

# **The Mood is the Root**

A research about the attitudes of German  
pastoralists towards the wolf and herd protection  
measures



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the wolf and herd protection measures

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## Preface

Animal Management is a study that focuses on many important aspects within the animal sector: ethology, marketing, business administration, genetics, political science, communication, ecology, legislation and regulations. Right now, you are reading our bachelor thesis "The Mood is the Root". During the last 20 weeks, we did research on the attitudes from our specialization Animal & Society.

First, we would like to thank our tutors Bart van Oost and Tina Siebel of the *Van Hall Larenstein*. They have helped us throughout the whole process of finding the project and presenting the final results. Especially during the hard times of processing and analysing the data, they were there for us and tried to support us as much as they could. We could not have asked for more suitable tutors than you, so: thank you!

Our independent tutor, Gabriëlle van Dinteren, has helped us to get even more excited about our project. Her critical attitude towards the project and her obvious interest in it led to an even higher motivation. Thank you, Gabriëlle!

The *Gesellschaft zum Schutz der Wölfe* was the contracting authority. Its great work in Germany was an incentive for us students and has made us want to support it as good as we can. Dr. Peter Blanché, we want to thank you for the opportunity to help wolves, livestock and pastoralists! Thank you for giving us the freedom of picking our project and guiding us when we needed it.

We would also like to thank all respondents to our pre-study and the survey. Thank you for giving us your time and participating in our graduation thesis!

Theresa Fedder & Carolin Stern  
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## Summary

Now that the grey wolf (*Canis lupus lupus*) returned to Germany, pastoralists need to adopt protection measures to prevent their animals from incidents. Most of the incidents arise where wolves establish themselves in new territories and pastoralists have not yet adjusted to their presence. The facts that there are effective herd protection measures (HPMs) available and the number of incidents is still high, lead to the expectation that the attitudes and the implementation of measures correlate. The core of the problem is that the implementation of HPM is satisfying for neither the pastoralists nor the contracting authority of the research, the *Gesellschaft zum Schutz der Wölfe* (GzSdW) (The Society for the Protection of the Wolf). The aim of this study is to describe the pastoralists' attitudes towards the wolf in Lower Saxony and the herd protection measures and whether there is a relation between these attitudes and the pastoralists' actual behaviour in terms of applying HPM. Research has shown that attitudes and behaviour are highly correlated. In this study, an affective, a conative and a cognitive component was measured to infer an attitude. The study gave answer to the following research questions:

1. What are the attitudes of pastoralists in Lower Saxony towards the wolf and the (applied) herd protection measures?
2. How do these attitudes influence the pastoralists' behaviour in terms of applying herd protection measures?

By means of a survey, the attitudes of pastoralists in Lower Saxony, were investigated. This research was based on data of a nonprobability sample, with 146 respondents belonging to the target group of sheep and goat keepers in Lower Saxony. Due to the nonprobability sample, no conclusion for all the pastoralists in Lower Saxony could be made. On a 5-point-scale from 'very positive' to 'very negative', the attitude of the respondents towards the wolf was negative ( $\bar{x} = 3,86$ ), which was the first part of the answer of the first research question. A general attitude towards HPM, the second part of the first research question, could not be inferred due to a lack of the conative component. The affection towards HPM was negative ( $\bar{x} = 3,79$ ) and the cognition towards HPM was slightly negative ( $\bar{x} = 3,47$ ). The results showed that respondents who applied no or few HPM, had a negative attitude towards the wolf. Also, the more negative the affection towards HPM, the less HPM were applied. There was no correlation between the cognition towards HPM and the applied HPM. There was neither a correlation between the general attitude towards the wolf and the affection, respectively cognition, towards HPM and the adjustment of HPM. The negative attitude towards the wolf could be explained with the emotionality of the topic. Different studies have proven a correlation between knowledge and attitudes already. It can thus be assumed that the negative affection and image towards HPM was accompanied by a lack of knowledge. The GzSdW has several possibilities to improve the situation with pastoralists, wolves and the HPM. By visiting more relevant events, the communication between supporters of the wolf and pastoralists with a negative attitude towards the wolf, can be improved. Respondents mentioned that fences cannot be used in protected areas. Therefore, the promotion of protection with guard dogs should be improved. To prevent prejudices by pastoralists concerning the name of the contracting authority, a change of the organisation's name should be taken into consideration (e.g. "Gesellschaft zum Schutz von Wolf und Nutztier"). Also, further scientific research is to be recommended, as there is a great interest in the topic.

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## Explanation of terms

Affection:	Feelings and emotions towards the research objects; one of the components that allow inference on someone's attitude.
Behaviour:	Already performed acts with respect to applied measures.
Cognition:	Beliefs and image of the research object, containing a reflection of perception (image) and available information (knowledge) about the object (Mayerl, 2009); one of the components that allow inference on someone's attitude.
Component:	Factors that determine an attitude: affection, conation and cognition.
Conation:	Verbal expression and behavioural intentions towards the research objects; one of the components that allow inference on someone's attitude.
Couple:	Two wild wolves; a male and a female (Bloch & Radinger, 2017).
Incident:	Lethal and non-lethal attacks of the wolf to livestock.
Individual wolf:	One (mostly male) wild wolf who is not part of a pack (Bloch & Radinger, 2017).
Livestock kill:	Deadly attack of the wolf to livestock (NLWKN, 2019b).
Monitoring year:	Observing, registration and statistically recording the occurrence of wild wolves. A monitoring year counting from 01.05. – 30.04. (DBBW, 2019a).
Pack:	Group of wild wolves, consisting of 3-15 animals (Bloch & Radinger, 2017).
Pastoralist:	A person that keeps and breeds goats and/ or sheep.
Surplus-killing:	A reflex of the wolf. Running sheep trigger a reflex that leads to the killing of more animals than the wolf could eat. In the wild, wolves start to eat their prey right after killing it – and lose the focus of the rest of the herd because of their foraging behaviour. But in a fenced herd, the running sheep trying to flee from the wolf trigger the "Surplus Killing" of the wolf. (Kruuk, 1972)
Variable:	Term for items in SPSS (question items, calculated components and calculated attitudes become variables during analysis).
Wolf area:	An area where wolves live and pastoralists can demand compensation for the hurt and killed animals (NLWKN, 2017).
Wolf guideline:	Guideline on the granting of equity benefits and contributions to the reduction or avoidance of economic burdens in Lower Saxony caused by the wolf (NLWKN, 2019c).

# 1 Introduction

## 1.1 Statement of the problem

Between the extermination of the grey wolf (*Canis lupus lupus*) in Germany in 1904, and the beginning of the protection of the wolf by law in 1990, 22 immigrated wolves have been shot legally in Saxony. The wolf is protected by appendix IV of the Habitat Directive (European right) and §44 of the Bundesnaturschutzgesetz (BNatSchG) (German right), which is the highest state of protection in Germany (BMU, 2019). After the prohibition of shooting wolves, the first two wolves came back to Germany in 1998 and had its first offspring in 2000. With the birth of the cubs, the first German pack of wolves was born after the extermination. (NABU, 2019a)

Since 2000, the number of packs in Germany has been growing constantly. In 2016, 18 years after the return of the wolf, the *Deutscher Bauernverband* estimated a number of about 1100 wolves in Germany (DBV, 2018). However, the *Bundesamt für Naturschutz* (BfN) and the *Dokumentations- und Beratungsstelle des Bundes zum Wolf* (DBBW) could only prove a number of 150-160 wolves in Germany (DBBW, 2019b). One year later, in the monitoring year 17/18, the DBBW counted 73 packs, 31 couples and three individual animals in Germany (Niedersächsisches Ministerium für Umwelt, Energie, Bauen und Klimaschutz, 2019b). Now, in 2019, wolves have started to form packs in Bavaria, Brandenburg, Mecklenburg Western-Pomeranian, Saxony-Anhalt, Thuringia and Lower Saxony (DBBW, 2019b).

The present study will focus on Lower-Saxony, where the first offspring of wolves was born in 2012 (NABU, 2019b). Five years later, the DBBW counted thirteen packs and ten couples in this region during the monitoring year 17/18 (DBBW, 2019b)<sup>1</sup>. In December 2017, the whole land of Lower Saxony was declared as wolf area (Niedersächsisches Ministerium für Umwelt, Energie, Bauen und Klimaschutz, 2019a). Genetic analysis (see appendix I) has shown that the wolves in Lower Saxony have affinity with the wolves in Saxony, where the first cubs of Germany were born in 2000 (NLWKN, 2019a). This proves that the wolves are related to the wolves that immigrated from Poland years ago (Wolf-Sachsen, 2019). Next to this, it can be expected that the population of the Central European lowland population will grow further and spread widely throughout Lower Saxony soon.

In many European countries where wolves can be found, incidents with livestock are the main conflict point. With the growing number of wolves, the incidents with livestock have been increasing. During the time that the wolf was extirpated in Lower Saxony, there was no need for the pastoralists to protect their animals, which made their work much easier than with the presence of the wolf. But now that the wolf has returned, pastoralists need to adopt and improve protection measures again. (Reinhardt & Kluth, 2019)

Between 2002 and 2017, 85,9% of the incidents on livestock were done to sheep and goats (Reinhardt & Kluth, 2019). The *Landesamt für Statistik Niedersachsen* registered 770 farms that keep 7949 goats in total and 2167 farms that keep 197.718 sheep (Landesamt für Statistik

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<sup>1</sup> Numbers for monitoring year 18/19 will be published in autumn 2019

Niedersachsen, personal communication, 2016). In 2017, Lower Saxony was the federal state with the most wolf-incidents so far. During the total of 159 incidents, 427 livestock animals got killed and another 124 injured by wolves (Reinhardt & Kluth, 2019). In 2018, the *Niedersächsische Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz* (NLWKN) registered 98 incidents with wolves in Lower Saxony and 240 killed livestock (Wolfsmonitoring, 2019).<sup>2</sup>

A research on comparison of livestock kills in different European countries showed that the extent of livestock damage does not depend on the size of the wolf population in one country or the number of livestock (Kaczensky, 1996). In fact, most of the incidents of wolves arise where wolves establish themselves in new territories and pastoralists have not yet adjusted to their presence. After one or two years, when pastoralists have had the time to adopt herd protection measures, the number of incidents goes back (Reinhardt & Kluth, 2019). The NLWKN published an overview of the reported cases of dead and injured animals in Lower Saxony of 2018, where the wolf was successfully determined as the cause (NLWKN, 2019b). Out of 260 registered attacks (by dogs and other predators), 130 shepherds did not apply protection measures according to the prescribed 'wolf guideline', which confirms the above-mentioned results of Reinhardt and Kluth, saying that pastoralists need to get used to the new situation.

The recent return of the wolf and the not properly adapted herd protection measures are thus a possible explanation for the high number of incidents. Overall, the number of incidents is declining, which underlines Kaczensky's theory. But, due to many unreported cases, the exact total number of recent incidents with wolves in Lower Saxony can only be estimated (GzSdW, 2018; Landesschafzuchtverband Niedersachsen e.V., 2019).

To understand why the wolf interferes with the pastoralists, it is necessary to understand the wolf's foraging and hunting behaviour. Wolves eat ungulates of medium heights, for example sheep and goats (Wolfsinformationszentrum Schleswig-Holstein im Woldpark Eekholt, 2019). They quickly learn that unprotected livestock is an easy food source (Wagner, Holzapfel, Kluth, Reinhardt, & Ansorge, 2012). If the livestock is kept in fences, it cannot run away which is its instinct. The hunting instinct of the wolf in combination with livestock in fences that cannot run away leads to the so-called "Surplus Killing" (Kruuk, 1972). Due to their foraging and hunting behaviour, wolves quickly learn to take advantage of the kept livestock and maybe even teach the rest of the pack, so that incidents continue and the number of livestock kills even rises (Radinger, 2019).

Because of the recent return of the wolf and the high number of incidents in Lower Saxony, the pastoralists are a very important target group for the ordering party, the *Gesellschaft zum Schutz der Wölfe* (GzSdW). Especially in Lower Saxony, the number of pastoralists and the number of incidents is very high. As the wolf is protected by law, the reduction of the wolf population is not an option and so, even though the former may first appear as a quick and easy solution, other measures need to be considered. To protect livestock, several measures

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<sup>2</sup> Numbers for 2018 have not been published by Reinhardt & Kluth yet (05.05.2019), because the evaluation of the incidents takes several months.

have been established for implementation and written down in the wolf guideline of Lower Saxony. In this guideline, the minimum requirements for herd protection measures are written down (see appendix II). It is thus a guideline for pastoralists who want to apply the predetermined measures to be able to get a compensation by the state (BfN, 2017).

The act of setting up protection measures for livestock is influenced by one's attitude towards these protection measures (see: Theoretical frame, attitudes in humans). An attitude is a belief or a feeling that motivates people to react on objects and correlates with their behaviour (Semin, Fiedler, Manstead, Pligt, & Schwarz, 1996). Furthermore, it is to be expected that the attitude towards the wolf and the herd protection measures influences the willingness to protect their livestock. The facts that there are effective measurements available and the number of incidents is still high, lead to the expectation that the attitudes and the application and implementation of measures correlate.

Protection measures need to be viable for the pastoralists, regarding money, effort and time. The core of the problem is that the implementation of the measures against incidents with wolves is satisfying for neither the pastoralists nor the GzSdW. This is why research must be made to find out more about the attitudes of the pastoralists towards the wolf and the protection measures. To the best of the authors knowledge no research has been carried out of investigating the attitudes of pastoralists in Lower Saxony over the above-mentioned topic. The collected data would help organisations like the GzSdW to understand this target group better and protect livestock and wolves more effectively.

## **1.2 Gesellschaft zum Schutz der Wölfe**

The GzSdW is a German organisation that is dedicated to help and protect wolves throughout Germany. The GzSdW is the contracting authority of this thesis. It is important for the organisation neither to function as a financial source for pastoralists (though the organisation offers financial aid in some cases) nor as a strict protector of the wolf (P. Blanché, personal communication, 28 January 2019). The GzSdW wants to find a way to protect wolves, livestock and pastoralists. Their work is based on scientific research and that is what they want to communicate to their target groups. Public relations and public work, cooperation with stakeholders (e.g. pastoralists, schools, kindergartens, zoos, wild parks and organisations), as well as material support, form the base of the organisation's work (GzSdW, 2019).

## **1.3 Objective**

The aim of this study is to describe the pastoralists' attitudes towards the wolf in Germany, especially Lower Saxony, and towards applied herd protection measures (HPM) to find out whether the application of HPM is related to their attitude. It will give an insight in how pastoralists feel and think about the wolf and herd protection measures and if the high number of incidents could be explained by the attitude of pastoralists and their behaviour.

## **1.4 Theoretical frame**

### **Wolves and humans**

The relation between wolves and humans is characterized by ups and downs throughout history and it has been one of the most emotional topics for a long time. A reason could be the

wolves' similarity to human beings as wolves have very complex social structures, such as humans. All times the wolf has been either competitor or ally. At pre-Christians times this predator even was an animistic reference animal. In Mongolia it still has this animistic image and is "fed" by decedents. During the Middle Ages the image of the wolf changed. Now, it has become a symbol of paganism and stands for all pagan and evil. Due to a lot of brutal wars and inadequate hygiene at this time, wolves began to feed on the dead human bodies lying around, a fact which has supported a brutal and man-eating image of the wolf. (Bomas, 2018)

So, maybe the underlying fear of the wolf did arise at this early time and fairy stories, such as the *Little Red Riding Hood*, still stir up this fear.

The paradox is that nowadays the dog, the domesticated equivalent of the wolf, constitutes the best friend of the human being whereas the wolf is still seen as an evil beast. Of course, this positive image of the dog has obvious reasons. Based on changing and settled lifestyles of humans the dog got more and more important as companion and "employee". It has helped protecting livestock against predators, supported shepherds tending their sheep and helped while hunting. (Interview with Kurt Kotrschal: Bomas, 2018; Wechsung, 2010)

Nowadays, the connection between dog and wolf is completely uncoupled in people's minds. Moreover, it is known that wolves usually do not attack humans but are very shy and generally avoid them (Mech, 2019). Wolf-attacks on humans are very rare (Deutscher Bundestag, 2018), especially when taking under consideration the numbers of wolfs existing and the documented incidents, but the fear is still around.

Furthermore, the similarity in social structures of wolves and humans makes the wolf as predictable as humans if enough knowledge about the wolf and its behaviour is present. Hence, a wolf does in fact not form a greater danger than cars or wild boars, for instance (Interview with Kurt Kotrschal: Bomas, 2018). But at the same time, it must not be forgotten that the wolf is also an opportunistic hunter and fenced sheep and goats form easy prey and are therefore in real danger if not protected properly. This characteristic supports the image of the wolf to be a bloodthirsty murderer and influences the attitudes of humans towards the wolf (Bloch & Radinger, 2017).

### **Attitudes in humans**

Loosely speaking, an attitude is a belief or a feeling that motivates people to react on objects, issues, events and/or people in a certain way. It helps people to orient themselves without filtering every new information anew (Stangl, 2019). According to Eagly and Chaiken (1993) an attitude is a 'tendency to evaluate an entity with some degree of favour or disfavour' (Eagly & Chaiken, S., 1993). Furthermore, it is to be expected that attitudes and behaviour correlate (Semin et al., 1996). Attitudes control our behaviour and define whether we like something/someone or not. There is almost no behaviour that cannot be explained by attitudes in psychology, because even instincts and reflexes are integrated in attitudes in human beings (Hermanns, Jakob, & Linke, 2002).

Although the definition of what an attitude is varies, many contemporary social psychologists agree that an evaluative (pro-con, pleasant-unpleasant) nature is the most characteristic attribute of an attitude. As an attitude is a hypothetical construct which cannot be observed

and measured directly, it can be made measurable based on this attribute (Ajzen, 2005). Furthermore, it is necessary to categorize the attitude-relevant responses in subgroups. The most common categorization goes back to the philosopher Plato and distinguishes an affective, a behavioural (conative) and a cognitive component (response category; see table 1)– the ABC of attitudes. These are measurable reactions to the attitude object or subject, that are also referred to as affection, conation and cognition (see explanation of terms) (Mayerl, 2009). Within these three components it is also useful to separate verbal from non-verbal responses (response mode; see table 1) to infer attitudes (Ajzen, 2005; Mayerl, 2009). As it is impossible to measure the non-verbal mode by a questionnaire this research will focus on the verbal modes.

Table 1: Responses used to infer attitudes based on Rosenberg and Hovland's analysis (1960) adopted from Ajzen (2005) (Ajzen, 2005).

Response category			
Response mode	Affection	Conation	Cognition
Verbal	Expressions of feelings towards attitude object	Expressions of behavioural intentions	Expressions about beliefs of attitude objects
Non-verbal	Physiological reactions to attitude object	Overt behaviours with respect to attitude object	Perceptual reactions to attitude object

This research is not the first one to study attitudes towards the wolf. Mostly, such studies have been conducted amongst the general public of different countries. In March 2018, a FORSA survey in collaboration with the Nature and Biodiversity Conservation Union (NABU) found that the majority of the German inhabitants supports the return of the wolves. 55% of the respondents had positive and just 12% negative feelings towards the wolf. Even 79% indicate to be pleased with the wolf as part of the German nature again. Furthermore, the research compared the results with the year 2015 and did not find a big difference in the public opinion. (BUND Landesverband Sachsen, 2018; NABU Niedersachsen, 2018).

A survey conducted in the Netherlands 2012 found out that 45% of the Dutch inhabitants are positive towards the return of the wolf, even if the wolf is not present in the country yet. The most named arguments for this opinion were based on nature aspects, such as self-regulation of the nature or that the wolf supports the natural balance, which can be seen as cognitive components. Also, affective aspects were named such as the beauty of the animal or that occurrence was thrilling. Arguments against the return were also split in cognitive and affective responses. Danger for humans or problems due to overload were named (cognitive). Opponents argue that people would fear the wolf. (Intomart GfK bv, 2012)

To sum up, the attitudes towards the (return of the) wolf seem to be positive amongst the majority of the general public. However, this topic is still controversial and provokes high emotional debates (Bomas, 2018; Mattijssen, Westerink, Buijs, Steingröver & Langers, 2013).

As pastoralists experience the wolf as real threat to their livestock and actually loose animals, emotions are heated. They are likely to be the most concerned group in this debate and therefore need special attention.

This research focuses on the attitudes of pastoralists by measuring the three components affection, conation and cognition to infer attitudes towards the wolf and herd protection measures. As mentioned earlier, attitudes and behaviour correlate (Semin et al., 1996). Therefore, it is to be expected that the attitude of pastoralists towards the wolf and protection measures influence the protection level of their livestock. The understanding of these attitudes could thus help to not only protect livestock, but also the wolf by increasing the acceptance amongst the target group.

In this study, a conceptual model was made to visualize the research design (see figure 1). By means of a questionnaire (see appendix III), the needed information about the components was collected. Then, the relations between the attitudes and the pastoralists' shown behaviour concerning the choice of HPM and the adjustment of HPM (see definition 'behaviour' at explanation of terms) were measured.

