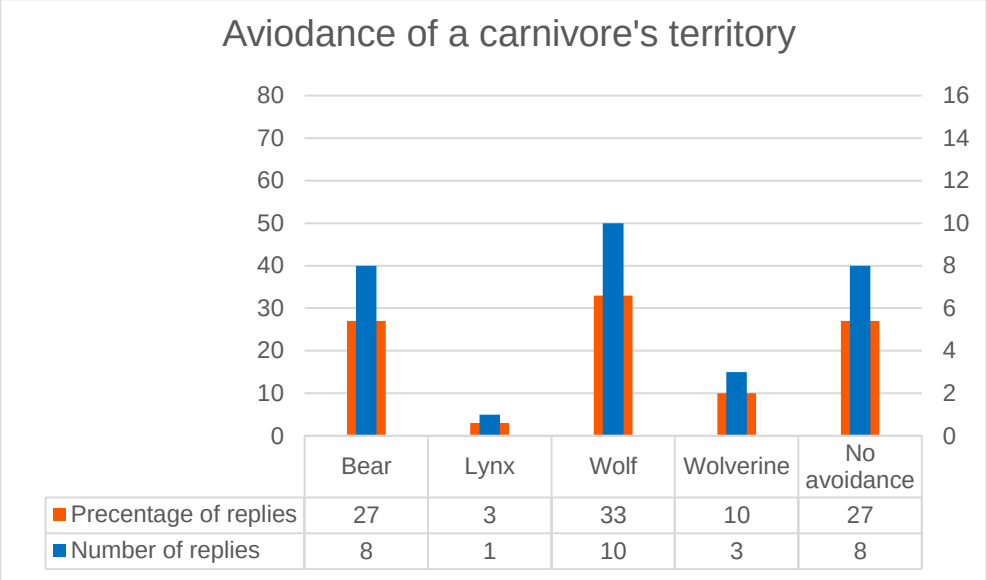


Figure 17. The total number and percentage, of answers from *Agronom – ekonomi*, if one would avoid being in an area where a carnivore may be present, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

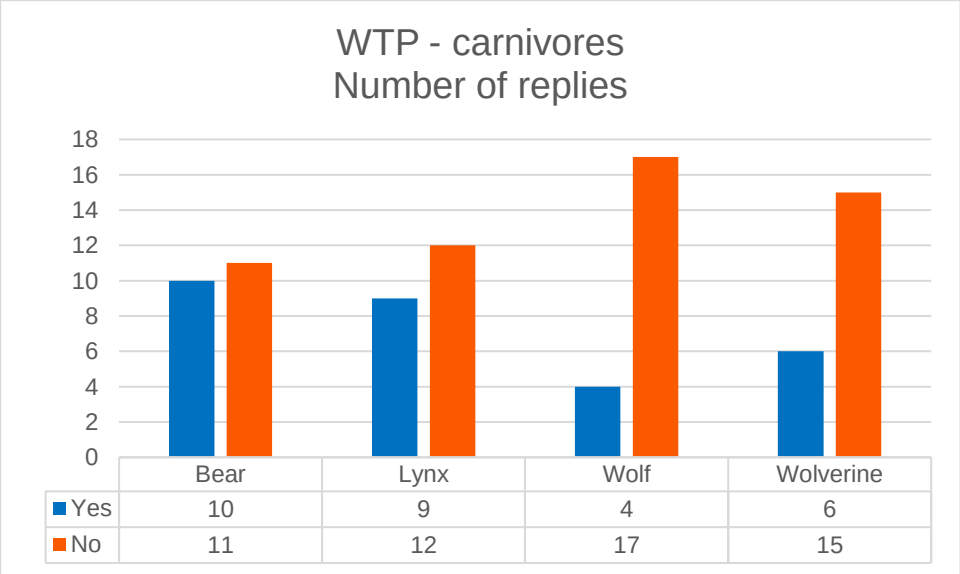


Figure 18. The total number, of answers from *Agronom – ekonomi*, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The total number is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

