THE IMPACT OF A WOLF CONSERVATION PROJECT ON ATTITUDES OF THE PUBLIC, HUNTERS AND FARMERS TOWARD WOLVES IN SLOVENIA

by

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ABSTRACT

For successful conservation of large carnivores, charismatic and controversial species, ensuring human tolerance is essential. Therefore, wolf conservation projects aim to improve both the biological and socio-political conditions. I used a mixed methods approach to explore the effectiveness of a wolf conservation project in improving the coexistence of wolves and humans in Slovenia. I evaluated the effectiveness of the project to improve the social acceptance of wolves in Slovenia by quantitatively investigating attitude change, an indicator of social acceptance, over a two year period. Although attitudes toward wolves generally seem to have remained stable, I documented change in beliefs about the extent of wolf-caused damage and actual and acceptable wolf population size, as well as changes in individual statements about attitudes toward wolf management. To explore the role of public participation in improved wolf conservation, I carried out 19 semi-structured interviews with a range of participants that were involved in different public involvement actions. For the basis of the evaluation of the process, Reed's (2008) criteria for effective stakeholder participation in environmental management were used. I found considerable evidence of learning through participation and increased social capital that positively influences the coexistence between wolves and humans in Slovenia.

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Table of Contents

List of Tables

List of Figures

List of Abbreviations and Symbols

AP	Action plan
CRO	Croatian representative
HD	Human dimensions
HDW	Human dimensions of wildlife
PP	Permanent (wolf) presence
OP	Occasional (wolf) presence
GO	Government organization
SH	Stakeholder
E	Expert

1. INTRODUCTION AND OVERVIEW

1.1. Human dimensions of wildlife & wolf management and conservation

Successful conservation of large carnivores requires favourable ecological conditions as well as a tolerant socio-political landscape (Treves & Karanth, 2003). In the 20th century, wildlife management was based on biological understanding of animals and their habitats and the belief that experts have the authority to make management decisions. This paradigm shifted in the 1980s and 1990s towards the recognition of the need for a multidisciplinary approach and participatory management (Riley et al., 2002). Krueger & Mitchell (1977) illustrated the complexity of any resource management as the seven dimensions of resource management that include the biophysical dimension but also the economic, social and cultural, political, legal, institutional and technological dimensions. This approach corresponds well also to ecosystem-based management principles, which consider the human society as a part of the ecosystem (Grumbine, 1994). Such management requires therefore sound knowledge of the biological as well as the sociological side of wildlife related issues. The latter is studied under the field of human dimensions of wildlife management (HDW) (Bath, 1998).

The field of HDW seeks to understand how people value wildlife, how they want wildlife to be managed, and how they affect or are affected by wildlife and wildlife management decisions (Decker, Brown, & Siemer, 2001). HD studies draw on social science concepts, theories, and research methods from disciplines of anthropology, political science, economics and applied areas such as communications and marketing, but mostly from social psychology. Within social psychology a cognitive approach is typically used, which explores people's values, attitudes, and norms regarding wildlife and its management in order to understand or predict their behaviour (Pierce, Manfredo, & Vaske, 2001). Scientific HD studies started in the 1950s in North America (Brown & Decker, 2001). They can be distinguished between descriptive

studies that compare subgroups and conceptual studies that search for response patterns through forming and testing of hypotheses. Both types are used for HD research on large carnivores. Increasing human- wildlife conflicts and increasing large carnivore populations in Europe brought HD studies from the United States overseas in the 1970s (Glikman & Frank, 2011).

Wolf management is a highly controversial issue, because of many associated conflicts. This fact emphasizes the need for understanding the social dimension. Conflicts among humans related to wolf conservation stem mostly from the conflict between the local and national interests in wolf management (Fritts, Stephenson, Hayes, & Boitani, 2003). When there is a legal at-risk status on wolves, this reflects the national view that wolves should be protected and restored. On the local scale, people living near wolves face real or perceived threats from wolf presence. Previous studies have indicated that the wolf acceptance capacity (i.e., public acceptance of wolves) is based on factors such as perceptions of risk and tolerance of that risk, fear of wolves, experience with wolves, knowledge, age, gender, proximity to a wolf pack, location of residence (e.g., rural or urban), membership within a certain interest group (e.g., environmentalists, farmers, foresters, hunters) and occupation (Bath, 2009).

HD studies have focused on: the economic value of wolves (Ericsson, Bostedt, & Kindberg, 2008), attitudes toward wolves (Bisi, Liukkonen, Mykrä, Pohja-Mykrä, & Kurki, 2010; Bjerke, Reitan, & Kellert, 1998; Kellert, 1985; Kellert, Black, Rush, & Bath, 1996), attitudes toward wolf management (Bjerke, Vitterso, & Kaltenborn, 2000; Ericsson & Heberlein, 2003; Kaltenborn & Bjerke, 2002; Kaltenborn, Bjerke, & Strumse, 1998; Karlsson & Sjöström, 2007; Kleiven, Bjerke, & Kaltenborn, 2004; E. Røskaft, B. Händel, T. Bjerke, & B. Kaltenborn, 2007; Skogen & Thrane, 2007; Vktersø, Bjerke, & Kaltenborn, 1999; B. Zimmermann, Wabakken, & Dötterer, 2001), factors affecting attitudes toward wolves and wolf management (Bjerke, et al., 2000; Ericsson & Heberlein, 2003; Kaltenborn & Bjerke, 2002; Kaltenborn, et al., 1998; Karlsson & Sjöström, 2007; Kleiven, et al., 2004; E. Røskaft, B. Händel, T. Bjerke, & B. P. Kaltenborn, 2007; Skogen & Thrane, 2007; Vktersø, et al., 1999; B. Zimmermann, et al., 2001), methodological issues of studying attitudes toward wolves (Ericsson, Sandström, & Bostedt, 2006), fear (Røskaft, Bjerke, Kaltenborn, Linnell, &

Andersen, 2003) and changes in attitudes toward wolves and wolf management over time (Bruskotter, Schmidt, & Teel, 2007; Majić & Bath, 2010).

In light of before mentioned complexity of wildlife management, all different social and biophysical dimensions (Krueger & Mitchell, 1977) require consideration at different spatial (local, regional, national and international) and temporal (past, present, future) scales. Accordingly, HD studies have evolved to capture and explain social and biophysical perspectives over time and space. In this thesis, wolf management was observed through the scales of time and space, with a particular in depth focus on the novel issue of the importance of the quality of public participation process for improved wolf conservation and management. Throughout the thesis, I use the terms conservation and management separately, although wildlife management typically covers also the conservation aspect. However, wildlife management is based on human values (Decker, et al., 2001) and since they vary from utilitarian to preservationist, I use both terms to remind the reader of the existing spectrum in practice.

Through the following introductory chapters (chapters 1-4), I will focus on the scale of time and possibilities of measuring change in attitudes across this temporal dimension. Since active participation is believed to be a successful strategy for inducing change (Fisbein & Ajzen, 1975), I will provide some background on the topic of public participation. Further, the context of the case study is presented and research objectives that arose from the following components of this content: the specific situation of wolf conservation in Slovenia, the role of public participation in it and measuring the effectiveness of a wolf conservation project.

1.2. The nature of attitude change research in HDW

Assessing attitudes in wildlife management typically serves immediate management needs. Since wildlife management is often more crisis driven than pro-active, cross sectional studies are typically conducted (Bath, 1996; Bruskotter, et al., 2007; Majić & Bath, 2010; Manfredo, Decker, & Duda, 1998). The topic of attitude change is of

special significance to HDW. Applying an attitudinal study on the same population in different points in time allows for making comparisons and can serve as an evaluation of the management implementation (Bath, 1996; Bath 1998). Monitoring attitudes over time as management practices change might reveal causes of conflicts or success of conservation efforts and is required for a transparent implementation of conservation actions and outcome assessment. (Treves, Wallace, Naughton-Treves, & Morales, 2006). In this sense attitudes serve as indicators upon which evaluation of management practices is made (Majić & Bath, 2010). With learning from long term management approaches, the need for situation-specific descriptive studies is likely to decrease (Manfredo, et al., 1998).

Research on attitude change is grounded in social psychology. Attitude change means that a person's evaluation of the attitude object is modified from one value to another. Many social psychologists base their theories of attitude change on the principle of cognitive consistency. The principle states that people are motivated to maintain a state of psychological harmony, or equilibrium, within their system of attitudes because disharmony is a tension producing, uncomfortable state. This state of discomfort often leads to an attitude change, which will restore a sense of harmony and reduce discomfort. The theory that greatly contributed to this concept was proposed by Leon Festinger (1975 in Eagly & Chaiken, 1993) as the theory of cognitive dissonance. It explains how cognitive elements (e.g. ideas, beliefs) relate to each other. According to the theory there are three possibilities of consonant, dissonant or irrelevant relationships. The dissonant relationship is the one where cognitive elements logically oppose each other and potentially leads to attitude change. To reduce dissonance as an uncomfortable state, a person has theoretically various solutions (Alcock, Carment, & Sadava, 1991):

- changing behaviour;
- modifying cognition;
- rationalizing that cognitions aren't really relevant to each other;
- adding new, consonant cognitions; and/or
- downgrading the importance of the dissonant cognition.

The attitude toward an object (e.g. the wolf or a specific option of wolf management) is determined by a person's salient belief about attributes of the object and by his or her evaluations of those attributes. Thus attitudes can be changed by targeting people's beliefs (Fishbein & Ajzen, 1975).

Later theories suggest that other factors also affect attitudes. Beside the cognitive route that is central to attitude change, there is also a peripheral route, as described in the elaboration likelihood model (ELM, Petty & Cacioppo, 1981). The model proposes that attitude change can occur also without issue relevant thinking through the peripheral route, whereas the central route refers to effortful issue-relevant thinking. Processing a message through the cognitive route is done when a person evaluates his or her arguments and the message may be perceived favourably, even if it contradicts a person's original belief system. On the other hand, evaluation of a message through the peripheral route is based on its external cues (i.e., credibility of the source and attractiveness of the message presentation) rather than arguments. For example, messages that target people's emotions related to the attitude object can be seen as changing attitudes through the peripheral route. A picture taken out of the context showing wolf pups can advertise for wolf protection, or a picture of livestock carcass calls for a wolf cull. A person evaluates the message through one of those two routes depending on his motivation to process the message and his ability for critical evaluation. However, a real attitude change is the one that persists and a change through the difficult way (i.e. cognitive route) tends to persist longer

Since behaviour and behavioural intention are partially based on attitudes, by changing the attitudes of individuals it is possible to influence their behaviour (Fishbein & Ajzen, 1975). Information that is intended to induce a real change in a given belief, attitude, intention, or behaviour must be linked directly to the variable that is to be changed. Two major strategies of change are persuasive communication and active participation. The latter tends to be more effective than passive exposure to information, because the participant, through his or her personal observation of various objects, events and people, acquires numerous new descriptive beliefs that are related to the attitude object. Such beliefs are also more reliable than information

generated by a third person, since a person rarely questions his or her own observation (Ajzen, 2005; Fishbein & Ajzen, 1975).

Changes of attitudes toward wildlife may occur after changes in management of the species or with the change in the population size (Bath, 1996). A possible factor that might influence attitudes is also the way the species is portrayed in the media (Bruskotter et al., 2007). A broader shift in public values and societal trends that moves away from traditional toward the more protectionist view may also influence attitudes toward wildlife (Williams et al., 2002), but such societal changes take time. Changes in attitudes toward wolves over a shorter period of time are more likely to occur due to a change in carnivore-livestock conflict, a change in policy, after awareness campaign or carnivore-livestock damage prevention programs are implemented (Majić & Bath 2010).

1.3. Public participation in geography and wildlife management

One reason the HDW field exists is the recognition that people care about wildlife (Decker, et al., 2001; Manfredo, Vaske, Brown, Decker, & Duke, 2009). The societal setting in which the need for such a field as the study of HDW emerged was the Americans' increased use of the outdoors and fish and wildlife resources after World War II. At that time societal values started to shift from consumption of wildlife toward its conservation and the ways in which people engaged with wildlife started to diversify. Controversies arising from consumption versus conservation values are one of the focuses of research in HDW (Decker, et al., 2001). The public gained more interest in environmental issues in the 1970s and 1980s, as people realised that the negative and unpredictable side effects of science and technology development are degrading the quality of environment and consequently harming people. The concept that was fundamental to the environmental movement was applied also to wildlife management as the ecosystem concept of wildlife management (Grumbine, 1994). This concept originates from general systems theory as a framework for analysing the interaction of society and nature (Gregory, Johnston, Pratt, Watts, & Whatmore, 2009). Today, concerns related to environment are expanding. According to Beck (1992), the modern society is characterized by a growing fear of environmental, health, economic and social risks. Those risks are often portrayed as uncertain, remote and unpredictable in the media and therefore the public trust in authoritative science is diminishing. Nevertheless, Beck believes that the same agents who produced the risks, i.e. science and technology, can also solve the very problems they created, but only with more democracy and participation of the broader society in decision-making in science and technology.

The widespread recognition of the need for public participation around the globe is a consequence of the environmental movement and associated thoughts of positioning science in today's society. For example the precautionary principle that deals with uncertainty and unpredictability of risks became the basis of European environmental law by the Treaty of European Union (1992) and is stated in the Rio Declaration on Environment and Development (1992) as lack of "full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental

degradation" (Foster, Vecchia, & Repacholi, 2000). The principle emphasizes public participation and shared responsibility among government, interest groups and the general public in decision-making and anticipatory action in environmental matters. In Europe, the democratization of science in environmental issues is enacted with the Aarhus Convention (1998). According to the convention, the public has the right to access environmental information and the right to participate in environmental decision-making.

Today, actively involving the public, including an increasingly diversified suite of stakeholders to reflect the diversity of wildlife values within the population, in different stages of the wildlife management process is believed to be the right tool to solve conflicts in wildlife management and is a part of the applied practice of the HDW field (Decker & Chase, 2001; Manfredo, et al., 1998; Treves, et al., 2006). In wildlife management, public participation is the "involvement of citizens in making, understanding, implementing, or evaluating management decisions for improved wildlife management" (Chase, Lauber, & Decker, 2001, p.153). Participation can take various forms from the different levels of involvement in the setting of wildlife policy to taking part in the solutions of managing wildlife related conflicts. Understanding public opinions on wildlife and its management through surveys is one form of public involvement when public opinion is taken into account by decision makers. Citizen science is another example. Volunteer participation in biological monitoring and research is a form of citizen science, where the public becomes a part of the scientific enquiry (Silvertown, 2009). The public can also be actively involved in environmental education programs for reducing human-wildlife conflicts (Espinosa & Jacobson, 2012). High involvement of local communities in wildlife management builds local support for conservation of even such controversial species as the tiger (Banerjee, 2012) and snow leopard (Jackson & Wangchuk, 2004). There are many claims for the benefits of participation, but those are rarely evaluated in practice (Reed, 2008), a gap this study seeks to address within the specific context of wolf-human conflicts in Slovenia. Reed (2008) also summarized eight best practice features of public involvement for improved environmental management and those were tested in this study.

1.4. Wolves and humans in Slovenia: The study area

In wildlife management, the opinions of the people that can be directly affected by wildlife are the most important to include in decision making (Ericsson & Heberlein, 2003). Findings from HD research are also most useful when they can be integrated with biological information about the species in the same geographical range (Bath & Majić Skrbinšek, 2000). The study area for this thesis therefore comprises the entire wolf range in Slovenia (Figure 1-2). Wolves are distributed in the south-western part of Slovenia. They inhabit a well preserved forested region in the Dinaric mountain range, one of Europe's biodiversity hot-spots, which on one hand represents a high quality habitat for the wolf, but is on the other hand also highly used by humans. This wolf habitat can be described as a mosaic of protected areas, forest reserves with several virgin forest stands, and rural human settlements. A large part of the area is protected under Natura 2000 and is recognized also as the Ecological Important Area and as the Designated area of Large Carnivores in Slovenia. About 43 wolves were present within the region in 2010 (Majić Skrbinšek, 2012). They represent the northwestern part of the Dinaric-Balkan wolf population (Figure 1-1), estimated at about 3900 individuals in total (Kaczensky et al., 2012). The trend of the population is currently unclear due to recent changes in the quality of wolf monitoring methodology (Majić Skrbinšek, 2012).

In such a multiuse landscape, wolves are in constant conflict with human interests, which represents the major limiting factor for their long term conservation. Wolves are present in the area of about 4,681 km^2. In this wolf area, there are also 1,038 farms, with the total of 21,229 sheep. Sheep breeding is one of the fastest growing industries in the country, with the number of sheep in Slovenia increasing six times in the last decade, accordingly with increasing wolf damages (Černe et al., 2010). Human settlements in the area are mostly small and located in lowland areas. Agriculture is mainly extensive. However, due to the stimulation through subsidizes for sheep and goat farming, the number of sheep and goats has increased five-fold in the last ten years (Statistični urad Republike Slovenije, 2013).

Since attitudes toward wolves can vary inside the wolf range as seen in Croatia (Bath & Majić Skrbinšek, 2000), the study area was divided into two strata of permanent and occasional wolf presence (Figure 1-2). The reason for stratifying the study area originates from findings of previous studies, which showed that differences in attitudes originate also from the differences in the length and extent of experience people have with wolves. Negative attitudes toward large carnivores reach their peak when the animals return to an area where people lack the experience of coexistence. After a while of coexistence, people gain experience of living close to large carnivores, and the proportion of people with positive attitudes raises (B. Zimmermann, et al., 2001). We assumed, therefore, that attitudes will be more negative in the area of occasional wolf presence, where people have less experience with wolves. The area where wolves appear occasionally is on the other hand also important for the conservation of the species on the larger scale because it might represent a corridor where the wolves from the Dinaric Mountains could connect with those in the Eastern Alps. The main division between the areas of permanent and occasional wolf presence is the Ljubljana-Trst highway.

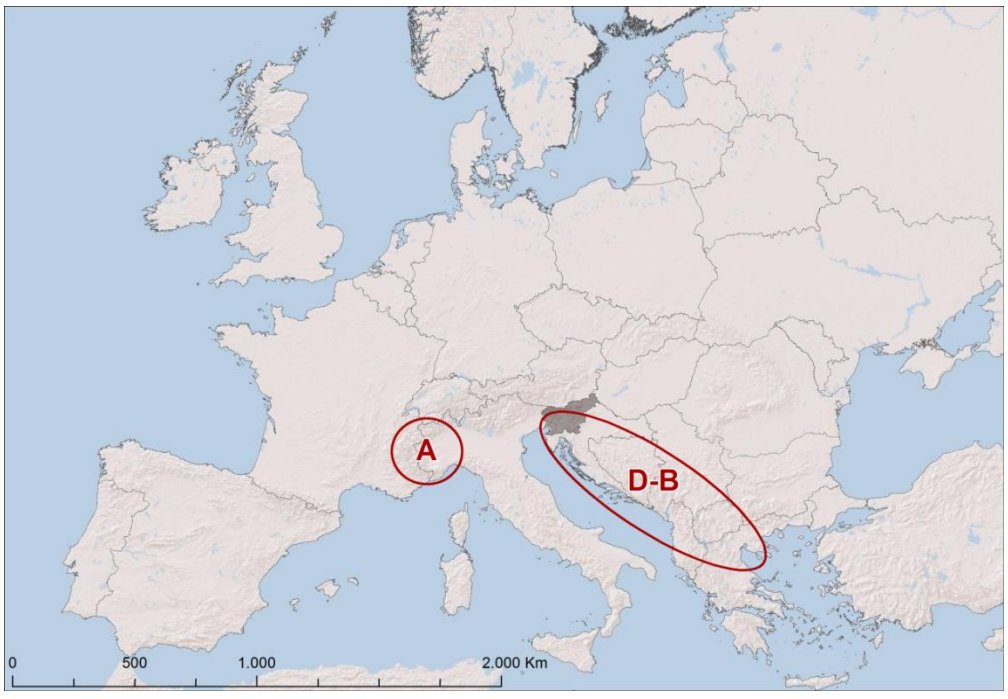

Figure 1-1: Wolves in Slovenia represent the northwestern part of the Dinaric-Balkan wolf population (D-B). The occasional wolf presence area in western Slovenia is a potential corridor for the connection with the Alpine wolf population (A).

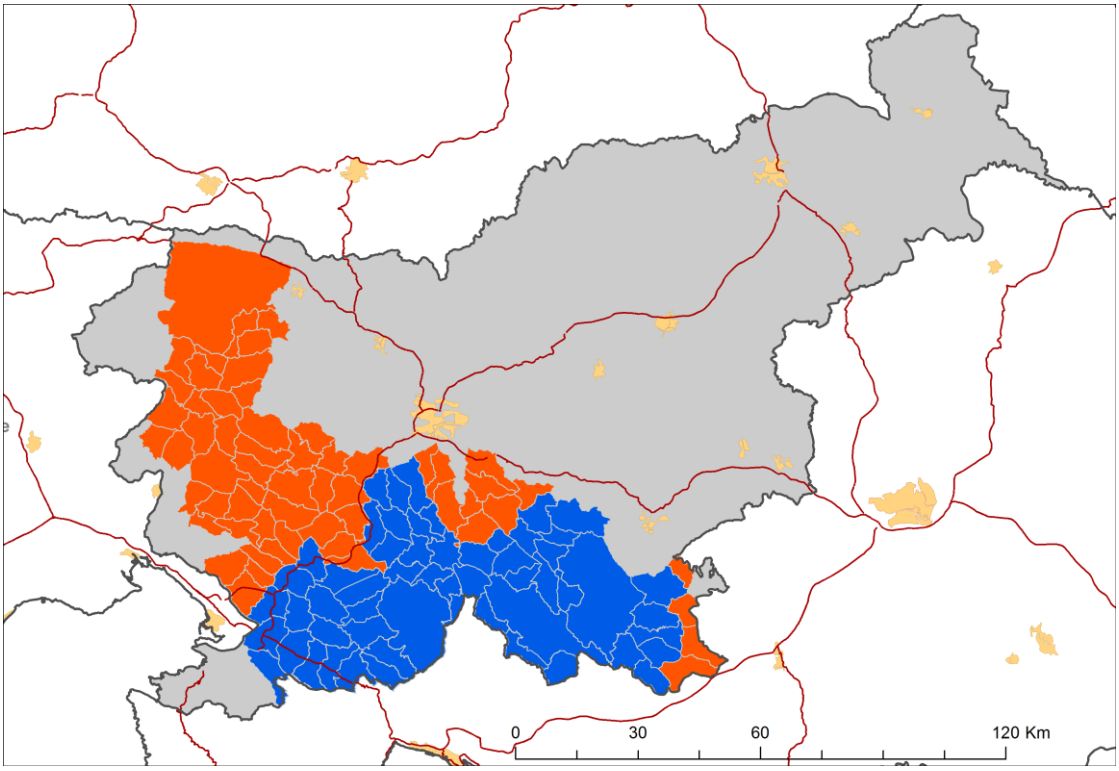

Figure 1-2: The study area in the south-west of Slovenia (grey) is defined by the borders of hunting grounds and is divided into two areas of permanent (blue) and occasional (orange) wolf presence. Highways and larger cities are also shown on the map.