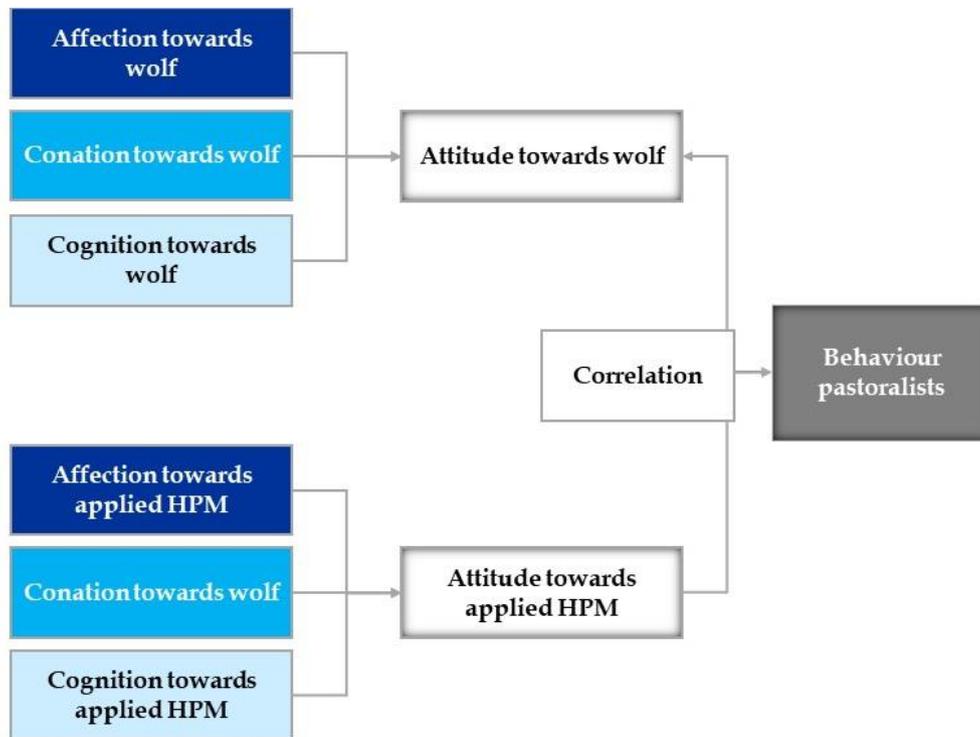


Figure 1: Conceptual model of the research project. The components are shown in the left column. These components led to attitudes towards the two topics "wolf" and "herd protection measures" (column in the middle). Finally, the actual behaviour of the pastoralists (right column) was checked for correlation with the attitudes.

## 1.5 Research questions

To achieve the above-mentioned objectives, the research report gives an answer to two research questions:

- ① **What are the attitudes of pastoralists (livestock keepers) in Lower Saxony towards the wolf and applied herd protection measures?**
- ② **How do these attitudes influence the pastoralists' behaviour in terms of applied herd protection measures?**

By dividing the first main question into the three components that actually measure attitudes, it is possible to give a more complex and detailed answer. For that reason, the following sub-questions were formulated and functioned as base for answering the second main question:

### **1.1. What are the attitudes of pastoralists towards the wolf?**

- a. What are the feelings of pastoralists towards the wolf?
- b. What are the behavioural intentions of pastoralists towards the wolf?
- c. What are the beliefs of pastoralists towards the wolf and what is their state of knowledge about the wolf?

### **1.2. What are the attitudes of pastoralists towards applied herd protection measures?**

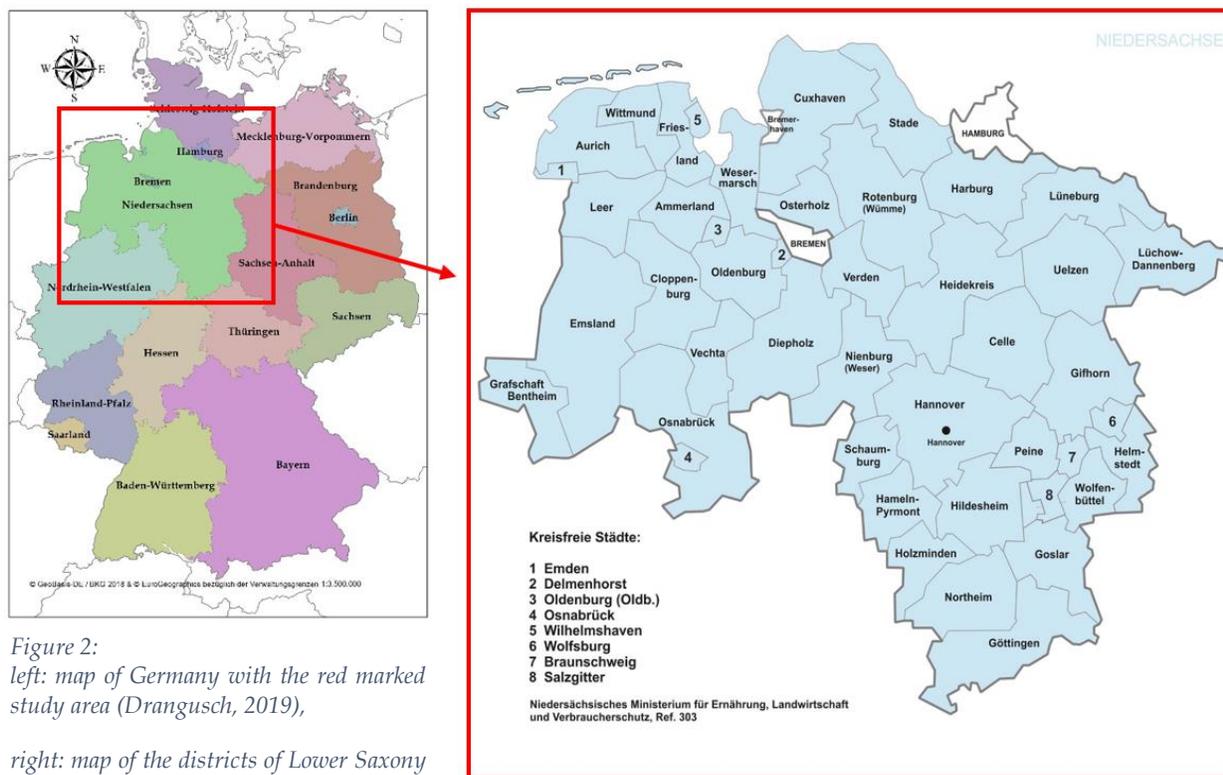
- a. What are the feelings of pastoralists towards the applied herd protection measures?
- b. What are the behavioural intentions of pastoralists towards applied herd protection measures?
- c. What are the beliefs of pastoralists towards herd protection measures and what is their state of knowledge about herd protection measures?

## 2 Methods

The present document is a research report with a quantitative and descriptive approach. By means of a survey, the attitudes of livestock keepers (pastoralists) in Lower Saxony, Germany, were investigated. With this information the relation between the attitudes and the pastoralists' behaviour in terms of applying protection measures were tested. The survey supported itself on the attitudes towards the wolf and the applied herd protection measures in connection with support options. As this survey was done in writing, the non-verbal responses are impossible to measure. To prevent a higher error rate, the questions only focused on the verbal response mode.

### 2.1 Study area

The extent of the research focused on one of the 16 German states: Lower Saxony in the North-West of the country. The state is divided in eight district-free cities and 37 districts (see figure 2). With an area of 47.614 km<sup>2</sup> it forms the second largest state in Germany. Lower Saxony has around 8 million inhabitants (31.12.2016) from which 533.000 live in the capital city Hannover (Land Niedersachsen, 2019).



The Lower Saxon nature is composed of sea, heath, marshlands and hills and is therefore one of the most varied states in Germany. Within the 17 parks and reserves there live plenty of different species – plants and animals (TourismusMarketing Niedersachsen GmbH & schaften, 2019). According to the database of the DBBW, there are 19 packs and one pair of wolves in the

monitoring year 2018/2019 (the monitoring 2018 /2019 is not complete yet; complete data will be available in autumn 2019) in Lower Saxony (request of database DBBW at 13<sup>th</sup> April 2019, 01:04:08pm, (DBBW, 2019a)). Because the immigration takes place from the east of the country, most wolves appear in the region *Lüneburger Heide* in the north-east of the state.

## 2.2 Research population and research sample

In 2016, Lower Saxony had 2.167 registered companies that kept sheep and 770 registered companies that kept goats (Landesamt für Statistik Niedersachsen, personal communication, 2016). The data base is from 2016 and, according to Constanze Leßmann (Landesamt für Statistik Niedersachsen, personal communication, 2016), comprehends the most actual data available. This data base (in total 2.937 companies) constituted the research population which, however, only provided guidance within the received data to ordinate the amount of responses.

### Research sample

Due to the privacy law it was not possible to contact the pastoralists directly. Different channels were used to reach as many pastoralists as possible (see paragraph 2.4). The above-mentioned number of companies in Lower Saxony still formed the base for the striven sample size. However, likelihood of participation was unequal. So, this research was based on data of a nonprobability sample. Hence, the final sample size could not be defined beforehand. Moreover, the final number of respondents did not allow to draw any inferences about the population (Semin et al., 1996). To get a useful result for the contracting authority, at least 300 respondents (10 % of the total population) were striven, which was determined by the authors. In the end, a total of 216 responses was reached, of which 146 responses belonged to the target group of sheep and goat keepers in Lower Saxony.

## 2.3 Pre-study

To test the questionnaire for its distinctness, possibilities of interpretation and functionality, a pre-study was carried out (Baarda, Kalmijn, & de Goede, 2015). It was tested amongst a group of fellow students, family and friends that is not representative of the target group of pastoralists. The questionnaire was sent by mail to the pre-study-population. Also, by asking for feedback on the questionnaire, it was possible to adjust question items and/or response options before sending the questionnaire to the final target group. Furthermore, information about the data processing and data analyses allowed adjustment within these topics as well. This way, it was possible to increase the reliability and the validity of the data.

## 2.4 Data collection

The data was collected through a survey, provided as an online questionnaire (see appendix III) and published on the websites of different sheep and goat associations in Lower Saxony and in the magazine *Schafzucht* which appears biweekly (Muth, 2019). The choice of an online questionnaire was based on the high number of respondents that was striven and to prevent that

people give socially accepted answers, and thus reduce the potential bias (Ericsson & Heberlein, 2003). For the magazine, an article was written containing a short description of the research and the request for support. In the editions of 2<sup>nd</sup> March and 16<sup>th</sup> March, the article with the link to the survey appeared in the printed and the online edition. Also, the link appeared in the newsletter of the sheep and goat association *Schafzuchtverband Niedersachsen*. Direct sellers of products of sheep and goats (contact data was found on the internet) were contacted by mail containing the link to the questionnaire and were asked to spread it amongst their colleagues. Furthermore, the link was spread amongst social media (*Facebook*) using relevant groups. In appendix IV a chronological overview of the contacted persons and groups can be found.

As internet users are a selective group (Baarda et al., 2015), and it was to be expected that a large part of the target group is not part of this selective group, other options of data collection were used. To generate a higher response rate, the *Wolf und Schaftagung*, a sheep conference in Faßberg, Germany, on 15<sup>th</sup> March 2019 as well as the 7. *Niedersächsischer Schaf- und Ziegentag*, a day of sheep and goats in Verden, Germany, on 29<sup>th</sup> March 2019 were visited. At both events the questionnaire was offered to the participants. As the time to fill in the questionnaire at the conferences was limited, another promotion tactic took place. Clothes pegs were labelled with the link of the online questionnaire and the date of expiry. These pegs were given to the participants with a short statement about the research. The reason for using clothes pegs instead of flyers was the utility of the object. A peg attracts more interest than a piece of paper and has a use besides the advertising function as well. So, people will have a further look at it when they are home. For a more detailed insight into the publications and resulting responses and clicks per day, see appendix V.

## Questionnaire

The questionnaire was created with Google (Google, 2019a). This platform provides possibilities to create different types of surveys with different response options. The data was stored online and the results then reported in Google table (Google, 2019b). The data was exported to Microsoft Excel and then to SPSS which is the statistic program for the data analysis of this research.

This questionnaire was developed by means of the book “Basisboek Enquêteeren” (Baarda et al., 2015) that provides theoretical knowledge about how to create a questionnaire. Moreover, the questionnaire was partly adopted and partly based on other researches on attitudes in structure and questioning. To assess the different dimensions of attitudes, five question items (QI 8, 9, 10, 13(2), 15(1)(2)(4)) were based on a Swedish study about attitudes of locals and hunters towards wolves (Ericsson & Heberlein, 2003). Six question items (QI 5, 7, 8, 13, 15(1)(3)(4), 16) were based on a study of acceptance amongst the German public (Kaczensky, 2006). This survey functioned as a starting point for the structure and classification of the questionnaire. The overlap in the type of the questions in both studies gave evidence for the accuracy of the questions. Some of the questions just functioned as a base and were adjusted to the special target group of pastoralists. QI 17 to 25 (attitudes towards herd protection measures) were developed by the authors based on the question types used before (attitudes towards wolf).

### Structure of the questionnaire

The questionnaire had 25 question items (QIs) that required about 15 minutes to respond, as a longer duration will likely lower the motivation of participation (EVALEA, 2019). The main topics were about the wolf and herd protection measures (HPM) to gain knowledge about the attitudes towards these two aspects. Another topic contained background information about the respondents such as age, district of living or herd size. A section ‘final note’ gave the chance to write down general comments and suggestions for support. The topics ‘wolf’ and ‘herd protection measures’ were split in different sections to make the questionnaire clearer. The different sections were cohabitations with the wolf (containing 2 QIs), attitude towards wolf (containing 3 QIs), wolf handling (containing 4 QIs), knowledge about the wolf (containing 3 QI), cohabitation with livestock (containing 2 QIs), application of HPM (containing 6 QIs) and knowledge about HPM and support options (containing 2 QIs). Some of the questionnaire items were split in a, b, c or comprise various sub-items and/or statements. Figure 3 shows the final structure of the research in a conceptual model. Note that the ‘conation towards the application HPM’ was not calculated because of missing QIs to measure the component.

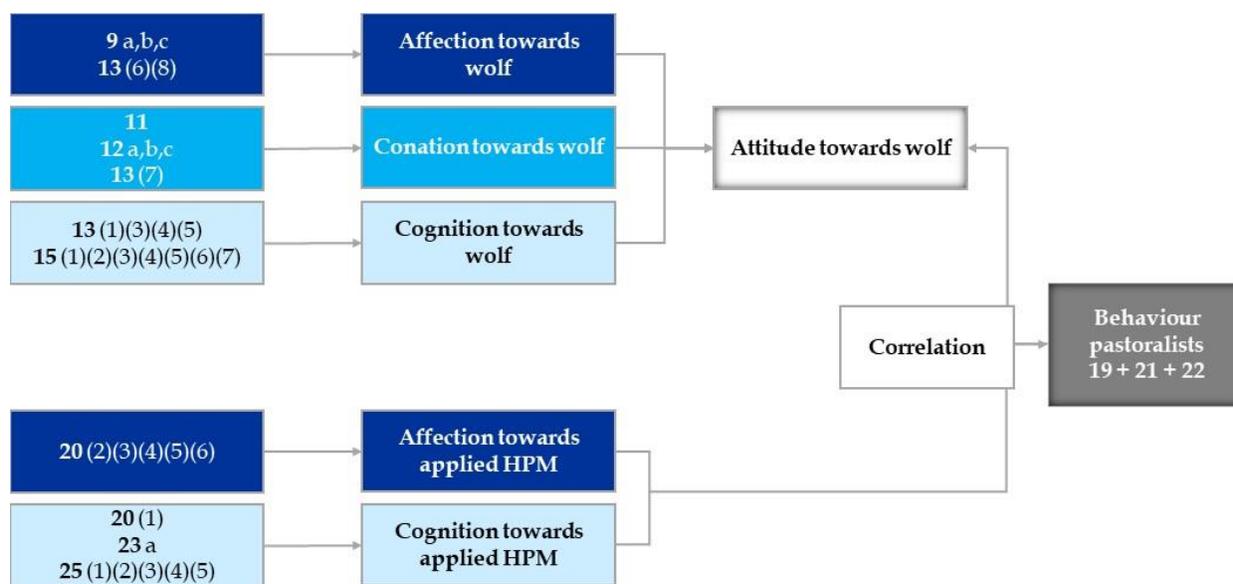


Figure 3: Final conceptual model. The QIs (column on the left) were used to measure the components (column second left) within the topics wolf and HPM. An attitude towards the wolf could be inferred, but due to the lack of the conation towards HPM, no general attitude towards the HPM could be inferred (column second right). Finally, the correlation between attitudes and the actual behaviour of the pastoralists (column on the right) was measured.

### *Response options*

Giving response options in a questionnaire helps the respondent to interpret the meaning of the question (Semin et al., 1996). Hence, this survey gave response options for most of the question items as it was done in writing and indistinctness could not be explained. The response options were determined by the nature of the question: multiple-choice, assessment or open questions. To get a complex answer to the research question all three types were used in this survey. Therefore, different response options were given: multiple-choice single answer (MCSA), multiple-choice multiple answer (MCMA), answers within a raster, answers by means of an assessment scale (5 point scales, also known as Likert Scale or rating scale (McLeod, 2008)) and open answers.

In line with Baarda (2015) multiple-choice options were used to enquire facts (gender or background information) and measure the conative component. Question items that enquire about opinions or the strength of emotions were answered by means of assessment scales. Last, there were open response options for questions with a lot of answer options (district of living: 45 in Lower Saxony) and to give space for additional information (Baarda et al., 2015). So, the option 'other' was given, to gain deeper information about the respondents' attitudes. To avoid a high amount of neutral answers (3 at a 5-point scale) further options as 'I do not know', 'I do not want to answer' and 'no opinion' were offered (Kaczensky, 2006). A detailed description of the different QIs and the related response options can be found in appendix VI.

## **2.5 Data processing**

The online questionnaire was exported from Google table to Excel (Microsoft Office Excel 2016) and first of all, every respondent got a number (ID) for identification purposes. To avoid spelling mistakes through input errors, the handwritten questionnaires were transferred by hand to this Excel data set, as Excel has a spelling control and SPSS does not. The Excel data set was then transferred to SPSS (IBM SPSS Statistics 25). There, the data set was completed with the right values and measures per item. Furthermore, the tool 'select cases' was used to select the cases belonging to the target group (district > 0 AND number\_animals > 0). The high coded values (999 for 'do not know' for instance) were sorted out per case by putting it as missing values to avoid the influence of the means of the data.

### **Data entry**

#### *Coding*

For further analysis in SPSS, the responses of the questionnaire needed to be coded. The coding took place in Excel. The responses of the open response options had to be evaluated individually. Within the MCSA, the response option consisted of a Likert or rating scale. A low number (1,2) matched a more positive result ('strongly agree' or 'very much') which allows inferences to a more positive attitude ('very positive' or 'positive'). A high number (4,5) was given for a more negative result ('strongly disagree' or 'very little') which allows inferences to a more negative attitude ('very negative' or 'negative'). Thus, QIs with a negative questioning needed recoding.

QIs with divergent response options (QI 21, 22 and 23) were also coded with low or high values to fit in the above-mentioned categories ‘positive’ and ‘negative’.

Special options got significantly higher values (‘I do not want to answer’ (666), ‘no opinion’ (888) and ‘I do not know’ (999)) in order to prevent confusion with the ‘normal’ values of the other response options. Also, the option ‘other’ got a higher value (777) and was analysed separately (see data analysis). MCMA response options had to be valued with yes (1) and no (0) to make analysis in SPSS possible. The following table 2 gives an overview of the QIs with the associated response options and gives further information about special characteristics of the coding in SPSS. A detailed explanation of the different QIs and associated codes can be found in appendix VI.

Table 2: Overview of QIs with the associated response options and further information about special characteristics of the coding in SPSS.

Response options	QI	SPSS name / content	Special characteristics of coding
open  (answers had to be valued individually)	1	year_of_birth	
	3	district	Every district had to be verified and was allocated an individual value (e.g. Braunschweig: 3). By giving districts beyond Lower Saxony the value “0”, the respondents could be excluded from the analysis, since they are not part of the research.
	4	number_animals	
	17	years_keeping_livestock	
MCSA  (Likert or rating scales; did not need recoding in most cases, value 1= positive attitude, value 5 negative attitude)	2	gender	
	5	wolves_region	
	6	incidents	
	7	attitude_wolf	
	8	number_wolves	
	10	move_behaviour	
	10.a	role_wolf	
	11	behavior_zoo	
	12.a-c	reaction	
	13.1-8	attitude	Reponses from QIs with negative questioning needed to be recoded (1 = 5; 5 = 1).
	14	wolf knowledge appraisal	
	15.1-7	wolf knowledge questions	
	16	number_packs	
18	type_keeping		
20.1-6	HPM demand	Reponses from QIs with negative questioning needed to be recoded (1 = 5; 5 = 1).	

	21	adjustment_HPM	1 = 'Germany', because of the assumption that someone's attitude is more positive if one applied HPM early
	22	guideline_adjustment	1 = 'immediately', because of assumption that someone's attitude is more positive if one applied HPM early and trust the experts who wrote guideline
	23	HPM_more_effective	1 = 'immediately', because of assumption that someone's attitude is more positive if one has great willingness to apply HPM
	24.1-2	HPM knowledge appraisal	
	25.1-5	HPM knowledge questions	0 = answered wrong; 1 = answered right
MCMA  (every single response option was coded with "yes" or "no")	9.a-c	emotions	
	19	applied HPM	
	23.a	HPM decision aspects	

#### *Data adaptation*

Some of the QI were transferred into new variables. By courtesy, the questionnaire did ask for the year of birth instead of age. For analysis the age is needed. So, a new variable was made by means of Excel calculating the age by subtracting the year of birth from the actual year (2019). In the same way the period of keeping animals was calculated: the questionnaire asked for the first year animals have been kept and this year was subtracted from the actual year. For clearer results with the items about knowledge, new variables were made with a change in coding. So, every respondent, who answered a question right did get a 1 and if the answer was wrong or 'I do not know' it got a 0.

#### *Data validation*

To reduce spelling and input errors, the data set was checked twice by the authors for spelling and coding by comparing the coded table with the raw data matrix. To prevent transmission errors from Excel to SPSS, the raw data matrix had the same format as in SPSS. So, the rows contained the cases and the columns contained the variables (QI). To validate the data, a visual control took place, as well as an identification of missing values by means of SPSS (Moriel, 2017). Missing data, such as forgotten values from the hand-written questionnaires, was then added and cases with too little data were removed (see section *not applicable values*) (see appendix VII).