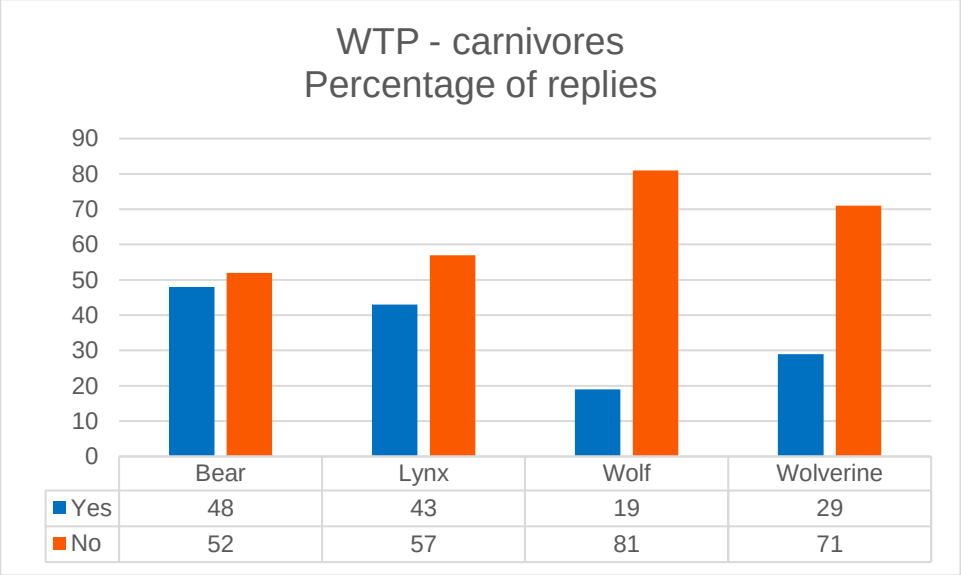


Figure 19. The percentage, of answers from *Agronom – ekonomi*, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The percentage is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

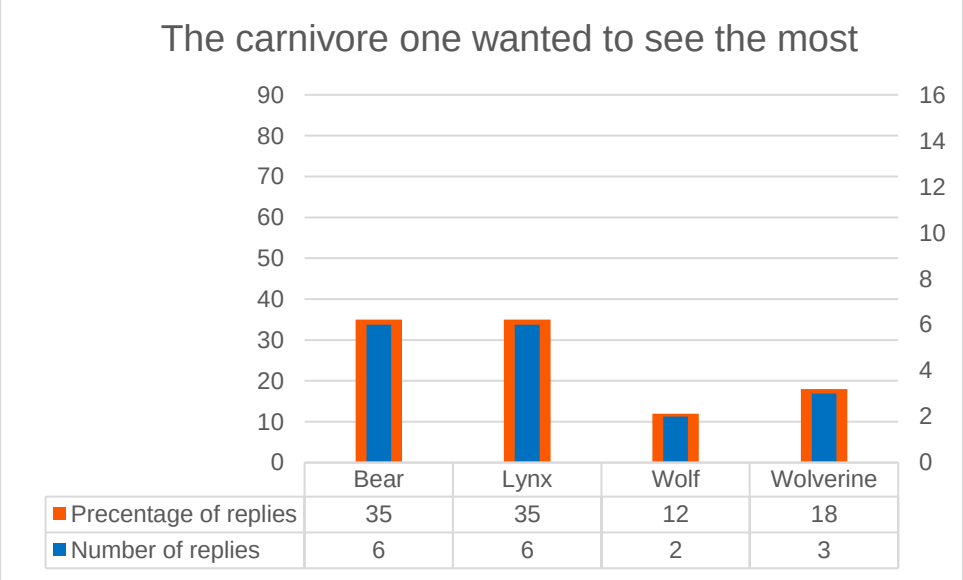


Figure 20. The total number and percentage, of answers from *Agronom – landsbygdsutveckling*, of the carnivore one wanted to see the most, on a safe distance, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

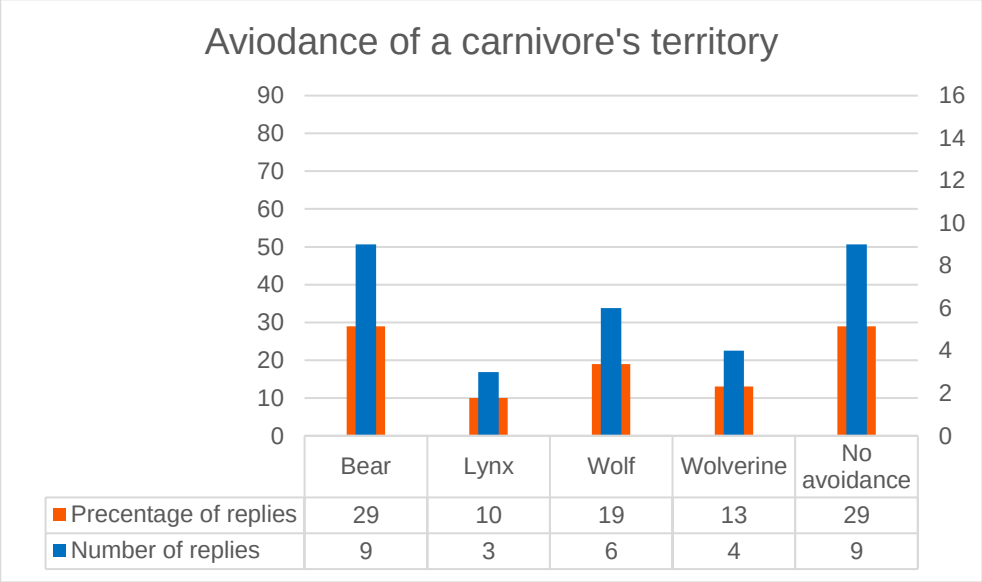


Figure 21. The total number and percentage, of answers from *Agronom – landsbygdsutveckling*, if one would avoid being in an area where a carnivore may be present, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