1.5. About the SloWolf project

The Slovenian wolf population is one of the few remaining autochthonous wolf populations in Europe. Little was known about Slovenian wolves before the project, either from a biological or sociological perspective. Management actions such as unplanned culling were often taken ad-hoc as a response to damages caused by wolves or perception of increased wolf presence. Such actions may have a negative impact on the population as well as on the human tolerance upon which its existence depends.

Therefore a wolf conservation project entitled "Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia (2010-2013) – SloWolf" ("About the SloWolf project", n.d.) was designed to gain knowledge to improve the biological conditions (habitat and prey base) as well as the coexistence of wolves and people. It is the first large scale project about wolves in Slovenia. The project is largely supported by the LIFE Programme, the European Union's financial

instrument for the environment. Since its beginnings in 1992, LIFE has co-financed more than 3,000 projects throughout the European Union, contributing approximately 2.2 billion euros to the protection of environment (Environment- LIFE Programme 2012). The SloWolf project falls under the LIFE+ Nature and Biodiversity component, which is dedicated to implementation of the Birds and Habitats Directives, EU's cornerstone policies of nature conservation. The applicant and the project leader is the Animal Ecology Group at the Department of Biology of the Biotechnical Faculty of the University of Ljubljana. The project is carried out collaboratively by partners from the University of Ljubljana, the Slovenian Forest Service, and the Society for the Conservation, Research and Sustainable Development of the Dinaric Alps- Dinaricum.

Project activities include working with people to mitigate conflicts related to wolves, raising their awareness and including them directly in wolf management. The project uses a series of stakeholder and public consultation procedures in order to enhance not only the quality of wolf management and conservation but also to promote collaboration as a way of making the decisions through the involvement of civil society. One of the main expected results of the project is improved local public and hunters' acceptance of wolves in their regions. Evaluation of the effectiveness of public involvement and awareness campaigns requires continued monitoring of their attitudes and knowledge. In my thesis I will explore how effective was the project in improving the acceptance of wolves for the purpose of their long- term conservation.

2. PROBLEM AND PURPOSE STATEMENT

Cross-sectional studies (i.e., studies that observe the population or a subset of a population at one point in time) that are more often crisis driven than pro-active have been recognized as not sufficient in long term wildlife management (Bath, 1996, 1998; Majić & Bath, 2010; Manfredo, et al., 1998). Still, they prevail in the HDW field (Bath, 1996; Bruskotter, et al., 2007). Some previous studies of changes in attitudes toward wolves have been conducted in North America and Europe, with

differing results. While some researchers (Bruskotter, et al., 2007; Williams, Ericsson, & Heberlein, 2002) found that attitudes remained relatively stable over decades, others found that considerable changes in attitudes can occur even over a relatively short period of time (Majić & Bath, 2010).

The basic assumption is that since human behaviour is partially based on attitudes, by changing the attitudes of individuals, it is possible to influence their behaviour (Ajzen, 2005; Fishbein & Ajzen, 1975). Conservation programs often include measures that are intended to improve the attitudes of that part of the society whose attitudes toward wolves are negative. The idea is that positive attitudes would result in a more appropriate behaviour toward wolves, (e.g. less illegal killing or higher support of preventive measures for livestock protection instead of lowering wolf population numbers in the area).

Wildlife management is believed to be better supported and public attitudes more positive if people have the chance to express their opinion in the decision-making process (Decker & Chase, 1997). Public participation in environmental decision-making from a normative perspective is a democratic right and the literature suggests it can deliver higher quality decisions from a pragmatic perspective (Reed, 2008). Nevertheless, the latter claims are rarely tested in practice. Combining quantitative data on attitude change and qualitative data about the participation process provides an opportunity to test these assumptions.

2.1. Research objectives

The purpose of this study is to document attitude change of the general public and key interest groups during the time of the wolf conservation project in Slovenia and to explore the role public participation has played in any observed change. This will provide new insights in understanding of attitudes in wildlife management and also contribute to evaluation of the effectiveness of the SloWolf project in improving the coexistence between wolves and humans in Slovenia.

There are two research objectives with corresponding research questions:

1. Understand the nature of changes in attitudes toward wolves and wolf management as a consequence of the SloWolf conservation project

    - Did the attitudes of the public, hunters and farmers toward wolves change during the timeframe of the project? Is it possible to detect an attitude change in such a short time?

    - On what level did the change, if any, occur: e.g. beliefs about wolves, attitudes toward wolves and specific management options, knowledge about wolves?

    - In case attitudes have changed, have they changed in a manner that is likely to reduce wildlife-related conflicts and enhance wolf conservation?

2. Understand the role of public involvement in a wolf conservation project.

    - Is there a link between public involvement in a wolf conservation project and change in attitudes toward wolves and wolf management? How do the people that were involved or heard about the SloWolf project evaluate their change of attitudes toward wolves?

    - To what extent were the objectives of the public involvement process met in the SloWolf project?

    - To what extent were the criteria outlined by Reed (2008) present in the project?

    - Based on the SloWolf experience, what are the criteria for good public involvement in conservation of large carnivores in Slovenia? Do Reed's criteria apply in this context?

3. METHODS

To answer all of the research questions, both qualitative and quantitative methods were employed. The underlying philosophies of the two approaches are often portrayed as different paradigms, where the goal of the first is describing and understanding and the goal of the second is explaining and predicting (Babbie & Mouton 2001). However, according to the pragmatic approach, a researcher should mix both sets, if this provides a better answer to research questions (Pierce, et al., 2001). Such a mixed method approach can strengthen conservation research that bridges the interdisciplinary domains between natural and social sciences (Glikman & Frank, 2011). Triangulation, exploring a social phenomenon from more than one methodological perspective, gives greater confidence in the accuracy of the findings (Siemer, Connelly, Brown, & Decker, 2001). The phenomena of attitude change and the role of public participation for improved wolf management can be observed from both, a quantitative and qualitative perspective. Mixed methods are often used for evaluation of public participation in environmental management to ensure rigour and comprehensiveness (Bellamy, et al., 2001; Charnley & Engelbert, 2005; Espinosa & Jacobson, 2012).

In evaluating the quality of quantitative research, I paid attention to reliability (i.e. repeatability of results), validity (whether the instrument measures what it was intended to measure) and representativeness (whether the sample represents the population) . Equivalently, scientific rigour in using qualitative methods was assured through dependability (improving the research design throughout data collection, i.e. expanding the sample, adapting interview questions), credibility (grounding the research in the reality of the participants), inclusiveness (ensuring that different views that exist in the population are captured) and transferability (providing enough context for comparing the results to other similar studies) (Siemer, et al., 2001).

3.1. Quantitative Methods: Measuring Attitude Change

Quantitative methods have a longer tradition in the field of human dimensions of wildlife (HDW) than qualitative methods. A researcher in HDW field employs quantitative research methods, when he or she strives to provide valid, reliable, and representative data (Vaske, 2008). Such data are also most frequently used by wildlife managers and decision makers. Statements about the entire population on the basis of its subset, the sample, are made through statistical analysis. The studied populations in this study were the general public, hunters and small cattle farmers living in the area of permanent and occasional wolf presence in Slovenia. The latter two groups were considered to be the most important interest groups in wolf management because of depredation of livestock, especially sheep and goats, and wild ungulates by wolves. The study was designed in the form of a cross-sectional pretest- posttest research design (Campbell & Stanley, 1966), where one sample is measured prior to the manipulation and the other after it. The manipulation in this case means the sum of all events connected to the wolf issue in Slovenia, including public involvement in the project activities and media reports that the studied population was exposed to during the time between measurements. The first data collection occurred at the beginning of the Slowolf project in 2010 and the second toward the end of the project in 2012.

Data for quantitative analysis was obtained with a survey (Vaske, 2008). This method is used to collect original data on populations that are too large to directly observe or to measure prevalent attitudes in them (Babbie & Mouton, 2001). Sampling the population is the crucial point in quantitative research to ensure representativeness. It requires a precise definition of the population and a list of all the members of it from which a sample is then drawn (Vaske, 2008). If the goal of a study is making generalization for the whole population based on the data from the sample, probability sampling is used. I divided the three studied populations (residents in the wolf area, hunters and sheep and goat farmers) into different non-overlapping groups (residents of towns and villages, members of hunting families, farmers of municipalities) and assigned a number to each person to ensure that all individuals in the wolf area have equal chance to be selected, regardless of the size of the group. Stratified random

sampling of the general public in both surveys was based on the 2002 National census (Statistični Urad Republike Slovenije, 2002) and the Slovenian Telephone Directory version 2010. The population of hunters was defined as all non-professional hunters in the area. In Slovenia, they are organized into local hunters clubs known as hunting families. Hunting families have the concession to hunt on hunting grounds that are either privately or state owned. Questionnaires for hunters were distributed through hunting families, according to the number of members in each family. The population of sheep and goat farmers consisted of farmers with at least one registered animal in 2008/2009 for the 2010 study and 2011/2012 for the 2012 study. Surveys should be carried out in a way that encourages high response rates and reduces non-response bias (Dillman, 2007). Surveying of the general public and hunters was done by mail, whereas sheep farmers were interviewed personally, because of the highest anticipated refusal rate.

Potential survey topics include attitudes, perceptions, decisions, needs, behaviour, lifestyle, affiliation and demographics (Alreck & Settle, 2004). I measured attitudes toward wolves, knowledge about wolves, attitudes toward wolf management and livestock protection, opinions about information and information sources, experience with wolves and socio-demographic information in the three interest groups. The questionnaire (Appendix I) was based on an instrument administered by Bath & Majić Skrbinšek (2000). Ordinal questions were measured on 5-point Likert scales.

Surveying enables researchers to gather the data from many respondents, where each person responds to many questions. Such a data set produces a large number of variables that are related in complex ways and can be examined through statistical inference with multivariate statistical techniques (Tabachnick & Fidell, 2001). I compared the socio-demographic characteristics of the samples using the t-test for normally distributed variables and Chi-square for categorical variables (Appendix I). I ran exploratory PCAs with a varimax rotation on two questionnaire sections of attitudes toward wolves and attitudes toward wolf management to identify the underlying components (Tabachnick & Fidell, 2001; Vaske, 2008). A linear multiple regression method was used to assess which variables are the best predictors of wolf acceptance and wolf conservation (Tabachnick & Fidell, 2001). Differences between

years in wolf acceptance and attitudes toward wolf conservation were tested with t-test for normally distributed variables, Mann-Whitney U-test for non-normal distributions and Pearson's chi-square test for nominal variables.

3.2. Qualitative Methods: Evaluating the Role of Public Involvement

According to Zimmermann's quote on natural resources "resources are not, they become" (E. Zimmermann, 1951 p.15), wildlife conservation and management is legitimate only when the various interests are recognized and understood and taken into account. Considering the very subjective nature of the existing "plurality of worlds" (Relph, 1970), that can be translated to plurality of interest in the HDW terminology, a thorough understanding of the various perceptions of wildlife and its management becomes a necessity for successful conservation. Qualitative methods are used to provide this understanding through examining the research context, processes, relationships, perceptions and the underlying characteristics of their variability, thus strengthening the internal validity of the mixed method research (Glikman & Frank, 2011).

In contrast to quantitative data collection methods, where sampling should generate data that is representative of the studied population, qualitative sampling aims to reach a range of different opinions and provide insights into the dimensions of the research topic (traveler's metaphor) as well as exploration of those dimensions in detail (mining metaphor) (Ritchie & Lewis 2003). Interviewees were selected in a manner to cover all involved interest groups that experienced different types of involvement in the SloWolf project. Views on public participation were sought also in the documents produced in the project such as workshop reports, evaluation forms, wolf management action plan proposal, invitation letters, etc.

A flexible, exploratory approach to analysis was used (Braun & Clarke 2006), as I examined a novel issue of the effectiveness of public participation for improved wolf conservation in Slovenia. Thematic analysis was chosen as it allowed me to identify, analyse and report patterns within the data in the form of themes. Two forms of

thematic analysis were used for analysis: theoretical to test and evaluate the participation process with criteria based on Reed's (2008) review article and inductive to explore participants' own views on this topic. Themes for evaluation of the participation process (Appendix III) were derived from Reed's (2008) criteria after initial coding of interviews and documents. This initial round of coding allowed identifying patterns that were not covered by Reed's criteria.

4. CO-AUTHORSHIP STATEMENT

Quantitative data for the thesis was collected in two points in time, at the beginning and toward the end of a project entitled "Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia (2010-2013) – SloWolf", supported by the European Union's LIFE Programme.

For the first data collection in 2010, the primary researchers were Urša Marinko and Aleksandra Majić Skrbinšek, who designed the instrument, selected samples and supervised the implementation. I participated as a research assistant in the phases of questionnaire design, face to face interviews with farmers and entering the collected data in the database.

In 2012/2013 I was the principal researcher, responsible for the evaluation of the SloWolf project from the sociological perspective. Specifically, I undertook sample design, implementation of data collection and data analysis under the supervision of Aleksandra Majić Skrbinšek and Urša Marinko. The instrument was slightly modified from the 2010 version to target research questions of this Master's thesis. I consulted also Tomaž Skrbinšek and Roman Luštrik from the Biotechnical faculty, University of Ljubljana on sampling methods.

For the qualitative part of this thesis, I selected the evaluation criteria, designed the questions and probes for the semi-structured interviews, selected the interviewees, coded and analysed the interviews and collected documents independently. However, I consulted my supervisors Dr. Alistair Bath, Dr. Kelly Vodden, Aleksandra Majić

Skrbinšek, Urša Marinko and other colleagues in the SloWolf project team in all of these stages.

5. Paper I: Evaluating the effectiveness of a wolf conservation project through measuring attitude change

5.1. Abstract

Intensive conservation projects such as those supported by the EU's LIFE Programme aim to improve conditions for species conservation, but their effectiveness are rarely tested on a large scale (Ferraro & Pattanayak, 2006). I evaluated the effectiveness of a conservation project in improving the social acceptance of wolves in Slovenia by investigating changes in attitudes toward wolves and wolf management, knowledge and beliefs in the populations of the general public, hunters and farmers living in wolf presence areas. The study was designed as a quasi-experiment, where samples were taken at the beginning of the project in 2010 and in 2012, after a part of the public awareness and public involvement actions were implemented. Although attitudes toward wolves generally seem to have remained stable over the last 13 years in Slovenia, when comparing results to a study by Korenjak (1999), I documented change over the two year period in the level of beliefs about the extent of wolf caused damage, actual and acceptable wolf population size and changes in five items about attitudes toward wolf management. Detectable changes over a short period of time seem to be context specific, since they occurred on the level of beliefs and attitudes to specific management options, even when knowledge levels remained unchanged. Evaluation of conservation projects is essential for their transparency and credibility; I suggest that attitudinal and belief monitoring with various interest groups using sensitive measures can be a way to achieve this legitimacy.

5.2. Introduction

5.2.1. Wolf conservation in Slovenia in the context of human dimensions

Large carnivore conservation and management is successful only when human society is taken into account as a part of their ecosystem (Grumbine, 1994; Riley et al., 2002; Treves & Karanth, 2003). Therefore, social acceptance capacity should be considered alongside the biological capacity. Wolf (*Canis lupus*) is listed as a species of Least Concern by IUCN (Jdedi, Masseti, Nader, de Smet, & Cuzin, 2010); however it is necessary to note that classification criteria take into account only biological conditions (Fritts, Stephenson, Hayes, & Boitani, 2003). Low acceptance by society is now regarded as the major threat for wolves in Europe and only recently this information was added to the monitoring of the wolf conservation status (Kaczensky et al., 2012). Intensive conservation projects such as those supported by the EU's LIFE Programme aim to improve conditions for species conservation, but the question remains, how effective they are in improving the social acceptance of such controversial species as the wolf.

Wolves in Slovenia belong to the north western part of the Dinaric-Balkan population. Unlike a lot of other wolf populations in Europe that were exterminated, this population never went extinct. Since the mid-18th century, the population has decreased severely due to systematical removal through historic hunting regulations. A significant shift in attitudes toward wolf management by the Slovene public was noted in 1973, when awards for culled wolves were cancelled (Jonozovič, 2003). This change in management policy was followed by a policy, which removed wolves as a game species. Since 1993, wolves have been officially protected in Slovenia, but exceptional culls are permitted to maintain wolf acceptance and prevent illegal killings. However, exceptional culling has been proved to be ineffective in lowering the number of attacks on livestock (Krofel, Černe, & Jerina, 2011). Moreover, it has been opposed by some parts of society. A petition for a wolf hunting ban in 2012 was supported by over 3000 singers and by 15 nature conservation oriented NGOs. Early research on attitudes toward wolves in Slovenia (Korenjak, 2000) showed that positive

attitudes prevail in general public and hunters, whereas sheep breeders experiencing wolf depredation on livestock possess more negative attitudes toward wolves.

In 2010, a LIFE+ wolf conservation project entitled "Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia (2010-2013)-SloWolf" started with a review of biological and social conditions for wolf conservation in Slovenia. The project provided an opportunity to evaluate threats to the Slovenian wolf population (i.e., biological and social) and to improve the conditions for its long-term conservation. Negative attitudes of various types and degrees exist in the populations of hunters, sheep farmers and the general public (Marinko & Majić Skrbinšek, 2011). These negative attitudes are due to competition with wolves for game species, livestock depredation and sensationalistic media reports. However, there are various project activities aimed to improve the coexistence of the society with wolves. These actions involved also the public and main interest groups- hunters and farmers in the wolf area in Slovenia on different levels of participation. Involvement actions ranged from volunteer engagement in wolf monitoring to introducing livestock protection measures on farms and involvement in the preparation of the wolf management action plan. The project was well covered in the media; for example the media followed the story of the Slovenian wolf Slavc, which became world known with his over 1500 km journey, crossing four countries to settle in a new territory in Italy. Slavc's story was covered in over 70 national and international reports. During the time of the project, a wide public debate about the legality and legitimacy of wolf culling occurred. Two consecutive deaths of collared wolves in September 2012 - one alpha female wolf killed illegally, followed by a young female wolf culled legally triggered public response and initiatives formed that advocated a ban on wolf hunting and caused a thorough investigation of wolf management in Slovenia by the European Commission.

The SloWolf project research and conservation area is focused on the areas where wolves appear permanently or occasionally. About 43 wolves were present in the south-western part of Slovenia in 2010 (Majić Skrbinšek, 2012), occupying an area of 4,681 km^2 (Černe et al., 2010). In this range, there are 1,038 farms, with a total of 21,229 sheep. Sheep breeding is one of the fastest growing industries in the area; the

number of sheep in Slovenia has increased six fold in the last decade, accordingly with increasing wolf damages (Černe, et al., 2010). A large portion of the studied area is at the same time protected under the Natura 2000 ecological network. Human settlements in the area are mostly small, located in lowland areas. Agriculture is mainly extensive and, in the last few years, due to the stimulation through subsidizes, small cattle have increased five-folds in the last ten years (Statistični urad Republike Slovenije, 2013).

The area where wolves appear occasionally is important for the conservation of the species on the larger scale because it might represent a corridor where the wolves from Dinaric Mountains could connect with those in the Eastern Alps. The main division between the areas of permanent and occasional wolf presences is the Ljubljana-Trst highway.

5.2.2. Project evaluation through measuring attitude change

Individual cross-sectional human dimension studies are typical in the literature and are more often crisis driven than pro-active and have been recognized as insufficient in long-term wildlife management (Bath, 1996, 1998; Bruskotter, Schmidt, & Teel, 2007; Majić & Bath, 2010; Manfredo, Decker, & Duda, 1998; Treves, Naughton-Treves, & Shelley, 2013). This research examines attitudinal change over the course of two years of the project duration. The comparison of attitudes serves as an evaluation of the management interventions. Monitoring attitudes is also an important part of a transparent, democratic and participatory approach of implementing conservation projects (Treves, Wallace, Naughton-Treves, & Morales, 2006), when the results are communicated and considered by decision-makers.

If a wolf conservation project is successful in improving the coexistence of wolves and humans, this should reflect also on attitudes. The basic assumption is that since behaviour is partially based on attitudes, by changing the attitudes of individuals, it is possible to influence their behaviour (Ajzen, 2005; Fisbein & Ajzen, 1975). The purpose of wolf conservation actions is to change attitudes of that part of the society

whose attitudes toward wolves are negative toward attitudes that are more positive, since such attitudes would result in a more desirable behaviour toward wolves (e.g. less illegal killing, support of preventive measures for livestock protection instead of lowering wolf population numbers in the area).

Attitudes are not studied per se in HDW, but as a part of broader theories. According to the cognitive approach (Vaske, 2008; Pierce et al. 2001), attitudes are placed into a hierarchy of cognitions with other psychological concepts such as values, value orientations, attitudes, and norms and beliefs. In the cognitive hierarchy concept (Fulton, Manfredo, & Lipscomb, 1996) these cognitions build one upon another like an inverted pyramid, where values that are few and general influence specific beliefs and attitudes through the pattern of basic beliefs and value orientations. The higher order attitudes and norms then influence behavioural intentions and finally behaviour. However, HD studies typically focus on the level of attitudes as the primary building stone in social psychology, because they are easy to conduct, interpret and they help to predict behaviour (Manfredo & Bright, 2008).

According to the theory of attitude change, the two major strategies of change are persuasive communication and active participation (Fisbein & Ajzen, 1975), with the second strategy being more effective in inducing change than passive exposure to information. Both strategies were used in the case of the SloWolf project, persuasive communication through an informational and educational campaign; and active participation in several activities that promoted the coexistence with wolves. Actively involving the public and stakeholders in different stages of the wildlife management process is believed to be an effective tool to solve conflicts associated with wildlife management (Decker & Chase, 2001; Treves, et al., 2006) and monitoring of attitudes therefore functions as the method of evaluation of such actions.

From previous studies of changes in attitudes toward wolves in North America and Europe, different results were found. While some researchers (Bruskotter, et al., 2007; Williams, Ericsson, & Heberlein, 2002) found that attitudes remained relatively stable over decades, others found that considerable changes in attitudes can occur even over a relatively short period of time (Majić & Bath, 2010). The fact that attitudes and even values toward wolves are changeable is supported also by the dramatic shift in

management from persecution to protection that happened in Europe and North America in the late 20th century (Shcwartz, Swenson, & S.D., 2003). Attitudes changed with increasing wolf abundance, changes in wolf management (e.g., programs to mitigate wolf caused damages) and conservation status (Majić & Bath, 2010; Treves, et al., 2013). Limited numbers of studies have considered changes in attitudes over time as a result of wolf conservation and public participation efforts. However, no study has focused on documenting attitude change over such a short period of two years as in the Slovenian context. Our research questions focus on the extent and the type of change in a short but intensive wolf conservation project, aimed at improving coexistence with wolves. Did the attitudes of different parts of society that live in the wolf area in Slovenia change during the time of the project and on what levels of the cognitive hierarchy did the change occur? We are interested in attitudes of the entire populations (in this case the populations of the general public, hunters and farmers in the wolf range in Slovenia) rather than change in individuals, since managers and decision makers rely on such data. The ultimate question is whether attitudes and other cognitive concepts (e.g., beliefs, knowledge) changed in a manner that is likely to reduce conflicts and enhance coexistence. We hypothesise that exposure to information about the SloWolf project and active participation in project's actions positively influenced attitudes in the three studied groups.