### *Indistinct values*

QIs with open answers were provided with examples to simplify the data processing. However, respondents gave their answers in different ways or indistinct values. To make these data suitable for analysis, clarification of the data was necessary. Two QIs were affected: QI 4 and QI 17.

QI 4 – How many animals: Some answers contained a number and the type of animal (sheep, mother sheep, lambs, e.g.). In this case just the number was used and split numbers (x mother sheep and x lambs) were added up. When respondents gave a range as answer (e.g. 7 to 9), the average was taken (8).

QI 17 – Period of keeping: Some respondents did not give the year since they keep animals but the amount of years. In this case, the year of initiation was calculated to use the above-mentioned formula.

One respondent answered “since the 80’s”. In this case the average of the 80’s was used (1985).

Another respondent answered “since existence of the farm 1872”. In this case the year of birth of the respondent was used, assuming that he has been living with sheep his whole life.

### *Not applicable values*

Partly filled questionnaires or missing data was not really an issue. However, there was one respondent who used to answer always with an “x” at QIs he did not want to answer (ID 138). Therefore, this case was sorted out because it was neither part of the target group nor important for the contracting authority. Other respondents had no sheep or goats or did not live in Lower Saxony and were therefore sorted out, as well.

## 2.6 Data analysis

### Quality of the questionnaire

As the item analysis is a condition for the descriptive analysis and tests the reliability and correctness of the items used (Novustat, 2019; Van Hall Larenstein, 2019) it was done per component within the two topics 'wolf' and 'HPM' (six times in total). The Cronbach's Alpha ( $\alpha$ ) had to be  $>0,7$  to ensure a reliable measurement of the components (Novustat, 2019). Every item that causes a decrease of that value was excluded from further analysis.

In the following a factor analysis was done to capture the variance in variables in a smaller set and basically reduces data (Van Hall Larenstein, 2019). Within the topics, containing the items that measured all three components, the factor analysis was done to check if the factors given by the analysis confirmed with the components determined by the authors. Aim of the factor analysis was to verify the results of the item analysis and to test the dimensionality and homogeneity (Novustat, 2019).

Finally, the item analysis as well as the factor analysis showed that the questionnaire was reliable, and the dimensions were clear. However, the number of included cases (= n) differed per item and thus per component, due to exclusion of cases with open response options ('I do not know' and 'other'). One question item had to be pulled out of the analysis, because data available changed in the time between developing and date of expiry of the questionnaire (QI 16). Two question items had to be pulled out, because of too little reliability (QI 10a) and indistinctness in interpretation (QI 10), which just became clear during analysis. QI 7, 14 and 24 were used as control variables as a self-assessment does not measure a component.

After a renewed determination of items that should measure the conation towards HPM and items that were used for correlation tests and defined as behaviour indicative items, no item was left to measure the conative component towards HPM. Therefore, no general attitude could be inferred. For correlation tests, only the affection and cognition towards HPM were used.

### Answering research questions

Research question 1 was mainly answered by means of descriptive statistics. The emotions towards the wolf were evaluated in text form and visualized with a bar chart. The means of the QIs per component were calculated to get a total score of the different components (Sirkin, 1995) within the two topics 'wolf' and 'HPM'. The total scores of the three components were categorized in very positive (1), positive (2), neutral (3), negative (4) and very negative (5) accompanied by the response options within the rating- and Likert-scales. Usually, only the median (= m) and the modus (= D) are used for the analysis of the ordinal Likert- and rating-scales (Wissenschafts-Thurm, 2016). But within analysis of attitudes, also the mean is a common used value (Kuipers, 2019). So, five new 'variables' were formed: Affection (wolf), Conation (wolf), Cognition (wolf) and Affection (HPM), Cognition (HPM). Every case was taken into account that answered at least one of the items that measured a component.

A variable for the general attitude towards the wolf was then created through the means ( $= \bar{x}$ ) of the three variables. Only respondents that had a value for all three variables (affection, conation, cognition) were taken into account. A percentage was given that indicated the proportion of respondents that have a positive or negative attitude and was visualized with a bar chart.

To investigate whether the attitude towards the wolf, respectively the affection and cognition towards herd protection measures, have an influence on the pastoralists behaviour, the correlation with behaviour indicative QIs (QI 19, 21, 22) was tested by means of the Spearman's rank correlation test (Universität Zürich, 2019). There was a significant correlation with  $p < 0,05$ . The correlation coefficient ( $= r_s$ ) was used to determine the impact that one variable has on the other ( $=$  effect size) and to see the direction of the correlation (positive or negative) (Fröhlich & Pieter, 2009). Furthermore, the variables 'Attitude wolf' and 'Affection HPM', respectively 'Cognition HPM' were also tested for correlation among each other and with QI 23, that measured the willingness of the respondents to protect their livestock more effectively, using the same test. Also, the self-assessments were tested for correlation and correctness by comparing their results with the calculated results.

The option 'other' was not analysed by means of statistical tests but described and compared with the statistical results by the authors and added to the report in text form.

### 3 Results

This chapter describes the demographics of the respondents and shows the results of the statistical analysis to give an answer to the research questions.

#### 3.1 Response rate

The click analysis is based on the data of the provider bit.ly and includes the clicks between 04.03.19-02.04.19. During that time, 322 people opened the link of the questionnaire and read the introduction. 164 opened it via email (newsletters of the associations, the student's advertising, e.g.) or directly (browser). Another 152 people opened it via Facebook, five via cellphone browser and one person opened it via the online-version of the magazine *Schafzucht*. (Bitlinks, 2019)

In total, 216 people responded to the questionnaire. 63 respondents live outside Lower Saxony and seven do not have goats or sheep, which comes to 146 respondents belonging to the study population. Out of the target population of 2937 companies that keep sheep and goats, the study sample represents 4,97%.

Average age of the respondents is 50,73 ( $\bar{x} = 50,73$ ;  $s = 11,883$ ) with the most respondents being 54 years old ( $D = 54$ ). The youngest respondent is 20 and the oldest respondent is 75 years old. 59,6% of the respondents are male and 40,4% are female ( $D = \text{male}$ ).

With a total of 9,6%, Hannover was the district with most of the responses ( $D = \text{Hannover}$ ), followed by the districts Cuxhaven (7,5%) and Nienburg (7,5%). There were no responses from the districts Emden, Delmenhorst, Wolfsburg, Braunschweig, Salzgitter, Gifhorn and Emsland (see figure 4).



Figure 4: Number of respondents (coloured in red) of the study population per district (edited figure).

The majority of the respondents keeps 30 animals ( $D = 9,6\%$ ). On average, the respondents keep 87 animals ( $\bar{x} = 87,25$ ;  $s = 254,601$ ). In total, the number of kept animals vary from 1-2000 animals. Three-quarter of the study population keep less than 51 animals. The amount of livestock of the remaining quarter varied from 51-2000 animals (see figure 5).

**QI 4: Number animals (n = 146)**

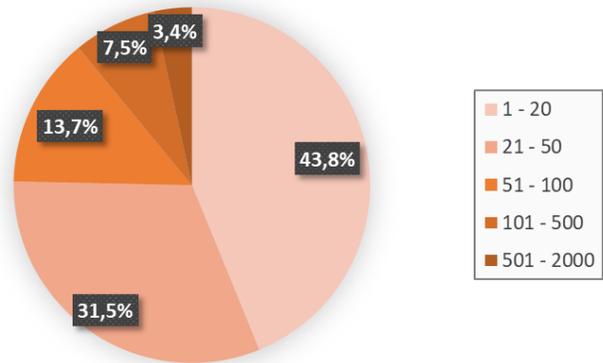


Figure 5: Overview of number animals kept by the respondents.

Even though the whole state Lower Saxony is officially 'wolf area', only four fifths of the respondents (80,1%) indicated that they keep their animals in a wolf area ( $D = \text{yes}$ ). The other respondents either did not know if they keep their animals in a wolf area (13,7%) or indicated not to keep their animals in a wolf area (6,2%) (see figure 6).

**QI 5: Wolf region (n = 146)**

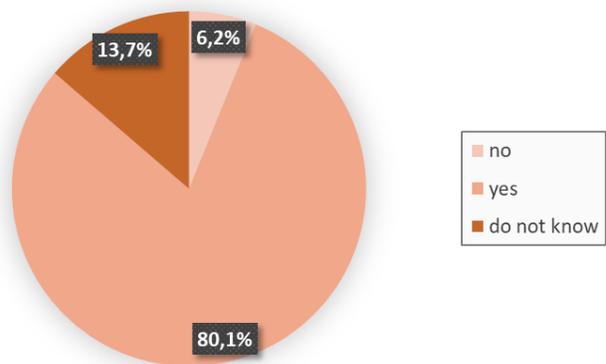


Figure 6: Overview of proportion respondents that indicate to keep their animals in a wolf region.

The majority of the respondents (83,6%) did not directly experience an incident with a wolf yet. Most of the other respondents (13,7%) had one to three incidents with a wolf. Just a small number of respondents (2,7%) had more than three incidents in the last three years (see figure 7).

**QI 6: Incidents (n = 146)**

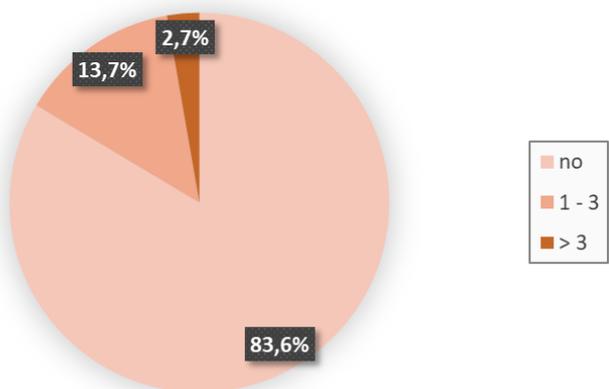


Figure 7: Overview of the incidents with a wolf amongst the respondents.

Most of the respondents have been keeping sheep or goats between 19-29 years ( $D_1 = 19, D_2 = 23, D_3 = 29$ ). One person (0,7%) started to keep their animals one year ago and another person started to keep sheep or goats 75 years ago, which is the longest period amongst the given responses. Amongst all respondents, the years of keeping is 24,31 on average ( $\bar{x} = 24,31, s = 14,322$ ) (see figure 8).

**QI 17: Years keeping animals (n = 146)**

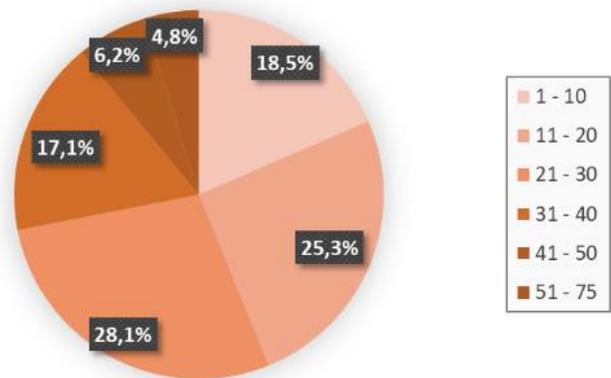


Figure 8: Overview of the years that goats or sheep were kept by the respondents.

Half of the respondents keep their animals as a hobby (50,7%;  $D = \text{hobby}$ ). The second biggest group of respondents keep their animals as a side business (38,3%). With a percentage of 11, the people that keep animals as a full-time business form the smallest group (see figure 9).

**QI 18: Type keeping (n = 146)**

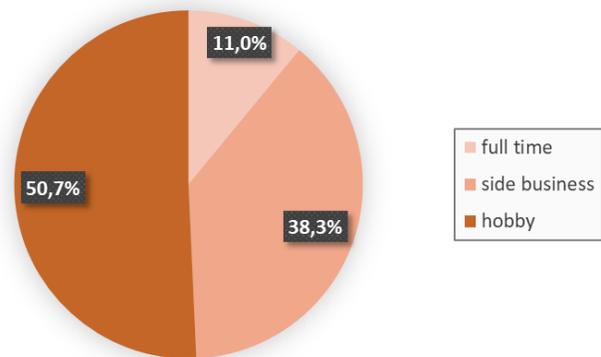


Figure 9: Overview of the type keeping animals.

More than half of the respondents (54,8%) apply one or two HPM. The second biggest group of respondents (35,6%) combines more than 2 HPM to protect their animals. The remaining respondents (9,6%) apply no HPM at all see figure 10).

**QI 19: Applied HPM (n = 146)**

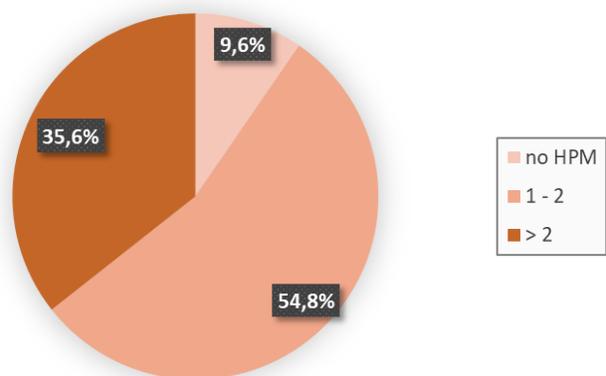


Figure 10: Overview of application of HPM.

Almost half of the respondents (45,9%) use a fixed fence to protect their animals and almost another half (45%) uses a mobile fence. One-fifth (19,9%) of the respondents keep their animals in a night pen and a smaller group of respondents (6,8%) protect their animals with guard dogs. 12,3% of the respondents do not apply any HPM at all and another 10,3% used the option 'other' to give additional information about their herd protection measures (see figure 11; note that the percentages do not add up to 100% because of the possibility to combine several HPM). Some respondents used the option 'other' to mention that they stopped taking their animals to certain areas as they are not able to apply HPM there. Some respondents mentioned that they protect their animals with alpacas, lamas or donkeys. Most of the respondents used the option to mention that they used fences without electricity to protect their animals.

Q1 19: Applied HPM (n=146)

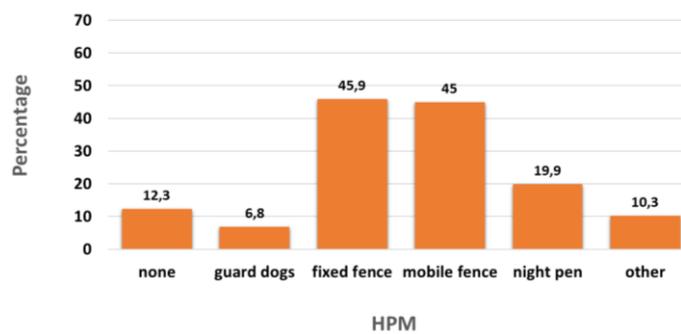


Figure 11: Overview of the applied HPM. The percentage is given at the y axis and the different HPM at the x axis.

## 3.2 Research questions

### 3.2.1 Attitudes

#### Affection towards wolf

Anxiety, fear and anger are the most common emotions named after having watched the three given pictures (see figure 12). Anxiety was named most at all three pictures (58,2% at the portrait of a wolf (picture one), 57,5% at the wolf observing sheep (picture two) and 43,2% at the foraging wolf pack (picture three)).



Figure 12: Pictures used to measure emotions: Portrait wolf (left) (Wikimedia, 2019), wolf observing sheep (middle) (Widstrand, 2019), wolf pack foraging on prey (right) (Wikipedia, Wikipedia, 2019).

Second, fear (38,4%) and anger (31,5%) were named especially at picture two. At picture three anger was the second leading emotion (36,3%) followed by fear (25,3%). Horror was also named at picture three (20,5%) and picture two (19,9%). Only picture one scored at positively occupied emotions such as admiration (18,5%) or happiness (6,8%). Interest was named most at picture one (16,4%) as well, followed by picture three (13,7%) (see figure 13).

The option "others" was used 43 times and contained further emotions as pleasure (0,6%), love (0,6%) and helplessness (2,1%), as well as other comments such as "that is nature" (2,1%). The rest of the comments were just random statements concerning the topic wolf in general in both ways, negative and positive.

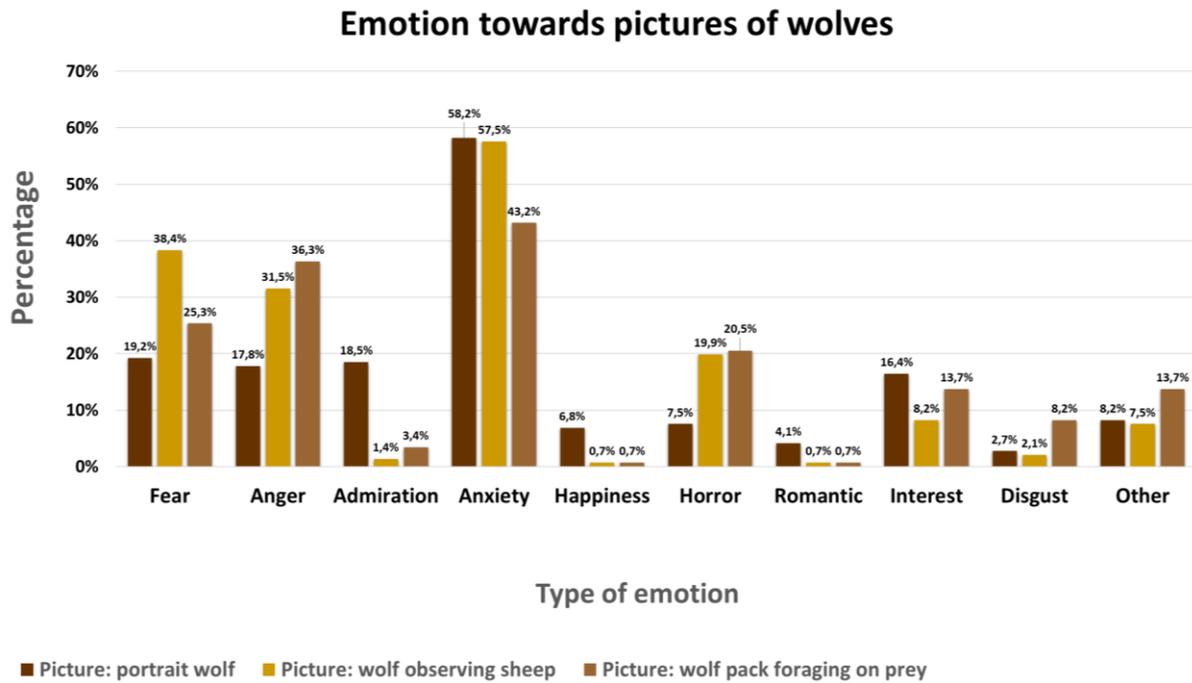


Figure 13: Proportion distribution of emotions towards pictures of wolves.

Based on the items that measured the affection towards the wolf, a negative overall value for affection towards the wolf can be inferred ( $\bar{x} = 4,1$ ). More than half of the respondents (78,7%) have a negative or very negative affection (see figure 14). In general, respondents fear more for their livestock ( $m = 5$ ) than for their children (median = 4). However, the majority of the respondents chose the option “I strongly agree” for both statements ( $D = 5$  for both). A detailed overview of the values of the items is given in appendix VIII.

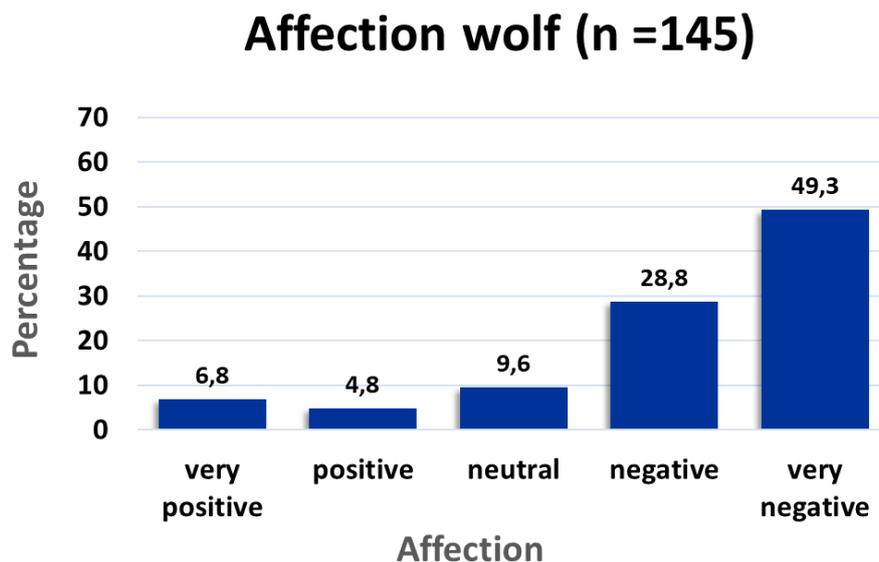


Figure 14: The general affection towards wolf calculated through the means of QI 13(6) and QI 13(8); the percentage is given at the y axis and the status of affection at the x axis.

### Conation towards wolf

To measure the conation towards the wolf the respondents were asked to state the most probable behavioural intentions in different situations. The overall conation towards the wolf is slightly negative ( $\bar{x} = 3,6$ ) (see figure 15). Just over half (63%) of the respondents score a negative or very negative value for conation towards the wolf. 17,8 % are neutral and only 19,2% are positive or very positive. A detailed overview over the values of the items is given in appendix VIII.

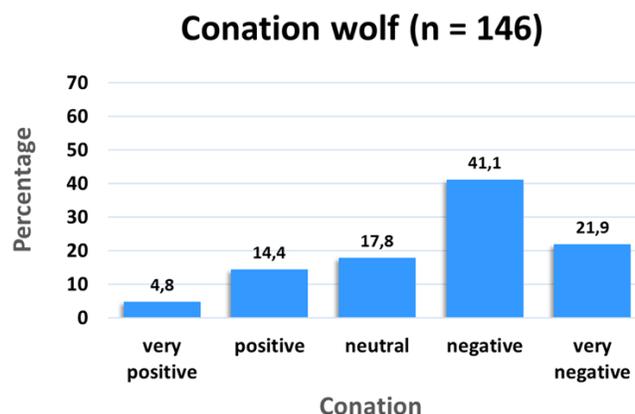


Figure 15: The general conation towards wolf calculated through the means of QI 11, 12a,b,c and 13(7); the percentage is given at the y axis and the status of conation at the x axis.