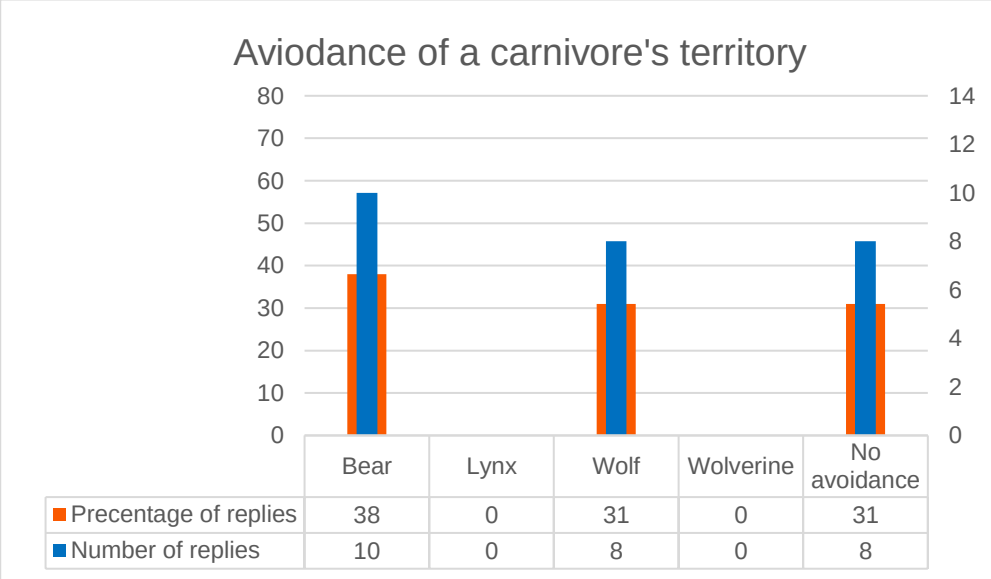


Figure 22. The total number and percentage, of answers from *Agronom – livsmedel*, if one would avoid being in an area where a carnivore may be present, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

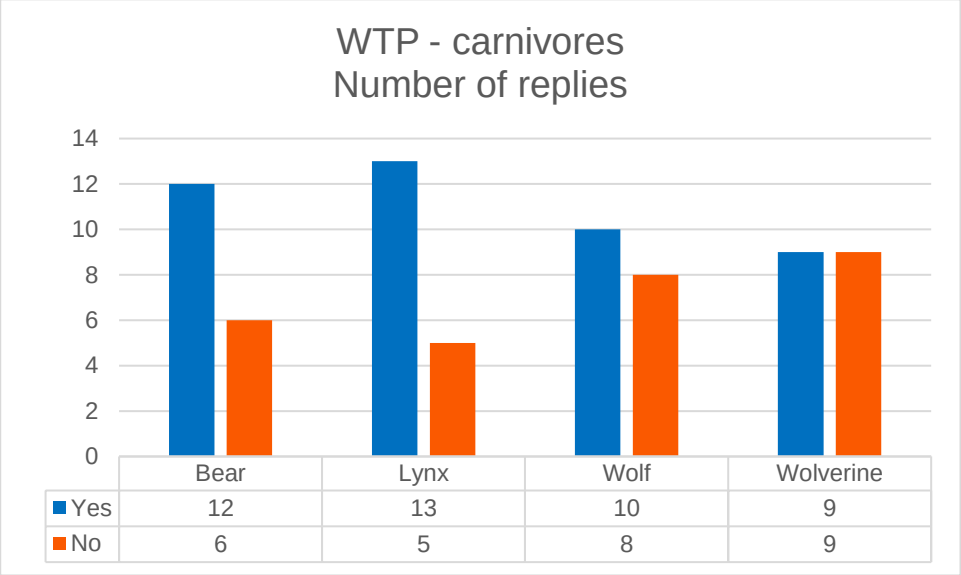


Figure 23. The total number, of answers from *Agronom – livsmedel*, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The total number is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