5.3. Methods

The study was designed in a form of a cross-sectional pretest- posttest research design (Campbell & Stanley, 1966), where one sample is measured prior to the manipulation in 2010 and the other after it in 2012. The manipulation in this case means the sum of all events connected to the wolf issue in Slovenia, including public involvement in the project activities and media reports that the studied population was exposed to during the time between measurements. Since this is a quasi-experiment, lacking full experimental control, special attention was given to the possible sources of external and internal invalidity. In such a design changes are not tracked within individuals and the reader has to be aware of the distinction between the real change in attitudes and

the change in attitudes as the consequence of the change in the structure of the sampled population. The two can be distinguished with controlling for those socio-demographic elements that have the strongest influence on attitudes (Majić & Bath, 2010).

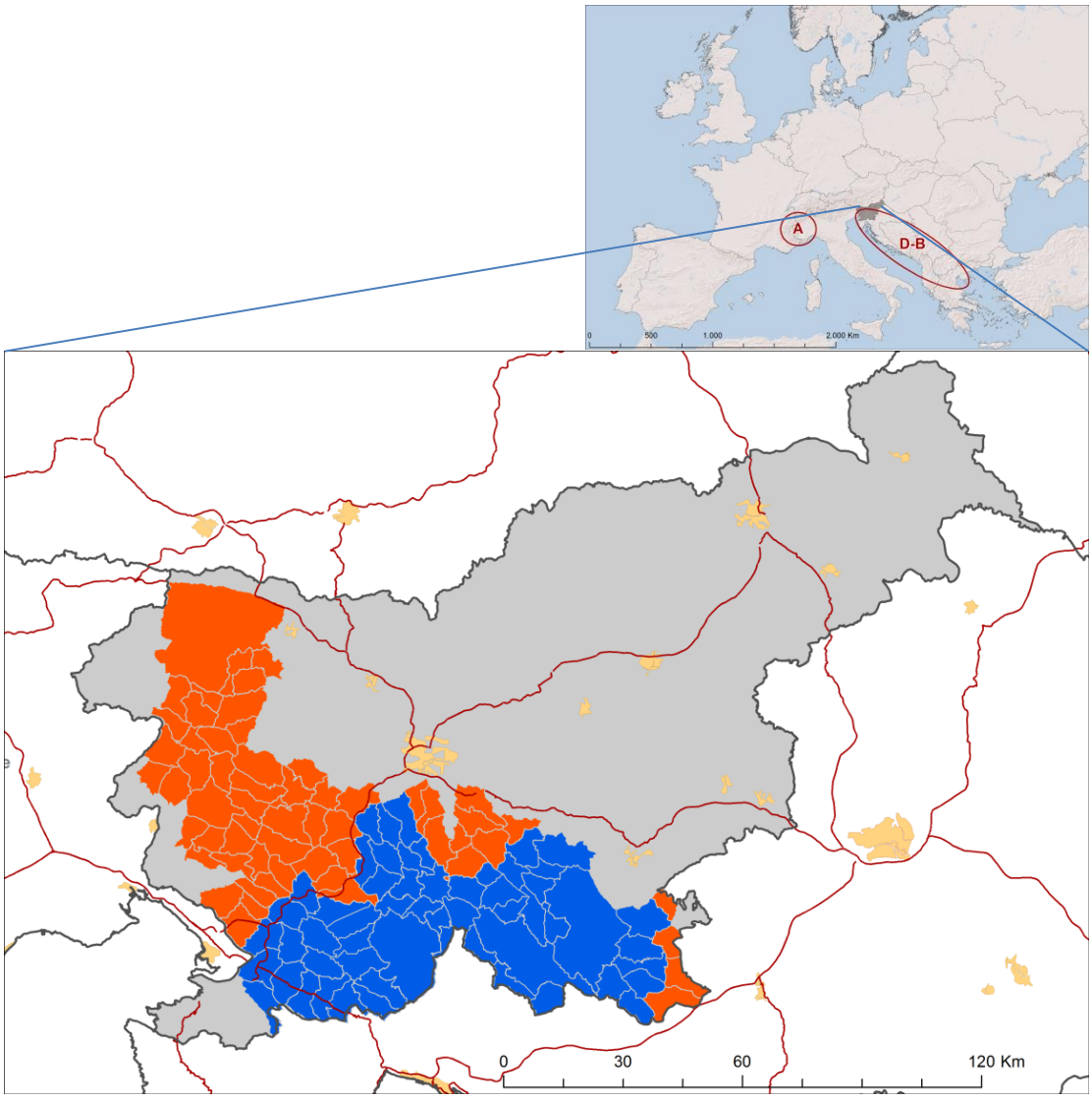

Figure 5-3: The study area is defined by the boundaries of the hunting grounds and is divided into two areas of permanent (blue) and occasional (orange) wolf presence in Slovenia. Wolves in Slovenia represent the northwestern part of the Dinaric-Balkan wolf population (D-B). Through the occasional wolf presence area, this population could potentially connect to the one in Eastern Alps (A).

5.3.1. Data collection

The studied populations were hunters, farmers and the general public residing in the wolf range in south-west Slovenia. The study area was divided into two areas (Figure 5-3) of permanent and occasional wolf presence, because attitudes can vary inside the wolf range as seen in Croatia (Bath & Majić Skrbinšek, 2000). Within the wolf presence area, the boundaries of the two study areas were more precisely defined by hunting ground boundaries. The whole study area is managed by a total of 108 Hunting families (local Hunters clubs) and five State's Hunting Reserves. Hunting families in Slovenia are NGOs that have the concession to hunt on hunting grounds that are either privately or state owned.

In 2012, a follow-up survey was conducted to replicate the survey completed in 2010. In both years, a mail survey was used to survey the general public and the hunters. Face-to-face interviews were used to survey sheep farmers, because of the highest anticipated refusal rate. Stratified random sampling of the general public in both surveys (2010 and 2012) was based on the 2002 National census (Statistični Urad Republike Slovenije, 2002) and the Slovenian Telephone Directory version 2010 on DVD. The number of questionnaires was selected proportionally to the number of residents in a municipality according to the census, in total of 650 per each wolf area both years. Respondents' addresses were randomly selected from the telephone directory using Macro Express Pro (Insight Software Solutions, Inc., 2010) and R package (R Core Team, 2012). Questionnaires for hunters were distributed through all hunting families in the wolf presence area, whereas the numbers of questionnaires were defined proportionally to the number of members in each family. The population of sheep and goat farmers consisted of farmers with at least one registered animal in 2008/2009 for the 2010 study and 2011/2012 for the 2012 study. Farmers were divided into areas of occasional and permanent wolf presence based on their address and samples were randomly selected based on the population of farmers in each area with a set sample seed number in R package.

The obtained sample sizes for mailed questionnaires to the general public and hunters were lower in the post-test 2012 study compared to the pre-test study in 2010 (Table

5-1). The obtained sample rates from personal interviewed farmers were substantially higher due to a different sampling method of face-to-face interviewing.

Table 5-1: Population sizes, sample sizes, obtained sample sizes and rates of the three studied interest groups: general public, hunters and farmers in the areas of permanent (PA) and occasional (OA) wolf presence in Slovenia.

Interest group	Population size 2010		Sample size		Obtained sample size 2010 And response rates		Obtained sample size 2012 And response rates	
	PA	OA	PA	OA	PA	OA	PA	OA
General public	129.557	158.206	1000	1000	324 32.4 %	291 29.1 %	279 27.9 %	259 25.9 %
Sheep and goat farmers	1053	1136	168	168	127 75.6 %	132 78.6 %	116 69.0 %	152 90.5 %
Hunters	3081	3022	650	650	220 33.8 %	204 31.4 %	163 25.1 %	170 26.2 %

5.3.2. The instrument

The questionnaires (Appendix I) were designed separately for each group based on Bath & Majić Skrbinšek's (2000) question format. For analysis, I used 54 questions. These questions measured eight concepts: attitudes toward wolves (section A, Appendix I), knowledge about wolves (section B, Appendix I), attitudes toward wolf management and livestock protection (section C, Appendix I), opinion about information and information sources (section D, Appendix I), experience with wolves (section E, Appendix I) and socio-demographic information (section F, Appendix I). Five questions were added in the 2012 questionnaires to incorporate attitude change (section A, Appendix I), information source and participation in the SloWolf project (section D, Appendix I). Ordinal questions were measured on the 5-point Likert-like scale.

5.3.3. Data analysis

Socio-demographic characteristics

The socio-demographic characteristics of the samples between years and between wolf areas were compared using the t-test for age and Chi-square for categorical variables gender, residence type, education, the rates of hunters within the general public and farmers; and farmers within general public and hunters.

Components of attitudes toward wolves

I ran exploratory PCAs with varimax rotation (Tabachnick & Fidell, 2001) on two questionnaire sections of attitudes toward wolves and attitudes toward wolf management to identify the underlying components. Tabachnick & Fidell (2001) suggest that that the underlying structure might differ by samples from different populations and the same populations in time, so I ran PCAs for joined samples and separately to check for consistency and differences. After investigating the scree plot and the interpretability of the components, I retained the first three components of the general attitudes section and items that gave the highest Cronbach's alpha on those. The first three components appeared constantly throughout all samples and therefore we saved the scores of the joined samples. Interpretation of components was done by investigating the marker variables (variables with highest loadings on components). PCA analysis for the wolf management section resulted in different models across samples; consequentially I used individual items in further analysis.

Predictors of wolf acceptance and of attitudes toward wolf conservation

I evaluated the extent of manipulation (i.e. possible influences on attitudes) with the multiple regression method that includes year as an independent variable, different information sources and involvement in the project. Data for multivariate regression was initially treated for missing values. Since imputation of missing values is affected by outliers (Quintano, Castellano, & Rocca, 2010), I first inspected those. I identified 50 multivariate outlier cases with Mahanalobis distance on 21 items used in the PCA and inspected their properties. Those cases didn't differ considerably from others in socio-demographic characteristics or the self-reported attitude toward wolves and therefore I excluded them from the imputation and multiple regression analysis. Missing data was inspected and handled with multiple imputation method. I used

Fully Conditional Specification with linear regression for scale variables and logistic regression for categorical variables for the imputation method and ran 10 iterations (van Buuren 2007). The number of imputations was determined by the percent of missing values, which suggests that three imputations raise the estimation efficiency by over 90 % (Schafer & Olsen, 1998).

Multivariate linear regression with Enter method was run on joined samples, where year of the survey and wolf presence area were added as variables and included in the analysis. Additionally, I included predictor variables referring to information sources about the SloWolf project (i.e., media, personal communication, public lecture, participation in the project) and the types of involvement in the project (i.e., participated in the wolf management action plan preparation, filled out a questionnaire in 2010, participated in workshops for management of wolf prey species, volunteered in wolf snow tracking or howling monitoring, collected samples for genetic analysis) and knowledge index in the multivariate linear regression. Knowledge index was computed as the sum of eight multiple-choice questions testing respondents' knowledge about wolves. Those were first recoded into dummy variables. The index represents the number of correctly answered questions about wolves. One item with less than 5 responses was omitted from the analysis: "*I received a donation of an electric fence or a guarding dog.*"

Changes in knowledge, wolf acceptance, attitudes toward wolf conservation and toward wolf management

I assessed differences between years 2010 and 2012 for each group separately on knowledge index, individual knowledge questions, perceived and acceptable wolf numbers and the distribution of factor regression scores for the first ("wolf acceptance") and third ("wolf conservation") component from the PCA analysis; and individual items for the attitudes toward wolf management section. I used t-test for normally distributed variables Mann-Whitney U test for non-normal distribution and Pearson's chi square test for nominal variables.

Self-evaluated attitude change

The 2012 instrument included questions about self-evaluated attitude change: *"Did your attitude toward wolves change in the past two years?* (yes/no); *"If yes, did your attitude toward the wolf become*: (5 point scale ranging from strongly more negative to strongly more positive) and an open ended question *"Why did your attitude toward the wolf change?"*. I compared frequencies for the first two questions within groups and coded and summarized the reasons.

5.4. Results

5.4.1. Sample characteristics

There were no significant differences in the gender structure per interest group in the two areas of wolf presence in both years (Table 5-2, Appendix II). The samples of farmers and general public are biased toward men, but the sample of hunters is in accordance to the gender structure in the population, which is around 1.5 % of females ("Podatki o stanju članstva med leti 2004 in 2009,"). I found significant differences in mean age in the 2010 samples of farmers and general public and 2012 samples of hunters; however no difference in mean ages between wolf presence areas exceeded 4 years (Table 5-3, Appendix II). Age across all samples ranged from 18 to 91 and their means from 49 (SD= 14) to 58 (SD= 15). Farmers were in average the oldest, followed by the general public and hunters. There was a significant difference of 2.5 years between 2010 and 2012 in mean farmers age. Most of the residents reside in the countryside (Table 5-4, Appendix II) and have finished primary or secondary school (Table 5-5, Appendix II). There were no differences in these characteristics across areas in all interest groups. Between 11.2 % and 14.4 % of farmers also reported to be hunters and this was also the case in between 5.4 % and 7.9 % of the general public (Table 5-6, Appendix II). There was also a significant difference in the rate of sheep and goat farmers among hunters in the 2012 samples (Table 5-7, Appendix II), with more farmers among hunters residing in the area of permanent wolf presence. Analyses for differences between years of joined samples of permanent and occasional wolf presence revealed significant differences in mean age of farmers

(Table 5-9, Appendix II), their place of residence (Table 5-10, Appendix II) and education structure (Table 5-11, Appendix II). The samples of hunters and general public were comparable in all other socio-demographic characteristics (i.e., gender, age, type of residence and education) (Table 5-8 to Table 5-13, Appendix II).

5.4.2. Components of attitudes toward wolves

PCA for joined samples resulted in 3 components that accounted together for 54.97 % of total variance of the general attitude section. The first component is comprised of 15 items with high internal consistency (Cronbach's alpha= 0.92, N=2222). It explains the majority of the total explained variance and was interpreted as "wolf acceptance" according to the marker variables. Respondents who scored high on this component tend to have positive feelings toward the three large carnivores in Slovenia, would accept wolf presence in their vicinity, do not think that damage caused by wolves is unacceptable or that wolves attack livestock because their character is vicious. The items that loaded highest on the second component pertained to the utilitarian view of value of wolves, where their existence (in limited numbers) is conditioned by their usefulness (regulating deer numbers, symbolizing unspoiled nature) and was therefore interpreted as "wolves' role and value". The marker variables for the last component pertained to their complete protection, approval with increasing wolf numbers and complete hunting ban and this component was interpreted as "Conservation of wolves" (Table 5-14).

Table 5-14: PCA loadings for the first three components of the general attitude section of the questionnaire for joined samples PCA. Only those >0.30 are shown. Marker variables loading >0.50 are bold.

Questions	"Wolf acceptance"	"Wolves' role and value"	"Conservation of wolves"
General feeling toward bears	**0.67**	0.43	
General feeling toward wolves	**0.72**	0.44	
General feeling toward lynx	**0.65**	0.39	
It is important to maintain the diversity of flora and fauna in Slovenia.	0.35	**0.53**	
It is important to maintain wolf population in Slovenia for future generations.	0.49	**0.65**	
Wolves represent a symbol of unspoiled nature.		**0.59**	0.38
There is no need to maintain the wolf in Slovenia, since it exists elsewhere in Europe.	-0.53	**-0.53**	
Wolves have an important role in regulating the numbers of deer.		**0.52**	0.38
Wolves kill too many deer.	-0.48		-0.42
Wolves and hunters together effectively regulate the numbers of deer.		0.51	
Wolves in Slovenia should be completely protected.			**0.80**
There are too few wolves in Slovenia to hunt.			**0.83**
I would accept the presence of wolves in the forests of my surroundings without difficulties.	**0.64**	0.39	
I am afraid to suffer financial loss due to the presence of wolves.	**-0.66**		
Wolves are not dangerous to people.	0.47	0.39	
Wolves don't belong in the human vicinity	-0.57		
Wolves are welcome in Slovenia, if their numbers are regulated.		**0.73**	
The number of wolves in Slovenia should increase.	0.51		0.59
Wolves cause unacceptable damage on livestock	**-0.76**		
Wolves attack livestock, because they are too many.	-0.58		
Wolves attack livestock, because their character is vicious.	**-0.65**		
Eigenvalue	8.56	1.69	1.30
% of variance explained by each component	40.75	8.05	6.17
Cumulative % of variance explained	40.75	48.80	54.97
Cronbach's alpha	0.92	0.89	0.81

5.4.3. Predictors of wolf acceptance and wolf conservation

The multivariate linear regression model (original data $F(22, 1994) = 35.25$, $p<0.001$) explained 27.2 % of variance in the factor regression scores for the first PCA component "wolf acceptance" in original data and average of 25.8 % of variance in data with imputed missing values. Significant predictors that positively correlated with "wolf acceptance" were knowledge index, education, and hearing about the

SloWolf project. Significant predictors that negatively correlated with "wolf acceptance" were being a farmer, age, reported experiencing wolf caused damage and belonging to the group of general public (Table 5-15, Appendix II).

The multivariate linear regression with the component "wolves' role and value" as the criterion variable resulted in a significant model (original data $F(23, 1993)= 10.58$; $p<0.001$), but a very low R^2 , (original data $R^2=0.11$; adjusted $R^2 = 0.10$; average imputed missing values data $R^2=0.10$; adjusted $R^2 = 0.09$) and so I omitted it from further analyses.

For the third PCA component "conservation of wolves" as the criterion variable, another significant model emerged (original data $F(22, 1994)= 32.31$; $p<0.001$). The multivariate linear regression model explained 24.8 % of variance in the factor regression scores of the component "wolf conservation" in original data and average of 21.8 % of variance in data with imputed missing values. Significant predictors that positively correlated with "wolf conservation" were belonging to general public or farmers, knowledge index, year, living in the area of permanent wolf presence and participated in the project as a volunteer. Significant predictors that negatively correlated were reported seeing wolf in the wild, age, living in the countryside vs. city, being male vs. female, hearing about the SloWolf project and received information about the project through a public lecture.

5.4.4. Changes in knowledge levels

There was no significant difference in knowledge index between years in all three groups (Table 5-17, Figure 5-8, Appendix II). Generally, hunters were more knowledgeable than general public and farmers (Table 17, Appendix II). When inspecting differences in individual knowledge items, most frequently the correct answer in all three groups was that wolves live in packs (Table 5-18, Appendix II) and in 2012 significantly more respondents from hunters and general public answered this question correctly. The least frequently correct answer within the hunters and general public was that historical distribution of wolves covered the entire Slovenian territory.

In 2012 significantly fewer respondents from hunters and general public correctly answered the question about wolves' main food source. The percent of missing answers for this question in these two groups is also higher in year 2012. Significantly more farmers in 2012 correctly answered the question about wolf hunting success.

5.4.5. Changes in beliefs about existing and acceptable wolf numbers

The belief about the existing wolf numbers in Slovenia varies highly in all three groups, with the range of 0 to 10 000 wolves). Significant changes in this belief occurred in the time of the project, with the median shifting lower in all three interest groups (Table 5-19, Appendix II). On the other hand, different results were found about the acceptable wolf number in Slovenia between the groups: the median of farmers shifted from acceptable number of 40 wolves in 2010 to 100 in 2012, whereas hunters' acceptable number lowered from 100 to 57 and the median of the general public stayed the same at the acceptable number of 100 wolves (Table5- 20, Appendix II). Generally, the difference between the belief about the existing wolf number and acceptable wolf number in Slovenia decreased in 2012 (Figure 5-4 and 5-5). The overall mean of the perceived existing wolf number was 226 wolves in 2010 and 151 in 2012, whereas the overall mean of the acceptable number was 989 in 2010 and 186 in 2012. Another noticeable change occurred in the sample of farmers, with fewer farmers stating that no wolves are acceptable in Slovenia. In all three groups, fewer respondents in 2012 believe that the trend of the wolf population in Slovenia is increasing (Table 5-21) and more of them believe that there are too few wolves now for their long term conservation (Table 5-23, Appendix II). More hunters and famers in 2012 also believe that damage caused by wolves is decreasing (Table 5-22, Appendix II).

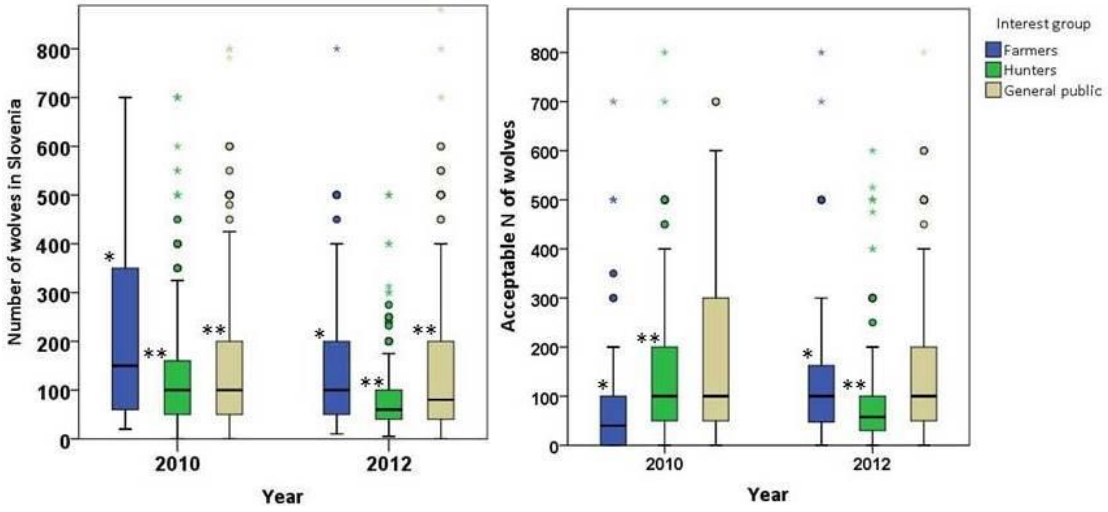

Figure 5-4 and 5-5: Boxplot diagrams for the opinion of the number of wolves and acceptable number of wolves in Slovenia by interest groups and year. Lower and upper sides of the box represent the 1. and 3. quartile, whiskers the minimum and maximum and dots outliers. Outliers above 800 are not shown. Significant differences within interest groups based on the Mann-Whitney U test are marked with (*) for $p<0.05$ and (**) for $p<0.001$.

5.4.6. Changes in wolf acceptance and attitudes toward wolf conservation

There was no significant difference by years in "wolf acceptance" factor regression scores means in the three interest groups (Table 5-24, Appendix II). Hunters scored the highest on "wolf acceptance" both years, followed by general public and then farmers (Figure 5-6).

Hearing about the SloWolf project was a significant predictor of both »wolf acceptance« and »wolf conservation« factor regression scores. In 2010, 24.9 % of the sampled farmers, 83.3 % of hunters and 30.2 % of the general public reported to have heard about the SloWolf project. In 2012, more respondents in all three groups reported their familiarity with the project. The rates were raised to 38.9 % in farmers, 93.5 % in hunters and 50.3 % in the general public sample (Table 5-25, Appendix II).