It is noticeable that the behavioural intentions while visiting a zoo and watch wolves in the enclosure are different from intentions in the other situations. The respondents would express themselves more positively and factually during the situation in the zoo ( $m = 2$ ). 45,9% say that they would stop and watch the animals for a while with fascination (very positive = 30,1%) or stop shortly and be pleased (positive = 15,8%). Still, 37% of the respondents indicate that they would tell their children all negative characteristics of the wolf and how dangerous it is (very negative) (see figure 16).

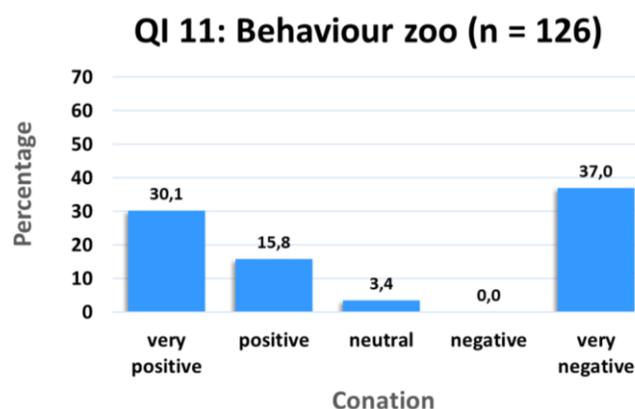


Figure 16: Results of QI 11 Behaviour in the zoo; 126 respondents were taken into account; the percentage is given at the y axis, the assumed conation (behavioural intentions) towards wolf based on chosen respond options is shown at the x axis.

Within the items that measured the conation towards the wolf a response option 'other' was given and used quite a lot. Mainly, the respondents indicate emotional comments such as worrying about livestock, pets and family or being afraid about the news that a wolf has been seen. Another part of respondents combines the different given answers. Often, the respondents indicate that they would recommend reporting the news to a wolf expert to support the monitoring. At the 'Behaviour zoo'-item, a frequent response was the rejection of visiting zoos or watching captured wild animals in general.

## Cognition towards wolf

As the cognitive component is composed of two aspects (image and knowledge, see explanation of terms) the results of this component are also divided into these aspects. The overall image towards the wolf is negative ( $\bar{x} = 4$ ) (see figure 17). The majority of the respondents (64,4%) (strongly) disagree with the statement that the wolf has the right to be in Germany. Furthermore, most of the respondents (72,6%) feel that there is not enough space for the wolf in Germany and over 60% think that the wolf is neither important for the natural balance (65,7%) nor the tourism (68,5%).

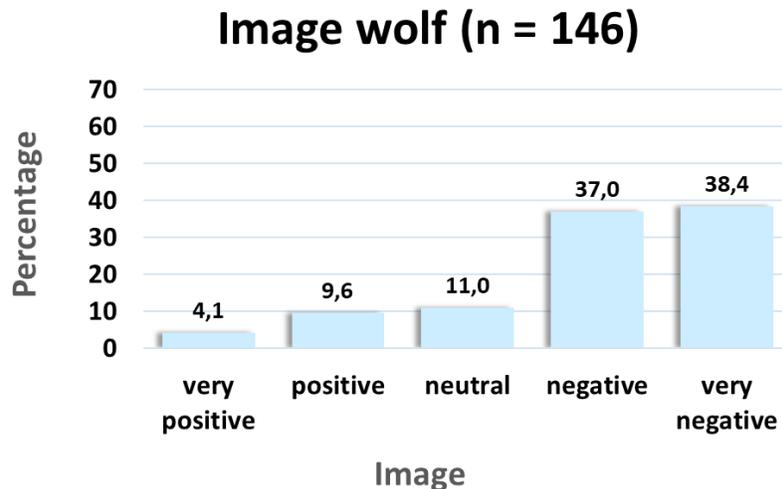


Figure 17: The general cognition towards wolf calculated through the means of Q1 13(1), 13(3), 13(4) and 13(5); the percentage is given at the y axis and the status of the image at the x axis.

Knowledge, which is the second aspect of the cognitive component, was measured by means of true/false questions about wolves. Just 6,2% out of 146 respondents answered all seven question correctly. 19,2% answered six questions correctly. The majority of the respondents (28,1%) answered five questions correctly. 24% gave the correct answer to four questions and 16,4% for three questions. Only 6,2% answered one (1,4%) or two (4,8%) questions correctly (see figure 18).

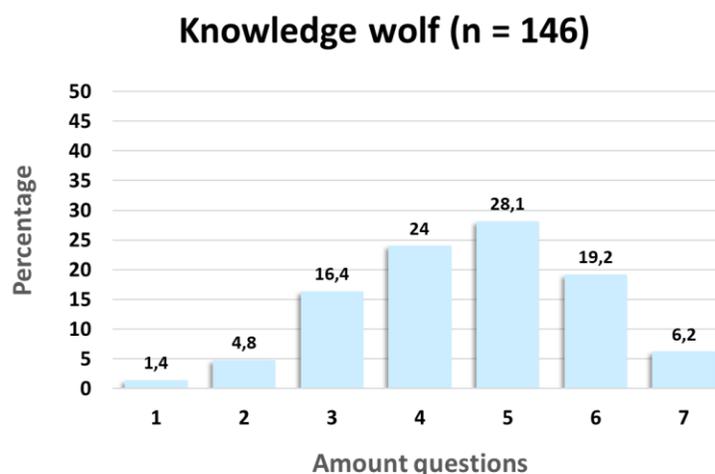


Figure 18: Results of knowledge questions about wolf; 146 respondents were taken into account; the bars show the percentage of respondents that answered correctly; the percentage is given at the y axis, the amount of questions is shown at the x axis.

On the first sight this matches with the results of the self-assessment ('How much do you know about wolves?'). 26,7% of the respondents indicated to know very much about wolves. Another 44,5% assessed that they know a lot and 53,5% answered five or more questions correctly. But, comparing the amount of right answers with the self-assessed value per respondent, barely a quarter estimated correctly (30,8%). The majority overestimated themselves and assessed a higher value than they actually scored (50,4%) (see figure 19). There were even two respondents who indicate to know very much about the wolf and had just one correct answer.

**Knowledge wolf self-assessment (n = 146)**

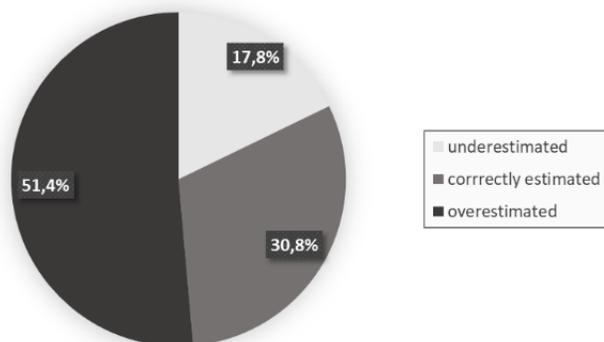


Figure 19: Correctness of the self-assessment of knowledge about the wolf; 146 respondents were taken into account. More than half of the respondents overestimated themselves.

The real knowledge about the wolf seems to have no influence on the image towards the wolf. (Spearman's  $p = 0,083$ ). In contrast, the self-assessment of knowledge correlates with the general attitude towards the wolf (Spearman's  $p = 0,007$ ;  $r_s = 0,223$ ;  $n = 146$ ). The main part of the respondents that have a negative or very negative image overestimated themselves (see table 3).

Table 3: Cross table of image (cognition) towards wolf and self-assessment of knowledge (0 = underestimated, 1 = correctly estimated, 2 = overestimated); noticeable is the overestimation of respondents with a negative or very negative image (see red mark).

### Cognition Wolf \* Correctness self-assessment Crosstabulation

Count

		Correctness self-assessment			Total
		0	1	2	
Cognition Wolf	very positive	1	3	2	6
	positive	6	6	2	14
	neutral	3	4	9	16
	negative	12	13	29	54
	very negative	4	19	33	56
Total		26	45	75	146

### General attitude towards wolf

In general, the attitude towards the wolf is negative ( $\bar{x} = 3,86$ ;  $m = 4$ ). 44,1% of the respondents have a negative attitude and 31% are even very negative towards the wolf. Just 14,5% have a positive (9%) or very positive (5,5%) attitude towards the wolf (see figure 20). This result takes 145 of the respondents (99,3%) into account, as one respondent does not have a value for affection and therefore sorted out.

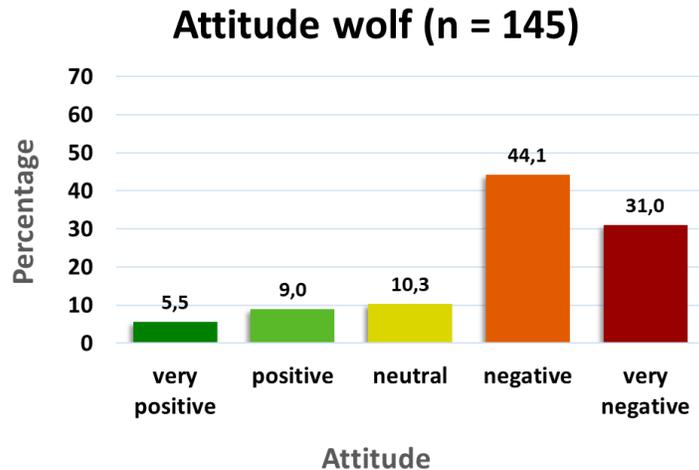


Figure 20: General attitude towards wolf based on means of components affection wolf, conation wolf and cognition wolf; 145 respondents were taken into account; the percentage is given at the y axis, the calculated attitude towards wolf is shown at the x axis.

The calculated attitude towards the wolf, based on the three components, is a bit less negative than the self-assessments of the respondents ( $\bar{x} = 4,03$ ). Within the self-assessment (What is your attitude towards the wolf?) almost half of the respondents (45,2%) indicate to have a very negative attitude towards the wolf. Another 31,5% say they have a negative attitude (see figure 21). So, the proportion of the negative and the very negative attitude is almost the other way around in the self-assessed attitude compared to the measured attitude. Furthermore, just 2,7% indicate to have a positive attitude in the self-assessment, but 9% actually have a positive attitude towards the wolf. On the other hand, more respondents indicate to have a very positive attitude (8,2%) in the self-assessment, but just 5,5% truly have a very positive attitude after measuring.

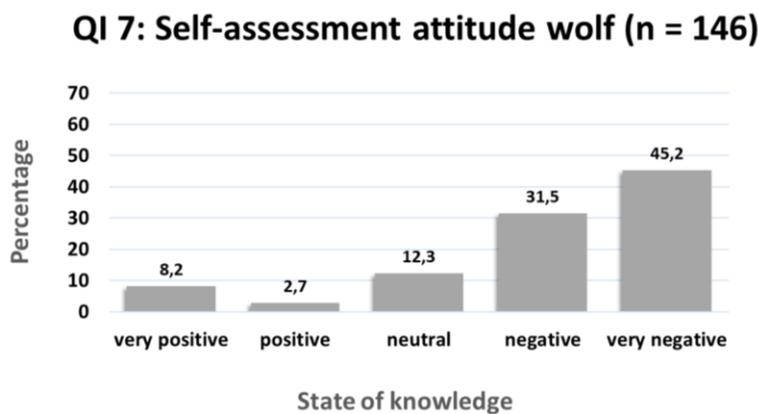


Figure 21: Results of QI 7 Self-assessment about attitude towards wolf; 146 respondents were taken into account; the percentage is given at the y axis, the attitude is shown at the x axis.

The respondents' opinion about the number of wolves in Lower Saxony is highly correlated with the measured attitude (Spearman's  $p = 0,000$ ;  $r_s = 0,548$ ) and the self-assessed attitude (Spearman's  $p = 0,000$ ;  $r_s = 0,725$ ). The majority (82,8%) either want less wolves or no wolves at all in Lower Saxony ( $m = 4$ ) (see figure 22), from which 74,7% have a negative or very negative calculated attitude. Just 7,5 % want more wolves in Lower Saxony.

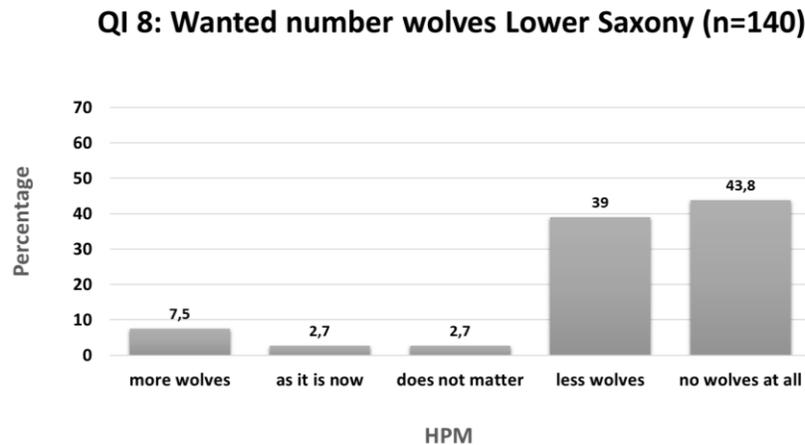


Figure 22: Results of QI 8: Wanted number of wolves in Lower Saxony; 140 respondents were taken into account; the percentage is given at y axis, the opinions of the respondents is given at the x axis.

Furthermore, there is a weak correlation between the number of incidents with a wolf and the calculated attitude (Spearman's  $p = 0,022$ ;  $r_s = 0,191$ ). So, the experience of an incident does have a small impact on the respondents' general attitude towards the wolf. Likewise, the amount of years that animals are kept is correlated with the respondents' attitude towards the wolf (Spearman's  $p = 0,006$ ;  $r_s = 0,168$ ). Also, the years of keeping animals have little impact on the attitude.

The general attitude does not influence the willingness of the respondents to protect their livestock more effectively (Spearman's  $p = 0,863$ ).

### Affection towards HPM

Based on the QI that measured the affection towards the HPM, a negative overall value for affection towards HPM can be inferred ( $\bar{x} = 3,79$ ). Most of the respondents (69,8%) have a negative or very negative affection towards HPM. The majority of the respondents has a negative affection (48,6%), followed by the respondents with a very negative affection (21,2%). Only 10,3% of the respondents are positive towards HPM, of which slightly less respondents have a very positive (2,1%) than a positive affection (8,2%) (see figure 23).

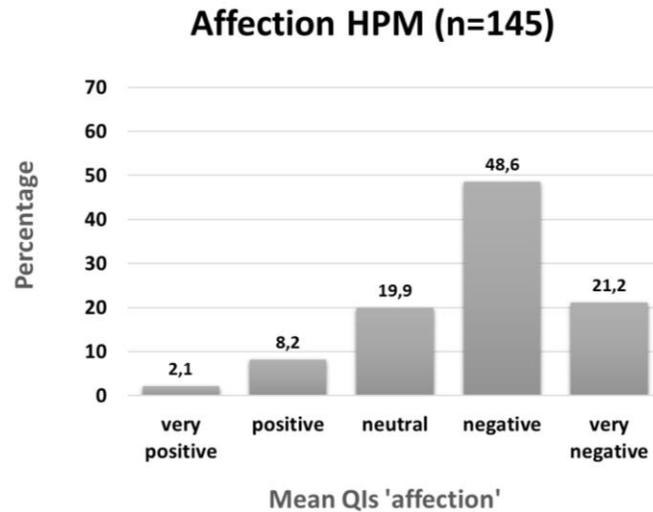


Figure 23: The general affection towards HPM calculated through the means of QI 20(2)(3)(4)(5)(6). The percentage is given at the y axis and the status of affection at the x axis.

Towards the statement that the current HPM is sufficient (QI 20(2)), the general opinion of the respondents is less negative and in fact neutral ( $m = 3$  and  $D_1 = 2$  and  $D_2 = 4$ ) (see figure 24). Out of all the QIs that are taken into account to measure the affection towards the HPM, this statement is the only QI with a general neutral response.

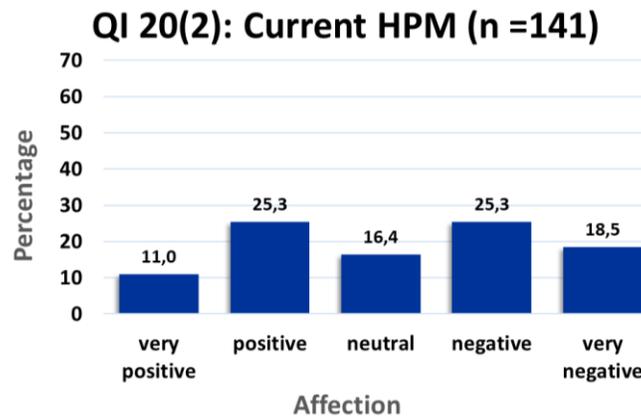


Figure 24: Results of QI 20(2): Current HPM; 141 respondents were taken into account; the percentage is given at the y axis, the assumed affection towards HPM based on status of agreement of the statement is shown at the x axis.

The respondents find the effort of adapting the HPM (bureaucratic, time and financial) too high. Furthermore, they feel abandoned regarding the adaption of herd protection measures by the supporters of the wolf and the departments ( $m = 4$  and  $D = 5$  for all statements).

### Cognition HPM

As the cognitive component consists of two aspects (image and knowledge, see explanation of terms) the results of this component are also divided into these aspects. About one quarter of the respondents (22%) do not find the requirements for their HPM appropriate. Another quarter of the respondents are neutral towards the statement (24%). The remaining half of the respondents finds the requirements inappropriate (see figure 25). As there is only one QI that measures the cognition towards HPM, the overall cognition has the same results as this QI and is slightly negative ( $\bar{x} = 3,47$ ).

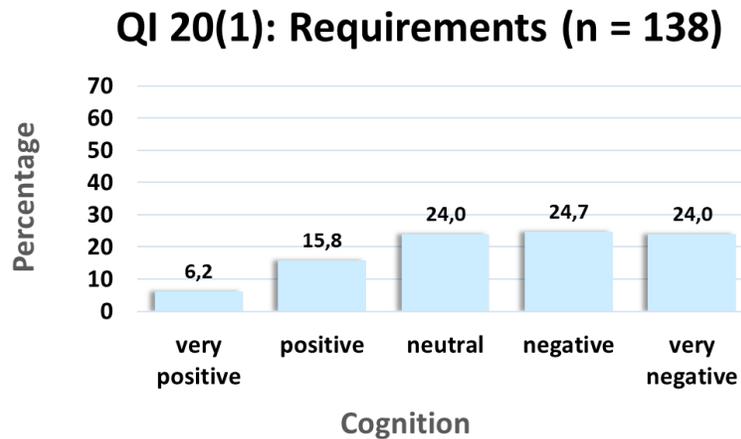


Figure 25: Results of QI 20(1): Requirements; 138 respondents were considered; the percentage is given at the y axis, the assumed affection towards wolf based on status of agreement of the statement is shown at the x axis; due to a negative questioning strongly disagree indicates a very positive cognition.

The majority of the respondents (69,9%) take financial and time aspects into consideration of adjusting HPM (see figure 26). Another big part of the respondents considers the bureaucratic effort while decision-making (59,6%). 11,6% of the respondents also name other aspects that play a role while decision-making. Within this option, many respondents say that they find the practicability of adapting HPM important. Another group of the respondents fear that smaller wildlife cannot pass the fences and consider this during decision-making. Another aspect that was named often is the effectiveness of the herd protection measure they are planning to adapt.

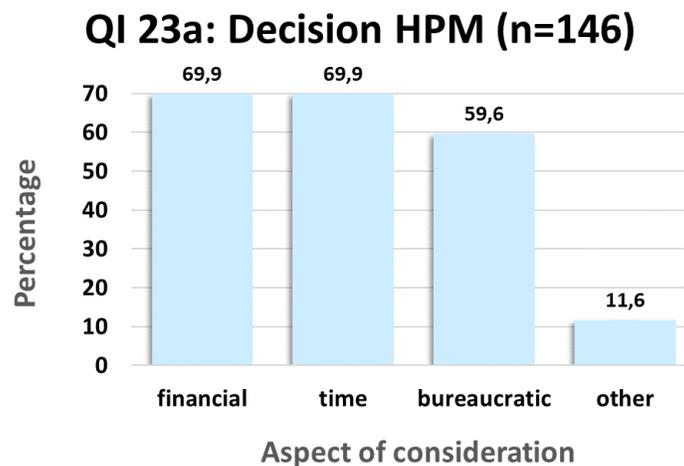


Figure 26: Results of QI 23a: Decision HPM; 146 respondents were considered; the percentage is given at the y axis, the aspects of consideration are shown at the x axis.

The knowledge about HPM and support options varies. Whereas the majority of the respondents (48,6%) answered both of the questions about HPM correctly (see figure 27), only a few had a great knowledge about the support options and answered all questions correctly (9,6%) (see figure 28). The majority (41,1%) answered only one question about the support options correctly. Also, the number of respondents that answered none of the questions correctly varies (8,9% at HPM and 17,8% at support options).