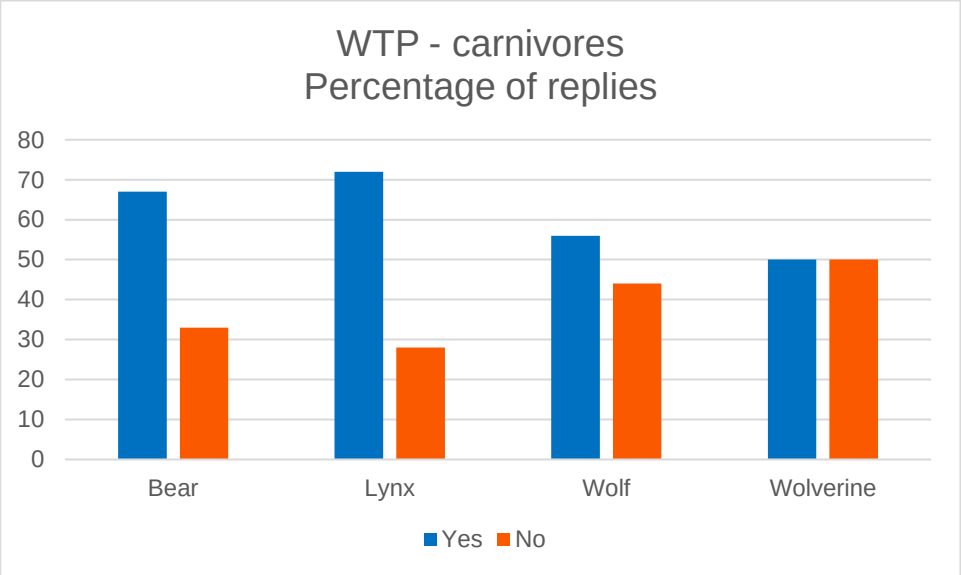


Figure 24. The percentage, of answers from *Agronom – livsmedel*, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The percentage is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

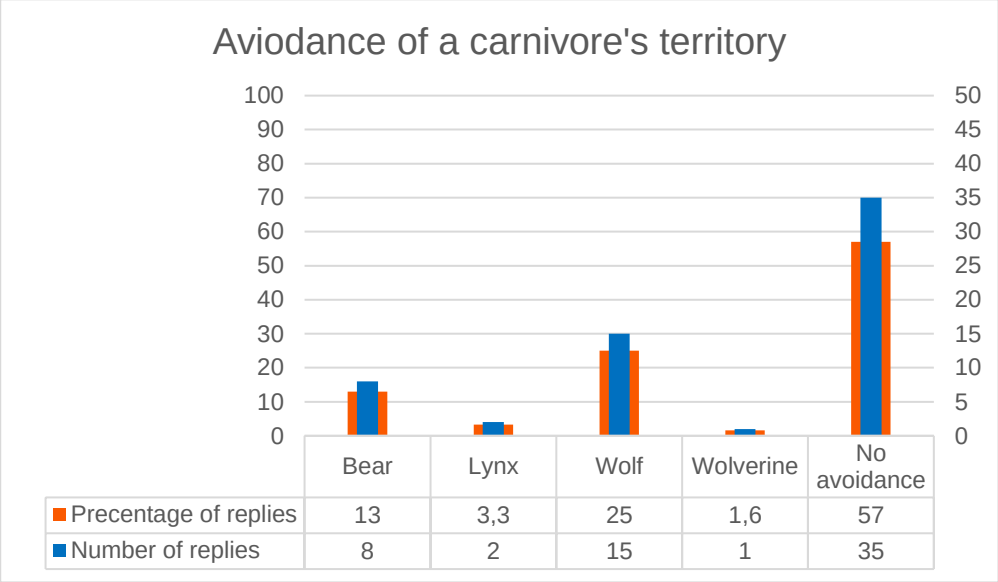


Figure 25. The total number and percentage, of answers from *Djursjukskötare*, if one would avoid being in an area where a carnivore may be present, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

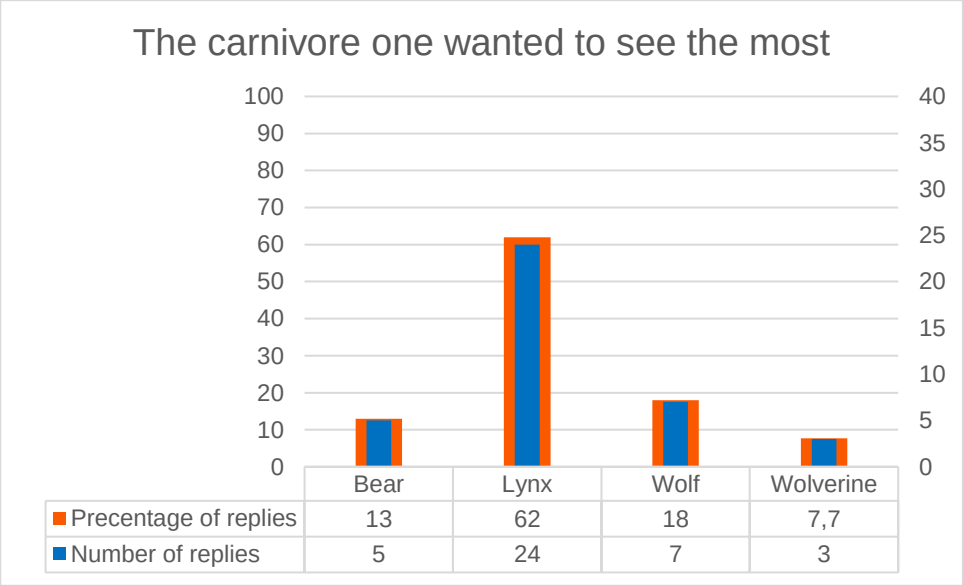


Figure 26. The total number and percentage, of answers from *Etologi och djurskydd*, of the carnivore one wanted to see the most, on a safe distance, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