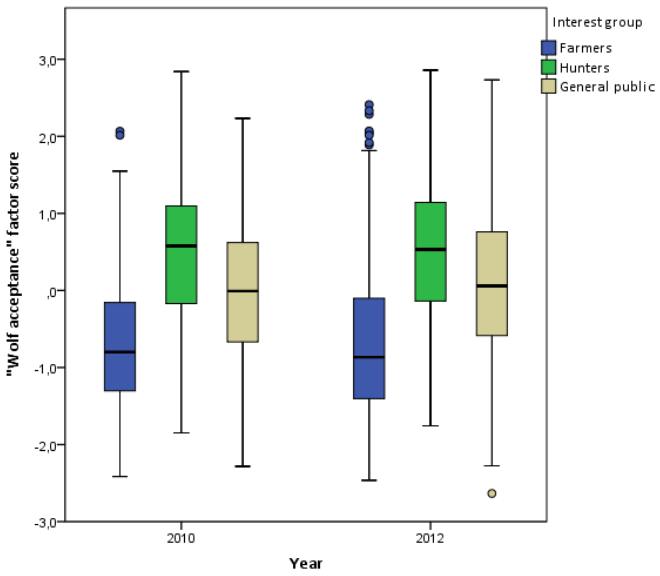

Figure 5-6: Boxplot diagram of »wolf acceptance« factor score distribution by interest groups and year. Lower and upper side of the box represent the 1. and 3. quartil, whiskers the minimum and maximum and dots outliters.

More detailed questions about respondents' familiarity with the project were added in the 2012 questionnaire. The most frequent information source for all three groups in 2012 were the media (Table 5-26, Appendix II), followed by personal communication. Of those respondents that reported to participate in the SloWolf project, farmers and the general public most frequently reported the attitude survey in 2010 (2.2 % and 3.6 %, respectively). 23.5 % of all sampled hunters reported to be involved in the collection of samples for genetic wolf monitoring (Table 5-27, Appendix II).

There was a significant difference in »wolf conservation« factor regression scores in farmers between years (Table 5-28, Appendix II). More farmers were in favour of complete wolf protection in 2012 than in 2010 (Figure 5-7). No signifcant difference was found with hunters and general public. Hunters scored the lowest on this component of all three groups.

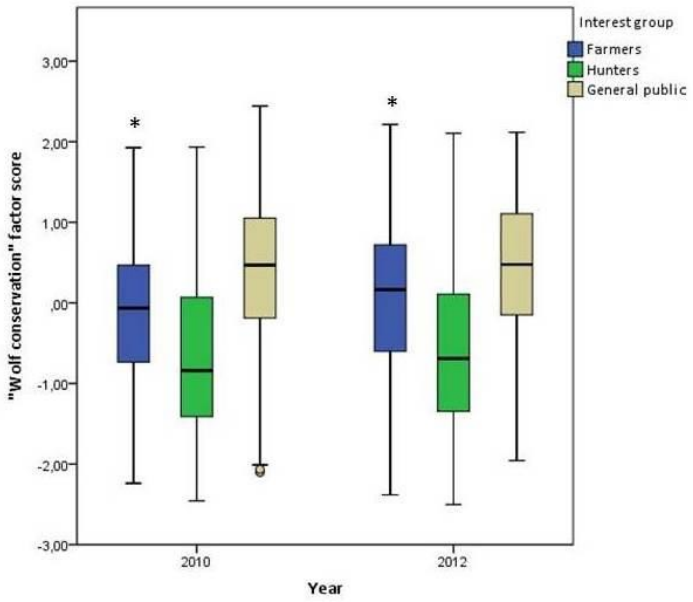

Figure 5-7: Boxplot diagram of »wolf conservation« factor score distribution by interest groups and year. Lower and upper side of the box represent the 1. and 3. quartil, whiskers the minimum and maximum and dots outliters. Significant differences within interest groups based on the Mann-Whitney U test are marked with (*) for $p<0.05$.

5.4.7. Changes in attitudes toward wolf management

In 2012, fewer respondents from the general public agreed that compensation was appropriate for mitigation of wolf caused damage than in 2010. More hunters were neutral toward the statement that appropriate livestock protection can lower the number of wolf attacks and fewer agreed that there is not enough education and information about wolves. Fewer farmers would agree with culling a wolf, in cases where it attacked livestock. More farmers agreed that wolf presence contributes to the development of ecotourism in Slovenia and that projects dealing with coexistence of wolves and people are important (Table 5-29).

Table 5-29: Differences in frequency distribution of answers to items of the attitudes toward wolf management section between years. Frequencies of disagree and strongly disagree categories and agree and strongly agree are summed. Pearson's Chi-square test was calculated on the original 5-point Likert scale (df=4).

Item	Interest group	Year	Disagree/ Strongly disagree (%)	Neutral (%)	Agree/ Strongly agree (%)	Pearson Chi-Square	p-value (2-sided)
1. Compensations for wolf damage are an appropriate way to lessen the conflicts between sheep and goat farmers and wolves.	Farmers	2010, N=254 2012, N=267	29.9 27.7	9.1 4.9	61.0 67.4	752	0.111
	Hunters	2010, N=409 2012, N=325	215 24.9	3.7 6.5	74.8 68.6	536	0.252
	General public	2010, N=584 2012, N=523	23.1 26.2	10.8 13.4	66.1 60.4	11.42	0.022*
2. Appropriate livestock protection (electric fences, guarding dogs) can lower the number of wolf attacks.	Farmers	2010, N=255 2012, N=267	19.6 19.1	4.7 7.9	75.7 73.0	5.37	0.252
	Hunters	2010, N=409 2012, N=327	10.5 8.6	0.7 2.4	88.8 89.0	11.43	0.022*
	General public	2010, N=583 2012, N=522	15.1 14.0	5.3 6.3	79.6 79.7	1.12	0.891
3. The usage of appropriate protection from wolf damages (electric fences, guarding dogs) has to be regulated with law.	Farmers	2010, N=255 2012, N=267	19.6 19.1	4.7 7.9	75.7 73.0	2.40	0.664
	Hunters	2010, N=409 2012, N=324	10.5 8.6	0.7 2.4	88.8 89.0	1.15	0.887
	General public	2010, N=584 2012, N=519	20.5 19.3	14.9 17.7	64.6 63.0	2.08	0.721
4. Compensations for wolf damage are only a short term for lessening of the conflict between small cattle breeders and wolves.	Farmers	2010, N=255 2012, N=267	16.5 16.9	17.3 11.2	66.3 71.9	6.38	0.173
	Hunters	2010, N=408 2012, N=325	12.3 17.2	6.4 9.2	81.4 73.5	6.72	0.151
	General public	2010, N=584 2012, N=519	20.5 19.3	14.9 17.7	64.6 63.8	2.66	0.616
5. The state has to take care for the undisturbed coexistence o wolves and people.	Farmers	2010, N=255 2012, N=267	7.1 10.9	5.5 9.0	87.5 80.1	7.28	0.122
	Hunters	2010, N=407 2012, N=328	5.7 8.5	5.9 4.0	88.5 87.5	3.71	0.447
	General public	2010, N=587 2012, N=517	6.8 7.9	6.1 6.2	87.1 85.9	4.37	0.358
6. If the small cattle farmer doesn't use measures for livestock protection from wolf attacks, he shouldn't receive compensations.	Farmers	2010, N=255 2012, N=267	51.0 49.1	11.8 11.6	37.3 39.3	1.31	0.860
	Hunters	2010, N=410 2012, N=327	20.7 22.9	5.1 6.1	74.1 70.9	4.86	0.302
	General public	2010, N=583 2012, N=516	32.8 30.6	12.2 12.2	55.1 57.2	2.65	0.619

Item	Interest group	Year	Disagree/ Strongly disagree	Neutral	Agree/ Strongly agree	Pearson Chi-Square	p-value (2-sided)
7. In case a wolf attacks livestock, I would agree with its culling.	Farmers	2010, N=255 2012, N=267	12.6 10.5	7.5 7.5	79.9 82.0	15.24	0.004*
	Hunters	2010, N=409 2012, N=325	18.3 22.8	7.8 9.5	73.8 67.7	3.71	0.447
	General public	2010, N=582 2012, N=517	6.8 7.9	6.1 6.2	87.1 85.9	0.98	0.913
8. Wolf presence has an important contribution to development of ecotourism in Slovenia.	Farmers	2010, N=252 2012, N=267	50.4 34.8	18.3 29.2	31.3 36.0	16.77	0.002*
	Hunters	2010, N=409 2012, N=327	33.7 32.7	14.4 18.7	51.8 48.6	4.97	0.291
	General public	2010, N=584 2012, N=521	25.5 26.5	22.4 19.4	52.1 54.1	3.52	0.474
9. I should have the right to participate in decision making in wolf management as the representative of general public.	Farmers	2010, N=254 2012, N=267	10.6 7.1	8.3 9.7	81.1 83.1	4.88	0.300
	Hunters	2010, N=406 2012, N=327	5.2 5.8	5.4 7.0	89.4 87.2	1.48	0.830
	General public	2010, N=568 2012, N=513	20.4 22.0	21.5 17.5	58.1 60.4	4.40	0.354
10. There is not enough education and informing about wolves.	Farmers	2010, N=255 2012, N=267	15.3 15.0	13.7 13.5	71.0 71.5	1.06	0.901
	Hunters	2010, N=409 2012, N=326	7.8 19.3	5.1 6.1	87.0 74.5	26.05	0.000**
	General public	2010, N=573 2012, N=514	4.5 7.0	6.1 7.2	89.4 85.8	4.10	0.393
11. Projects dealing with coexistence of wolves and people are important.	Farmers	2010, N=255 2012, N=267	17.3 8.6	15.7 10.9	67.1 80.5	17.23	0.002*
	Hunters	2010, N=407 2012, N=325	6.1 7.7	2.9 5.8	90.9 86.5	5.40	0.248
	General public	2010, N=572 2012, N=508	9.1 8.5	7.5 6.3	83.4 85.2	1.73	0.786
12. It is important to cooperate with neighbour countries in management of the wolf population in Slovenia.	Farmers	2010, N=253 2012, N=267	9.9 4.5	11.1 10.5	79.1 85.0	6.67	0.155
	Hunters	2010, N=409 2012, N=326	3.2 6.1	1.5 2.5	95.4 91.4	8.28	0.082
	General public	2010, N=572 2012, N=508	9.1 8.5	7.5 6.3	83.4 85.2	6.08	0.193
(Farmers only) I feel strong fear when wolves attack livestock.	Farmers	2010, N=254 2012, N=266	29.5 31.6	12.6 5.3	57.9 63.2	9.28	0.054
(Farmers only) Wolves' attacks occur more frequently, if livestock is not effectively protected.	Farmers	2010, N=254 2012, N=267	12.6 10.5	7.5 7.5	79.9 82.0	2.12	0.714

*significant difference in distribution at p<0.05

**significant difference in distribution at p<0.001

5.4.8. Self-evaluated attitude change

The majority of respondents in 2012 within all three groups responded that their attitude toward wolves did not change in the last two years (Table 5-30). Most of the relatively small number of farmers (92.0 %) who claimed their attitude became more negative toward wolves, most of hunters (63.3 %) reported to become more positive and the general public split evenly (48.8 % more negative and 51.1 % more positive) (Table 5-31). The main reason for a self-evaluated positive change was gaining knowledge about wolves, followed by believes that wolves existential rights and ecological role and value (Table 5-32). The main reason for a self-evaluated negative change was damage to livestock, followed by media reports and damage on wildlife.

Table 5-30: Rates of answers to the question: *"Did your attitude toward wolves change in the last two years?"* in the 2012 sample.

Interest group	Yes (%)	No (%)
Farmers, N=264	9.1	90.9
Hunters, N=323	15.8	84.2
General public, N=504	14.7	85.3

Table 5-31: Rates of answers to the question: "If your attitude toward wolves changed in the last two years, had it become: strongly more negative, slightly more negative, slightly more positive or strongly more positive?" Sum of positive and negative answers are also shown.

	Strongly more negative (%)	Slightly more negative (%)	Slightly more positive (%)	Strongly more positive (%)
	Sum negative (%)		Sum positive (%)	
Farmers, N=25	44.0	48.0	4.0	4.0
	92.0		8.0	
Hunters, N=55	7.3	29.1	34.5	29.1
	36.4		63.6	
General public, N=84	26.2	22.6	19.0	32.1
	48.8		51.1	

Table 5-32: Reasons for positive or negative self- evaluated attitude change toward wolves and their frequencies.

Positive change	Better knowledge of wolves	15
	Wolves have a right to exist	8
	Ecological role of wolves, maintaining balance in nature	8
	Because they are endangered	5
	SloWolf project/ participation	3
	Beauty, respect of wolves, symbol of nature	3
	Better wolf management	1
	Less damage caused by wolves	1
	Positive personal experience- seen wolf in nature	1
Negative change	Damage on livestock	37
	Media reports	12
	Damage on wildlife	9
	Unsuitable wolf management	9
	Fear	8
	Too many wolves	7
	Increased wolf presence	7
	Damage	4
	Wolves do not belong here	2

5.5. Discussion

Since this is a cross-sectional and not a longitudinal study, inferences of causes of change have to be interpreted with caution, as a change might reflect changes in samples rather than change in individuals. However, this approach is suitable for evaluating the success of a conservation project, since decision makers and managers rely on data representative of the population. Socio-demographic characteristics between samples within interest groups varied little, although farmers in 2012 samples tended to be about two years older and more of them lived in the countryside. Adding to other studies reviewed by Williams, et al. (2002), my results confirm that attitudes toward wolves tend to be more negative with older people, males, rural residents, and those that have experienced wolf caused damage (Ericsson & Heberlein, 2003). On the other hand, attitudes are more positive with increased education.

Attitudes of the three main interest groups toward wolves in Slovenia seem to remain largely stable over the last decade. Similar results appeared from a study in 1999 (Korenjak, 2000). Hunters are the interest group with the most positive attitudes toward wolves, followed by the general public and the sheep and goat farmers

represent the negative part of the attitude spectrum. From 1999 to 2010/2012 a part of neutral attitudes in the general public shifted to positive attitudes, based on comparing frequencies across categories of the item *"What is your attitude toward wolves"*. Farmers' attitudes are not comparable, since the study in 1999 included only farmers that experienced wolf caused damage.

Although generally, attitudes toward wolves didn't change considerably over the past decade or the two years of this study period, a closer investigation reveals some changes which support the thesis that the impact of the SloWolf project is measurable in the studied populations and positive for further wolf conservation and conflict mitigation. Exposure to information, in our case measured as hearing about the SloWolf project, predicted wolf acceptance in a positive direction, which suggests that potentially attitudes change through persuasive communication (Ajzen & Fishbein, 1977). A large part of respondents, a half of the general public, almost 40 % of farmers and over 90 % of hunters, reported hearing about the SloWolf project, mainly from the media. Whether this represents the population is a question in the case of hunters and general public, because people familiar with the project are more likely to have filled out a questionnaire. In the case of farmers, where interviews were conducted on nearly the whole selected sample, this estimate is probably closer to the population parameter. I did not measure, if the project image was positive or negative, however, a printed media content analysis showed that after the start of the SloWolf project, negative and misleading reporting decreased (Kastelic, 2013). Articles, connected to the project focused on wolf biology and importance of wolf conservation despite connected conflicts as well as the complexity of wolf management rather than simply promoting full protection. Better knowledge of wolves was the most common reason for self-reported positive attitude change. Hearing about the project was a negative predictor of complete wolf protection and this reflects the project image represented in the media as well.

A significant decrease in perceived wolf numbers is also an indication that the results of the SloWolf project, particularly wolf monitoring results, reached the three studied populations. Before the project, wolf population monitoring was based on opportunistic recordings and wolf numbers were overestimated. The first systematic

and reliable estimate was conducted in 2010 based on genetic monitoring and the results were reported in the media in the beginning of 2012 (Majić Skrbinšek, 2012). The change in this monitoring methodology resulted in a change in wolf number estimates from 70-100 before the project to 32-43 at the time of the project.

Comparing a change in perceived wolf numbers to the change of acceptable wolf numbers revealed a depolarization between these two beliefs, as the difference between the belief about the existing wolf number and acceptable wolf number in Slovenia decreased in 2012. Such a change indicates a potential decrease in the conflict within interest groups originating from different wolf acceptance capacities. However, directions of change differed between groups: the median of the acceptable number of wolves within hunters lowered from 2010 to 2012, increased within farmers and remained the same within general public. An indicator of higher awareness about wolf conservation issue was also the increase in the belief that a higher number of wolves in Slovenia are needed for their long term conservation.

Another indicator of reduced conflict was that more hunters and farmers in 2012 believed that the wolf caused damage is decreasing. The wolf caused damage trend from 1994 to 2013 reached its peak between 2007 and 2011 with between 408 and 575 reported damage cases and 217,338 euro and 346,029 euro of total paid compensation a year ("Strokovno mnenje za odstrel velikih zveri za obdobje 1.10.2012- 30.9.2013," 2013). Donations of electric fences within the SloWolf project on ten hot spots lowered the total damage compensations by about 100,000 euro a year (Kavčič et al., n.d.).

Knowledge levels tested with the knowledge index didn't improve during the time of the project. The possible reasons are that hunters, farmers and the general public are not interested enough in the wolf biological facts or that the messages tested with knowledge items were not effectively communicated. There were also more missing answers in 2012 than in 2010, especially in the knowledge item where a negative change was measured within hunters and the general public (i.e., the item about the wolves' main food source), probably due to the increased length of the questionnaire in 2012. For the future, we recommend a more careful construction of knowledge

items that would measure specifically the changes in perceived messages communicated within the project.

I found less support for attitude change as a consequence of active participation (Ajzen & Fishbein, 1977). Participation in the project was not connected to wolf acceptance and only volunteers, who participated in wolf howling or snow tracking monitoring tended to be more in favour of wolf conservation. Activities of the SloWolf project involving the public and interest groups were diverse and specific and as such, their effect on attitudes is not directly comparable to measure the general impact of participation across different actions on attitudes. On the other hand, I did not sample enough participants from the action donation of protection measures to include this type of involvement into the regression model. Cross-sectional sampling is therefore not adequate for final inferences about the impact of participation on attitudes and longitudinal monitoring of participants' attitudes from individual actions is needed to evaluate its effects.

Results from hunters suggest that although they are generally the most positive toward wolves among the three studied groups, their attitude toward the SloWolf project might not be completely positive. Fewer respondents in 2012 agreed that such projects are important; Although almost a quarter of respondents participated in collecting samples for genetic monitoring this was neither a predictor of wolf acceptance nor wolf conservation. The second most important information source about the SloWolf project for hunters was personal communication. As Karlsson & Sjöström (2007) discussed, indirect experiences that spread as anecdotes might have influenced attitudes more than direct experience in our case.

More respondents were in favour of complete wolf protection in 2012 and the year of survey was a significant predictor of wolf conservation component from the PCA analysis. Support for complete protection increased even in the population of farmers. Hypothetically, two scenarios are possible. Louder calls for wolf hunting ban might polarize the public further and therefore increase the wolf associated conflict, especially as it is already polarized on the urban-rural level. On the other hand the increased support of the most negative group suggests that higher support for

complete wolf protection is possible with added effort to best management practices and education.

I measured changes on various levels. Changes over a short period of time seem to occur on a higher level of cognitive hierarchy (Vaske & Donnelly, 1999), such as beliefs attitudes toward specific management options. Attitudes as indicators of conflicts in current management situation (Majić & Bath, 2010) therefore need to be context specific (Kleiven, Bjerke, & Kaltenborn, 2004) and measuring general attitudes is of less value for this purpose than measuring changes in beliefs or changes of attitudes toward specific management options. However, we need to be aware that beliefs on the higher level of cognitive hierarchy are more susceptible to change, which suggest that only management with strong support over a longer time could influence change in deeper rooted general attitudes toward wolves.

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6. Paper II: Evaluating the effectiveness of public involvement in a LIFE project for improving the coexistence between wolves and humans in Slovenia

The role of public participation for wolf conservation

6.1. Abstract

In wildlife conservation and management the need for public participation is accepted almost as a paradigm. Public participation in environmental decision-making is a democratic right from a normative perspective and is believed to deliver higher quality decisions from a pragmatic perspective (Reed 2008). Citizen science programs, for example, aim to improve knowledge and awareness of environmental issues. Local involvement in carnivore management is intended to raise acceptance of carnivores. However, not every public involvement process is effective and evaluation that would identify recommendations for improvement lags behind the practice.

In this article I explore what constitutes an effective public participation process and if and how it can enhance the coexistence of wolves and humans in the Slovenian context. Data sources included 19 semi-structured interviews with a range of participants that were involved in different actions in a wolf conservation project combined with a review of key documents associated with the participation process. Reed's (2008) criteria of best practice in participation in environmental management were used as the basis of the evaluation. I used these criteria as an evaluation guide, but their appropriateness from the participants' view was also assessed. All participants agreed on the importance of the Reed's (2008) criteria that we recommend as a basis for future evaluation, with the addition of the criteria that were most frequently suggested by participants. As outcomes and process influence each other in participation, I found positive evidence for improved coexistence between wolves and humans through different types of learning and in turn increased social capital.

6.2. Introduction

Public participation in wildlife management is the "involvement of citizens in making, understanding, implementing, or evaluating management decisions for improved wildlife management" (Chase, Lauber, & Decker, 2001; p.153). There are several claims of how public participation improves wildlife conservation. Experience and research has shown that wildlife management decisions are better accepted by the public if they have had the chance to express their opinion in the decision-making process (D. J. Decker & Chase, 1997; Reed, 2008). Citizen science, for example, enhances conservation through participants' data collection for conservation research, but also through increased participants' knowledge (Brossard et al., 2005; Bonneau et al., 2009; Jordan et al., 2011) and awareness of environmental issues (Jordan et al., 2011), as well as through empowerment of local communities (Constantino et al., 2012). High involvement of local communities in wildlife management has been shown to build local support for conservation even for such controversial species as the tiger (Banerjee, 2012) and snow leopard (Jackson & Wangchuk, 2004).

Researchers have measured the impact of participation on participants, focusing on different levels of cognitions in the cognitive hierarchy (Fulton, Manfredo, & Lipscomb, 1996) and have come to contrasting conclusions in different circumstances. While some researchers found a significant change in volunteers' attitudes after receiving intensive environmental education and training (Bonneau, Darville, Legg, Haggerty, & Wilkins, 2009), others found no significant change on the level of attitudes in less intensive citizen science programmes (Brossard, Lewenstein, & Bonney, 2005). Changes related to participation of the local community in intensive environmental education programs have been found on the level of knowledge and behavioral intentions (Espinosa & Jacobson, 2012) and even behaviour (Jordan, Gray, Howe, Brooks, & Ehrenfeld, 2011). Overall, research suggests that with carefully implemented public participation, solutions to wildlife related conflicts can be found and willingness to coexist with carnivores can increase (Jackson & Wangchuk, 2004), but if participation is not well planned, conflicts might even expand (Gerner, Heurich, Gunther, & Schraml, 2011; Lange & Hehl-Lange, 2011). Thus, despite its recognized merits, understanding of the importance of public participation for wildlife conservation remains lacking and is rarely evaluated.