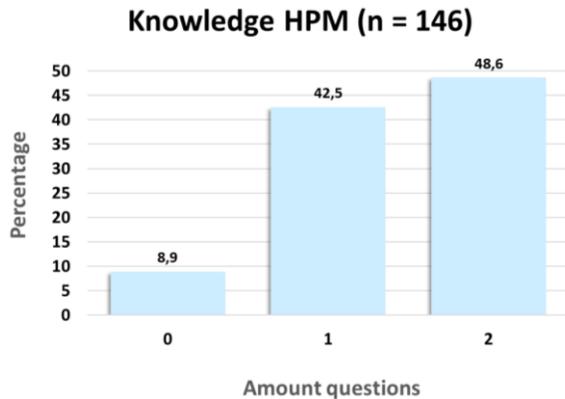


Figure 27: Results of knowledge questions about HPM; 146 respondents were taken into account; the percentage is given at the y axis, the amount of questions is shown at the x axis; the bars show the percentage of respondents that answered right.

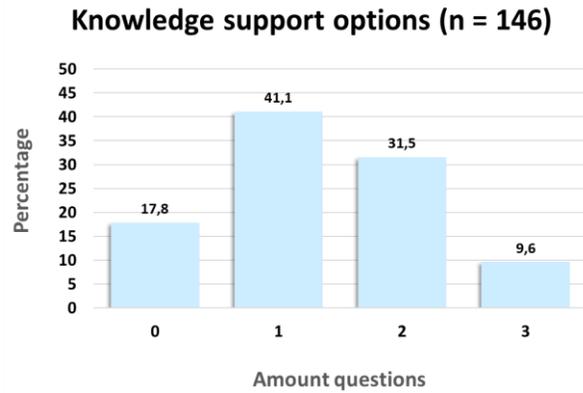


Figure 28: Results of knowledge questions about support options; 146 respondents were taken into account; the percentage is given at the y axis, the amount of questions is shown at the x axis; the bars show the percentage of respondents that answered right.

Many respondents (33,6%) claim to know more about the HPM than they really do (see figure 29). The smallest group of the respondents underestimated their knowledge about the HPM (12,3%). The remaining respondents estimated their knowledge correctly (54,1%).

Within the knowledge about the support options, the spreading of the self-assessment of the respondents is similar (see figure 30). While the respondents that underestimated themselves make up the smallest group (22%), the number of respondents that overestimated themselves equals the number of respondents that estimated themselves correctly (both 39%).

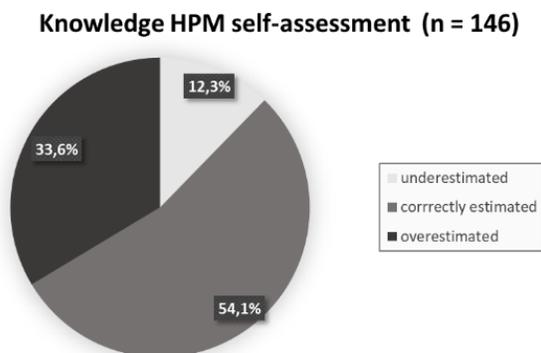


Figure 29: Correctness of the self-assessment of knowledge about the HPM. 146 respondents were taken into account.

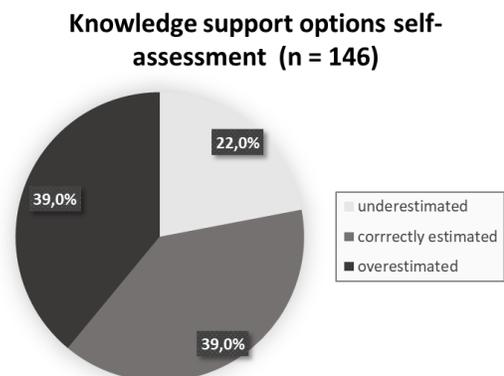


Figure 30: Correctness of the self-assessment of knowledge about the wolf. 146 respondents were taken into account.

### Attitude HPM

As this research has the approach to infer an attitude by using the three components affection, conation and cognition, no attitude towards HPM can be calculated due to a lack of a value for the conative component. Taking just the affective and cognitive component into account a slightly negative general attitude towards HPM could be inferred ( $\bar{x} = 3,7$ ). To stick to the research, approach the components were used separately to investigate correlations.

The affection towards HPM has a strong relation to the attitude towards the wolf (Spearman's  $p = 0,000$ ;  $r_s = 0,555$ ;  $n = 146$ ). So, respondents who have a negative attitude towards the wolf do also have a negative affection towards HPM. Furthermore, the self-assessed amount of knowledge about HPM and support options is higher the more negative the respondents' affection towards HPM is (Spearman's  $p = 0,047$ ;  $r_s = -0,164$ ;  $n = 146$  (HPM); Spearman's  $p = 0,014$ ;  $r_s = -0,202$ ;  $n = 146$  (support options)). Although, both of the correlations are not really strong. Moreover, the correctness of the self-assessment of the knowledge about support option correlates with the respondents' affection towards HPM (Spearman's  $p = 0,003$ ;  $r_s = 0,246$ ;  $n = 146$ ). 53,9 percent of the respondents that have a negative or very negative attitude overestimated themselves and just 32,4 percent assessed their amount of knowledge correctly.

Respondents who have a negative attitude towards the wolf do also have a negative cognition towards HPM (Spearman's  $p = 0,000$ ;  $r_s = 0,394$ ;  $n = 138$ ). The self-assessed amount of knowledge about support options is higher the more negative the respondents' cognition towards HPM is (Spearman's  $p = 0,023$ ;  $r_s = -0,193$ ;  $n = 138$ ). And also, the correctness of this self-assessment correlates with the respondents' cognition towards HPM (Spearman's  $p = 0,001$ ;  $r_s = 0,285$ ;  $n = 138$ ).

### Open response options

The evaluation of the open response options gives a deeper insight in how the respondents think about the whole topic. The responses can be divided into four main topics: NIMBY, threat, emotion and acceptance.

Some respondents take the view that the wolf is a great animal and that it may exist but not in such a cultivated country and not in their region. This is also known as NIMBY (not in my backyard) and indicates a general positive attitude towards an object or subject (especially within environmental topics) as long as one is not directly concerned (Pol, Di Masso, Castrechini, Bonet, & Vidal, 2006).

Other respondents see the wolf as great threat to their business or even their own freedom and life. The emotional comments contain mostly anger at the wolf and/or the government. Respondents with a more positive attitude also name anger at pastoralists who do not protect their livestock properly. Also, the helplessness and hopelessness of pastoralists become clear in these comments. They do what they can but often their hands are tied because of the law and provisions.

Some respondents also want to make clear that the wolf just belong to the nature and that we need to accept it as it is and learn to deal with it. This type of comment often came from respondents who have a neutral or (very) positive attitude towards the wolf. An overview of the given comments per QI with open response options can be found in appendix IX.

### 3.2.2 Impact of attitudes on behaviour

#### Attitude wolf

The more negative the attitude, the less HPM are applied (Spearman's  $p = 0,017$ ;  $r_s = - 0,198$ ;  $n = 145$ ). However, the correlation is not strong. Half of the respondents who have a positive or very positive attitude towards the wolf apply more than two HPM to protect their livestock. In contrast, less than a third of the respondents who have a negative or very negative attitude apply more than two HPM. More than half of these respondents apply one or two HPM and about a tenth does not apply any HPM. Less than half of the respondents with a positive or very positive attitude apply one or two HPM and there is just one respondent who is very positive towards the wolf but has applied no HPM (see table 4).

Table 4: Cross table of attitude wolf and applied HPM.

#### Attitude Wolf \* 19 Applied HPM Crosstabulation

Count		19 Applied HPM			Total
		no HPM	few HPMs (1-2)	many HPMs (>2)	
Attitude Wolf	very positive	1	4	3	8
	positive	0	5	8	13
	neutral	0	8	7	15
	negative	5	39	20	64
	very negative	8	24	13	45
Total		14	80	51	145

There is neither a correlation between the general attitude towards the wolf and the adjustment of HPM in the last three years (Spearman's  $p = 0,700$ ) nor between the attitude and the adjustment after the publication of the wolf guideline (Spearman's  $p = 0,807$ ).

#### Affection HPM

The more negative the affection towards HPM, the less HPM are applied (Spearman's  $p = 0,001$ ;  $r_s = - 0,263$ ;  $n = 146$ ). This correlation is stronger than the one between the attitude towards the wolf and the applied HPM. Only 28,4% of the respondents that have a negative or very negative affection towards HPM apply more than two HPM. Most of them (59,8%) apply one or two HPM and the remaining 11,8% do not apply any HPM. In contrast, 53,3% of the respondents who have a positive or very positive affection towards HPM apply more than two HPM. Another 40% apply one or two HPM and just 6,6% do not apply HPM (see table 5).

Table 5: Cross table of affection HPM and applied HPM.

### Affection HPM \* 19 Applied HPM Crosstabulation

Count

		19 Applied HPM			Total
		no HPM	few HPMs (1-2)	many HPMs (>2)	
Affection HPM	very positive	1	0	2	3
	positive	0	6	6	12
	neutral	1	13	15	29
	negative	8	39	24	71
	very negative	4	22	5	31
Total		14	80	52	146

There is neither a correlation between the affection towards HPM and the adjustment of HPM in the last three years (Spearman's  $p = 0,570$ ) nor between the affection and the adjustment after the publication of the wolf guideline (Spearman's  $p = 0,212$ ).

### Cognition HPM

There is no correlation between the cognition towards HPM and the applied HPM (Spearman's  $p = 0,067$ ), the adjustment of HPM in the last three years (Spearman's  $p = 0,481$ ) and the adjustment after the publication of the wolf guideline (Spearman's  $p = 0,424$ ).

## 4 Discussion

This chapter is divided into two sub-chapters: methodology and results. The methodology describes the most influential changes during the research and the effects on the investigation. The discussion of the results interprets the results of this research compared with other scientific researches and what the practical relevance of the results is.

### 4.1 Methodology

A pre-study was carried out to test the distinctness, possibilities of interpretation and functionality of the questionnaire (Baarda et al., 2015) and has been done with people who are not pastoralists in Lower Saxony. Therefore, they were not familiar with the topic around herd protection measures. While the distinctness and the needed time to fill in the questionnaire could be tested, the possibilities of interpretation could not be tested sufficiently.

Due to the promotion of the questionnaire via associations, clubs and social media, plus the voluntary participation on the survey, researchers could not control who reacted to the questionnaire. The likelihood of participation was thus unequal. This study reflects the attitudes of only 5% of the target population and cannot be used to infer an attitude for all pastoralists in Lower Saxony. (Semin et al., 1996)

The response options in the questionnaire differed per QI. Most of the response options were rating- or Likert-scales of which most of them consisted of a 5-point scale. The scales had the following structure: 1 = very positive, 2 = positive, 3 = neutral, 4 = negative and 5 = very negative. But as some response options were statements (QI 8, 11, 12, 21) and it was not made obvious which answer is the most negative/ positive, it cannot be said if the respondents shared the student's opinion on which statement is the strongest. In order to get as much data as possible, the respondents could choose the response option "other", where an open answer could be given. In case that the given answers did not suit the participants' attitude, this response option provided a possibility to explain their answer in more detail. Noticeable is that within the QIs with statements as response options, the option 'other' was used very often. With the high number of 'other'-responses, it can be assumed that the respondents did not agree with the ranking within the response options of the QIs with statements. As there was no possibility to code the given answers, they could not be taken into account for the individual statistical analysis. But, the answers were needed for determination of the attitude. This may appear as a pitfall, but the information of these answers will firstly help the contracting authority to determine its target, as they offer more detailed information. And secondly, the answers were used as controlling and filling information for the individual QI. They were not used for analysis by means of statistical tests but were used in the report for descriptions and comparisons of the statistical results. The fact that the option "other" was used often thus had a positive influence on the results and for the contracting authority.

It was chosen to spread the questionnaire via the social media platform Facebook because of the issues with the privacy law and the low number of responses during the first week of the data collection period (10 responses in 6 days; see appendix V). The students hoped that via Facebook,

the questionnaire would reach more people who belong to the target population and were more willing to participate on the research. The questionnaire's link was published in several Facebook groups for buying and selling goats and sheep. Also, the *Interessengemeinschaft der Weidetierhalter Deutschland* (WNoN) and the *Bürgerinitiative „Für wolfsfreie Dörfer“* posted the link to the online-questionnaire on their Facebook pages. The two associations were initiators of the event in Faßberg on 15<sup>th</sup> March 2019, that the researching students attended. After putting the questionnaire on Facebook, the number of respondents rose quickly (18 responses on 6<sup>th</sup> March 2019; see appendix V). Out of these respondents, the number of participants who belonged to the target population was high. Thus, posting the questionnaire on Facebook had a positive influence on the research, as there were more responses to be analysed.

With the number of used channels and the resulting number of the reached people from the target group, a higher number of respondents would have been desirable. A possible explanation for the low response rate within the target population could be that the data collection period was during the whole month of March. This was a very busy time for the pastoralists because from March on, sheep give birth to their lambs and pastoralists need to be there for the animals. Thus, the pastoralists' free time was limited, and it is to be left standing that there was no time to respond to the questionnaire.

Also, because none of the participants were obliged to fill in the questionnaire, it is likely that more pastoralists with a very strong attitude reacted to the survey. People with a very positive or a very negative attitude are more likely to feel tempted by a public opinion poll. Neutral answers are hard to get through the questionnaire with voluntary participation, which is why the attitudes of the respondents are not spread equally. The overall results and the responses within the option 'other' shows that a possible reason for this could be the emotionality of the topic. As the participation on the questionnaire was voluntary, less neutral data could be collected. The so created bias influenced the research results because the attitude often was either very positive or very negative. But, strong attitudes are more helpful for the contracting authority as they offer more options to work on.

In the end, only one QI was left to measure the component of the cognition of the attitude towards the HPM. Because of the complexness of attitudes, one QI is not enough to measure one component. Thus, the measured component 'cognition HPM' is not representative but was used within this research for further analysis.

The conation component of the attitude towards the HPM could not be measured at all due to the lack of QIs for this component. This problem goes back to the establishment of the questionnaire. Looking back, the quality of the QIs within the topic 'HPM' should have been closer to the ones of the topic 'wolf', to prevent the lack of QIs. The effect of the missing component 'conation HPM' is that no general attitude towards the HPM could be measured. Therefore, it is possible that the answers to the research questions are not representative.

## 4.2 Results

The present study was designed to investigate the attitudes of pastoralists in Lower Saxony towards wolves and herd protection measures (HPM) and whether these attitudes have influence on the applied HPM. Based on the theory of planned behaviour (Ajzen, 1985) it was expected that the attitudes of pastoralists correlate with their actual behaviour (Ajzen, 1985, 2005). The theory implies that the attitude, the subjective norm and the perceived behaviour control towards an object lead to behavioural intentions and finally to someone’s actual shown behaviour (see figure 31). As the application of HPM is a planned behaviour, this model functioned as orientation of the research. But, this study only focussed on the first path – the attitude’s influence on behaviour (see red marks in figure 31) by means of measuring the pastoralists’ attitudes towards the wolf and towards the HPM and the correlation between these attitudes and their actual shown behaviour in terms of applying and adjusting HPM.

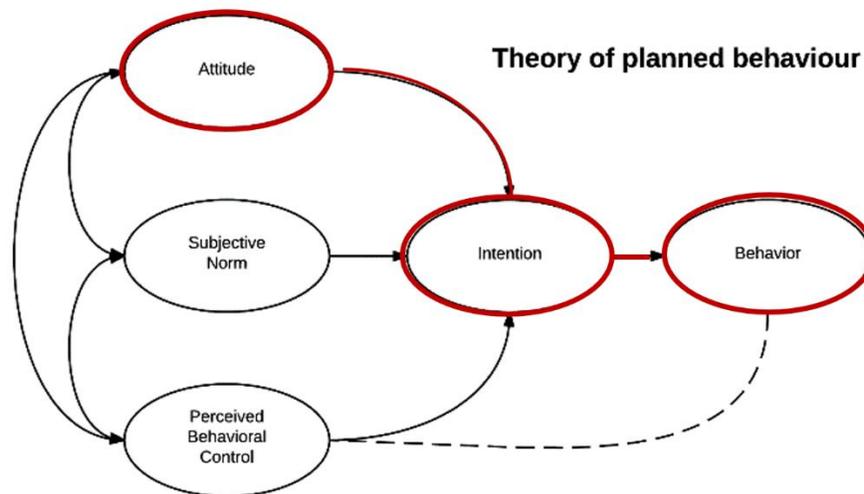


Figure 31: Model of the theory of planned behaviour of Icek Ajzen (1985). Source: (Wikipedia, Wikipedia, 2019).

As attitudes cannot be measured directly (Ajzen, 2005) three components were used to infer a general attitude. For both of the topics, “attitude towards wolf” and “attitude towards HPM”, the affection (feelings), conation (behavioural intentions) and cognition (image and knowledge) were measured by means of a questionnaire. For checking purposes, a raw measurement of the attitude towards the wolf took place through a self-assessment. The self-assessed attitude was more negative than the measured attitude. As it can be reasonably assumed that the measuring through the components gives a more reliable result, the respondents’ real attitude towards the wolf is less negative than assessed.

The most named emotions with regard to the wolf were anxiety, fear and anger. Also, horror and interest were named quite often and just admiration was named a little more often as a positively defined emotion. Especially fear for children and, mainly, fear for livestock is really an issue amongst pastoralists, of course. So, the general affection towards the wolf is, as expected,

negative. This result is consistent with the experience of the wolf expert Kurt Kotrschal who mentioned the topic as a very emotional debate (Bomas, 2018).

The behavioural intentions (conation) towards the wolf are in general negative, as well. This research also shows that behavioural intentions differ per situation and that it is hard to make a clear separation between behavioural intentions and emotional reactions within this topic. The tendency to a high emotional discussion can also be seen in public debates about the wolf.

The respondents also have a general negative image (cognition) towards the wolf. They do not think that the wolf has any importance or advantage for nature, locals or tourism in Lower Saxony. Moreover, more than 70% of the respondents say that there is not enough space for the wolf in a cultivated landscape.

The analysis of the second aspect of the cognition, knowledge, showed that the level of knowledge was not related to the respondents' image or general attitude towards the wolf. The majority answered at least five out of seven knowledge questions correctly. However, just over half of the respondents (51,4%) overestimated themselves at the self-assessment about their knowledge.

According to Kaczensky (2006) the main influence factors on an attitude towards the wolf are the importance of the topic for the respondent, the subjective involvement and the assessment of the habitat suitability (Kaczensky, 2006). It can be assumed that all three factors are applicable to the target group concerned in this study. Within this research, incidents with the wolf form most likely the subjective involvement. With a total of 79 incidents in 2016 (Niedersächsisches Ministerium für Umwelt, Energie, Bauen und Klimaschutz, 2016), the proportion of the target population that has had an incident with a wolf is 2,69%. The proportion of the study population that has had at least one incident is 17%. This shows that the study population represents a group of pastoralists from Lower Saxony who have had an above-average number of incidents, which gives reasons to call the actual representativeness of the sample in question. However, correlation tests within this study showed little relation between the attitude and the number of incidents. In addition, an overview of the *Niedersächsische Landtag* of companies that keep sheep, shows a steady decrease in companies over the last 15 years (Niedersächsischer Landtag, 2018) and there are no actual numbers of incidents for 2018 yet. It could thus be assumed that the total number of companies is even less in 2019 and also the number of incidents changed. So, it cannot be said if the number of respondents with incidents is overrepresented.

The general attitude towards wolves amongst pastoralists in Lower Saxony is negative. This result is confirmed by studies of Kaczensky (2006) and Ericsson et al. (2003). Kaczensky (2006) indicates that the percentage of pastoralists and hunters is highest within the group that has a negative attitude towards the wolf (Kaczensky, 2006). Ericsson et al. found out that the attitude towards wolves in Sweden changed since 1976 from positive to negative (2003) amongst hunters and the public because wolves chose central and southern Sweden as suitable habitat instead of the mountains, as had been expected. So, the personal consternation increases and ended up in a negative attitude (C.K. Williams, G. Ericsson, & T.A. Heberlein, 2002; Ericsson & Heberlein, 2003). Furthermore, the respondents' opinion about the number of wolves in Lower Saxony underlines

the negative attitude of the pastoralists, as 82,8% of the respondents want less or no wolves at all in Lower Saxony.

Considering the attitudes towards herd protection measures, the results are similar. First of all, 69,1% of the respondents feel abandoned by the government and associations. Second, the effort for applying and adjusting HPM is too high. Almost half of the respondents think that especially the financial and time effort is far too high. The bureaucratic effort does play a less important role. A reason for that could be, that pastoralists cannot afford the higher financial effort and also time which is necessary to improve measures, is non-existent. The affection of respondents towards HPM is thus negative, as well. Respondents also seem to have no trust in existing measures or in the wolf management. 28,1% indicated to not have done any adjustment in HPM through the years, although they know that the wolf is around. The remaining 71,9% did just adjust their measures as the wolf came to Lower Saxony (21,9%), to their region (21,2%) or even after they had an incident (4,1%). Only 7,5% of the respondents adjusted HPM as they knew the wolf was back in Germany. They perhaps hoped that the wolf would not come to Lower Saxony and would stay in the east of the country. 17,1% gave other reasons for adjustment.

Half of the respondents (49,3%) indicate that they did no adjustment when the new guideline for the wolf in Lower Saxony was published. A possible reason could be that pastoralists do not think that these requirements will work and neither the government nor experts can give them the 100% guarantee (Agrar Heute, 2014; 'CHWOLF.org', 2019) that they hope for.

The responses to the question if the requirements for the applied measures are useful, which also reflects the image respondents have towards HPM, spread widely. Maybe this opinion depends on the experience that respondents have had or based on statements of colleagues or parties concerned. Also, here it might be the case that the image towards HPM is dependent on the subjective involvement.

The analysis of the knowledge aspect showed that there is few knowledge about HPM and especially the support options. But, in contrast to the self-assessed knowledge about the wolf, the majority assessed their knowledge correctly in questions about HPM (54,1%). 39% assessed their amount of knowledge correctly for the questions about support options, but the same proportion (39%) overestimated themselves.