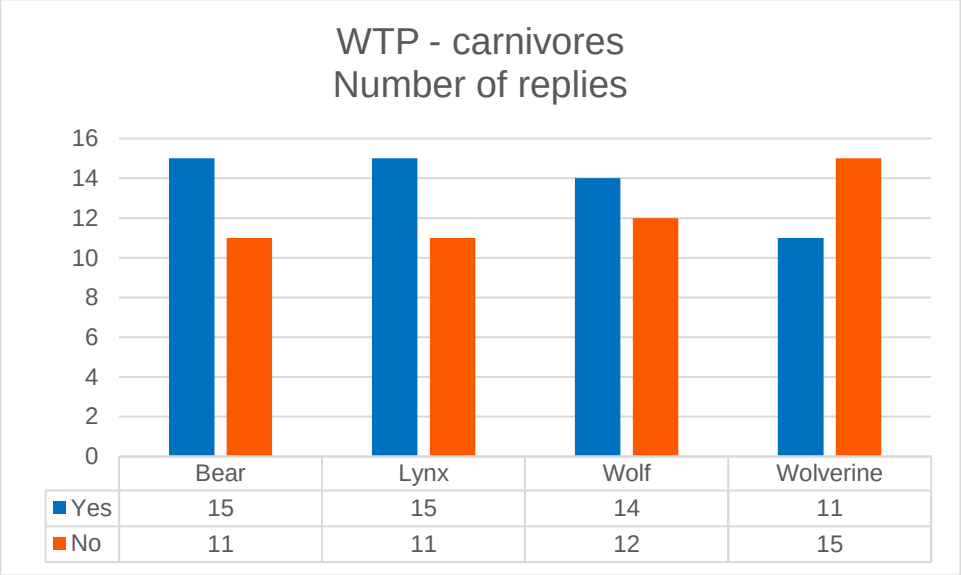


Figure 27. The total number, of answers from *Landskapsarkitekt*, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The total number is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

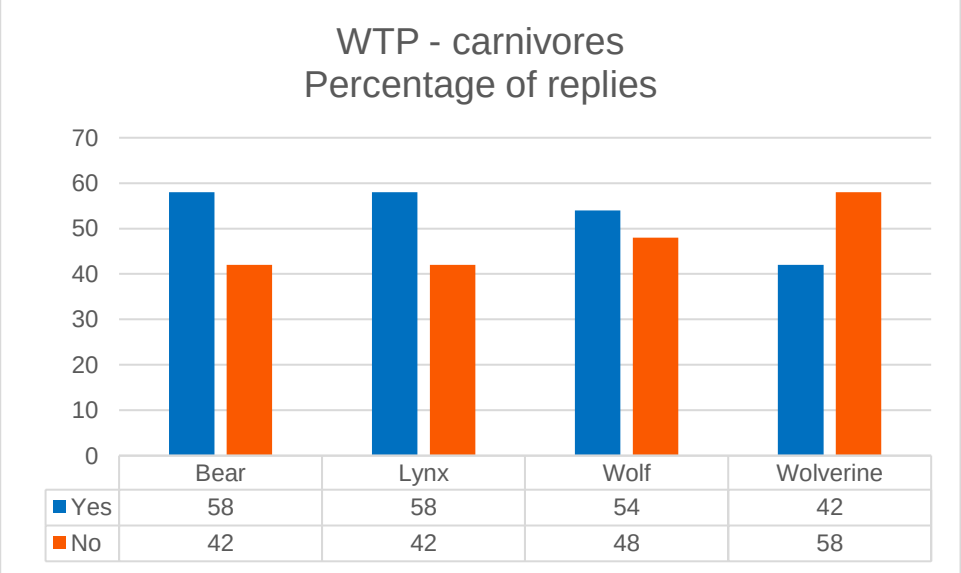


Figure 28. The percentage, of answers from *Landskapsarkitekt*, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay. The percentage is on the y-axis, WTP is on the x-axis and a descriptive table is on the bottom of the figure.