6.2.1. Evaluation of public participation

Evaluation is an essential part of public participation and whereas the involvement of participants in wildlife management and conservation is definitely increasing, clear evaluation practice lags behind (Bellamy, Walker, McDonald, & Syme, 2001; Plummer & Armitage, 2007; Reed, 2008; Laurian & Shaw, 2009). Without a single guideline for successful public involvement in wildlife management, the criteria for what counts as good public involvement seems to be very context specific (Constantino, et al., 2012; Treves, Wallace, Naughton-Treves, & Morales, 2006) and differs between the public and experts (S. E. Decker & Bath, 2010). Evaluation of public participation can address different questions, such as the success of participation (whether the objectives were met), effectiveness of the process (what worked well and what not) and its impacts (on participants, quality of decisions, etc.)

(Warburton, Wilson, & Rainbow, n.d.). Laurian & Shaw (2009) also identified multiple possible goals of participation for evaluation, ranging from process-based goals to outcome-based goals.

The effectiveness of public participation for wildlife conservation depends on the nature of the process and some researchers have tried to measure the success of public involvement for improved wildlife management. For example, Raik, Lauber, Decker, & Brown (2005) emphasized learning and capacity as the key factors of improved collaborative management of wildlife management. While some authors have focused on the outcomes of participation, others have examined the quality of the process itself. Laurian & Shaw (2010) described a quality participation process as the one where participants are well informed about the issue(s), have a stake in the outcome, and understand the decision making process. Further, attendance should be broad and all stakeholders are given a voice and treated fairly.

Reed (2008) provided a synthesis of best practice features from a review of environmental management literature. He describes participation as a process that is best guided by a philosophy that emphasizes empowerment, equity, trust and learning; early involvement in the process; systematic stakeholder representation; clear objectives that are agreed with stakeholders; an appropriate selection of participatory methods; skilled facilitation; integration of local and scientific knowledge and finally, institutionalisation of participation. Moreover, Reed (2008) also suggests that factors that contribute to good participation need to be evaluated systematically against criteria from the literature and stakeholders themselves, combining insights from quantitative and qualitative data.

6.2.2. Case study: Public participation in the SloWolf project

Public participation is not only desired for better environmental management it can be a legal obligation as well and this applies to carnivore conservation in Slovenia. Slovenia ratified the Aarhus convention in 2004, which requires that the public be included in environmental decision-making. In 2010, a first large scale project about

wolves in Slovenia "Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia – SloWolf" started. The project is largely supported by the European Union's LIFE Programme (About the SloWolf project, n.d.). SloWolf is an applied and scientific project. The main goal is to ensure the long-term conservation of wolves in Slovenia and for that it is essential to understand both, the biological and social aspects of conservation. Apart from improving the biological and sociological knowledge needed for successful conservation of wolves, the project aims to improve the local residents' acceptance of wolves in Slovenia.

In the SloWolf project, the public and interest groups were involved in several project actions. Project activities included working with people to mitigate conflicts related to wolves, raising their awareness and including them directly in wolf management. The project used a series of stakeholder and public consultation procedures in order to enhance not only the quality of wolf management and conservation but also to promote collaboration as a way of making the decisions through the involvement of civil society. The need to include the public and interest groups in wolf management was identified by people themselves as a 2011 study found that 86 % of interviewed farmers, 86 % of sampled hunters and 60 % of the sampled members of the general public living in the area of permanent wolf presence agree that they need to be included in the decision making process regarding wolves. The responses of people living in the area of occasional wolf presence were similar: 77% of the sample of farmers, 92 % of hunters and 57 % of the general public agree that they need to be included (Marinko & Majić Skrbinšek, 2011).

6.2.3.. Description of the SloWolf public involvement actions

Development of the action plan for wolf population management (Action A2)

The goal of this action was the development of a Management Action Plan for the wolf population in Slovenia, as an operational document for a period of five years. The main objective of the action plan is to establish a system of wolf conservation management in Slovenia, thereby increasing the potential for long-term wolf conservation while minimizing the number of human – wolf conflicts.

The proposal of the action plan was designed through five facilitated workshops with the collaboration of 55 participants from 22 different organisations (Table 6-1). Invitations were sent to 26 organisations that were identified in a stakeholder analysis performed by the project team. Each workshop started with a series of presentations to provide necessary background for a common discussion. At the first workshop, participants worked within smaller groups to define the main challenges for wolf management in Slovenia. Identified challenges were then grouped into themes that became titles of chapters within the action plan. Each participant made a list of five priority themes which require the most attention. At the end of the first workshop, participants agreed on the content of introductory presentations for the next workshop. At the following two workshops, participants worked in groups to propose specific activities to resolve previously identified challenges. Those were finally presented, discussed and if necessary, adjusted within the whole group. The proposal of the action plan also specifies who is responsible for each activity, time frame for its implementation and the associated costs. During the time period of this study, the document was in the process of adoption by the government.

Improvement of management of wild ungulate species (Action C2)

By the time of the interviews, three of five planned workshops for preparation of a proposal for management of wolf prey species were carried out. Improving wild ungulate management was an action designed to link hunting management of wolf prey species with wolf management to ensure a sufficient prey base for the wolf and to raise the acceptance of proposed management by interest groups. Hunters, foresters, biologists and agronomists were recognized as interest groups for this action, in which 48 participants from 8 different organisations participated. To ensure that the views from the whole wolf area were included, workshops were organized at different locations. Participation methods were similar as those described under Action A2.

Involvement of hunters and volunteers in the wolf population monitoring activities (Action C3)

Involvement of hunters and volunteers in wolf population monitoring is a form of citizen science, which on one hand aids in large-scale data collection and on the other aims to strengthen interest in wolf conservation through enhancing citizen trust in

scientific information. By the end of 2012, after three years of the program, over 850 people provided their contact details for receiving information about volunteering. A total of 732 attendance signatures were collected at educational seminars. In reality, fewer people attended the seminars, since some attended the seminar more than once. A total of 190 volunteers were counted in wolf howling monitoring, ranging from 60 to 65 participants each year. Again, some of these volunteers were counted more than once if they attended multiple monitoring events. A total of 453 participants were counted in winter snow tracking monitoring, ranging from 37 to 134 per year.

Training of agriculture advisory service in damage prevention measures (Action C5)

An educational seminar about damage prevention measures was organized for agriculture advisory service employees with the aim to enable employees to then disseminate this knowledge to the farmers. This is the action with the lowest participation level. Participants were given lectures and taken to the field to experience best practice examples of damage prevention; 12 agriculture advisors attended the seminar. The rest of participants were project stuff, experts and interested public.

Best practice demonstration of damage prevention measures at selected wolf damage hot-spots (Action C6)

18 sheep breeders and one cattle breeder participated in this action, with 10 receiving a donation of electric fencing and 12 a guarding dog. Farmers signed a contract about appropriate prevention measures and reported their effectiveness to the action coordinator, who frequently monitored the sites. Three of the farmers quit the program during the time of the project, either because they did not use the fence appropriately or because the dogs exhibited unwanted behaviour that was not possible to change.

The purpose of this research is to find out what constitutes a good public participation process for wolf conservation and management in Slovenia, as well as the extent to which a wolf conservation project entitled “Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia (2010-2013)-

SloWolf" has met these criteria. Ultimately, I was interested in how the public involvement process could enhance the coexistence between wolves and humans in Slovenia and improve wolf conservation and management. One of the goals of the SloWolf project was to raise the acceptance of wolves by Slovene society. The project actions were designed to improve attitudes of the key interest groups toward wolves and wolf management. According to the theory of attitude change (Fisbein & Ajzen, 1975), active participation is potentially more effective in changing attitudes than passive exposure to information. Therefore, I sought to assess also the impact of public participation on participants' attitudes toward wolves, which should become more positive after being involved in the project.

6.3. Methods

I focused on measuring participants' satisfaction with the process rather than impacts of participation. Wildlife conservation and management is complex and tangible outcomes, such as the effectiveness of action plans in increasing wildlife populations are often not measurable during the time of an individual conservation project. An additional consideration is that management plans and actions are integrated into a larger social and ecological context. Therefore I focused on measuring more intangible (Innes & Booher, 1999; Plummer & Armitage, 2007) features and outcomes of the process of participation based on eight features of best practice participation outlined by Reed (2008). I also tested whether these criteria apply in the Slovenian context based on participants' perceptions. The case of the SloWolf project provides an opportunity to test Reed's criteria for good public involvement on a range of different levels of participation and among different interest groups in the same social context. Participants also expressed their own views about what is important for the quality of the involvement process. I then observed whether those differ from the criteria in the literature and what are the similarities and differences across different interest groups and actions.

Table 6-1: The number and types of participants by actions and the number of conducted interviews.

Action	Involve-ment type	Title of the action	N of partici-pants	Type of participants	N of interviews
A2	FACILITATED WORKSHOPS	Elaboration of wolf population action plan	55	Decision makers	5
				Experts	2
				Animal rights associations	1
				Hunters	/
				Agriculture	3
				Foresters	1
				Croatian representatives	2
C2		Improvement of management of wild ungulate species	48	Decision makers	1
				Experts	2
				Foresters	1
				Hunters	1
C3	CITIZEN SCIENCE	Involvement of hunters and volunteers in the wolf population monitoring activities	See action description	Experts	1
				Hunters-volunteers	1
				Non-hunters volunteers	1
C5	EDUCATION	Training of agriculture advisory service in damage prevention measures	30	Experts	2
				Chamber of agriculture and forestry in Slovenia	1
				Union of sheep and goat farmers associations	1
				Agriculture advisors	1
C6	DONATION PROGRAM	Best practice demonstration of damage prevention measures at selected wolf damage hot-spots	19	Sheep and cattle breeders	2

6.3.3. Data collection

Data collection consisted primarily of 19 semi structured interviews with participants involved in different actions of the SloWolf project (Table 6-1). An interview schedule (Appendix III) was designed based on Reed's (2008) criteria and the various participation opportunities within the project. Additional information was provided through an interview with the project coordinator and documents that described the

participation process or its goals, such as workshop reports, evaluation forms, wolf management action plan proposal, invitation letters, etc.

Participants, ranging from experts (i.e., researcher, project coordinator), government representatives, and stakeholders (i.e., farmers, agriculture and farmers' association representatives, forester, hunters, volunteers, animal rights association representative) to representatives from Croatia (see Table 6-2), were interviewed between August 10 2013 and October 16 2012. The interviewees participated in one or more project actions. Six of them were females and thirteen males. The interviews lasted between 29 and 83 minutes. Interviewees were chosen on the basis of preliminary discussion with project action coordinators or selected from lists of participants, with the aim to reach a wide range of participants sharing a stake in wolf management and conservation. Croatian representatives were involved in the Slovenian project to share their experience, since they completed a similar wolf conservation project before the SloWolf project and because Slovenia and Croatia share the same wolf population.

To assist in testing the hypothesis: If public participation enhances the coexistence between wolves and humans then participants' attitudes toward wolves will become more positive as a result of participation, a closed question on a five point Likert-like scale was asked at the end of each interview. The question was: In the past two years, did your attitude toward wolves become: strongly negative/ slightly more negative/ stayed the same/ slightly more positive/ strongly more positive. This question measures the impact of participation on participants' self-evaluated attitude change.

Table 6-2: The structure of interviews by the actions in which respondents participated, gender and organization or occupation, which they represent (GO=government organization; E=expert; CRO=Representatives from Croatia; SH= stakeholder).

ID	Organisation	Gender	A2	C2	C3	C5	C6
GO-N1	Slovenian environment agency	F	x				
E-1	Biotechnical faculty, researcher	M	x	x		x	
SH-AR	Animal rights association	F	x				
CRO-GO	State institute for nature protection	F	x				
SH-A1	Chamber of agriculture and forestry in Slovenia	M	x			x	
GO-A	Ministry of agriculture and the environment, agriculture sector	M	x				
GO-N2	Ministry of agriculture and the environment, nature sector	M	x				
CRO-E	Faculty of veterinary medicine, researcher	M	x				
SH-A2	Union of sheep and goat farmers associations	M	x			x	
SH-F	Slovenian forest service	M	x	x	x		
GO-N3	The institute of the Republic of Slovenia for nature conservation	M	x			x	
SH-A3	Sheep breeder	F, FAMILY					x
SH-V	Volunteer	M			x		
SH-HV	Hunter, volunteer	M			x		
SH-A4	Agriculture advisor	M				x	x
GO-N4	Ministry of agriculture and the environment, nature sector	F	x	x		x	
SH-H	Hunter	M		x			
SH-A5	Farmer	M	x				
E-2	Project coordinator	F	x	x	x	x	x

6.3.4. Data analysis

Two forms of thematic analysis were used for qualitative analysis: theoretical, to test and evaluate the participation process with criteria developed by Reed (2008) and inductive, to explore participant's own views on this topic. Since several types of public involvement and participants of different background were compared, thematic analysis was chosen as it allows the researcher to identify, analyse and report patterns (Braun & Clarke, 2006). Themes (see Table 6-3, Appendix III) were derived from Reed's (2008) criteria after initial coding of interviews and documents. This initial round of coding ensured patterns not related to Reed's criteria could also be identified. I used (QSR International NVivo 10, 2012) for coding.

In contrast to quantitative methods, which are generally preferred in conservation research to generate data that is representative of a studied population, this study is based on qualitative methods that aim to examine a range of different opinions regarding public participation in the Slovenian context of wolf management and thus to explore this issue in depth Since this is an exploratory study of a novel issue in a Slovenian context and in light of what has been said by Blackstock, Kelly, & Horsey (2007) that evaluation of participation is in itself a participatory process, participants were asked at the end of the interview to share their own perspective on good public participation in wolf conservation and management and to address any issues that had been missed by the interview schedule.

6.4. Results

Following are the results of the thematic analysis of the documents and interviews. First, comments on the importance of good participation criteria are demonstrated, followed by an evaluation of the process with themes derived from Reed's (2008) criteria and the results of participants' self-evaluated attitude change. Finally, additional participants' views about good public participation for improved wolf conservation and management are presented.

6.4.1. Importance of Reed's criteria

1. Philosophy of empowerment, equity, trust and learning

The importance of equity and empowerment in the participation process was emphasised in the common preparation of the wolf management action plan proposal. Most participants are aware, however, that it is not possible that different groups will all be satisfied with every action in the mutually produced plan. The more extreme the views of a participant were, the less likely he or she was satisfied with the process. Other participants recognized this, but they still believed that a democratic and

transparent process that is accessible to all parties and provides all participants the chance to express their opinion enables a constructive discussion and a better understanding of the arguments for a certain decision (GO-N2) and that such a process cannot be discredited even by the extreme interest groups that are unsatisfied with the final product (E-2, GO-N2). Experts (E-2, CRO-E) are aware that if groups with extreme views are not meaningfully engaged, they will seek alternative ways outside the participatory process, such as: protesting, seeking public support through the media, or by simply not obeying the legal decisions.

Further, if participants do not recognize their input in the final product (e.g. the management plan), this gives them a feeling of not having the power to really influence the decision-making process (GO-N2). Therefore, for participants to feel empowered, decisions must not exist only on paper, but have to be also performed in practice (GO-A, CRO-GO, CRO-E).

As Reed (2008) had also noted, most participants talked about the importance of being informed about the issues being discussed before participation, stating that if people want to actively participate, they need to be prepared and receive background information material beforehand (CRO-GO; SH-A1). Others believed that it is enough to be informed of the objective and goals initially if enough information is presented at workshops themselves (CRO-E, GO-A). Various aspects and benefits of learning were discussed in the interviews by respondents from differing backgrounds. GO-N2, SH-H, SH-HV, SH-V and SH-A3 stated that they learned much more about wolf biology through active participation. Participants connected to agriculture (SH-A5, GO-A, SH-A3, SH-A4) reported that they received useful information about damage prevention methods. Government representatives (GO-N2, GO-N4) were pleased with learning about participation methods that they can implement in their work.

2. Early and ongoing involvement throughout the process

Participants mainly agreed that involvement throughout the process in necessary for a quality process. The project coordinator (E-2), for example, believes that involvement of the representatives from different organizations throughout the process enables a continuity of a dialogue and a more effective working process. There was less

agreement about the need for broad-based early involvement. While many respondents thought that a broad spectrum of interest should be represented and reflected in the project partnership (SH-H, SH-A4, GO-N4, SH-A2), the experts raised the concern that a too broad involvement complicates the application process phase, which requires focus and dedication (E-1, E-2). GO-N1 and SH-A2 believe that interest groups should be invited early enough to have the chance to co-shape project goals and activities.

GO-N2 thinks that an important part is also the evaluation and the accessibility of material after the end of the project. The latter can be difficult to achieve, since funding for website maintenance is assured only for the time of the project. One respondent (CRO-GO) also suggested that it is fair to inform participants about the results of actions in which they participated even after their involvement.

3. Systematic stakeholder representation and participation level

All interviewees believe that involving the general public and a variety of interest groups is beneficial for wolf conservation and management despite different perceptions about good wolf management. For one farmer (SH-A5), for example, it means higher culling numbers and for the animal rights representative no wolf culling (SH-AR). The diversity of involved perceptions requires some time to find a common language:

> *"{ } we shouldn't fear different thinking people, but invite them to join. Maybe it won't work at the first meeting or workshop, but it will on the second."* (GO-N3)

The degree of involvement and influence is seen differently; from a hunter's perspective professionals directly involved in the wolf issue, (e.g., agriculture, hunting and forestry), should have more influence (SH-HV), but the agriculture advisor's view is, that the primary beneficiary should be farmers, since *"...if there were no farmers, there would not be any problem at all, the wolf could be everywhere."* (SH-A4)

Involving the general public is seen as essential to raise the social acceptance of wolves (GO-N2, AP, SH-A1) and the interested public needs to be included in

preparation of management documents for them to be considered legitimate (SH-A2). Today, the general public needs to be informed about environmental issues (GO-N1) and this also results in higher environmental public awareness. Including a variety of views in wolf management enables exchange of expert and lay experience (SH-A5) and the formulation of better designed management actions (GO-N2).

The Croatian representatives (CRO-GO, CRO-E) addressed the need to expand the cooperation on an international level to form an international working group in the future, including researchers, stakeholders and decision-makers for long term effective cooperation.

4. Clear and agreed upon participation process objectives

E-2 is aware that at the beginning of the process, the rules and the purpose of participation need to be clearly explained so that people have realistic expectations about it. Interview respondents suggested that participants need to understand the broad objectives of the project and particular goals of participation (SH-A2, CRO-E), On the other hand, respondents felt that rules and goals need to be flexible enough to provide space for discussion of alternative scenarios (GO-N3 and SH-AR) and to allow participants to co-shape both project goals and activities. CRO-E believes that it is not necessary to explain the goals of specific aspects of the participation project, in which people are not involved.

5. Selection of the appropriate participation methods

CRO-GO and GO-N1 noted that active participation in the process of the preparation of the wolf management plan, where people need to express their opinion, think and ask their colleagues for their opinions is a novelty in Slovenia and people need time to get used to it. However, working in smaller groups enables constructive discussion and makes active participation easier (E-2, GO-N4). Participants from interest groups other than experts and government organizations did not comment much on the importance of the appropriate selection of the participation method.

6. Skilled facilitation

The majority of participants of the A2 action believe that good moderation of such workshops is essential to provide a quality process. A good moderator provides space for a safe confrontation of opposing views and directs them to a constructive discussion (GO-N2, SH-A1, GO-N1, CRO-E, E-2). The farmer and the forester believe that without good moderation it is difficult to achieve any substantial results. Good moderator also needs to be neutral, but at the same time understand the discussed topic (CRO-GO).

7. Integrating local and scientific knowledge

Some participants felt that decisions should be based on reliable, scientific conclusions that represent the frame within which compromises should be sought (SH-F, GO-N3). E-2 and GO-N3 noted that also decision makers need to learn from participants, since they need to understand their experiences and perceptions. Such learning about the variety of perceptions and attitudes toward the wolf and wolf management enables decision-makers to form future actions to target negative attitudes and false perceptions (E-2).

8. Institutionalisation/ continuation of participation

» Continuity is important for quality. « (CRO-GO)

To ensure the quality of the involvement process and its outcomes, respondents argued that participation should continue beyond the project (CRO-GO, GO-N4). Cooperation within interest groups is needed also for both the preparation and the enforcement of the action plan (GO-N4). A hunter-volunteer (SH-V) involved in wolf monitoring pinpointed the need to continue with it, since monitoring lasting over longer periods, e.g. 10 years gives a more reliable picture of the wolf population. As intensive conservation programs often have a limited duration, after the project, the government should take responsibility to continue activities of wolf research and management (CRO-E) and public awareness (SH-V).

6.4.2. Evaluation of the involvement process

Research findings regarding the evaluation of the SloWolf involvement process are presented in Table 6-4 according to themes derived from Reed's criteria. Participants provided evidence for the presence or absence of each criterion, which is grouped as different concerns or reasons for satisfaction with the process. In cases where a criterion could not be evaluated with a concern or satisfaction due to lack of data or mixed results, comments are listed without a positive (+) or negative (-) sign. For example, for *CR2 timing*, the majority of participants only reported on timing of their involvement, but did not comment whether there are satisfied or dissatisfied with it.

The majority of interviewed participants of action A2 and C2 agreed that views were equally respected in the process, but some expressed the concern with the imbalanced representation of interest groups at workshops. A farmer commented on the inequality from the view of urban dominance in wolf management decision making that he felt through the project.

Empowerment can be measured on several levels, e.g. psychological, social, economic and political (Constantino, et al., 2012). Here, we sought to measure empowerment on an individual, psychological level. In the case of the donation program action, presence of empowerment was confirmed, if the farmer believed that the donated guarding dog is preventing wolf attacks on livestock, whereas in the A2 action plan, empowerment meant that the participant believed that his or her input will be incorporated in the action plan and that the plan will be actualized in practice. Regarding the action plan and the ungulate management proposal, participants mostly believed their input was correctly integrated in the document that is therefore more legitimate. However, there were concerns related to the fact, that the documents were not enacted or that no feedback was received at the time of interviews.

Mostly, representatives of interest groups were involved at the implementation phase of the project, but did not express any concern related to early or ongoing involvement. Only one participant from the action A2 was not satisfied, because he did not receive any feedback about the progression of the action plan document development.

While some participants, mostly government representatives, believed that all relevant interest groups were involved at facilitated workshops in actions A2 and C2, there were also those, who identified some missing interest groups such as landowners, recreational land users and foreign researchers. Regarding the level of participation, almost all participants would like to be involved more intensively in wolf conservation, management or research. All interviewees, except SH-AR, confirmed that the objectives of participation were made clear to them. I found little evidence that these objectives were agreed upon, but also no concerns pertaining to this criterion.

Participants were mostly satisfied with the participation process, organisation of meetings, field work and the accessibility of advice in the case of livestock protection donations. However, some were not satisfied with the selection of time and place or organisation of the meetings. They provided also ideas for improvement in the process. Participants from the action A2, preparation of the action plan proposal, recommended a separate workshop for farmers only (SH-A1), ensuring more balanced representation of interest groups (GO-N1), including the voice of the general public from public opinion surveys (SH-AR), an uninvolved person as the workshop moderator (SH-AR), collecting individual ideas instead of group ideas (SH-A5) and preparing also an international action plan (CRO-GO, CRO-E). Volunteers from the action C3 proposed continuous wolf monitoring over longer periods (SH-HV) and communicating back research results, based on the data they helped to collect (SH-V). A farmer (SH-A3) involved in the protection measures donation program offered to present his experience to other farmers.