Different studies have proven a correlation between knowledge and attitudes already (Allum, Sturgis, Tabourazi, & Brunton-Smith, 2008; Ramsey & Rickson, 1976). It could thus be assumed that the negative affection and image towards HPM is accompanied by a lack of knowledge, even though the questions about HPM and support options might not be enough to measure the knowledge sufficiently.

To investigate whether the pastoralists' attitude influences their behaviour in terms of applying herd protection measures, the correlation between the attitude, respectively the affection and cognition, and behaviour indicative question items was measured.

Against the expectation, all three variables (attitude towards wolf, affection towards HPM, cognition towards HPM) were only weakly related to the application of HPM, which indicates that the attitude has not that much impact on the pastoralists' behaviour in terms of applying HPM. This matches the statement of Stangl (2019) who indicates that an attitude often has an

uncertain relation to the actual behaviour (Cherry, 2019; Stangl, 2019). Coming back to the above-mentioned theory of planned behaviour, it could be that this relation is so weak because only the attitude was taken into account. This research did not pay any attention to the subjective norm or the perceived behaviour control. According to Ajzen (1985) all three aspects play an important role in influencing behaviour. Perhaps the pastoralists' behaviour is influenced by the subjective norm (the behaviour of others) or the perceived behaviour control (building up a fence feels secure).

Another possible reason for that weak relation could be the situation of the pastoralists itself. As the wolf is (still) protected by law pastoralists have little possibilities for action. If they want to keep their livestock, they need to apply and constantly adjust herd protection measures. It is proven that actual shown behaviour sometimes conflicts with someone's attitude, because of a special need of action (Hans D. Mummendey, 2013; Hans Dieter Mummendey, 1988).

The results of this study are a first step finding a solution to this wildlife-human conflict. If pastoralists feel abandoned any longer, the danger of self-justice will increase, as people already have begun to shoot the wolves themselves illegally. Since the year 2000, 24 wolves were found dead – shot illegally – in Germany. The estimated number is even higher (NABU, 2017). The longer the problem exists, the higher the danger of self-justice gets. A longitudinal research in Wisconsin, USA, showed a decrease in tolerance over time. Throughout the years there was an increasing in the fear of wolves, the sense of competition for deer, the inclination to poach wolves, approval of lethal control of wolves involved in livestock and pet attacks and endorsement of regulated public hunting or trapping of wolves. Thereby, the familiarity with wolves did not play a role and the negative experience was little associated with this decrease in tolerance (Treves, Naughton-Treves, & Shelley, 2013).

Other studies show that the attitude towards the wolf is also negative in countries where shooting wolves is allowed. Enksaikhaan & Kaczensky (2006) proved negative attitudes amongst pastoralists in Mongolia (Kaczensky, 2006) where the wolf is not under protection by law (Eregdenedagva, Samjaa, Stubbe, & Stubbe, 2016). Bath & Majic (2009) brought evidence to a negative attitude towards wolves in Croatia, as well (Majić & Bath, 2009). There, the wolf is just protected by law since 1995 (Štrbenac et al., 2005).

In general, attitude research is of particular importance for associations that advocate wildlife as well as for the wild animals and their conservation. Moreover, the parties concerned need to be heard and their problems need to be taken seriously, because wildlife management is human management – the “humans dimension of wildlife management (HDWM)” (J. Decker, Brown, Vaske, & Manfreda, 2004). Therefore attitude research on concerned parties is important to improve the situations for persons affected and the wild animals.

## 5 Conclusion

Since the wolf is back in Germany, the human – wildlife conflicts keep increasing, mainly because of incidents with livestock. Pastoralists likely are the most concerned group in this debate and therefore need special attention. As it is known that attitudes influence behaviour it is important to get to know the pastoralists' attitudes towards the wolf, as well as towards herd protection measures (HPM) to finally create a higher acceptance.

Therefore, this research focussed on two main questions:

1. *What are the attitudes of pastoralists (livestock keepers) in Lower Saxony towards the wolf and the (applied) herd protection measures?*
2. *How do these attitudes influence the pastoralists' behaviour in terms of applying herd protection measures?*

As an attitude cannot be measured directly, three components were used to finally infer attitudes towards the wolf and towards HPM. The affection (feelings), conation (behavioural intentions) and cognition (image and knowledge) towards the two topics were measured by means of a questionnaire.

The overall attitude towards the wolf is negative. However, it is less negative than the self-assessed attitude of the respondents. Demographic data has no influence on the attitude. In fact, there is a correlation between the attitude and the years of keeping animals as well as between the attitude and the number of incidents. But, as these correlations are not really strong it can be concluded that these variables are not decisive for forming an attitude.

A general attitude towards HPM could not be calculated due to a lack of measurements for the conative component. The affection towards HPM is negative and the cognition neutral. However, there is a lack of knowledge about HPM and support options.

The pastoralists fear the wolf because it is a threat to their animals, which they have never had before. Incidents with the wolf lead to more fear and less acceptance within the population of the wolf. But, these incidents may happen because pastoralists did not protect their animals according to the minimum standards for the common herd protection measures.

However, correlation tests between the attitude towards the wolf, respectively the affective and cognitive component of HPM, and behaviour indicative items only show weak relations. It can be concluded that the attitudes of the respondents do not have a great impact on their behaviour in terms of applying HPM and no influence on the adjustment of HPM. A possible explanation could be the situation of the pastoralists themselves. As the wolf is protected by law, pastoralists have little possibilities for action and if they want to protect their livestock they need to apply existing measures, whether they think it is useful or not. This could also be seen within the open response options. The respondents mentioned acceptance, as long as they are not concerned, emotions like anger at the wolf and at the government, helplessness or hopelessness. The evaluation of these comments showed the need of communication with pastoralists as they told everything that came to their mind by filling in the questionnaire. This also underlines that the topics "wolf" and "herd protection" cause a high emotional debate. This needs to be considered when finding solutions and compromises.

Another possible reason for the weak relation between attitude and behaviour could be that the subjective norm and the perceived behaviour control also play an important role and may have more influence on the pastoralists' behaviour as only their attitude. These aspects did not attract interest in this research.

As the likelihood of participation on this research was unequal amongst pastoralists, the acquired findings can just be used for the sample size of 146 respondents. So, it is not possible to infer an attitude for all pastoralists in Lower Saxony. However, it can be assumed that the attitude of the whole population is similar and also not only concern people who keep sheep and goats, but also other animals. Furthermore, this topic cannot be limited per state, as this topic affects all pastoralists. These facts became apparent through the total amount of responses (216) which also contained horse owners, dog breeders or people that keep cattle and people who do live in other parts of Germany.

The wolf will remain a controversial topic amongst pastoralists. In future it will be necessary to consider the human dimension of wildlife management to find sustainable solutions that are suitable for both, human and wildlife.

## 6 Recommendation

This chapter describes the recommendations mainly for the contracting authority, the *Gesellschaft zum Schutz der Wölfe e.V.*. Furthermore, there are some recommendations for further research to improve the protection of wolves and pastoralists more effectively. Finally, there are some recommendations for the government, how to support parties concerned more successfully. These recommendations are mainly based on the results of this research about attitudes of pastoralists in Lower Saxony.

### Contracting authority

The topic around the wolf is mainly affected by the two extremes: people that are very positive and people that are very negative towards the presence of the wolf. Both parties have their reasons and backgrounds that need to be understood in order to improve the situation. The GzSdW's task is to be the mediator between the two extremes, to protect the wolf as well as the pastoralists and their livestock sustainably. As people who have a very positive attitude do not form a conflict with the target position of the contracting authority, the recommendations only focus on the people with a more negative attitude towards wolves and HPM.

Even though herd protection measures are available, incidents occur frequently which is mostly associated with high financial loss and emotional pain for the pastoralists. To fight the problem about the high number of incidents on its roots, the pastoralists need to be heard and understood. The results of this research show that most of the respondents (69,1%) feel abandoned. They are not necessarily angry at the wolf itself but at wolf supporters and the government. So, the communication with the people concerned needs to be improved. Therefore, it is recommended that the GzSdW could not only offer information but is present and communicates with pastoralists at events like the Wolf and Sheep Conference in Faßberg. Being present within the pastoralists community and to make clear that the organisation also wants to protect them and not only the wolf is important to increase the trust in associations and give the concerned people the feeling to be understood and getting real support. Especially pastoralists that keep their animals in protected areas, where fixed fences are not allowed, need more information about alternative HPM and more support with the adaption of herd protection measures as well. In this case guard dogs are the most suitable solution. As the GzSdW is working with guard dogs already, it can be recommended to improve the way of promotion of the dogs' work through organizing events about herd protection measures or publish articles in relevant magazines such as the *Schafzucht*.

Furthermore, this research showed a lack of knowledge, especially about HPM and support options. Most of the respondents overestimated themselves at a self-assessment of their knowledge. Even though the amount of knowledge has no, or just little, relation to the general image towards the wolf or HPM it could be helpful to increase the pastoralists' knowledge about the topics. A possible solution could be a hand out with information about the wolf, HPM and support options directed to the target group, that is available online or in a printed version at events. This hand out must not be longer than three pages and should only contain the most important and helpful information with necessary links to make the information intake as easy as possible.

As especially the results of the open response options show that the respondents have a critical view on wolf supporters and associations it is to be recommended to promote the membership of pastoralists to the GzSdW. This would likely make the organisation more convincing. Moreover, a change of the name of the GzSdW should be taken into consideration as pastoralists with a negative attitude most likely tend to form prejudices against the organisation by just hearing the name. At the visited events, the authors were advised not to name the contracting authority. Talking to the visitors of the events, this recommendation turns out as right. A more objective name could help to prevent negative prejudices and make clear that both sides, wolf and pastoralists, respectively livestock, are important for the organisation.

Suggestions:            *Zusammenleben Mensch und Wolf (ZMW)*  
                              *Gesellschaft zum Schutz von Wolf und Nutztier (GzSWN)*  
                              *Arbeitskreis Wolf und Nutztierhalter (AK WNh)*

Finally, there are five recommendations that arise out of the results of this research:

- Personal conversation with the target group of pastoralists at events
- Improving the way of promotion of guard dogs through organizing events and publishing articles
- Short hand out containing the most important and helpful information about wolf, HPM and support options for the target group of pastoralists
- Membership of pastoralists to become more convincing
- Changing name to prevent prejudices

## Science

This research only focused on pastoralists in Lower Saxony. Due to the way of data collection, it turns out that this is a topic of great concern. Not only people from Lower Saxony who keep sheep and goats felt attracted, but also people from other states as well as horse and pet owners and people who keep cattle. It is thus recommended to expand the research sample size, respectively do more apart researches on other animal keepers throughout the whole country and compare them to get an overall image of the attitudes of parties concerned. Then it will probably be possible to improve the management of the wolf in the whole country and support the cooperation of the states.

To change the (negative) attitudes of the people concerned it would be necessary to investigate the reasons for their attitude on the one hand. On the other hand, taking into account the subjective norm and the perceived behaviour control (based on the model of Ajzen (1985)) would be necessary too. As this research only focused on the attitude of pastoralists and showed that there is little relation to the actual shown behaviour it is possible that the other two aspects play an important role by applying or adjusting HPM.

Another interesting aspect is the name recognition of supporting organisations. As this research investigated a lack of knowledge especially about HPM and support options, it would be interesting to investigate if pastoralists even know the associations and institutions that offer support, to get to know how to improve the name recognition and thus the support of pastoralists.

In the end, there are four recommendations for the scientific approach of the topic:

- Further research not only within Lower Saxony, but country-wide and also on horse and pet owners and people who keep cattle
- Research about reasons of attitude
- Research about subjective norm and perceived behaviour control
- Research on name recognition of supporting organisations

### **Government**

The government plays an important role within the wolf management. Moreover, the evaluation of the open response option within this research showed that pastoralists make the government responsible for incidents and want them to be more active. Therefore, recommendations are given for the government agencies as well.

As the majority of the respondents feel abandoned of wolf supporters and the government, it is recommended that the institutions become more and easier accessible for people concerned. The government agencies should give the pastoralists the feeling to be there if needed and to help finding solutions and providing support and information. Actually, the wolf consultants should fulfil this task. In reality, there are more conflicts than cooperation between pastoralists and consultants (this information was given to the authors by one of the respondents). The government need to make sure that the employed wolf consultants are not only experienced in wolf behaviour but also in livestock behaviour, herd protection measures and human psychology. Furthermore, they need to stay objective and sympathetic towards the pastoralists. In addition, it is important that the states begin to cooperate and that the management of the wolf takes place throughout the whole country. The states could support each other and adapt measures from other, more experienced states.

So, there are three recommendations that should be considered by the government, to help solving the conflicts between the wolf and pastoralists:

- Being more accessible and less complicated in terms of providing support and information
- Wolf consultants experienced in wolf behaviour, livestock behaviour and human psychology and staying objective
- Cooperation of states → management country-wide

Even though, not all recommendations are clearly based on only the results of this research they are derived from the overall experience and impressions the authors got during the whole process of this research.

The wolf will remain a controversial topic which will hardly find an end soon. Cooperation of all parties concerned is the most important thing in the opinion of the authors. An objective attitude, a factual argumentation and a mutual understanding are essential to find a solution for both wildlife and humans.

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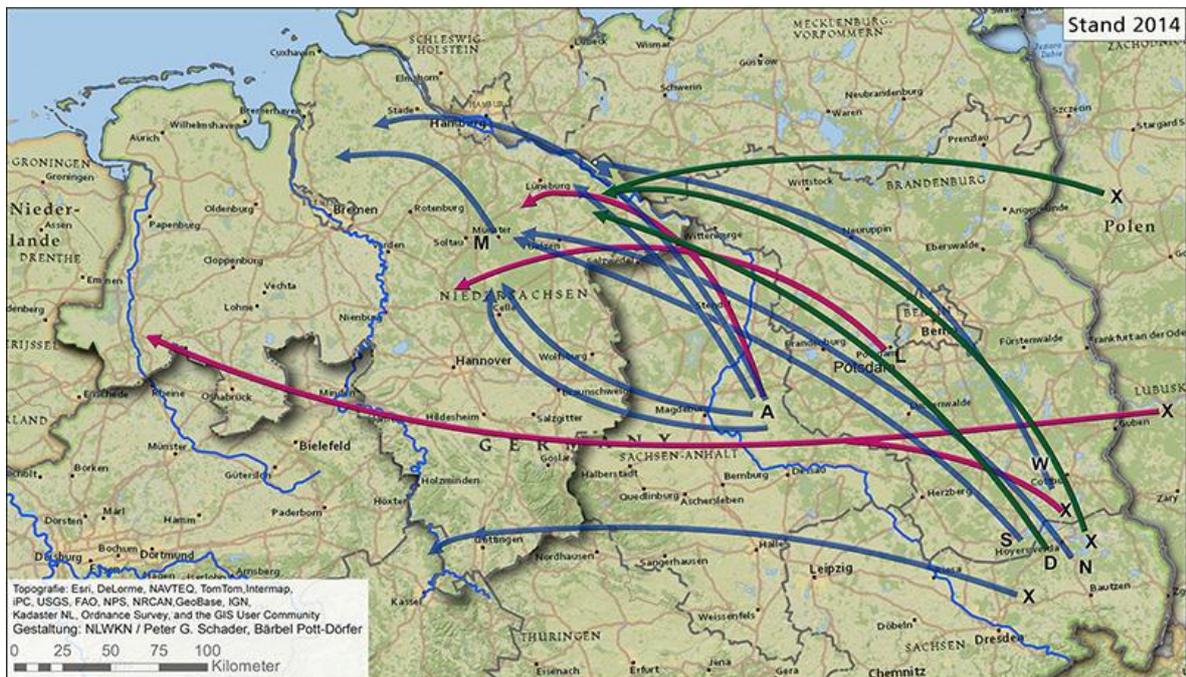
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## 8 Appendices

### Appendix I: Origins of the wolves of Lower Saxony



Lower Saxony's wolves originally come from eastern Germany and western Poland: (A) Altengrabower Rudel, (S) Seenlandrudel, (N) Nochtener R., (D) Daubaner R., (L) Lehniner R., (W) Welzower R., (M.) Munsteraner R., (X) pack assignment not possible. (NLWKN, 2019a)

## Appendix II: Herd protection measures of the wolf guideline

In 2017, the NLWKN published the “Guideline on the Granting of Equity Benefits and Contributions to the Reduction or Avoidance of Economic Burdens in Lower Saxony caused by the Wolf” (NLWKN, 2017). In this report, the minimum standards for the common herd protection measures are described. These standards serve as a guideline for the shepherds who might want to apply for a compensation due to an incident with a wolf. Compensations can only be given to shepherds with livestock such as sheep, goats, game, cattle, horses, guard dogs and other protection animals. If the guidelines are fulfilled, and the local wolf representative confirms that an incident was caused by a wolf, the shepherd can apply for a compensation from the state Lower Saxony. If a wolf was first seen in a region, the region will be declared as “Förderkulisse Herdenschutz”. If so, the local shepherds must apply an extra protection, which is called “Grundschutz”. The preconditions for the Grundschutz are:

- (1.1) A completely closed, electrically charged network mesh or strand fence with a design-related height of at least 90 cm.
- (1.2) A bottom guard with at least one live wire or a live smooth wire with a maximum of 20 cm ground clearance.
- (1.3) When using live wires or wires, used electric fencers must have a discharge energy of at least 1 Joule according to the manufacturer.

Alternatively, the following protection measures are suitable:

- Wire mesh fencing or knotted mesh with at least 120 cm in height, which cannot be slipped by wolves due to the design and underground protection. This can consist in the fact that the fence is embedded at least 20 cm deep in the ground or on the outside in a maximum of 20 cm height and 15 cm distance is supplemented by a live wire or a live smooth wire. As an alternative to being let into the ground or to a live wire near the ground, fencing nets can also be supplemented by a knotted netting fixedly connected to the vertical fence, which rests on the floor to the outside at a width of 100 cm. This knotted netting must be fixed to the ground both at the fence side and at the outer edge by floor anchors placed at least every 4 m so that it is fixed every 2 m in total.
- Alternatively, wire mesh or knotted meshes of at least 90 cm in height, which cannot be slipped by wolves due to their design and have underground protection as described in Section 2.1, can be provided by broadband strands or barbed wires which are mounted at a maximum distance of 20 cm above the fence and each other be increased at least 120 cm.

### Dogs

- Suitable breeds: Pyrenean Mountain Dog, Maremmano-Abruzzese or half-breeds
- Must pass test before serving as a guard dog
- Protection: If dogs are used to protect sheep, 2 guard dogs can be subsidized for a herd of 100 sheep. If the herd counts 200+ animals, for each 100 animals more, one more guard dog can be subsidized.

This counts for other livestock as well, but with these animals, other conditions apply.

Other conditions apply for exceptions, such as protected areas as dikes.

## Appendix III: Questionnaire

### Meinungsumfrage zu den Themen Wolf & Herdenschutz

Wir sind Theresa Fedder und Carolin Stern und studieren Tiermanagement an der niederländischen Fachhochschule Van Hall Larenstein in Leeuwarden. Im Rahmen unserer Bachelorarbeit möchten wir gerne Meinungen und Einstellungen zum Thema Wolf in Niedersachsen und zu angewandten Herdenschutzmaßnahmen niedersächsischer Schaf- und Ziegenhalter/-innen erfahren.

Ihre Meinung ist uns wichtig um herauszufinden, wo es die meisten Konflikte zwischen Mensch und Tier, Zivilisation und Wildtier gibt und wir möchten auf diesem Wege einen Beitrag zur Verbesserung der Situation von Nutztierhaltern und Wildtierpopulation(en) leisten.

Unter Beachtung der Datenschutz-Grundverordnung (EU-DSGVO) ist diese Umfrage selbstverständlich gänzlich anonym. Sie beinhaltet 25 Fragen, die ca. 15 Minuten Ihrer Zeit beanspruchen.

Mit der Teilnahme an der Umfrage stimmen Sie zu, dass die gesammelten (anonymen) Daten verarbeitet und die Ergebnisse aus der Analyse der gesamten Daten an Dritte weitergegeben werden dürfen.

Bitte füllen Sie den Fragebogen ohne zusätzliche Hilfe und nach bestem Wissen und Gewissen bis spätestens 31.3.2019 aus.

Alle mit Sternchen (\*) markierten Fragen müssen ausgefüllt werden, da sonst keine verwertbaren Resultate garantiert werden können.

Bei Fragen zur Umfrage können Sie sich gerne an Carolin Stern unter der E-Mail-Adresse carolin.stern@hvhl.nl wenden.

Vielen Dank für Ihre Teilnahme!

Theresa Fedder & Carolin Stern

### Allgemeines

1. Bitte geben Sie hier Ihr Geburtsjahr ein. (Bitte als 4-stellige Zahl angeben, also z.B.: 1960)  
.....
2. Bitte wählen Sie aus den folgenden Optionen.
  - Männlich
  - Weiblich
  - Divers
3. In welchem Landkreis halten Sie Ihre Tiere? Bitte das KFZ-Zeichen angeben (Bsp.: "H" für Hannover, "CUX" für Cuxhaven)  
.....

4. Wie viele Tiere halten Sie im Schnitt?

.....

### **Zusammenleben mit dem Wolf**

In diesem Abschnitt würden wir gerne von Ihnen wissen, ob Sie Ihre Tiere in einem Wolfsgebiet halten und ob es schon mal zu Konfrontationen kam.

5. Gibt es in Ihrer Region freilebende Wölfe?

- Ja
- Nein
- Weiß nicht

6. Haben Sie in den letzten 3 Jahren durch Übergriffe eines Raubtieres Schäden an Ihren Tieren erlitten?

- Nein
- Ja, einmal
- Ja, zweimal
- Ja, dreimal
- Ja, mehr als dreimal

### **Einstellung zum Wolf**

In diesem Abschnitt würden wir gerne mehr zu Ihrer generellen Einstellung zum Wolf erfahren. Bitte beantworten Sie die Fragen "aus dem Bauch heraus", also was Ihnen als erstes in den Sinn kommt.