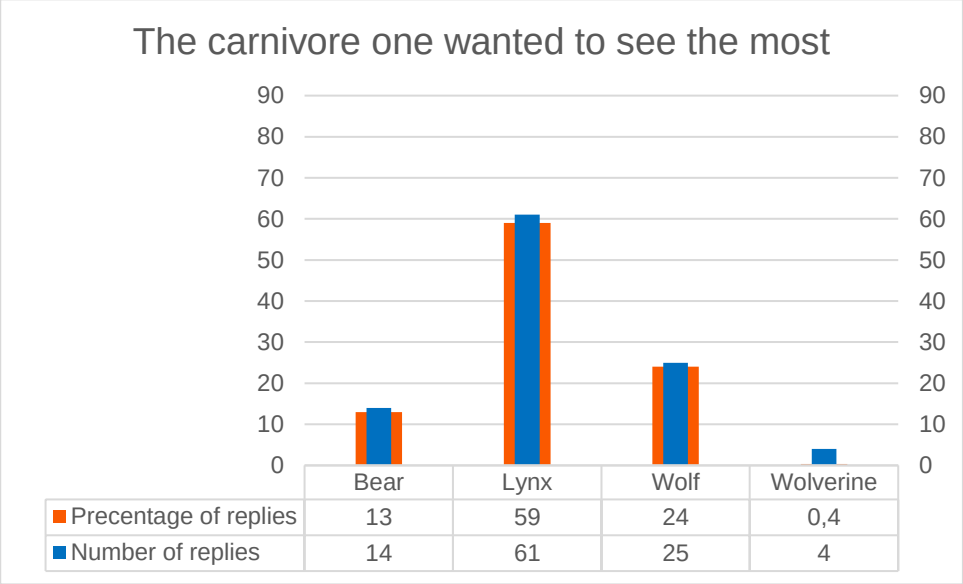


Figure 29. The total number and percentage, of answers from *Veterinär*, of the carnivore one wanted to see the most, on a safe distance, with percentage on the left y-axis, total number on the right y-axis, carnivore on the x-axis and a descriptive table on the bottom of the figure.

4 Discussions

From the results one can make the conclusion that students at SLU have a generally positive attitude towards carnivores and the conservation of these animals. This may be because SLU is an environment-oriented university, that is focusing on sustainability (Swedish University of Agricultural Sciences 2018), and that the students who are studying there have an interest in animals and the environment. Gangaas et al. (2015) found that one's environmental value orientation influenced their attitude towards carnivores. If they had interest concerning the environment, people would generally have a positive attitude towards carnivores and the current number of these animals.

Bear was the carnivore respondents least wanted to come across. This may be due to old fears of attacks to one self or to one's domestic or semi-domestic animals. In present days, media have occasionally enhanced the image of bears aggressiveness. That one did want to come across bear the least may also be to the fact that it is the largest animal and, in people's mind, may inflict the most damage or pain to the individual. The harm or pain a carnivore can inflict is generally associated with the level of fear of the animal (Johansson et al. 2012b). Fear can be governed by how uncontrollable and unpredictable the carnivore may seem to be. In the case of wolf, one's negativity towards the animal can be linked to distrust of authorities managing these animals. People may feel powerless in the decisions made concerning the management of Sweden's carnivores (Johansson et al. 2012a).

Lynx was the carnivore respondents wanted to see the most (figure 3). This may be, as Johansson et al. (2012a) brings up, because people view lynx as the least threatening and would cause least harm or pain, in contrast to bear, due to its size. This in combination with that people may think it is the cutest or appealing of these animals, or that feline animals perhaps are generally at SLU more popular, makes it the most popular carnivore in this project (Smith et al. 2012). Wolverine could be viewed as the least popular carnivore, from the results of this study. Even though respondents

would avoid bear and wolf territory more, and despite being about the same size as lynx, wolverine was the carnivore respondents least wanted to see and was the carnivore respondents was willing to pay for the least (figure 4 & 5). This corresponds with the results of Ericsson et al. (2007), where they found that in their survey, with 11,418 Swedes, that wolverine was the carnivore one was least likely to pay for the conservation of. They also found that there was only one earlier study, concerning WTP of wolverine. So, wolverine may be the least popular due to lack of knowledge of the animal. In Sami societies, WTP may be affected by other variables, due to more experience.

The highest percentage of SLU-respondents would not avoid a land area knowing there are carnivores present. Bear was the carnivore one would avoid its territory, followed by wolf. Avoidance of these territories may not only be out of fear of harm to oneself, but fear of harm to a pet when out walking.

The only big difference between urban and rural residents was their willingness to pay for the conservation of wolf (figure 10 & 11). There was still a higher percentage that was willing to pay than not. But, comparing to the general response, there was a higher percentage who was less willing to pay for the conservation of Sweden's large carnivores among they who had a rural upbringing. Rural residents are more likely to have a direct or indirect experience of carnivores. During one's upbringing, negative influences, from for example parents, neighbours or hunters who have had negative experiences of carnivores or harbor negative attitudes toward carnivores, may have an effect on one's own attitude (Broberg & Brännlund 2008). There may also occur a "not in my backyard" effect, where one may be alright with carnivores, just not where they live (Ericsson et al. 2008). But to just say that if one comes from a rural upbringing affect their WTP is to oversimplify (Ericsson et al.2007). As this study shows there was a general positive attitude, both from respondents that grew up in urban and rural environments.

It was not found in this project that living in close vicinity to carnivores had a more negative effect on people's attitudes. Living in close vicinity and to have direct experience of carnivores may not be the same thing. Ericsson & Heberlein (2003) found, back when the wolf population was relatively small, that Swedes who lived in areas where wolves had established had a more negative attitude than the general attitude of the study groups. It has been studied that distance to a wolf territory affect attitudes just as much as other variables, such as owning livestock, being a member of nature conservation organisations, being a hunter or owning a hunting dog (Karlsson & Sjöström 2007).