All participants, except SH-AR, were satisfied with either the workshop moderator or action coordinator and did not point out any negative characteristics.

Participants pointed out several types of mutual learning from the process that they see as beneficial. Regarding the information material received before or at the beginning of participation, most reported to be well informed, whereas SH-F wanted to be better informed. Mostly, participants expressed a wish to continue with their participation in the future. However, government representatives (GO-N2, CRO-GO)

also expressed a concern that this may not be possible due to financial limitations. Thus, a commitment to institutionalization is uncertain.

Table 6-4: Expressed satisfaction (+, blue text) and concerns (-, red text) of participants on themes derived from Reed's criteria by each involvement action.

	A2- action plan	C2- ungulate management	C3- citizen science	C5- education seminar	C6- best protection practice
CR1 equity	**+ all views equally respected** (GO-N2, SH-A1, GO-N4, CRO-GO, CRO-E, SH-H) **-Numbers of participants from different interest groups not balanced** (GO-N1, SH-AR, GO-A, SH-F)	**+ all views equally respected** (GO-N4)	No evidence	No evidence	**-urban dominance in decision making** (SH-A3)
CR1 empowerment	**+ input integrated into AP** (GO-N2, SH-A1, SH-A5, GO-N4, GO-A, SH-F, CRO-GO, CRO-E, SH-H) **+ believing in legitimacy of the AP** (GO-A, SH-F, SH-A5, GO-N4, GO-N3) **- AP not enacted** (GO-A, SH-A5) **- no feed back** (SH-AR, SH-A2) **-financial limitations to fulfilling the AP** (GO-N1, SH-A4, GO-N3)	**+ believing in legitimacy of the proposal** (GO-N4, SH-F) **- the proposal not enacted** (SH-F)	**+ collected data contributing to research** (SH-HV) **-no feedback** (SH-V)	No evidence	**+ satisfied with receiving a guarding dog** (SH-A3,SH-A4) **- No evidence for effectiveness of the damage prevention method** (SH-A3,SH-A4)
CR2 timing	**Preparation phase** (GO-N2, GO-A, CRO-GO, CRO-E, E-1, E-2) **Invited at the implementation phase** (GO-N1, SH-AR, SH-A5, GO-N3) **Not invited** (SH-A2) **-No feedback** (SH-A2)	**+ Preparation phase** (E-1, E-2) **Implementation phase** (SH-F, SH-H)	**Preparation phase** (E-1, E-2) **Implementation phase** (SH-V, SH-HV)	**Preparation phase** (E-1, E-2) **Invited at implementation phase** (SH-A4)	**Preparation phase** (E-1, E-2) **Implementation phase** (SH-A3, SH-A4)
CR3 stakeholders representation	**+ all interest groups involved** (GO-N2, GO-A, E-1, CRO-GO, GO-N3, GO-N4, SH-A2) **-not enough landowners** (SH-A1) **-missing local residents** (GO-N1) **-missing independent researchers** (SH-AR **-missing wildlife protection groups** (SH-AR) **-too many animal protection groups** (SH-A2) **-missing experts from agriculture** (SH-A2) **-missing researchers from Italy** (SH-F) **-missing recreational users** (CRO-E)	**+all interest groups involved** (GO-N4) **-not high enough representation of local hunters** (SH-F)	**+ accessible to the public** (SH-HV) **-not enough involvement of the youth** (HV-V)	**-foreign experience missing** (SH-A2)	**-not enough involvement of local residents** (SH-A3)
CR3 participation level	**+enough involvement** (GO-A) **+expert opinion more weight** (SH-F, E-1) **-different representatives from the same organisations attending the workshops** (GO-N2) **-interest groups should not have the right to decide for the whole nation** (SH-AR)	**-input of local hunters not enough considered** (SH-F)	**- a wish for higher involvement in field research** (SH-V) **-hunters not paid for their work** (SH-H)	**-not high enough response from agriculture advisors** (SH-A1) **-not enough integration of practical experience** (evaluation forms)	**-not enough cooperation on the local level** (SH-A3)

	A2- action plan	C2- ungulate management	C3- citizen science	C5- education seminar	C6- best protection practice
CR4 clear objectives	+ yes (GO-N2, AP, GO-N1, SH-A5, GO-N4, GO-A, workshop report, SH-F, GO-N3, CRO-GO, CRO-E) -not clear (SH-AR)	+ yes (GO-N4, SH-H)	+yes (SH-HV, SH-V)	+yes (SH-A1, SH-A4, GO-N3)	+yes (SH-A3, SH-A4)
CR4 agreed objective	+ agreed presentation topics for next workshops (workshop report)	No evidence	No evidence	No evidence	+about the frequency of reporting (SH-A3)
CR5 satisfaction With participation methods	+appropriate and well preformed method (GO-N2, SH-A1, GO-N1, SH-A5, GO-N4, GO-A, evaluation forms, SH-F, GO-N3, CRO-GO, CRO-E) +well organized (GO-N2, GO-N1, GO-A, SH-F, GO-N3) -not appropriate method (SH-AR) -time and place not accessible to everyone (SH-AR, SH-A2)	+well organized (SH-H) +appropriate and well preformed method (SH-H, evaluation forms) -not enough time for formulating conclusions (GO-N4) -introductory lectures too long (SH-F)	+ well organized (SH-HV, SH-V) +several dates for preparatory lectures (SH-HV)	+place and time well chosen (GO-N3) +content and method positively evaluated (evaluation forms, GO-N3) -place and time not well chosen (SH-A1, SH-A2) -discussion missing (SH-A1)	+ advice always accessible (SH-A3, SH-A4)
CR6 facilitation	+skilled facilitation (GO-N2, GO-N1, SH-A5, SH-A2, CRO-GO, CRO-E, GO-A, SH-F, GO-N3 -the moderator allowed offensive behavior (SH-AR)	+skilled facilitation (SH-H)	+ reliable, well organized (SH-HV, SH-V)	+focused (GO-N3) + no negative critics (GO-N3)	+ kind, accessible (SH-A3, SH-A4) + no negative critics (SH-A3, SH-A4)
CR7 learning	+about wolf biology (GO-N2) +about the complexity of wolf management (GO-N2, SH-AR, CRO-E, GO-A, SH-F) +about other attitudes toward the wolf (GO-N1, CRO-E, SH-F, GO-N3) +about protection measures (SH-A5, GO-A) +about participation methods (GO-N2, GO-N4) -did not learn about alternatives to wolf culling (SH-AR)	+about wolf biology (SH-H) +about other attitudes toward the wolf (SH-H)	+ about wolf biology and research (SH-HV, SH-V) + about the complexity of wolf management (SH-V)	+ through discussions with participants (SH-A4) +lost fear of wolves through learning (SH-V)	+ about wolf behaviour (SH-A3) + about damage prevention methods (SH-A3, SH-A4)
CR7 understandable material	+ well informed (SH-AR, SH-A5, GO-A) -missing material before workshops (SH-F)	+ well informed (SH-H) -missing material before workshops (SH-F)	+ well informed (SH-HV)	+ Material and lectures positively evaluated (evaluation forms) + appropriate introductory lectures (SH-A1)	No evidence
CR8 continuation	+ wish to continue (GO-N2, SH-AR, SH-A5, CRO-GO, CRO-E, GO-A) -financial limitations (GO-N2, CRO-GO)	No evidence	+ wish to continue (SH-H)	+ wish to continue (SH-HV, SH-V)	+ wish to continue (SH-A3)

As a part of evaluation, participants were asked about their attitude change toward wolves. The majority of participants reported that their attitude toward the wolf remained the same as it was before their involvement of the project. None of them reported a negative attitude change, three participants reported their attitudes became slightly more positive and two claimed they became strongly more positive toward the wolf.

6.4.3. Additional participants views and recommendations for good public involvement in wolf conservation and management

At the end of each interview, participants were asked to express their own views about good public participation, what it means to them, and what they wish for the future. These views, coded as themes, are presented in order of the most frequently discussed. Some of the themes where the same or very similar to those covered by Reed (2008), but some additional themes where also raised (e.g., informing the uninterested public and educating the youth).

The themes that were most commonly emphasized as the most important part of the involvement process were systematic representation, informing the public, a respectful dialogue, continuation of the process after the project, reaching a consensus in decision making and educating the youth. Following, I present additional themes that were raised and some suggestions from participants for the future public involvement in wolf conservation and management.

Informing the public

This theme was emphasized by government officials (GO-N1, GO-N4), representatives from Croatia (CRO-GO, CRO-E), a forester (SH-F) and by a sheep breeders' association representative (SH-A2). Informing the generally uninterested population of local residents was recognized as a basic way of raising awareness (GO-N1). Ideally people would recognize the value of wolves as a symbol connected to

their national identity, since they are an autochthonous species and therefore a part of Slovene national natural and cultural heritage (SH-F).

> *»When he ((a local)) knows about an issue, he easily identifies himself with it: This is mine, I live here. And not as if it was something elusive, only from hunters, not ours.«* (GO-N1)

To ensure effective public outreach and awareness-building GO-N1 suggested that a Public Relation Officer to deliver the right information at the right time is necessary and future projects need to provide more training for the employees for working with the media. One respondent suggested that more information should be published in local newspapers to target local residents (SH-A2).

A government representative (GO-N4) suggested, however, that leaving scientific results to be interpreted by journalists is dangerous, since these results may be difficult to understand and translate into a common language, therefore such a person needs to clearly understand the complexity of wolf research and management. Journalists should be treated as a separate interest group in future wolf conservation. To balance sensationalistic reporting about wolf damages, the public needs to receive accurate information constantly and in a timely manner. This will eventually also break the stereotypes about wolves:

> *"Talking about the public- it has generally positive attitude toward the bear: they are sweet, teddy bear, but the bear makes large problems. The wolf is less accepted. Public ignorance is big, although the wolf does not attack people. Here, the perception of carnivores is not realistic. And here is the need to break the stereotypes."* (CRO-GO)

Respect

This theme was mentioned by five representatives of different interest groups: an animal rights group (SH-AR), farmers (SH-A4, SH-A5), a hunter (SH-H) and forester (SH-F). Respect of different views is essential for effective communication, building trust, knowledge integration and two way learning. In SH-F's view, respect is

connected to the ability to hold back your own views at times and be open to compromises. This is especially important by those with differing views from the mainstream:

> *"It's not enough that they invite you formally and then try to discredit you immediately, because you are different thinking"* (SH-AR).

Consensus and compromise

In the view of the government representative (GO-N2) consensus is essential for legitimate decisions, but reaching consensus was a theme that arose but with some ambiguity. This suggests that modes of decision-making, including consensus, need more attention in future public involvement processes.

> *"Consensus is needed everywhere. { } However, I know that our association will always oppose culling, but I believe that culling is an extreme method, where consensus is not needed. It should be simply forbidden and that's it."* (SH-AR)

In contrast to the view above, a farmer (SH- A5) believes that making compromises is possible. Compromising for the hunter (SH-H) meant involving different interest groups to legitimately assign land use for different purposes, e.g. farming and carnivore conservation that should not overlap.

Educating the youth

Respondents felt that education about wolves should start early, as today's children are future decision makers (CRO-GO) and that researchers and wolf managers should talk directly to children in local schools. Because of their personal experience they have the potential to inspire children's interest in the topic (CRO-GO, SH-V), but need to be cautious of not using too complicated language.

6.5. Discussion

Findings suggest that the criteria pointed out by Reed (2008) are a good basis for evaluating the quality of participatory processes in wolf conservation and management. There were no considerable differences in perceptions on what constitutes a good public participation process between the experts, government representatives and stakeholders. All of them wished to continue to participate in the future and agreed on the importance of most criteria from the literature, which seems promising for future collaborative wolf management in Slovenia and elsewhere. Even though I tested the same evaluation criteria on a variety of different involvement processes, they appear fundamental enough to be applied in different circumstances with slight modifications. It is also evident that these criteria do not function independently and therefore it is important to pay attention to all of them. For example, early involvement was linked to agreed upon objectives and systematic representation was connected to equity and learning. In the action A2, for example, a more balanced representation of interest groups would provide more opportunity to balance differing views about wolf management and ensure equality. Broader involvement would provide more opportunity for learning. In the action C6, best practice demonstration of damage prevention measures, higher and more intensive involvement of local residents could address the concern of urban dominance in wolf management.

Beside the criteria outlined by Reed, several participants highlighted additional aspects for good involvement in wolf management in Slovenia. More emphasis should be put in the future, they suggest, on informing the public, educating the youth and ensuring a respectful dialogue. An important topic was also reaching consensus and we found evidence that the process of consensus building is not completely clear to all participants. Innes & Booher (1999) pointed out that it is not enough that a consensus building process *is fair*, it needs to be *regarded as fair* by participants. I suggest that future involvement in mutually designing management plans needs to address explicitly the inherent limitations of consensus building, such as that agreement on every point is not possible, as well as the full range of outcomes of the process, such as learning about the problem, about each other's interests and the variety of possible

solutions. Indeed, the strongest positively evaluated criterion was learning, with found evidence for it in all actions. Additionally, all participants regarded learning as very beneficial, ranging from technical learning about damage prevention and participation methods to social learning about attitudes toward wolves and the complexity of wolf management.

Looking closer at each criteria and the evaluation of the SloWolf project participation process, while participants agreed generally on the characteristics of good participation, there are discrepancies in perceptions between participants to what degree those criteria were met in the project. Overall, I received more positive comments than expressed concerns, which indicates that generally, considerable attention was paid in the project to ensuring a quality involvement process. Most concerns with the involvement process were expressed by the representative of the animal rights association and the representative of the union of sheep and goat farmers association, even when the majority of other participants were satisfied with the same criteria. Reporting back the results of evaluation to all participants will provide them the opportunity to reflect on their own and others' satisfaction level with the involvement process, ideally leading to learning and future improvements.

However, results of this study should not be taken as generalizable to the interest groups examined in general, since in some cases only one interview per interest group was conducted. Further, the study may have limited transferability to other situations. This study is focused on the application of good public participation criteria and effectiveness for wolf conservation in a middle European setting, with specific societal context, especially with its specific organization of hunting and short history of democratic and public participation approaches.

6.5.1. Implications for wolf conservation and management in Slovenia

Evaluation of the participation process through face to face semi-structured interviews with project participants is at the same time a form of public involvement and can be regarded as a part of the adaptive co-management process, if the findings are

incorporated in future management (Plummer & Armitage, 2007). I received valuable input on participants' satisfaction with the process and also suggestions for further involvement. I suggest further implementation of qualitative evaluation in conservation projects to fine tune the process through learning about participants' expectations, not necessarily to satisfy every desire but to transparently flag the limitations of the processes and actions employed and to seek opportunities for adaption and improvement.

A positive finding was that government representatives acknowledged the benefits and the necessity of public involvement for improved wolf management. They recognized that by including interest groups in wolf management, as in the case of wolf action plan preparation, the final result is better accepted and would like to use this method also in the future.

Chase et al. (2004 in Reed, 2008), Reed (2008) and others focus largely on the quality of the process itself in evaluation while others focus on the contributions participation processes make to outcome goals. Yet outcomes and process are often blurred in participation (Innes & Booher, 1999). This study therefore considers both evaluation types. As demonstrated by Brossard et al. (2005), Bonneau et al. (2009), Espinosa & Jacobson (2012) and Jordan et al. (2011), conservation benefits can be achieved through improved attitudes, knowledge, behavioural intentions and behaviour. Therefore, in addition to evaluating the involvement process in the SloWolf project, I measured participants' self-evaluated attitude change toward wolves and found some support for the hypothesis for attitude change through participation. Although most of participants did not change their attitude toward the wolf, those who reported a positive attitude change, where involved in actions with a higher participation level, involved in more than one action or already held positive attitudes toward the wolf. While farmers, who were involved in best practice demonstration, did not change their initially negative attitude, they learned useful information about wolf behaviour and damage prevention measures that are necessary for improving their coexistence of wolves.

As high involvement of local communities in wildlife management has been shown to build local support for conservation of carnivores (Banerjee, 2012; Jackson &

Wangchuk, 2004), wolf conservation projects should therefore focus on more intensive involvement of local residents and should enable their interaction with other interest groups to enable shared learning, i.e. learning about other attitudes toward the wolf and the complexity of wolf management. As farmers expressed their wish to continue to participate in wolf management, there is a chance of improving their attitudes toward the wolf in the future. Those farmers also provided evidence for positive tangible impacts of the SloWolf project. They reported on good damage protection practice spreading to other farmers in the area. They also began to suggest new protection and education measures, such as the idea of actively promoting good practice through public lectures.

Similar to Raik et.al. (2005) I found a lot of evidence for increased social capital as a consequence of the participatory process through different types of learning and an expressed higher level for understanding of opposing views that is often the key challenge in wildlife management. As Coleman (1998) describes, the value of social capital depends on the level of social organization and is built upon changes in the relations among persons that facilitate action. In the case of the SloWolf project, action for example, means the ability to perform a dialogue about wolf management. However, if outcomes and process in participation are blurred (Innes & Booher, 1999) one influences the other in both ways. If the outcomes of such a process are not reported back or are delayed, as it was in the case of the wolf management action plan proposal, this might degrade the perception of the quality of the process and lead to dissatisfaction and even reduced future participation. This in turn may reduce conservation outcomes. This evaluation provided new knowledge that should be incorporated into further management for the improvement of wolf conservation. In Slovenian context, public participation in wolf conservation and management is a novel approach and it is therefore necessary to lay solid foundations for participation that should continue also after the end of the SloWolf project. Continuation and institutionalisation of participation will be therefore needed to make a long lasting improvement of wolf conservation in Slovenia.

6.6. References

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7. SUMMARY

Evaluation of conservation projects is essential for their transparency and credibility and such evaluation must address social as well as biological variables (Ferraro & Pattanayak, 2006; Kleiman et al., 2000; Stem, Margoluis, Salafsky, & Brown, 2005). This is especially important in conservation of charismatic and controversial large carnivores in human dominated landscapes such as Central Europe and Slovenia within it. Evaluation should include an assessment of achieved project goals as well as the process used to accomplish them (Kleiman, et al., 2000; Reed, 2008; Warburton,

Wilson, & Rainbow, n.d.). A good evaluation provides new knowledge that can be incorporated into further management for its improvement. For that, clear problem definition of a problem and expected goals are needed. However, ultimate project success, such as the long term conservation of wolves in Slovenia, cannot be directly measured during the time of the project implementation. In this case intermediate-level criteria, such as those that measure the success of the process of participation, may allow for evaluation of the progress toward ultimate goals (Kleiman, et al., 2000).

Negative attitudes of farmers and hunters due to depredation on livestock and wildlife and negative attitudes due to sensationalistic reports about wolf caused damage were identified as one of the major threats for the wolf population in Slovenia. Actions were designed for raising awareness about wolf conservation through informing and involving the public and interest groups, specifically in wolf presence areas, with the goal of improving acceptance of wolves in their regions. As a measure of success, statistically significant improvement of at least 5 % change in attitudes toward and knowledge of wolves was set at the beginning of the project. Generally, attitudes toward wolves and knowledge levels have remained stable over the first half of the project implementation, but I documented a change in other cognitions.

For the interpretation of the results of attitude change, the position of attitudes within broader theories in social psychology has to be considered. The cognitive approach (Fulton, Manfredo, & Lipscomb, 1996) explains the position of attitudes in the hierarchy of cognitions with other psychological concepts such as values, value orientations, attitudes, and norms. When observing general attitudes of hunters and the general public toward wolves measured with the question *"What is your attitude toward wolves?"* those seem to remain stable in Slovenia over the last 13 years, compared to a study by Korenjak (2000). However, I documented a change on the level of beliefs about the extent of wolf caused damage, actual and acceptable wolf population size and changes in five items about attitudes toward wolf management. This suggests that detectable changes over a short period of time are context specific and that therefore evaluation measures have to be sensitive enough to capture this.

Further, an important question in evaluation of project success is that of the contribution of the documented change to the ultimate goal, improving the coexistence

of wolves and humans in Slovenia. First, I will discuss the positive indicators for improvement in co-existence and then the negative. Exposure to information, in this case measured as hearing about the SloWolf project, predicted wolf acceptance in a positive direction, which supports the thesis of Ajzen & Fishbein (1977) attitude change as a consequence of persuasive communication. A surprisingly large number of respondents reported hearing about the SloWolf project and although I did not measure whether the project image is positive or negative, a printed media content analysis by Kastelic (2013) revealed a decrease in negative and misleading reporting on wolves in Slovenia. A change in perceived and acceptable wolf numbers also indicates first, an information spread about project results to the three studied interest groups and second, a reduction in conflict within interest groups based on different acceptance capacities through the depolarization in the beliefs between existing and acceptable perceived wolf numbers. Finally, a positive indicator of reduced conflict within hunters and farmers was the rise in the belief that the wolf caused damage is decreasing. Damages done by wolves actually did decrease partially as a consequence of a protection measures donation program within the SloWolf project (Kavčič et al., n.d.).

A negative indicator in the evaluation through quantitative monitoring was little or no increase in knowledge levels about wolves, as knowledge was a significant predictor of both, wolf acceptance and wolf conservation. Percent of correct answers was in 2012 with some questions even lower in the case of hunters. Fewer hunters in 2012 also believed that such conservation projects are important. Although the project team published articles on wolves regularly in a hunter's magazine that is sent to every hunter monthly, the increase in inaccurate beliefs about those knowledge items within hunters may have spread possibly through personal communication, since this was also the most common way of hearing about the SloWolf project.

Such quantitative information is useful for reporting to project financers, but practice in evaluation of biological conservation has shown also the need for qualitative assessment that provides more comprehensive explanation of the complex human influences on conservation (Stem, et al., 2005). For example, from the quantitative analysis, I found little support for a positive influence of public participation.

However, the sample was not designed to target specifically participants in the project and longitudinal monitoring of participants in different actions would be needed to quantitatively measure changes in attitudes within them. Therefore, for a better understanding of the possible causes of attitude change, the context and processes that lead to it, a qualitative evaluation was added to the evaluation of the SloWolf project. I focused on the criteria that contribute to a good public participation practice and its possible influences on attitude change. Since the attitude change literature suggests the greater impact of active participation comparing to passive information dissemination (Fishbein & Ajzen, 1975), I revised active forms of participation such as participation in the decision making process, citizen science, best practice of wolf damage prevention measures and educational seminars.

The universal criteria for good public involvement in wildlife management and conservation are hard to define and have been reported to be very context specific (Constantino et al., 2012; Treves, et al., 2006). The case of the SloWolf project with its variety of public involvement actions on different levels and forms of participation provided an opportunity for first, testing to what degree generally recognized criteria for effective public participation, as outlined by Reed (2008), was incorporated in the process design and implementation and perceived as being present by a variety of participants in different actions of the project and second, to find out what importance participants place on these criteria and how they envision a good participation process. The final goal was to define how public participation could enhance wolf conservation in Slovenia.