7. Wie ist Ihre Einstellung zum Wolf in Niedersachsen?

- Sehr positiv
- Positiv
- Neutral
- Negativ
- Sehr negativ
- Weiß nicht

8. Bitte kreuzen Sie die für Sie zutreffendste Aussage an.

- Ich hätte gerne mehr Wölfe in Niedersachsen.
- Die Anzahl der Wölfe in Niedersachsen ist gut so wie sie jetzt ist.
- Mir ist es egal, ob es in Niedersachsen Wölfe gibt oder nicht.
- Ich würde mir wünschen, dass es weniger Wölfe in Niedersachsen gibt.
- Ich möchte überhaupt keine Wölfe in Niedersachsen.
- Zur Anzahl der Wölfe in Niedersachsen habe ich keine eindeutige Meinung.

9. Was empfinden Sie bei dem Anblick folgender Bilder? Bitte kreuzen Sie die für Sie zutreffendste(n) Emotion(en) an. (Mehrfachnennungen möglich)



- Angst
- Wut
- Bewunderung
- Sorge
- Glück
- Entsetzen
- Romantik/Nostalgie
- Interesse
- Ekel
- Sonstiges, .....

### Umgang mit dem Wolf

Bitte stellen Sie sich die im Folgenden beschriebenen Situationen möglichst genau vor und beantworten Sie die Fragen so spontan wie möglich.

10. Ein Wolf wird in einem Gebiet, in dem Sie häufig sind, gesichtet. Würden Sie sich weiterhin frei in diesem Gebiet bewegen?

Sicher ← ----- → Sicher nicht

10.a. Die Anwesenheit des Wolfes spielt dann ...

Eine große Rolle bei der Entscheidung ← ----- → Keine große Rolle bei der Entscheidung

11. Sie sind mit Ihrer Familie im Zoo, in dem es auch ein Wolfsgehege gibt. Wie verhalten Sie sich am ehesten?

- Ich bleibe stehen und erläutere meinen Kindern die negativen Eigenschaften von Wölfen und welche Gefahr von Ihnen ausgeht.
- Ich schaue kurz ins Gehege, äußere mich abfällig über die Tiere und ziehe meine Kinder möglichst schnell daran vorbei.
- Ich laufe einfach weiter und ignoriere das Gehege.
- Ich schaue kurz und freue mich mit meinen Kindern über die Tiere.
- Ich bleibe fasziniert stehen und schaue mir die Wölfe eine Weile interessiert an.
- Ich weiß nicht.
- Sonstiges, .....

12. Bitte kreuzen Sie die für Sie zutreffendste Reaktion auf die folgenden Situationen an.
- a. Ihr Nachbar hat in der letzten Nacht einen Wolf in der Umgebung gesehen und erzählt Ihnen von dieser Beobachtung. Was ist Ihre erste Reaktion?
    - Ich zucke mit den Schultern, weil es mir egal ist.
    - Ich freue mich und setze mich nachts auf die Lauer, um den Wolf mit eigenen Augen sehen zu können.
    - Ich rege mich lautstark auf und schimpfe über den Wolf.
    - Ich freue mich über die Nachricht und frage weiter nach.
    - Ich schüttele den Kopf und äußere meinen Unmut über diese Nachricht.
    - Ich weiß nicht.
    - Sonstiges, .....
  - b. Ein Ihnen entgegenkommender Wanderer erzählt Ihnen von seiner Begegnung mit einem Wolf und erläutert Ihnen ganz euphorisch, wie toll diese Tiere sind. Was ist Ihre erste Reaktion?
    - Ich argumentiere stark gegen den Wolf, aufgrund der Gefahr für Mensch und Tier in der Region.
    - Ich stimme in die Euphorie mit ein und äußere meine Faszination zu den Tieren.
    - Ich winke ab, da mir das Thema egal ist.
    - Ich freue mich mit ihm und frage interessiert nach.
    - Ich merke an, dass ich den Wolf nicht so toll finde, da er auch eine Menge Konflikte mitbringt.
    - Ich weiß nicht.
    - Sonstiges, .....
  - c. Auf einer Versammlung erzählt Ihnen ein Kollege, dass er kürzlich mehrere Nutztiere durch einen Wolfsangriff verloren hat. Er schimpft stark über das ganze Thema Wolf. Was ist Ihre erste Reaktion?
    - Ich zeige mein Mitgefühl und betone, dass der Wolf wirklich eine Bedrohung ist.
    - Ich verweise auf Fachkundige, um sich Rat und Unterstützung zu holen.
    - Ich rege mich mit ihm auf und stimme zu, dass die Gefahr für Verluste zu groß ist.
    - Ich beschwichtige ihn und mache deutlich, dass das Verhalten des Wolfes auf Instinkten basiert.
    - Ich argumentiere gegen das Schimpfen und merke an, dass wir uns umstellen müssen und dann ein Zusammenleben möglich ist.
    - Ich weiß nicht.
    - Sonstiges, .....

13. Bitte kreuzen Sie die folgenden Aussagen mit der jeweils für Sie zutreffendsten Antwort an.

	Stimme auf jeden Fall zu	Stimme zu	Weder noch	Stimme nicht zu	Stimme auf keinen Fall zu	Weiß nicht
Der Wolf hat ein Recht hier zu sein, da er früher auch schon in Deutschland gelebt hat.						
Ich finde es wichtig, dass ich gut aufgeklärt werde, wenn der Wolf in meiner Umgebung vorkommt.						
Es gibt in Deutschland nicht genug Platz für den Wolf.						
Der Wolf ist wichtig für das natürliche Gleichgewicht.						
Die Anwesenheit des Wolfes ist gut für den Tourismus.						
Durch die Anwesenheit des Wolfes habe ich Angst um meine Kinder.						
Die Anwesenheit von Wölfen wird mein Freizeitverhalten negativ beeinflussen.						
Durch die Anwesenheit von Wölfen habe ich ständig Angst um meine Tiere.						

### **Wissen über den Wolf**

An dieser Stelle möchten wir gerne mehr über Ihr Wissen zum Thema Wolf erfahren. Bitte beantworten Sie die Fragen ohne Hilfsmittel.

14. Wie viel wissen Sie über den Wolf?

- Sehr viel
- Viel
- Nicht viel/nicht wenig
- Wenig
- Sehr wenig

15. Bitte beurteilen Sie folgende Aussagen mit Richtig oder Falsch.

	Richtig	Falsch	Weiß nicht
Ein ausgewachsenes Wolfsmännchen wiegt durchschnittlich 85 kg.			

Es ist ganz normal, dass Menschen von Wölfen getötet werden.			
Der Wolf spielt für die Verbreitung von Tollwut keine große Rolle.			
Wölfe fressen nur kranke Tiere.			
Der Wolf kann mit Leichtigkeit 2 m hoch springen.			
Mehrfachtötungen an Nutztieren durch Wölfe basieren auf einem Reflex.			
Die sozialen Strukturen in einem Wolfsrudel sind denen der Menschen ähnlich.			

16. Wie viele Wolfsrudel gibt es derzeit in Niedersachsen?

- 0 bis 5
- 6 bis 10
- 11 bis 15
- 16 bis 20
- 21 bis 25
- Weiß nicht

### **Zusammenleben mit Nutztierhaltern**

In diesem kurzen Abschnitt geht es um allgemeine Hintergrundinformationen zu Ihrem Leben mit Ihren Nutztieren.

17. Seit wann halten Sie Ihre Tiere? (Angaben in Jahren)

- 0-5
- 6-10
- 11-20
- 20+

18. Sie betreiben die Haltung Ihrer Tiere ...

- ... hauptberuflich
- ... nebenberuflich
- ... als Hobby
- Sonstiges, .....

### **Anwendung von Herdenschutzmaßnahmen**

In diesem Abschnitt möchten wir gerne mehr erfahren über die von Ihnen angewendeten Herdenschutzmaßnahmen und Ihren Umgang mit diesen.

19. Mit welchen Maßnahmen schützen Sie Ihre Herde momentan? (Mehrfachnennungen bei Kombinationen möglich)

- Gar nicht

- Mit Herdenschutzhunden
- Mit festem Stromzaun
- Mit mobilem Stromzaun
- Durch Nachtpferche
- Sonstiges, .....

20. Bitte kreuzen Sie die zutreffendste Antwort an.

	Stimme auf jeden Fall zu	Stimme zu	Weder noch	Stimme nicht zu	Stimme auf keinen Fall zu	Weiß nicht
Ich finde die Vorgaben für meinen momentan angewendeten Schutz nicht sinnvoll.						
Ich finde meinen momentanen Schutz völlig ausreichend.						
Ich finde den bürokratischen Aufwand viel zu hoch, um meine Schutzmaßnahmen anzupassen.						
Ich finde den zeitlichen Aufwand viel zu hoch, um meine Schutzmaßnahmen anzupassen.						
Ich finde den finanziellen Aufwand viel zu hoch, um meine Schutzmaßnahmen anzupassen.						
Ich fühle mich von Wolfsbefürwortern und den Behörden bei der Umsetzung und Anpassung neuer Herdenschutzmaßnahmen im Stich gelassen.						

21. Ich habe den Schutz meiner Tiere angepasst seit...

- ... ich weiß, dass Wölfe wieder in Deutschland sind.
- ... ich weiß, dass der Wolf in Niedersachsen ist.
- ... ich weiß, dass meine Region zum Wolfsgebiet erklärt wurde.
- ... ich einen Rissvorfall in meiner Herde hatte.
- Ich habe meinen Schutz nicht verändert.

- Sonstiges, .....
22. Mit der Veröffentlichung der Richtlinie Wolf und des darin geforderten Grundschatzes im Jahr 2017, habe ich meine Schutzmaßnahmen in folgendem Zeitraum angepasst:
- Sofort
  - Innerhalb der vorgeschriebenen 6 Monate
  - Nach den vorgeschriebenen 6 Monaten
  - Ich habe meine Maßnahmen nicht angepasst.
23. Könnte ich meine Tiere (noch) effektiver schützen, würde ich dies ...
- ... sofort machen. (auf "weiter" klicken)
  - ... vielleicht machen, nachdem ich mich über den nötigen Aufwand informiert habe. (weiter bei Frage 23 a)
  - ... nicht machen. (auf "weiter" klicken)
- a. Bei der Entscheidung zur Anpassung meiner Schutzmaßnahmen sind mir folgende Aspekte wichtig (Mehrfachnennungen möglich):
- der finanzielle Aufwand
  - der zeitliche Aufwand
  - der bürokratische Aufwand
  - Sonstiges, .....

**Wissen über Herdenschutzmaßnahmen und Förderungsmöglichkeiten**

Der folgende Abschnitt beschäftigt sich mit dem theoretischen Wissen über Herdenschutzmaßnahmen und Förderungsmöglichkeiten für diese. Bitte beantworten Sie auch diesen Abschnitt ohne Hilfsmittel.

24. Wie viel wissen Sie über Herdenschutzmaßnahmen und deren Förderungsmöglichkeiten im Allgemeinen?

	Sehr viel	Viel	Nicht viel / nicht wenig	Wenig	Sehr wenig
Herdenschutzmaßnahmen					
Förderungsmöglichkeiten					

25. Bitte beurteilen Sie folgende Aussagen mit Richtig oder Falsch.

	Richtig	Falsch	Weiß nicht
Pro AntragstellerIn können pro Jahr 30.000 € Präventionsförderung beantragt werden.			

WolfsberaterInnen unterstützen NutztierhalterInnen bei der Antragstellung für Präventionsmaßnahmen.			
Der Grundschutz fordert eine Zaun- Mindesthöhe von 120 cm mit maximal 30 cm Abstand zum Boden.			
In Deutschland gibt es Stiftungen und Vereine, die Nutztierhalter finanziell unterstützen.			
Der Australian Shepherd ist eine geeignete Hunderasse, um Nutztiere zu beschützen.			

**Schlussbemerkungen**

Wobei wünschen Sie sich bei der Haltung und dem Schutz Ihrer Tiere konkret mehr Unterstützung?

.....  
.....  
.....

Sonstige Anmerkungen, Vorschläge, Wünsche oder Kritik

.....  
.....  
.....

VIELEN DANK!!

Der Fragebogen wurde erfolgreich ausgefüllt. Wir danken Ihnen recht herzlich für Ihre Unterstützung. Falls Sie Interesse an der Auswertung und den Ergebnissen der Untersuchung haben, können Sie sich gerne an Carolin Stern unter der E-Mail-Adresse carolin.stern@hvhl.nl wenden.

Vielen Dank!

Theresa & Carolin

## Appendix IV: Overview of the contacted persons, associations and Facebook sites

when	what	who	email or link
01.03.	association	Mathias Brockob	[REDACTED]
04.03.	pastoralist	Mathias Dreyer	[REDACTED]
04.03.	pastoralist	Mathias Dreyer	[REDACTED]
04.03.	press	Waldeckische Landeszeitung	[REDACTED]
04.03.	pastoralist	Jan Teerling	[REDACTED]
04.03.	pastoralist	Jörg Ermshausen	[REDACTED]
04.03.	pastoralist	Michael Seel	[REDACTED]
04.03.	press	MK Kreiszeitung/ Wiewelhove	[REDACTED]
04.03.	association	Tim Backhaus	[REDACTED]
04.03.	meeting	Gina Strampe	[REDACTED]
04.03.	press	Jan-Gerd Ahlers	[REDACTED]
04.03.	press	unknown	[REDACTED]
06.03.	meeting	Klaus Gerdes (LWK)	[REDACTED]
06.03.	pastoralist	Herr Koopmann	[REDACTED]
06.03.	pastoralist	Herr Mielinski	[REDACTED]
06.03.	pastoralist	unknown	[REDACTED]
06.03.	facebook	Freundeskreis freilebender Wölfe e.V.	[REDACTED]
06.03.	facebook	Bürgerinitiative "Für wolfsfreie Dörfer"	[REDACTED] [REDACTED]
08.03.	association	Petra Gremlitz-Harms	[REDACTED]
08.03.	newsletter	Landes-Schafzuchtverband Weser-Ems e.V.	[REDACTED] [REDACTED]

08.03.	facebook	Schafe & Ziegen: Haltung, Pflege und Zucht	[REDACTED]
09.03.	facebook	Ziegen und Schafe so wie andere Tiere tauschen, kaufen und verkaufen	[REDACTED]
12.03.	pastoralist	Schäferei Seebürger	[REDACTED]
13.03.	association	Herr Czerkus	[REDACTED]
13.03.	pastoralist	Frau Krüger-Degener	[REDACTED]
13.03.	pastoralist	Frau Benning	[REDACTED]
13.03.	facebook	Wolf und Wildtierschutz	[REDACTED]
15.03.	press	Frauke Muth	[REDACTED]
16.03.	pastoralist	Herr Dumke	[REDACTED]
16.03.	pastoralist	Herr Schmücker	[REDACTED]
17.03.	facebook	WNoN	[REDACTED]
20.03.	pastoralist	Herr Jilg	[REDACTED]
20.03.	pastoralist	unknown	[REDACTED]
20.03.	facebook	Bürgerinitiative "Für wolfsfreie Dörfer"	[REDACTED]

## Appendix V: Publications, resulting responses and clicks per day

date	publications	responses online	responses offline	Target population	clicks
28.02.					2
01.03.		1		1	14
02.03.	Online- and print-version magazine Schafzucht	3		1	5
03.03.		5		3	6
04.03.		1			9
05.03.					1
06.03.	Facebook: Bürgerinitiative "Für wolfsfreie Dörfer"	18		13	11
	Website: Schafzucht-Niedersachsen				
	Facebook: Freundeskreis freilebender Wölfe e.V.				
07.03.		52		28	2
08.03.	Facebook: Schafe & Ziegen Haltung Pflege und Zucht	28		20	48
	Newsletter: Landes-Schafzuchtverband Weser-Ems e.V.				
09.03.	Facebook: Ziegen und Schafe so wie andere Tiere tauschen, kaufen und verkaufen	5		4	12
10.03.		5		4	4
11.03.		1		1	7
12.03.		1		1	9
13.03.	Facebook: Wolf und Wildtierschutz	16		15	36
14.03.		7		6	6
15.03.	Event: 20 Jahre Wolf in Deutschland	8	1	4	19
16.03.		8		6	28
17.03.	Facebook: WnoN	11		8	21
18.03.		4		3	11
19.03.		5		2	8
20.03.	Facebook: Bürgerinitiative "Für wolfsfreie Dörfer"	10		8	41
21.03.		4		3	11
22.03.		1			5
23.03.					1
24.03.		2			2
25.03.		1			7
26.03.		1			3
27.03.		1			4
28.03.					1
29.03.	Event: 7. Niedersächsischer Schaf- und Ziegentag	1	10	10	1
30.03.		1		1	2
31.03.		4		4	2
01.04.					1
02.04.					9
		205	11	146	349
		<b>Number of total responses:</b>		216	
		<b>Number of cancellations:</b>		144	

## Appendix VI: Detailed explanation of the QIs

Detailed explanation of the question items (QIs) from the questionnaire with the related section, response options, measured component, measure and code in SPSS, the individual response options and further analysis.

Yellow: open response option

Orange: multiple choice single answer (MCSA)

Green: multiple choice multiple answer (MCMA)

Blue: negative questioning; response options needed recoding

section	QI	content/ SPSS name	response options	analysis	measure in SPSS	code in SPSS	suggested answers/ our categorisation	missing for analysis
background information	1	year of birth	open	Demographic	scale	/	/	1353
	2	gender	MCSA	Demographic	nominal	0 1 2 666	divers male female did not want to answer	0, 666
	3	district	open (license plate)	Demographic	nominal	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	beyond Lower Saxony AUR, NOR BRA BS CE CLP CUX, OTT, WEM DAN DH, SY EL, ASD, LIN, MEP EMD FRI, JEV GF GÖ, DUD, HMÜ, OHA GS, BRL, CLZ H, BU, NRÜ, SPR HE	

						17 HI, ALF 18 HK, FAL, SFA, SOL 19 HM 20 HOL 21 LER 22 LG 23 NI 24 NOH 25 NOM, EIN, GAN 26 OHZ 27 OL, DEL 28 OS, BSB, MEL, WTL 29 PE 30 ROW, BRV 31 SHG, RI, STH 32 STD 33 SZ 34 UE 35 VEC 36 VER 37 WF 38 WHV 39 WL 40 WOB 41 WST 42 WTM		
	4	number_animals	open	Demographic.	scale	666	do not want to answer	
cohabitation with wolf	5	wolves_region	MCSA	Demographic	nominal	0 1 999	no yes do not know	999
	6	incidents	MCSA	Demographic	ordinal	0 1 2	no few (1,2) many (>2)	
attitude towards wolf	7	attitude_wolf	MCSA	Control wolf rq1	ordinal	1 2	very positive positive	999

					3 4 5 999	neutral negative very negative do not know	
8	number_wolves	MCSA	Control wolf rq1	ordinal	1 2 3 4 5 888	more wolves number is good does not matter less no wolves no opinion	888
9.a	a_Emotion_fear	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_anger	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_admiration	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_worry	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_happiness	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_shock	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_romantic	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_interest	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_disgust	MCMA	Affection wolf	nominal	0 1	no yes	777
	a_Emotion_other	MCMA	Affection wolf	nominal	0 1	no yes	777
9.b	b_Emotion_fear	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_anger	MCMA	Affection wolf	nominal	0 1	no yes	777

	b_Emotion_admiration	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_worry	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_happiness	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_shock	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_romantic	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_interest	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_disgust	MCMA	Affection wolf	nominal	0 1	no yes	777
	b_Emotion_other	MCMA	Affection wolf	nominal	0 1	no yes	777
9.c	c_Emotion_fear	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_anger	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_admiration	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_worry	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_happiness	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_shock	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_romantic	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_interest	MCMA	Affection wolf	nominal	0 1	no yes	777
	c_Emotion_disgust	MCMA	Affection wolf	nominal	0 1	no yes	777

		c_Emotion_other	MCMA	Affection wolf	nominal	0 1	no yes	777
dealing with wolf	10	move_behaviour	MCSA	No analysis	ordinal	1 2 3 4 5	very positive positive neutral negative very negative	
	10.a	role_wolf	MCSA	No analysis	ordinal	1 2 3 4 5	very much a lot neutral few very little	
	11	behavior_zoo	MCSA	Conation wolf	ordinal	1 2 3 4 5 777 999	very positive positive neutral negative very negative other do not know	777, 999
	12.a	sighting_wolf	MCSA	Conation wolf	ordinal	1 2 3 4 5 777 999	very positive positive neutral negative very negative other do not know	777, 999
	12.b	meeting_hiker	MCSA	Conation wolf	ordinal	1 2 3 4 5 777 999	very positive positive neutral negative very negative other do not know	777, 999
	12.c	story_colleague	MCSA	Conation wolf	ordinal	1 2	very positive positive	777, 999

						3 4 5 777 999	neutral negative very negative other do not know	
13.1	wolf_right	MCSA	Cognition wolf	ordinal		1 2 3 4 5 999	very positive positive neutral negative very negative do not know	999
13.2	information	MCSA	No analysis	ordinal		1 2 3 4 5 999	very positive positive neutral negative very negative do not know	999
13.3	space_wolf	MCSA	Cognition wolf	ordinal		5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
13.4	natural_balance	MCSA	Cognition wolf	ordinal		1 2 3 4 5 999	very positive positive neutral negative very negative do not know	999
13.5	tourism	MCSA	Cognition wolf	ordinal		1 2 3 4 5 999	very positive positive neutral negative very negative do not know	999

	13.6	fear_children	MCSA	Affection wolf	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
	13.7	impact_leisure	MCSA	Conation wolf	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
	13.8	fear_animals	MCSA	Affection wolf	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
knowledge over wolf	14	knowledge	MCSA	Control wolf rq1	ordinal	1 2 3 4 5	very much a lot neutral few very little	
	15.1	weight	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	
	15.2	kill_people	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	
	15.3	distribution_rabies	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	
	15.4	only_sick_animals	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	