The programme Agronom – ekonomi stood out of all the responding programmes. The largest proportion of these students would not be willing to pay for the conservation of any carnivores (figure 18 & 19). Perhaps this is because they have, or that their education gives, an economic view of the problems carnivores may inflict on a both small and large scale. Or, perhaps their socioeconomic variables, which also affect people's attitudes (Johansson et al. 2012b), differs from the rest of the programmes. Socioeconomic variables were not in the scope in this study, so gender, age and income are unknown. It also doesn't investigate how much one is willing to pay, for the conservation of Sweden's large carnivores. Neither does it describe how urban and rural residents are distributed over the programmes. The amount one was willing to pay may have given a bigger difference between urban and rural residents or have given a bigger difference between the people who lived far or close to carnivores. There were no answers from the programme *Sport och sällskapsdjur*. This could be an error from my point, where they did not get an email with the survey. Further flaws are that some programmes had a low reply frequency, compared to e.g. the programmes *Veterinär* and *Djursjukskötare*. The programmes *Civilingenjör i energisystem, Civilingenjör i miljö- och vattenteknik* and *Ekonomi - hållbar utveckling* had to low reply frequency to be considered a descriptive representation of these programmes attitudes towards carnivores. For the engineer programmes, the low reply frequency may be because they also receive emails from Uppsala University and checks that email account more often, or these students may lack an interest concerning questions around wildlife. There was no statistical analysis made, due to lack of time, which could have confirmed that the sample was big enough to represent SLU. But, because the email-list does not show how many students still are studying at SLU, a statistical analysis may give incorrect results. I know that for the Biology and Environmental Science programme (Biologi och miljövetenskap), grade 2015, that about half of the students no longer attend that class.

Finding a positive attitude towards these species and no major difference urban or rural residents or living near to or far from carnivores, which have an effect when viewing the general public of Sweden (Broberg & Brännlund 2008. Karlsson & Sjöstrom 2007), is characteristic for university educated and high female to male ratio (Ericsson, et al. 2007). This, in combination with SLU's environmental orientation, can be a positive indication for future conservation management of Sweden's large carnivores.

5 Conclusion

It was found in this study that students at SLU in Uppsala are generally positive to the conservation of Sweden's large carnivores. It was not found that growing up in an urban or rural environment made a big difference on one's attitudes towards these carnivores, neither did it make a difference if one had lived near or far from these carnivores. More people would not avoid a carnivore's territory than those who would. This can indicate low fear of confronting these animals. Respondents would avoid bear the most, this perhaps because it can make the most harm. Lynx was the carnivore respondents wanted to see the most, perhaps because it may not cause as much harm as for example bear, or because feline animals are more popular in general at SLU. The higher proportion of respondents would be willing to pay for the conservation of these carnivores. This positive attitude, in combination with SLU's environmental orientation, can be a positive indication for future conservation management of Sweden's large carnivores.

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Gunnel Alvenäs, for help with the email-list.

Classmates, for help with making the survey questions understandable and making me understand “survey-tech”.

Appendix 1 - survey questions

Frågor om rovdjur
1. Vilken utbildning läser du?
Agronom - ekonomi
Agronom - husdjur
Agronom - landsbygdsutveckling
Agronom - livsmedel
Agronom - mark/växt
Biologi och miljövetenskap
Civilingenjör i energisystem
Civilingenjör i miljö- och vattenteknik
Djursjukskötare
Ekonomi - hållbar utveckling
Etologi och djurskydd
Landskapsarkitekt
Sport- och sällskapsdjur
Veterinär

2. Är du uppväxt i en stad eller tätort? Med stad eller tätort menas sammanhängande bebyggelse med minst 200 invånare.
Ja
Nej

3. a) Har du bott i närheten till något av Sveriges stora rovdjur (björn, järv, lo, varg), eller i närheten av deras revir?
Ja
Nej
Vet inte
3. b) Eventuell kommentar

4. a) Vilket av Sveriges stora rovdjur skulle du minst vilja stöta på i skogen?
Björn
Järv
Lo
Varg
4. b) Eventuell kommentar

5. a) Vilket av Sveriges stora rovdjur skulle du helst vilja se i naturen (på säkert avstånd)?
Björn

Järv
Lo
Varg
5. b) Eventuell kommentar

6. a) Skulle du vara villig att betala, en valfri summa, för bevarandet av björn?
Ja
Nej
6. b) Eventuell kommentar

7. a) Skulle du vara villig att betala, en valfri summa, för bevarandet av järv?
Ja
Nej
7. b) Eventuell kommentar

8. a) Skulle du vara villig att betala, en valfri summa, för bevarandet av lo?
Ja
Nej
8. b) Eventuell kommentar

9. a) Skulle du vara villig att betala, en valfri summa, för bevarandet av varg?
Ja
Nej
9. b) Eventuell kommentar

10. Multiple-choice question a) Skulle vetskapen om det finns något/några av Sveriges stora rovdjur i ett markområde hindra dig från att vistas där, i så fall vilket/vilka?
Björn
Järv
Lo
Varg
Nej
10. b) Eventuell kommentar

Appendix 2 - tables

Table of the distribution of urban or rural residents and respondents that may live in close vicinity to carnivores