Even though I tested the same evaluation criteria (Appendix III) on a variety of different involvement processes within the same project, our findings suggest that they are fundamental enough to be applied in different circumstances with slight modifications. All interviewed participants agreed on the importance of the criteria of empowerment, equity, early and inclusive involvement, clear objectives and appropriately selected methods, skilled facilitation, learning and institutionalisation of participation. However, their perception about the degree of the presence of those criteria in the project varied. The following themes occurred in discussions about participant's own views on what constitutes good participation for improved wolf

management and conservation: systematic representation, respect, consensus building, and continuation, educating the youth and informing the public.

Learning through participation was found as the most important contribution to improved wolf conservation. As opposing views about wolf management are one of the major challenges for their conservation, social learning enhances the capacity to learn about the complexity of wolf management and enhances the information flow about possible solutions and about others' perspectives. The action that provided the most opportunity for social learning was the common preparation of a wolf management action plan, where the widest spectrum of interests was brought together. Interviewees expressed that they had learned about wolf biology, the complexity of wolf management, about the variety of perceptions about wolves, about damage protection measures and about participation methods. Also, in the quantitative study, learning was found as the most common reason for self-evaluated positive attitude change toward wolves. Although the majority of interviewed participants claimed their attitude toward wolves in the course of involvement in the project did not change, learning about the complexity of wolf management is an important step toward improving their long-term conservation.

Innes & Booher (1999) and Plummer & Armitage (2007) pointed out the importance of intangible outcomes and of public participation being integral to consensus building and adaptive co-management. Tangible outcomes can be easily recognized, for example, the creation of a wolf management action plan. Intangible outcomes are on the other hand less obvious, but no less important. In the case of the participatory production of a wolf management action plan, they refer, for instance, to enhanced legitimization for the enforcement of policies and actions. Even when a consensus building process does not produce agreement, the results of this study suggest that success of a participation process should be measured by learning about the problem, each other's interests and the possibilities of working together to solve a joint problem. In this way, participants build on available social, intellectual and political capital, with possible consequences measured long after the process. However, outcomes and process are often blurred in participation (Innes & Booher, 1999; Plummer & Armitage, 2007). Even when a good public participation process has

positive intangible effects on participants, if outcomes that are delayed or not reported back, this might degrade the perception of the quality of the process and lead to dissatisfaction. In Slovenian context, public participation in wolf conservation and management is a novel approach and it is therefore necessary to lay solid foundations for participation that should continue also after the end of the project. Continuation and institutionalisation of participation would be therefore needed to make a long lasting improvement of wolf conservation in Slovenia.

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9. APPENDICES

9.1. Appendix I: Questionnaires

9.1.1. Questionnaire for the general public 2012

Public opinion survey on attitudes toward wolves and wolf management

WOLF 2012

The project is funded by European Union
in the frame of LIFE Program and by
Ministry of agriculture and environment
of the Republic of Slovenia

SLOWOLF
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SloWolf project partners:
University of Ljubljana
Dinaricum Society
Slovenian Forest Service

Dear Sir or Madam!

Since 2010, a project "Conservation and surveillance of the conservation status of the wolf (Canis lupus) population in Slovenia-SloWolf" coordinated by Biotechnical Faculty of the University of Ljubljana is taking place. The goal of the project is to ensure long term conservation of the wolf population in Slovenia and to improve their **coexistence with humans**. As a part of this project, we are conducting **a public opinion survey for the second time**. Included in the survey are residents of Natura 2000 and adjacent areas in which wolf presence is anticipated.

We are aware that knowledge about public opinion and attitudes is needed for successful wolf conservation and management. **We are convinced that undisturbed coexistence of wolves and resident, living in wolf areas, needs to be assured**. At the same time, the government's duty is to respect the public opinion in making decisions about wolf management.

We kindly ask you to take about ten minutes of your time for this questionnaire. Regardless of your attitudes toward the wolf, your opinion is valuable. Therefore, we ask you to answer all questions and so aid to more accurate survey results. Please, send back the filled out questionnaire in the envelope enclosed. The results of the survey will be published on www.volkovi.si webpage in spring 2013.

The questionnaire is anonymous and your answers strictly confidential.

For further information, please contact Jasna Mulej (phone number: (01) 320 33 36 or e-mail address: jasna.mulej@bf.uni-lj.si).

We thank you for you cooperation in advance!

Mag. Aleksandra Majić Skrbinšek Jasna Mulej Tlhaolang

Section A: We will start with questions about your feelings toward three large carnivore species living in Slovenia. Please circle the response that best describes your opinion.

1. Which of the following best describes your feelings toward the large carnivores living in Slovenia that are listed below:

Circle the response that best describes your opinion.	Completely against	Against	Neither in favour nor against	Moderately in favour	Completely in favour
Bear	1	2	3	4	5
Wolf	1	2	3	4	5
Lynx	1	2	3	4	5

2. Did your attitude toward wolves change in the past two years?

a) Yes b) No

If your answer to the previous question was "Yes", did your attitude toward the wolf become:

Circle the response that best describes your opinion.	Strongly more negative	Slightly more negative	Stayed the same	Slightly more positive	Strongly more positive
	1	2	3	4	5

Why did your attitude toward the wolf change? (Please explain.)

_____
_____
_____
_____
_____

To continue, we are going to list a series of general statements about your attitude toward the wolf, as well as some questions about your attitude toward the nature, hunting and small cattle ranching. Please circle the response from 1 to 5 that best describes your opinion.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
3.It is important to maintain the diversity of flora and fauna in Slovenia.	1	2	3	4	5
4.Humans have the right to change the environment.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
5. Nature is capable to balance human interventions in it.	1	2	3	4	5
6. We need to protect what is left of the unspoiled nature from all forms of human interventions.	1	2	3	4	5
7. As citizens of the Republic of Slovenia, we have to report every action that is harmful to nature.	1	2	3	4	5
8. It is important to maintain wolf population in Slovenia for future generations.	1	2	3	4	5
9. Wolves represent a symbol of unspoiled nature.	1	2	3	4	5
10. There is no need to maintain the wolf in Slovenia, since it exists elsewhere in Europe.	1	2	3	4	5
11. Wolves have an important role in regulating the numbers of deer.	1	2	3	4	5
12. Wolves kill too many deer.	1	2	3	4	5
13. Wolves and hunters together effectively regulate the numbers of deer.	1	2	3	4	5
14. Wolves in Slovenia should be completely protected.	1	2	3	4	5
15. There are too few wolves in Slovenia to hunt.	1	2	3	4	5
16. I would accept the presence of wolves in the forests of my surroundings without difficulties.	1	2	3	4	5
17. I am afraid to suffer financial loss due to the presence of wolves.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
18. Wolves are not dangerous to people.	1	2	3	4	5
19. Wolves don't belong in the human vicinity.	1	2	3	4	5
20. Wolves are welcome in Slovenia, if their numbers are regulated.	1	2	3	4	5
21. The number of wolves in Slovenia should increase.	1	2	3	4	5
22. Wolves cause unacceptable damage on small cattle.	1	2	3	4	5
23. Wolves attack small cattle, because they are too many.	1	2	3	4	5
24. Wolves attack small cattle, because their character is vicious.	1	2	3	4	5
25. Small cattle ranching should be limited in the areas, where wolves exist.	1	2	3	4	5

Section B: To continue, there are some general questions about the wolf as a species. Please circle the response that you find the most appropriate or best describes your opinion.

1. **Which of the listed animals causes the most of damage (in agriculture, fruit farming or livestock breeding) in Slovenia according to your opinion?**

   a) Bear
   b) Wolf
   c) Lynx
   d) Raven
   e) Stray dogs
   f) Other:_____

2. **How many wolves do you believe currently exist in Slovenia? _____ wolves. (*Please give a number*.)**
3. **The average male wolf in Slovenia weighs:**

   a) 15-30 kg
   b) 31-45 kg
   c) 46-60 kg
   d) More than 60 kg
   e) I am not sure

4. **The majority of wolves' diet in Slovenia is represented by:**

a) Deer
b) Scavenge
c) Domestic animals
d) I am not sure

5. The wolf catches his prey (deer):

a) Every time he hunts
b) One time in 2 trials
c) One time in 10 trials
d) One time in 20 trials
e) I am not sure

6. How do wolves live?

a) In pairs
b) Solitary
c) In packs
d) I am not sure

7. How do you think did the wolves come to Slovenia?

a) Wolves were introduced by people.
b) Wolves exist in Slovenia since ever.
c) Wolves came from neighbor countries.
d) I am not sure.

8. Do you believe that the wolves in the past existed on the entire area of Slovenia?

a) Yes.
b) No, they existed only in some areas.
c) No, in past they didn't exist in Slovenia.
d) I am not sure.

9. In the past, wolves were almost exterminated in Slovenia. What do you think was the main reason for that?

a) Human killing.
b) Unsuitable living conditions.
c) Bad health of wolves.
d) I am not sure.
e) Something else:_____

10. For their long term existence, the number of wolves in Slovenia today is:

a) Too small.
b) Just right.
c) Too big.
d) I am not sure.

11. How many wolves do you think should live in Slovenia? _____ wolves.

12. Are wolves protected as an endangered species?

a) Yes.
b) No.
c) I am not sure.

13. Is the number of listed animals in your opinion:

Circle the number from 1 to 3 that best describes your answer.	Declining	Stable	Increasing
Bears	1	2	3
Wolves	1	2	3
Lynx	1	2	3

Section C: The following questions refer to your opinion about wolf management, the systems of livestock protection, livestock breeding practices and awareness. Please, circle the response that best describes your attitude or opinion.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Compensations for wolf damage are an appropriate way to lessen the conflicts between small cattle farmers and wolves.	1	2	3	4	5
2. Appropriate livestock protection (electric fences, guarding dogs) can lower the number of wolf attacks.	1	2	3	4	5
3. The usage of appropriate protection from wolf damages (electric fences, guarding dogs) has to be regulated with law.	1	2	3	4	5
4. Compensations for wolf damage are only a short term for lessening of the conflict between small cattle breeders and wolves.	1	2	3	4	5
5. The state has to take care for the undisturbed coexistence o wolves and people.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
6. If the small cattle farmer doesn't use measures for livestock protection from wolf attacks, he shouldn't receive compensations.	1	2	3	4	5
7. In case a wolf attacks livestock, I would agree with its culling.	1	2	3	4	5
8. Wolf presence has an important contribution to development of ecotourism in Slovenia.	1	2	3	4	5
9. I should have the right to participate in decision making in wolf management as the representative of general public.	1	2	3	4	5
10. There is not enough education and informing about wolves.	1	2	3	4	5
11. Project dealing with coexistence of wolves and people are important.	1	2	3	4	5
12. It is important to cooperate with neighbour countries in management of the wolf population in Slovenia.	1	2	3	4	5

13. Damage caused by wolves in Slovenia is:

a) Increasing.
b) Staying the same.
c) Decreasing.
d) I am not sure.

14. If it was possible, I would like to participate in the project of conservation and management of large carnivores in Slovenia?

a) Yes, as a volunteer in project activities (*your contact- optional*: _____)
b) Yes, but only as an outside observer.
c) No, I am not interested in this subject.

Section D: Please, share your opinion about information and information sources:

1. **Evaluate the following information sources based on the amount of information about the wolf they provide**.

	No information	Little information	I can't decide	Enough Information	Plenty of information
Television	1	2	3	4	5
Radio	1	2	3	4	5
Internet	1	2	3	4	5
Magazines and newspaper	1	2	3	4	5
Books	1	2	3	4	5
Personal communication	1	2	3	4	5

2. **How much do you believe you can trust the following sources of information about the wolves?**

	Don't trust at all	Don't trust	I can't decide	Trust	Completely trust
Media	1	2	3	4	5
Hunters	1	2	3	4	5
Foresters	1	2	3	4	5
Biologists	1	2	3	4	5
Small cattle farmers	1	2	3	4	5
Veterinaries	1	2	3	4	5
Environmentalists	1	2	3	4	5
Ministry of agriculture and the environment	1	2	3	4	5

3. The amount of content about nature and animals in the commercial media is:

a) Zero
b) Too little
c) Just enough
d) A lot
e) Too much

4. The following two statements refer to your opinion about media reports on wolf attacks on livestock. Please, choose the answer that best describes your opinion or attitude.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) Media reports on wolf attacks on livestock are correct and objective.	1	2	3	4	5
b) Media reports on wolf attacks on livestock are often exaggerated.	1	2	3	4	5

5. **Did you ever hear about the Slovenian project ""Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia" (shortly: SloWolf)?**
    a) Yes.
    b) No.

If your answer was "Yes" (you heard about the project), please answer the following questions:

How did you find out about the SloWolf project? (Multiple answers possible)

a) Media
b) Through personal communication
c) I attended an educational lecture about wolves
d) I actively participated in the project
e) I do not remember
f) Other:_____

If you actively participated in the SloWolf project, in which of the following actions were you involved? (Multiple answers possible)

a) Workshops for the preparation of the wolf management action plan proposal
b) I participated in the public opinion survey about attitudes toward wolves in 2010
c) Workshops for the improvement of management of wild ungulate species
d) As a volunteer in wolf howling/ winter snow tracking
e) I received a donation of an electric fence or a guarding dog
f) In collecting genetic samples (hair, feces, etc.)

Section E: We are interested also in your experience with wolves.

1. **Have you ever seen a wolf in the nature?**

a) Yes. b) No.

2. **Have you ever seen a wolf in captivity (e.g. in the zoo)?**

a) Yes. b) No.

3. **Have you ever experienced damage caused by a wolf (attack on domestic animals, damage on your property)?**

a) Yes. b) No.

Section F: To finish, we would like to know some information about you solely for the purpose of statistical analysis.

I. **Gender:** a) Female b)Male

II. **Age:_____** years.

III. Place of residence:

a) City
b) Village or countryside

IV. **Level of education:**

a) Uncompleted elementary school
b) Completed elementary school
c) Completed high school
d) University education

V. **Are you a hunter?**

a) Yes.
b) No.

VI. Do you breed goats and sheep?

a) Yes.
b) No.

VII. On the scale of 1 to 5 please circle the response about your familiarity with the following themes:

	Not at all	Too little	Medium	Good	Excellent
Hunting	1	2	3	4	5
Nature conservation	1	2	3	4	5
The wolf situation in Slovenia	1	2	3	4	5

I. On the scale of 1 to 5 please circle the response about your interest in the listed activities.

	Not at all	Little	Medium	Quite a lot	A lot
Hiking	1	2	3	4	5
Mushroom and wild berries' picking	1	2	3	4	5
Dog walking	1	2	3	4	5
Observing birds	1	2	3	4	5
Observing wildlife	1	2	3	4	5
Taking photographs of nature	1	2	3	4	5
Hunting	1	2	3	4	5
Fishing	1	2	3	4	5

We thank you very much for your cooperation!

Your opinion importantly contributes to improving wolf management in Slovenia!

If you have any comments about the thematic or on the questionnaire, please express them here:

_____

_____

_____
_____
_____
_____
_____
_____
_____

The questionnaire was prepared and designed by:
Jasna Mulej Tlhaolang and Urša Marinko

Front page illustration:
Andrea Bardi

Ljubljana 2012, printed in 2000 copies

9.1.2. Questionnaire for sheep and goat farmers 2012

Public opinion survey on attitudes toward wolves and wolf management 2012

SECTION A: We will start with questions about your feelings toward three large carnivore species living in Slovenia. Please circle the response that best describes your opinion.

1. Which of the following best describes your feelings toward the large carnivores living in Slovenia that are listed below:

Circle the response that best describes your opinion.	Completely against	Against	Neither in favour nor against	Moderately in favour	Completely in favour
Bear	1	2	3	4	5
Wolf	1	2	3	4	5
Lynx	1	2	3	4	5

2. Did your attitude toward wolves change in the past two years?

a) Yes b) No

If your answer to the previous question was *»Yes«*, please answer the next question.
Did your attitude toward the wolf become:

Circle the response that best describes your opinion.	Strongly more negative	Slightly more negative	Stayed the same	Slightly more positive	Strongly more positive
	1	2	3	4	5

Why did your attitude toward the wolf change? (Please explain.)

_____

_____

_____

To continue, we are going to list a series of general statements about your attitude toward the wolf, as well as some questions about your attitude toward the nature, hunting and small cattle ranching. Please circle the response from 1 to 5 that best describes your opinion.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
3. It is important to maintain the diversity of flora and fauna in Slovenia.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
4. Humans have the right to change the environment.	1	2	3	4	5
5. Nature is capable to balance human interventions in it.	1	2	3	4	5
6. We need to protect what is left of the unspoiled nature from all forms of human interventions..	1	2	3	4	5
7. As citizens of the Republic of Slovenia, we have to report every action that is harmful to nature.	1	2	3	4	5
8. It is important to maintain wolf population in Slovenia for future generations.	1	2	3	4	5
9. Wolves represent a symbol of unspoiled nature.	1	2	3	4	5
10. There is no need to maintain the wolf in Slovenia, since it exists elsewhere in Europe.	1	2	3	4	5
11. Wolves have an important role in regulating the numbers of deer.	1	2	3	4	5
12. Wolves kill too many deer.	1	2	3	4	5
13. Wolves and hunters together effectively regulate the numbers of deer.	1	2	3	4	5
14. Wolves in Slovenia should be completely protected.	1	2	3	4	5
15. There are too few wolves in Slovenia to hunt.	1	2	3	4	5
16. I would accept the presence of wolves in the forests of my surroundings without difficulties.	1	2	3	4	5
17. I am afraid to suffer financial loss due to the presence of wolves	1	2	3	4	5
18. Wolves are not dangerous to people.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
19. Wolves don't belong in the human vicinity.	1	2	3	4	5
20. Wolves are welcome in Slovenia, if their numbers are regulated.	1	2	3	4	5
21. The number of wolves in Slovenia should increase.	1	2	3	4	5
22. Wolves cause unacceptable damage on small cattle.	1	2	3	4	5
23. Wolves attack small cattle, because they are too many.	1	2	3	4	5
24. Wolves attack small cattle, because their character is vicious.	1	2	3	4	5
25. Small cattle ranching should be limited in the areas, where wolves exist.	1	2	3	4	5

SECTION B: To continue, there are some general questions about the wolf as a species. Please circle the response that you find the most appropriate or best describes your opinion.

15. Which of the listed animals causes the most of damage (in agriculture, fruit farming or livestock breeding) in Slovenia according to your opinion?

a) Bear
b) Wolf
c) Lynx
d) Raven
e) Stray dogs
f) Other:_____

2. How many wolves do you believe currently exist in Slovenia? _____ wolves. (*Please give a number*.)

3. The average male wolf in Slovenia weighs:

a) 15-30kg.
b) 31-45kg.
c) 46-60kg.
d) More than 60 kg
e) I am not sure

4. The majority of wolves' diet in Slovenia is represented by:

a) Deer
b) Scavenge
c) Domestic animals
d) I am not sure

5. The wolf catches his prey (deer):

f) Every time he hunts
g) One time in 2 trials
h) One time in 10 trials
i) One time in 20 trials
j) I am not sure

6. How do wolves live?

e) In pairs
f) Solitary
g) In packs
h) I am not sure

7. How do you think did the wolves come to Slovenia?

e) Wolves were introduced by people.
f) Wolves exist in Slovenia since ever.
g) Wolves came from neighbor countries.
h) I am not sure.

8. Do you believe that the wolves in the past existed on the entire area of Slovenia?

e) Yes.
f) No, they existed only in some areas.
.
g) No, in past they didn't exist in Slovenia.
h) I am not sure

9. In the past, wolves were almost exterminated in Slovenia. What do you think was the main reason for that?

f) Human killing.
g) Unsuitable living conditions.
h) Bad health of wolves.
i) I am not sure.
j) Something else:_____

10. For their long term existence, the number of wolves in Slovenia today is:

e) Too small.
f) Just right.
g) Too big.
h) I am not sure.

11. How many wolves do you think should live in Slovenia? _____ wolves.

12. Are wolves protected as an endangered species?

d) Yes.
e) No.
f) I am not sure.

13. Is the number of listed animals in your opinion:

Circle the number from 1 to 3 that best describes your answer.	Declining	Stable	Increasing
Bears	1	2	3
Wolves	1	2	3
Lynx	1	2	3

SECTION C: The following questions refer to your opinion about wolf management, the systems of livestock protection, livestock breeding practices and awareness. Please, circle the response that best describes your attitude or opinion.

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	Compensations for wolf damage are an appropriate way to lessen the conflicts between small cattle farmers and wolves.	1	2	3	4	5
2.	Appropriate livestock protection (electric fences, guarding dogs) can lower the number of wolf attacks.	1	2	3	4	5
3.	The usage of appropriate protection from wolf damages (electric fences, guarding dogs) has to be regulated with law.	1	2	3	4	5
4.	Compensations for wolf damage are only a short term for lessening of the conflict between small cattle breeders and wolves.	1	2	3	4	5
5.	The state has to take care for the undisturbed coexistence o wolves and people	1	2	3	4	5
6.	In case a wolf attacks livestock, I would agree with its culling.	1	2	3	4	5
7.	If livestock is not effectively protected, wolf attacks are more common.	1	2	3	4	5
8.	In case a wolf attacks livestock, I would agree with its culling.	1	2	3	4	5
9.	If the small cattle farmer doesn't use measures for livestock protection from wolf attacks, he shouldn't receive compensations.	1	2	3	4	5
10.	Wolf presence has an important contribution to development of ecotourism in Slovenia.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
11. I should have the right to participate in decision making in wolf management as the representative of general public	1	2	3	4	5
12. There is not enough education and informing about wolves.	1	2	3	4	5
13. Project dealing with coexistence of wolves and people are important.	1	2	3	4	5
14. It is important to cooperate with neighbour countries in management of the wolf population in Slovenia.	1	2	3	4	5

15. Damage caused by wolves in Slovenia is:

e) Increasing.
f) Staying the same.
g) Decreasing.
h) I am not sure.

16. Do you believe, your livestock is effectively protected against wolf attacks?

a) Yes.
b) Neither good nor bad.
c) No.
d) I am not sure

.

17. Would you change your livestock raising practice, if this would lower or eliminate wolf attacks on livestock?

a) No, because this is the way my ancestors raised livestock.
b) No, because I am used to this practice and I am not prepared to change it.
c) Yes, if the state would offer support (subventions, information- seminars).
d) Yes, I intend to change it.
f) Yes, I already changed it.

Following are questions about the features of the damage compensation system and livestock protection measures. Please rate the features. In case you are not familiar with the damage compensation system and livestock protection measures, please leave the line blank.

18. The features of the damage compensation system and livestock protection measures are described below. Please, circle the answer on a scale from 1 to 5 that best describes your oppinion.

Damage compensation system for wolf attacks on livestock.

		Completely unsatisfied	Unsatisfied	Neither satisfied nor unsatisfied	Satisfied	Completely satisfied
a.	*Familiarity with the damage compensation system.*	1	2	3	4	5
b.	*Response time from reporting the damage.*	1	2	3	4	5
c.	*Qualification of the damage registrar.*	1	2	3	4	5
d.	*The amount of compensation.*	1	2	3	4	5
e.	*The whole process from the damage reporting to receiving compensation.*	1	2	3	4	5

Damage prevention measures agianst wolf attacks.