	15.5	jumping_power	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	
	15.6	instinct	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	
	15.7	social_structure	MCSA	Cognition wolf	nominal	0 1 999	wrong right do not know	
	16	number_packs	MCSA	No analysis	nominal	1 2 3 4 5 999	0-5 6-10 11-15 16-20 21-25 do not know	999
cohabitation with animals	17	years_keeping_livestock	open	Demographic	scale	666	do not want to answer	
	18	type_keeping	MCSA	Demographic	nominal	1 2 3 777	full time side business hobby other	777
application of HPM	19.1	HPM_none	MCMA	Rq2	nominal	0 1	no yes	777
	19.2	HPM_dogs	MCMA	Rq2	nominal	0 1	no yes	777
	19.3	HPM_fixed_fence	MCMA	Rq2	nominal	0 1	no yes	777
	19.4	HPM_mobile_fence	MCMA	Rq2	nominal	0 1	no yes	777
	19.5	HPM_night_pen	MCMA	Rq2	nominal	0 1	no yes	777
	19.6	HPM_others	MCMA	Rq2	nominal	0 1	no yes	777
	20.1	requirements	MCSA	Cognition HPM	ordinal	5 4 3	very negative negative neutral	999

					2 1 999	positive very positive do not know	
20.2	current_HPM	MCSA	Affection HPM	ordinal	1 2 3 4 5 999	very positive positive neutral negative very negative do not know	999
20.3	bureaucratic_effort	MCSA	Affection HPM	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
20.4	time_effort	MCSA	Affection HPM	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
20.5	financial_effort	MCSA	Affection HPM	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
20.6	support_extend	MCSA	Affection HPM	ordinal	5 4 3 2 1 999	very negative negative neutral positive very positive do not know	999
21	adjustment_HPM	MCSA	Rq2	nominal	1 2	wolf in Germany wolf in Lower Saxony	777

						3 4 5 777	wolf region incident no adjustment other	
	22	guideline_adjustment	MCSA	Rq2	nominal	1 2 3 4	immediately within 6 months after 6 months no adjustment	
	23	HPM_more_effective	MCSA	Control attitude wolf	nominal	1 2 3	immediately maybe no	
	23.a.1	financial_aspect	MCMA	Cognition HPM	nominal	0 1	no yes	777
	23.a.2	time_aspect	MCMA	Cognition HPM	nominal	0 1	no yes	777
	23.a.3	bureaucratic_aspect	MCMA	Cognition HPM	nominal	0 1	no yes	777
	23.a.4	other_aspects	MCMA	Cognition HPM	nominal	0 1	no yes	777
knowledge over HPM	24.1	knowledge_HPM	MCSA	Cognition HPM	ordinal	1 2 3 4 5	very much a lot neutral few very little	
	24.2	knowledge_support	MCSA	Cognition HPM	ordinal	1 2 3 4 5	very much a lot neutral few very little	
	25.1	prevention_support	MCSA	Cognition HPM	nominal	0 1 999	wrong right do not know	
	25.2	support_wolf_consultants	MCSA	Cognition HPM	nominal	0 1 999	wrong right do not know	

	25.3	basic_protection	MCSA	Cognition HPM	nominal	0 1 999	wrong right do not know	
	25.4	financial_support_clubs	MCSA	Cognition HPM	nominal	0 1 999	wrong right do not know	
	25.5	suitable_dog_breed	MCSA	Cognition HPM	nominal	0 1 999	wrong right do not know	

## Appendix VII: Changes in the cases

ID	Version	QI	Changes
138	Online	4	Case deleted
206	Offline	12.c	Negative + very negative: negative for further analysis
208	Offline	12.b	Negative + very negative: very negative for further analysis
		23	No response: "maybe" for further analysis
		23.a	No response: "financial", "bureaucratic" and "time" for further analysis due to the response at QI 20
209	Offline	8	Negative + very negative: very negative for further analysis
		12.b	Negative + very negative: very negative for further analysis
211	Offline	13.2-8	No response: "I do not know" for further analysis
214	Offline	15.2-8	No response: "I do not know" for further analysis
215	Offline	12.b	Positive + negative: "neutral" for further analysis
		12.c	Neutral + negative + very negative: "negative" for further analysis

## Appendix VIII: Results per QIs used to measure components

QI	Median (m)	Mode (D)	Mean ( $\bar{x}$ )
Affection wolf			
13(6)	4	5	3,52
13(8)	5	5	4,33
Conation wolf			
11	2	5	2,98
12a	4	4	3,71
12b	4	4	3,95
12c	4	4	3,83
13(7)	4	5	3,54
Cognition wolf			
13(1)	4	5	3,76
13(3)	5	5	3,88
13(4)	4	5	3,82
13(5)	4	5	4,04
Affection HPM			
20(2)	3	2*	3,16
20(3)	4	5	3,99
20(4)	4	5	3,98
20(5)	4	5	4,01
20(6)	4	5	3,99
Cognition HPM			
20(1)	4	4	3,47

## Appendix IX: Results open response options

QI	Comment "other"
9a	<ul style="list-style-type: none"> <li>• anmutiges Tier, je doch nicht für diese Region</li> <li>• Angst, Wut, Eine Existenzbedrohend Situation</li> <li>• Bewunderung, Glück, Interesse, Liebe zum natürlichen Wesen</li> <li>• Da ist halt einfach ein Wolf. Sieht man öfter mal...</li> <li>• Bewunderung, Glück, Interesse, Faszination</li> <li>• Ein tolles Wildtier für die Wildniss</li> <li>• Sorge, zukunfs ängste</li> <li>• Schade, dass es ihn wieder gibt</li> <li>• Schönes Tier, passt hier nicht her</li> </ul>
9b	<ul style="list-style-type: none"> <li>• Angst, Wut, Entsetzen, Hilflosigkeit</li> <li>• Natur</li> <li>• Wut AUF den unfähigen Nutztierhalter</li> <li>• es ist eine natürliche Situation</li> <li>• Angst, Angst sowohl bei Wolf oder fremdem Hund</li> <li>• gar nichts, Wolf verhält sich halt wie ein Wolf</li> <li>• Lass Dich nicht von mir erwischen...</li> <li>• Wolf oder Hund? Soll das Bild bewusst neg. Assoziationen hervorrufen?</li> <li>• Hund oder Wolf?</li> <li>• Auf dem Foto sehe ich keinen Wolf.</li> <li>• Interesse, Besorgnis, da Schafe ungeschützt scheinen</li> <li>• Angst, Sorge, 17 Lämmer hat er von uns gerissen</li> </ul>
9c	<ul style="list-style-type: none"> <li>• Angst, Wut, Sorge, Entsetzen, Ohnmächtigkeit, nicht eingreifen zu können</li> <li>• Vorsicht und Neugier</li> <li>• Wut, Sorge, Zu viele, zu nah</li> <li>• natürliches Verhalten</li> <li>• Natur</li> <li>• Der Wolf jagt nur,um zu fressen. Und: er isst alles auf - im Gegensatz zum Menschen</li> <li>• So ist das Leben - aber es müssen keine Nutztiere als Nahrung dienen</li> <li>• gar nichts, Wolf verhält sich wie ein Wolf</li> <li>• Normalität</li> <li>• Romantik der Nichtbetroffenen</li> <li>• Wildtierrisse interessieren mich nicht!</li> <li>• Nichts, ein Foto von natürlichem Verhalten von Tieren</li> <li>• Interesse, Lecker Futter</li> <li>• weder noch</li> <li>• Interesse, Respekt</li> <li>• gehört zum Wolf</li> <li>• Toll, muss aber nicht bei mir vor der Haustür sein</li> <li>• Hoffnung, dass keine Nutztiere gerissen werden</li> <li>• Sie müssen fressen, brauchen große Reviere und haben keine Wälder</li> </ul>
11	<ul style="list-style-type: none"> <li>• Ich erkläre ihnen eie geföhlich Wölfe für uhre geliebzeb ponies ist und dass diese nicht mehr sicher sind zu Hause. Und dass es schön wäre, wenn wir keine freilevenden Wölfe in der Nachbargemeinde hlten.</li> <li>• Ich bleibe fasziniert stehen, und erkläre den Kindern so gut wie möglich alles was ich weiß über Wölfe, positives wie gefährliches</li> </ul>

	<ul style="list-style-type: none"> <li>• ich mag keine Wildtiere im Zoo</li> <li>• Ich informiere mich und die Kinder möglichst sachlich.</li> <li>• Ich bleibe fasziniert stehen und beobachte die Wölfe mit den Kindern. Wenn sie Fragen stellen, beantworte ich diese mit dem Ziel, meine Kinder für die Natur und das Tier zu öffnen</li> <li>• Ich besuche kein Zoos mit eingesperrten Wildtieren</li> <li>• Schaue fasziniert zu, erkläre unseren Kindern aber die Sorgen und Gefahren für Weidetierhalter bei Wölfen in freier Wildbahn</li> <li>• Wölfe sind schöne, schlaue und faszinierende Raubtiere - Zweibeinige Räuber sind auch nicht meine Freunde</li> <li>• ich bedaure die Tiere</li> <li>• Wenn möglich würde ich testen, wie die Wölfe auf meine mitgeführten HSH reagieren!</li> <li>• gehe nicht in Zoos</li> <li>• Ich schaue mir die wölfe genauso an , wie die elefanten, esel oder heidschnucken</li> <li>• Ich beobachte die Wölfe eine Zeit und habe Sorge bei dem Gedanken an meine Schafe, die nicht hinter einem festen Zaun leben</li> <li>• Habe keine Kinder</li> <li>• Empfinde Bedauern; kein Wildtier sollte in Gefangenschaft leben müssen</li> <li>• Ich schaue mir die Tiere an</li> </ul>
12a	<ul style="list-style-type: none"> <li>• Große Furcht um das Leben unserer Tiere</li> <li>• ich würde nervös werden</li> <li>• Ich mache mir erbsthafte Sorgen und Gedanken wie ich meine Ponies auf der Weide schützen kann, da es baurechtlichen nicht möglich ist eineb Stall für sie zu bauen.</li> <li>• Wildkamera aufhängen, Stall sichern</li> <li>• Ich äußere meinen Unmut, schimpfe, und lege mich auf die Lauer</li> <li>• Sage soll gemeldet und kartiert werden</li> <li>• Ich kann kaum dchlafen,weil ich mir Sorgen um meine Tiere mache.</li> <li>• Ich mache mir Sorgen um meine Enkel auf dem Weg zum Bus und um meine Tiere</li> <li>• Ich erhöhe die Schutzmaßnahmen</li> <li>• Ich mache mir Sorgen um meine Tiere!</li> <li>• Ich werde mich darauf einstellen und Vorsorge treffen, dass meine Tiere geschützt sind und meine Familie sich entsprechend verhält.</li> <li>• Ich sperre meine Tiere in den Stall</li> <li>• Ich sage: "Dein Schweigen schützt den Wolf."</li> <li>• ich mache mir Sorgen was passieren wird</li> <li>• Ich schimpfe auf die Politik, die uns alleine lässt</li> <li>• Große Sorge, ist das Vieh gut genug geschützt,</li> <li>• Die Nachricht besorgt mich, ich frage nach und teile meine Sorgen mit</li> <li>• die Angst um meine Schafe steigt wieder in mir hoch</li> <li>• Sorge um meine Herde</li> <li>• Ich höre genau zu, frage ggf. nach und bleibe sachlich.</li> <li>• Teile meine Sorge um meine Ponystute mit.</li> <li>• Treffe Vorsorge für meine Nutztierhaltung</li> <li>• Ich überlege mir Schutzmassnahmen für meine Schafe</li> </ul>

	<ul style="list-style-type: none"> <li>• Ich prüfe, ob meine Schafe in der Nähe stehen und ich sie eventuell umtreiben muss!</li> <li>• Ich versuche meine Schafe in Sicherheit zu bringen</li> <li>• ich habe Angst</li> <li>• Ich versuche dem Nachbar mit Informationen über den Wolf die Situation für uns Schäfer zu erläutern.</li> <li>• Ich würde zu erst nach meinem Tierbestand schauen.</li> <li>• Ich freue mich nicht unbedingt, rege mich auch nicht auf, frage aber weiter nach</li> <li>• ??</li> <li>• wenn er keinen Schaden macht soll er laufen</li> <li>• Ich schaue genau hin , ob reste von wildtieren oder haustieren zu erkennen sind</li> <li>• Ich überprüfe die Zäune und hole ggf. meine Schafe ans Haus. Auf alle Fälle schlafe ich unruhiger.</li> <li>• Ich sage dem Jäger bescheid, damit er die Weiden Nachts kontrollieren kann. Damit man den Weidetieren frühzeitig helfen kann, bei einem Übergriff.</li> <li>• Ich freue mich über die Nachricht, weiteres abhängig von der Einstellung des Nachbarn</li> <li>• Ich habe Angst und bin verärgert</li> <li>• Ich überlege ob meine Schafe ausreichend gesichert sind.</li> <li>• Das ist keine besondere nachricht, man kann die wilfe hier regelmässig sehen und hören</li> <li>• nehme die Information als Schafhalter machtlos zur Kenntniss</li> <li>• Ich bringe meine Tiere in Sicherheit</li> <li>• Ich habe Angst um unsere Schafe</li> <li>• kontrolliere die Herde nachts</li> <li>• Ich äußere die Angst um meine Tiere</li> </ul>
12b	<ul style="list-style-type: none"> <li>• Ich tippe mir an die Stirn und denke :Er hat bestimmt keine Schafe</li> <li>• ich freu mich für ihn, geb aber auch meine bedenken kunt</li> <li>• ich erzähle ihm von den Schäden an meinen Tieren</li> <li>• Keine Meinungsäußerung zum Wanderer</li> <li>• Ich gratuliere zu dieser äußerst seltene Begegnung, zeige aber auch auf, daß ich auf Begegnung zwischen Wolf und Schaf verzichten kann</li> <li>• ich frage ihn, ob er auf dem Land lebt und Tiere hält</li> <li>• Ich bleibe sachlich, frage ggf. nach und je nach Reaktion des Wanderers liefere ich Gegenargumente.</li> <li>• Der beruhigt sich auch wieder... Habe selbst öfter Sichtungen.</li> <li>• Ich habe Angst vor einem Raubtier in meiner unmittelb. Umgebung</li> <li>• Ich argumentiere und informiere über die Konflikte im Zusammenleben mit dem Wolf auf dichtem Raum, und die Gefahr für Mensch und Tier in der Region.</li> <li>• Volksverdummung schuld der Regierung wenn etwas passiert</li> </ul>
12c	<ul style="list-style-type: none"> <li>• frage ob der Riss gemeldet wurde und ob selber DNA Proben genommen wurden.</li> <li>• Ich lade ihn in die "Bürgerinitiative für wolfsfreie Dörfer" ein.</li> <li>• Wer Tiere hat, muss mit Verlust rechnen. Alles nicht mehr schlimm, denn es gibt ja inzwischen die Entschädigungszahlungen.</li> <li>• Ich zeige Mitgefühl und erkundige mich nach den Überlebenden</li> </ul>

	<ul style="list-style-type: none"> <li>• ich lasse ihn ausreden, frage ihn, welche Schutzmaßnahmen er treffen kann und wie seine Lösung aussähe</li> <li>• Ich frage wieviel Tiere betroffen sind, wie es dem Rest der Herde geht und welche Choletaralschäden entstanden sind</li> <li>• Die ersten 3 Antworten + Mitgefühl für Verlust</li> <li>• Die Politik ist in der Pflicht! Bald passiert etwas bei Kindern . Seltsamer Tierschutz Gedanke- die Opfer werden nicht geschützt</li> </ul>
18	<ul style="list-style-type: none"> <li>• bin Altenteiler, bewirtschaftete nur noch mein Grünland</li> </ul>
19	<ul style="list-style-type: none"> <li>• Mit festem Stromzaun, Durch Nachtpferche, Alpakazucht, erhalten keine finanzielle Unterstützung</li> <li>• Tiere kommen nur raus, wenn jemand auf dem Hof ist. Nachts gar nicht mehr.</li> <li>• Mit mobilem Stromzaun, Ponys haben keinen besonderen Bedarf, weil sie angeblich nicht zum Beuteschema gehören</li> <li>• Mit festem Stromzaun, Nachts müssen die Tiere in den verschlossenen Stall.</li> <li>• Mit mobilem Stromzaun, Herdenschutzhunde !!!! Lama</li> <li>• Wohnen im Nachbardorf von Rodewald, d.h. mitten im Territorium des 6köpfigen Rodewalder Rudels. Als Hundezüchter haben wir wertvolle Zuchthunde - die gehen nur in Begleitung in den Auslauf, Halogenlampe, Pfefferspray und Mistforke habe ich immer dabei. Wird bei 1 Wolf helfen, bei 6 sicher nicht.</li> <li>• Mit festem Stromzaun, bis zu 1,8m E- Stachldraht -&gt; 5 Drähte in Bau</li> <li>• Einsperren + nur beaufsichtigt rauslassen</li> <li>• Übernachtung im Stall</li> <li>• Mit festem Stromzaun, Nachts alle im Stall</li> </ul>
21	<ul style="list-style-type: none"> <li>• Reine Materialkosten 15.000 EUR</li> <li>• ich bin Pferdehalter, da kriegt man eh nichts und ich glaube nicht, dass die vorgeschlagenen Schutzmaßnahmen ausreichend schützen, das zeigt sich immer wieder</li> <li>• Schutz Verbesserung ist im Rahmen der Biotop Pflege nicht durchführbar, gefährdet andere</li> <li>• Seit ich von HH nach LG gezogen bin.</li> <li>• Ich DARF keinen wolfssicheren Zaun bauen, bin gezwungen, die Tiere morgens zur Weide hin ("2 km) und abends in den Stall zu holen!</li> <li>• Riss durch Luchs</li> <li>• Seit das Rodewalder Rudel da ist.</li> <li>• Baumaßnahme von 2016 bis ca.2024</li> <li>• Wölf in meiner Umgebung gesichtet wurden</li> <li>• Der Wolf in Sachsen-Anhalt ist</li> <li>• wir werden den Schutz in den nächsten Monaten erhöhen</li> <li>• ... ich einen Rissvorfall in meiner Herde hatte, unser Landkreis aber noch gar nicht in der Wolfskulisse lag. Zu Frage 22.: Noch vor der Richtlinie Wolf Schutzmaßnahmen ergriffen.</li> <li>• Schutz ist zt. gar nicht möglich und zeitnah nicht umsetzbar</li> <li>• im Ort Schafe gerissen wurden</li> <li>• Seit der ersten Sichtung in unserer Region</li> <li>• Mehrere Litzen</li> <li>• Die Wölfe meinen Reitplatz nachts aufgesucht haben (Spuren) und über meine Terrasse gelaufen sind, bevor überhaupt bekannt war dass sie hier sahen (hässlicher hund der versuchte beim Verscheuchen knurrte)</li> </ul>

	<ul style="list-style-type: none"> <li>• Fohlen in der Box statt auf Weide ist das gewollt ß</li> <li>• Seit die wölfe spürbar dichter an die koppel kommen - vorher 1 hsh nun 4 x hsh! Und die wölfe kommen in diesen tagen wieder sehr dicht an die schafe - wieviel hsh muss ich bei mehr als 10 erwachsenen wölfen am zaun haben ?</li> <li>• Ich passe den Schutz nach gegebenen Möglichkeiten an</li> <li>• Eine Anpassung an die Vorgaben ist geplant.</li> <li>• Seit wölfe am zaun stehen</li> <li>• ich Schnucken halte</li> <li>• Meine Tiere bleiben im Stall, wenn der Wolf die ersten Tiere reisst</li> <li>• Tiere stehen direkt am Haus</li> </ul>
23a	<ul style="list-style-type: none"> <li>• für Pferde gibt es keine effektiven Schutzmaßnahmen, außer kontrolliertem Weidegang und Stall.</li> <li>• es muss der emotionale "Wert" berücksichtigt werden, den Schmerz kann mir niemand ersetzen, müsste ich eines meiner geliebten Pferde, die für uns Familienmitglieder sind, so vorfinden, lebend noch, leidend, und das vielleicht seid Stunden, unrettbar verloren, oder nur mit größeren Einschränkungen am Leben zu erhalten</li> <li>• Wildtiere, Biotop Bewohner andere beeinträchtigte Wiesenbewohner</li> <li>• Unterstützung vom Staat</li> <li>• die Sicherheit meiner Tiere.</li> <li>• meine eigene Einschätzung der Gefahrenlage</li> <li>• Die bewiesene Wirksamkeit</li> <li>• Ich habe keine eigenen Flächen - ich kann vielerorts keine geeigneten Schutzmaßnahmen ergreifen, da sie durch den Eigentümer nicht gewünscht sind - ich will keine stromführenden Netze mehr nutzen, da ich schon diverse Verluste meiner beernteten Tiere in Netzen hatte, mehr als das z.B. durch wildernde Hunde der Fall war</li> <li>• an den deichen sind die Deichverbände zuständig</li> <li>• Die Sinnhaftigkeit</li> <li>• Der Sinn.Wolfsabweisend ist wie Wasserabweisend.Man wird trotzdem nass bzw. überwindet der Wolf immer wieder auch als sicher eingestufte Schutzmaßnahmen.</li> <li>• Das Umsetzen der höheren Eketrozäune bringt mich an an meine körperlichen Grenzen</li> <li>• Nutzen oder Schadensverlagerung</li> <li>• wer seine Tiere liebt muß sich um Schutzmaßnahmen kümmern</li> <li>• Die Zäune verstoßen gegen die Landschaftsschutzgebietsauflagen</li> <li>• Die Umsetzbarkeit</li> <li>• Tierschutz auch kleinen Wildtieren gegenüber.</li> </ul>