Table 1. *The total number and percentage of answers from respondents that grew up in an urban or rural environment and from respondents that may have lived in close vicinity to carnivores, where "Yes" is that they grew up in an urban environment or lived in close vicinity to carnivores and "No" is that they grew up in a rural environment or have not lived close to carnivores. "Don't know" is that they don't know if they have lived close to carnivores.*

	Number – yes	Percentage – yes	Number – no	Percentage – no	Number – don't know	Percentage – don't know
Respondents with an upbringing in urban/rural environment	277	74	96	26		
Respondents that may live in close vicinity to carnivores	139	37	177	47	58	16

Table, of answers from the programmes at SLU in Uppsala, of the carnivore one wanted to come across the least

Table 2. *The total number and percentage, of remaining answers from all programmes, of the carnivore one wanted least to come across*

	Agronom ekonomi	*Agronom husdjur*	*Agronom landsbygdsutveckling*	*Agronom livsmedel*	*Agronom mark/växt*	*Biologi och miljövetenskap*	*Djursjukskötare*	*Etologi och djurskydd*	*Landskapsarkitekt*	*Veterinär*
Bear – number	14	30	14	12	16	17	47	34	19	82
Bear – percentage	70	81	78	67	73	77	87	87	73	78
Lynx – number	1	1	0	0	0	1	0	0	0	0
Lynx – percentage	5	2,7	0	0	0	4,5	0	0	0	0
Wolf – number	5	4	2	5	4	4	4	4	5	19
Wolf – percentage	25	11	11	28	18	18	7,4	10	19	18
Wolverine – number	0	2	2	1	2	0	3	1	2	4
Wolverine – percentage	0	5,4	11	6	9	0	5,6	2,6	8	3,8

Table, of answers from the programmes at SLU in Uppsala, of the carnivore one wanted to see the most

Table 3. *The total number and percentage, of remaining answers from all programmes, of the carnivore one wanted to see the most, on a safe distance.*

	Agronom ekonomi	*Agronom husdjur*	*Agronom livsmedel*	*Agronom mark/växt*	*Biologi och miljövetenskap*	*Djursjukskötare*	*Landskapsarkitekt*
Bear – number	6	11	7	3	5	12	7
Bear – percentage	29	30	39	15	23	22	27
Lynx – number	14	18	9	13	15	34	16
Lynx – percentage	67	49	50	65	68	63	62
Wolf – number	0	7	2	0	2	7	3
Wolf – percentage	0	19	11	0	9,1	13	12
Wolverine – number	1	1	0	4	0	1	0
Wolverine – percentage	4,8	3	0	20	0	1,9	0

Table, of answers from the programmes at SLU in Uppsala, of possible avoidance of carnivore territory

Table 4. *The total number and percentage, of remaining answers from all programmes, if one would avoid being in an area where a carnivore may be present.*

	Agronom husdjur	*Agronom mark/växt*	*Biologi och miljövetenskap*	*Etologi och djurskydd*	*Landskapsarkitekt*	*Veterinär*
Bear – number	10	7	7	7	8	44
Bear – percentage	21	24	29	15	27	29
Lynx – number	2	1	1	3	0	10
Lynx – percentage	4	4	4	6,4	0	6,5
Wolf – number	6	6	5	4	4	35
Wolf – percentage	13	23	21	8,5	13	23
Wolverine – number	3	2	0	4	0	11
Wolverine – percentage	6	7,7	0	8,5	0	7,1
No avoidance – number	27	10	11	29	18	54
No avoidance – percentage	56	38	46	62	60	35

Table, of answers from the programmes at SLU in Uppsala, of WTP for the conservation of Sweden's large carnivores

Table 5. *The total number and percentage, of remaining answers from all programmes, of the carnivore one was willing to pay for the conservation of. "Yes" is that you are willing to pay and "No" is that you are not willing to pay.*

	Agronom husdjur	*Agronom landsbygdsutveckling*	*Agronom mark/växt*	*Biologi och miljövetenskap*	*Djursjukskötare*	*Etologi och djurskydd*	*Veterinär*
Bear – number, yes	27	12	13	19	46	34	70
Bear – percentage, yes	75	67	59	86	85	87	68
Bear – number, no	9	6	9	3	8	5	33
Bear – percentage, no	25	33	41	14	15	13	32
Lynx – number, yes	30	13	13	20	49	36	80
Lynx – percentage, yes	81	72	59	91	91	92	77
Lynx – number, no	7	5	9	2	5	3	24
Lynx – percentage, no	19	28	41	9	9,3	7,7	23
Wolf – number, yes	24	11	12	20	46	37	71
Wolf – percentage, yes	67	61	55	91	85	95	68
Wolf – number, no	12	7	10	2	8	2	33
Wolf – percentage, no	33	39	45	9	15	5,1	32
Wolverine – number, yes	25	11	13	20	43	33	62
Wolverine – percentage, yes	69	61	59	91	80	85	60
Wolverine – number, no	11	7	9	2	11	6	42
Wolverine – percentage, no	31	39	41	9	20	15	40

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