		Completely unsatisfied	Unsatisfied	Neither satisfied nor unsatisfied	Satisfied	Completely satisfied
f.	*Familiarity with damage prevention measures –* ***electric fences***	1	2	3	4	5
g.	*Familiarity with damage prevention measures –* ***guarding dogs***	1	2	3	4	5
h.	*Familiarity with damage prevention measures –* ***combination of measures (elektric fences and guarding dogs)***	1	2	3	4	5
i.	*The amount of subventions for electric fences.*	1	2	3	4	5
j.	*Help with initiating protection measures.*	1	2	3	4	5

19. If it was possible, I would like to participate in the project of conservation and management of large carnivores in Slovenia?

d) Yes, as a volunteer in project activities (*your contact- optional*: _____)
e) Yes, but only as an outside observer.
f) No, I am not interested in this subject.

SECTION D: Please, share your opinion about information and information sources:

1. Evaluate the following information sources based on the amount of information about the wolf they provide.

	No information	Little information	I can't decide	Enough Information	Plenty of information
Television	1	2	3	4	5
Radio	1	2	3	4	5
Internet	1	2	3	4	5
Magazines and newspaper	1	2	3	4	5
Books	1	2	3	4	5
Personal communication	1	2	3	4	5

2. How much do you believe you can trust the following sources of information about the wolves?

	Don't trust at all	Don't trust	I can't decide	Trust	Completely trust
Media	1	2	3	4	5
Hunters	1	2	3	4	5
Foresters	1	2	3	4	5
Biologists	1	2	3	4	5
Small cattle farmers	1	2	3	4	5
Veterinaries	1	2	3	4	5
Environmentalists	1	2	3	4	5
Ministry of agriculture and the environment	1	2	3	4	5

3. The amount of content about nature and animals in the commercial media is:

f) Zero
g) Too little
h) Just enough
i) A lot
j) Too much

4. The following two statements refer to your opinion about media reports on wolf attacks on livestock. Please, choose the answer that best describes your opinion or attitude.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) Media reports on wolf attacks on livestock are correct and objective.	1	2	3	4	5
b) Media reports on wolf attacks on livestock are often exaggerated.	1	2	3	4	5

5. Did you ever hear about the Slovenian project ""Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia" (shortly: SloWolf)?

a) Yes. b) No.

If your answer was "Yes" (you heard about the project), please answer the following questions:

How did you find out about the SloWolf project? (Multiple answers possible)

g) Media
h) Through personal communication
i) I attended an educational lecture about wolves
j) I actively participated in the project
k) I do not remember
l) Other:_____

If you actively participated in the SloWolf project, in which of the following actions were you involved? (Multiple answers possible)

g) Workshops for the preparation of the wolf management action plan proposal
h) I participated in the public opinion survey about attitudes toward wolves in 2010
i) Workshops for the improvement of management of wild ungulate species
j) As a volunteer in wolf howling/ winter snow tracking
k) I received a donation of an electric fence or a guarding dog
l) In collecting genetic samples (hair, feces, etc.)

SECTION E: We are interested also in your experience with wolves.

4. Have you ever seen a wolf in the nature?

c) Yes. d) No.

5. Have you ever seen a wolf in captivity (e.g. in the zoo)?

a) Yes. b) No

.

6. Have you ever experienced damage caused by a wolf (attack on domestic animals, damage on your property)?

a) Yes. b) No.

If you answered *»Yes.«*, please answer also the next question.

How many times did you experience damage caused by a wolf in 2011 and 2012?

a) Once.
b) 2 - 3-times.
c) 4-times or more.

SECTION F: To finish, we would like to know some information about you solely for the purpose of statistical analysis.

I. Gender:

a) Female. b) Male.

II. Age: _____ years.

III. Place of residence:

a) City.
b) Village or countryside.

IV. Level of education:

e) Uncompleted elementary school
f) Completed elementary school
g) Completed high school
h) University education

V. Which domestic animal represents the primary activity on your farm?

a) Sheep and goats.
b) Cattle.
c) Horses.
d) Pigs.
e) Poultry.
f) I am no longer keeping livestock.
g) Other:_____

VI. Are you a hunter?

a) Yes.
b) No.

VII. On the scale of 1 to 5 please circle the response about your familiarity with the following themes:

	Not at all	Too little	Medium	Good	Excellent
Hunting	1	2	3	4	5
Nature conservation	1	2	3	4	5
The wolf situation in Slovenia	1	2	3	4	5

VIII. On the scale of 1 to 5 please circle the response about your interest in the listed activities.

	Not at all	Little	Medium	Quite a lot	A lot
Hiking	1	2	3	4	5
Mushroom and wild berries' picking	1	2	3	4	5
Dog walking	1	2	3	4	5
Observing birds	1	2	3	4	5
Observing wildlife	1	2	3	4	5
Taking photographs of nature	1	2	3	4	5
Hunting	1	2	3	4	5
Fishing	1	2	3	4	5

We thank you very much for your cooperation!

Your opinion importantly contributes to improving wolf management in Slovenia!

If you have any comments about the thematic or on the questionnaire, please express them here:

9.1.3. Questionnaire for hunters 2012

Public opinion survey on attitudes toward wolves and wolf management

WOLF 2012

The project is funded by European Union
in the frame of LIFE Program and by
Ministry of agriculture and environment
of the Republic of Slovenia

SLOWOLF
WWW.VOLKOVI.SI

SloWolf project partners:

University of Ljubljana
Dinaricum Society
Slovenian Forest Service

Dear Sir or Madam!

Since 2010, a project "Conservation and surveillance of the conservation status of the wolf (Canis lupus) population in Slovenia-SloWolf" coordinated by Biotechnical Faculty of the University of Ljubljana is taking place. The goal of the project is to ensure long term conservation of the wolf population in Slovenia and to improve their **coexistence with humans**. As a part of this project, we are conducting **a public opinion survey for the second time**. Included in the survey are residents of Natura 2000 and adjacent areas in which wolf presence is anticipated.

We are aware that knowledge about public opinion and attitudes is needed for successful wolf conservation and management. **We are convinced that undisturbed coexistence of wolves and resident, living in wolf areas, needs to be assured**. At the same time, the government's duty is to respect the public opinion in making decisions about wolf management.

We kindly ask you to take about ten minutes of your time for this questionnaire. Regardless of your attitudes toward the wolf, your opinion is valuable. Therefore, we ask you to answer all questions and so aid to more accurate survey results. Please, send back the filled out questionnaire in the envelope enclosed. The results of the survey will be published on www.volkovi.si webpage in spring 2013.

The questionnaire is anonymous and your answers strictly confidential.

For further information, please contact Jasna Mulej (phone number: (01) 320 33 36 or e-mail address: jasna.mulej@bf.uni-lj.si).

We thank you for you cooperation in advance!

Mag. Aleksandra Majić Skrbinšek Jasna Mulej Tlhaolang

Section A: We will start with questions about your feelings toward three large carnivore species living in Slovenia. Please circle the response that best describes your opinion.

3. **Which of the following best describes your feelings toward the large carnivores living in Slovenia that are listed below:**

Circle the response that best describes your opinion.	Completely against	Against	Neither in favour nor against	Moderately in favour	Completely in favour
Bear	1	2	3	4	5
Wolf	1	2	3	4	5
Lynx	1	2	3	4	5

4. Did your attitude toward wolves change in the past two years?

a) Yes
b) No

If your answer to the previous question was "Yes", did your attitude toward the wolf become:

Circle the response that best describes your opinion.	Strongly more negative	Slightly more negative	Stayed the same	Slightly more positive	Strongly more positive
	1	2	3	4	5

Why did your attitude toward the wolf change? (Please explain.)

_____

_____

_____

To continue, we are going to list a series of general statements about your attitude toward the wolf, as well as some questions about your attitude toward the nature, hunting and small cattle ranching. Please circle the response from 1 to 5 that best describes your opinion.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. It is important to maintain the diversity of flora and fauna in Slovenia.	1	2	3	4	5
2. Humans have the right to change the environment.	1	2	3	4	5
3. Nature is capable to balance human interventions in it.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
4. We need to protect what is left of the unspoiled nature from all forms of human interventions.	1	2	3	4	5
5. As citizens of the Republic of Slovenia, we have to report every action that is harmful to nature.	1	2	3	4	5
6. It is important to maintain wolf population in Slovenia for future generations.	1	2	3	4	5
7. Wolves represent a symbol of unspoiled nature.	1	2	3	4	5
8. There is no need to maintain the wolf in Slovenia, since it exists elsewhere in Europe.	1	2	3	4	5
9. The primary purpose of huniting is nature conservation.	1	2	3	4	5
10. Hunting is primarily an economic activity.	1	2	3	4	5
11. Hunting is primarily a sport.	1	2	3	4	5
12. Wolves have an important role in regulating the numbers of deer..	1	2	3	4	5
13. Wolves kill too many deer.	1	2	3	4	5
14. Wolves and hunters together effectively regulate the numbers of deer.	1	2	3	4	5
15. Wolves in Slovenia should be completely protected.	1	2	3	4	5
16. There are too few wolves in Slovenia to hunt.	1	2	3	4	5
17. . I would accept the presence of wolves in the forests of my surroundings without difficulties.	1	2	3	4	5
18. I am afraid to suffer financial loss due to the presence of wolves.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
19. Wolves are not dangerous to people.	1	2	3	4	5
20. Wolves don't belong in the human vicinity.	1	2	3	4	5
21. Wolves are welcome in Slovenia, if their numbers are regulated.	1	2	3	4	5
22. The number of wolves in Slovenia should increase.	1	2	3	4	5
23. Wolves cause unacceptable damage on small cattle.	1	2	3	4	5
24. Wolves attack small cattle, because they are too many.	1	2	3	4	5
25. Wolves attack small cattle, because their character is vicious.	1	2	3	4	5
26. Small cattle ranching should be limited in the areas, where wolves exist.	1	2	3	4	5

SECTION B: To continue, there are some general questions about the wolf as a species. Please circle the response that you find the most appropriate or best describes your opinion**.**

16. Which of the listed animals causes the most of damage (in agriculture, fruit farming or livestock breeding) in Slovenia according to your opinion?

a) Bear
b) Wolf
c) Lynx
d) Raven
e) Stray dogs
f) Other:_____

17. How many wolves do you believe currently exist in Slovenia? _____ wolves. (*Please give a number*.)

18. The average male wolf in Slovenia weighs:

a) 15-30 kg
b) 31-45 kg
c) 46-60 kg
d) More than 60 kg
e) I am not sure

19. The majority of wolves' diet in Slovenia is represented by:

a) Deer
b) Scavenge
c) Domestic animals
d) I am not sure

20. The wolf catches his prey (deer):

a) Every time he hunts
b) One time in 2 trials
c) One time in 10 trials
d) One time in 20 trials
e) I am not sure

21. How do wolves live?

a) In pairs
b) Solitary
c) In packs
d) I am not sure

22. How do you think did the wolves come to Slovenia?

a) Wolves were introduced by people.
b) Wolves exist in Slovenia since ever.
c) Wolves came from neighbor countries.
d) I am not sure.

23. Do you believe that the wolves in the past existed on the entire area of Slovenia?

a) Yes.
b) No, they existed only in some areas.
c) No, in past they didn't exist in Slovenia.
d) I am not sure.

24. In the past, wolves were almost exterminated in Slovenia. What do you think was the main reason for that?

a) Human killing.
b) Unsuitable living conditions.
c) Bad health of wolves.
d) I am not sure.
e) Something else:_____

25. For their long term existence, the number of wolves in Slovenia today is:

a) Too small.
b) Just right.
c) Too big.
d) I am not sure.

26. How many wolves do you think should live in Slovenia? _____ wolves.

27. Are wolves protected as an endangered species?

g) Yes.
h) No.
i) I am not sure.

28. Is the number of listed animals in your opinion:

Circle the number from 1 to 3 that best describes your answer.	Declining	Stable	Increasing
Bears	1	2	3
Wolves	1	2	3
Lynx	1	2	3

SECTION C: The following questions refer to your opinion about wolf management, the systems of livestock protection, livestock breeding practices and awareness. Please, circle the response that best describes your attitude or opinion.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Compensations for wolf damage are an appropriate way to lessen the conflicts between small cattle farmers and wolves.	1	2	3	4	5
2. Appropriate livestock protection (electric fences, guarding dogs) can lower the number of wolf attacks.	1	2	3	4	5
3. The usage of appropriate protection from wolf damages (electric fences, guarding dogs) has to be regulated with law.	1	2	3	4	5
4. Compensations for wolf damage are only a short term for lessening of the conflict between small cattle breeders and wolves.	1	2	3	4	5
5. The state has to take care for the undisturbed coexistence o wolves and people.	1	2	3	4	5
6. In case a wolf attacks livestock, I would agree with its culling.	1	2	3	4	5

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
7.	If the small cattle farmer doesn't use measures for livestock protection from wolf attacks, he shouldn't receive compensations.	1	2	3	4	5
8.	Wolf presence has an important contribution to development of ecotourism in Slovenia.	1	2	3	4	5
9.	I should have the right to participate in decision making in wolf management as the representative of general public.	1	2	3	4	5
10.	There is not enough education and informing about wolves.	1	2	3	4	5
11.	Project dealing with coexistence of wolves and people are important.	1	2	3	4	5
12.	It is important to cooperate with neighbour countries in management of the wolf population in Slovenia.	1	2	3	4	5

13. Damage caused by wolves in Slovenia is:

a) Increasing.
b) Staying the same.
c) Decreasing.
d) I am not sure.

29. If it was possible, I would like to participate in the project of conservation and management of large carnivores in Slovenia?

g) Yes, as a volunteer in project activities (*your contact- optional*: _____)
h) Yes, but only as an outside observer.
i) No, I am not interested in this subject.

SECTION D: Please, share your opinion about information and information sources:

6. **Evaluate the following information sources based on the amount of information about the wolf they provide**.

	No information	Little information	I can't decide	Enough Information	Plenty of information
Television	1	2	3	4	5
Radio	1	2	3	4	5
Internet	1	2	3	4	5
Magazines and newspaper	1	2	3	4	5
Books	1	2	3	4	5
Personal communication	1	2	3	4	5

7. **How much do you believe you can trust the following sources of information about the wolves?**

	Don't trust at all	Don't trust	I can't decide	Trust	Completely trust
Media	1	2	3	4	5
Hunters	1	2	3	4	5
Foresters	1	2	3	4	5
Biologists	1	2	3	4	5
Small cattle farmers	1	2	3	4	5
Veterinaries	1	2	3	4	5
Environmentalists	1	2	3	4	5
Ministry of agriculture and the environment	1	2	3	4	5

8. The amount of content about nature and animals in the commercial media is:

a) Zero
b) Too little
c) Just enough
d) A lot
e) Too much

The following two statements refer to your opinion about media reports on wolf attacks on livestock. Please, choose the answer that best describes your opinion or attitude.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) Media reports on wolf attacks on livestock are correct and objective.	1	2	3	4	5
b) Media reports on wolf attacks on livestock are often exaggerated.	1	2	3	4	5

9. Did you ever hear about the Slovenian project ""Conservation and surveillance of the conservation status of the wolf (*Canis lupus*) population in Slovenia" (shortly: SloWolf)?

c) Yes. d) No.

If your answer was "Yes" (you heard about the project), please answer the following questions:

How did you find out about the SloWolf project? (Multiple answers possible)

a) Media
b) Through personal communication
c) I attended an educational lecture about wolves
d) I actively participated in the project
e) I do not remember
f) Other:_____

If you actively participated in the SloWolf project, in which of the following actions were you involved? (Multiple answers possible)

a) Workshops for the preparation of the wolf management action plan proposal
b) I participated in the public opinion survey about attitudes toward wolves in 2010
c) Workshops for the improvement of management of wild ungulate species
d) As a volunteer in wolf howling/ winter snow tracking
e) I received a donation of an electric fence or a guarding dog
f) In collecting genetic samples (hair, feces, etc.)

SECTION E: We are interested also in your experience with wolves.

1. Have you ever seen a wolf in nature?

a) Yes. b) No.

2. Have you ever seen a wolf in captivity (e.g. in the zoo)?

a)) Yes. b) No.

3. Have you ever experienced damage caused by a wolf (attack on domestic animals, damage on your property)?

a) Yes. b) No.

4. Did you ever shoot or kill a wolf (hunt, drive over, other)?

a) Yes. b) No
.

SECTION F: To finish, we would like to know some information about you solely for the purpose of statistical analysis.

I. **Gender:** a) Female b)Male

II. **Age: _____** years.

III. Place of residence:

a) City
b) Village or countryside

IV. Level of education

a) Uncompleted elementary school
b) Completed elementary school
c) Completed high school
d) University education

v. I hunt only on hunting grounds of my hunting family.

a) Yes.
b) No, I hunt also on other hunting grounds in Slovenia.
c) No, I hunt also abroad.
d) No, I hunt also on other hunting grounds in Slovenia and abroad

.

vi. Is or were any of your parents a hunter?

a) Yes.
b) No.

V. For how long are you a member or a hunting family? _____years.

VI. Do you use a hunting dog?

a) Yes.
b) No.

VII. **Do you bread sheep and goats?**

a) Yes.
b) No.

VIII. On the scale of 1 to 5 please circle the response about your familiarity with the following themes:

	Not at all	Too little	Medium	Good	Excellent
Hunting	1	2	3	4	5
Nature conservation	1	2	3	4	5
The wolf situation in Slovenia	1	2	3	4	5

IX. On the scale of 1 to 5 please circle the response about your interest in the listed activities.

	Not at all	Little	Medium	Quite a lot	A lot
Hiking	1	2	3	4	5
Mushroom and wild berries' picking	1	2	3	4	5
Dog walking	1	2	3	4	5
Observing birds	1	2	3	4	5
Observing wildlife	1	2	3	4	5
Taking photographs of nature	1	2	3	4	5
Hunting	1	2	3	4	5
Fishing	1	2	3	4	5

We thank you very much for your cooperation!

Your opinion importantly contributes to improving wolf management in Slovenia!

If you have any comments about the thematic or on the questionnaire, please express them here:

_____
_____
_____
_____
_____

The questionnaire was prepared and designed by:
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Front page illustration:
Andrea Bardi

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9.2. Appendix II: Supplementary results to Paper I

Table 5-2: Gender rates per interest group, wolf presence area and year with the results of the Pearson's chi squared test of differences (df=1) in the gender structure between areas of permanent (PA) and occasional (OA) wolf presence.

Year	Interest group	Wolf presence area	Female (%)	Male (%)	Pearson's chi square	P (2-sided)
2010	Farmers N=259	PA	29.1	70.9	0.114	0.787
		OA	31.1	68.9		
	Hunters N=420	PA	2.3	97.7	0.188	0.765
		OA	3.0	97.0		
	General public N=605	PA	35.3	64.7	0.231	0.672
		OA	37.2	62.8		
2012	Farmers N= 267	PA	27.6	72.4	4.287	0.051
		OA	39.7	60.3		
	Hunters N=329	PA	6.2	93.8	2.960	0.104
		OA	2.4	97.6		
	General public N=529	PA	31.5	68.5	1.613	0.204
		OA	36,8	63,2		

Table 5-3: Mean age per interest group, wolf area of permanent (PA) and occasional (OA) presence and year with the results of the t-test for independent samples for differences between years.

		Wolf presence area	Mean	SD	t	df	P (2-sided)
2010	Farmers	PA, N=126	55.40	12.44	2.000	252	0.047*
		OA, N=128	52.15	13.78			
	Hunters	PA, N=217	48.78	14.20	-1.143	417	0.245
		OA, N=202	50.38	14.42			
	General public	PA, N=319	53.48	14.16	2.204	605	0.043*
		OA, N=288	51.11	14.70			
2012	Farmers	PA, N=116	57.70	14.85	1.321	265	0.188
		OA, N=151	55.19	15.76			
	Hunters	PA, N= 161	48.86	14.48	-2.050	323	0.041*
		OA, N=164	52.07	13.74			
	General public	PA, N=278	53.61	14.66	-0.388	533	0.698
		OA, N=257	54.12	15.45			

*the difference is significant at a level of $p<0.05$

Table 5-4: Rates of participants residing in a city versus countryside per interest group, wolf presence area and year with the results of the Pearson's chi squared test of differences (df=1) in the residence type structure between areas of permanent (PA) and occasional (OA) wolf presence.

Year	Interest group	Wolf presence area	City (%)	Countryside (%)	Pearson's chi square	P (2-sided)
2010	Farmers N= 259	PA	10.2	89.9	4.162	0.051
		OA	3.8	96.2		
	Hunters N=406	PA	15.6	84.4	1.754	0.198
		OA	20.6	79.4		
	General public N=598	PA	21.0	79.0	1.692	0.193
		OA	25.4	74.6		
2012	Farmers N= 267	PA	2.6	97.4	3.950	0.081
		OA	0	100		
	Hunters N=322	PA	23.0	77.0	0.000	/
		OA	23.0	77.0		
	General public N=529	PA	23.0	77.0	0.957	0.365
		OA	26.7	73.3		

Table 5-5: Education structure per interest group, wolf presence area and year and the results of the Pearson's chi squared test of differences (df=3) in the education structure between areas of permanent (PA) and occasional (OA) wolf presence.

Year	Interest group	Wolf presence area	Unfinished primary school	Primary school	Secondary school	Higher education	Pearson's chi square	P (2-sided)
2010	Farmers N= 258	PA	5.6	34.1	50.0	10.3	5.626	0.131
		OA	6.1	21.2	62.1	10.6		
	Hunters N=413	PA	1.4	11.6	69.9	17.1	2.348	0.503
		OA	1.0	9.6	66.5	22.8		
	General public N=606	PA	3.1	16.4	50.9	29.6	6.972	0.073
		OA	0.7	12.5	56.2	30.6		
2012	Farmers N= 267	PA	4.3	42.6	41.7	11.3	0.404	0.939
		OA	4.6	38.8	44.1	12.5		
	Hunters N=328	PA	0.0	11.2	65.2	23.6	4.948	0.176
		OA	1.8	6.6	66.5	25.1		
	General public N=533	PA	1.1	8.3	58.8	31.8	0.518	0.915
		OA	0.8	7.8	57.0	34.4		

Table 5-6: The rate of hunters between farmers and general public per wolf presence area and year with the results of the Pearson's chi squared test of differences (df=1) between areas of permanent (PA) and occasional (OA) wolf presence.

Year	Interest group	Wolf presence area	Hunter (%)	Pearson's chi square	P (2-sided)
2010	Farmers N= 259	PA	11.8	0.379	0.538
		OA	14.4		
	General public N=606	PA	7.3	0.462	0.497
		OA	5.9		
2012	Farmers N= 268	PA	11.2	0.026	0.872
		OA	11.8		
	General public N=535	PA	7.9	1.294	0.255
		OA	5.4		

Table 5-7: The rate of sheep and goat farmers between hunters and general public per wolf presence area and year with the results of the Pearson's chi squared test of differences (df=1) between areas of permanent (PA) and occasional (OA) wolf presence.

Year	Interest group	Wolf presence area	Farmer (%)	Pearson's chi square	P (2-sided)
2010	Hunters N= 409	PA	13.6	1.050	0.305
		OA	10.3		
	General public N=605	PA	6.9	0.109	0.741
		OA	7.6		
2012	Hunters N= 330	PA	13.0	4.762	0.029*
		OA	6.0		
	General public N=535	PA	9.0	2.484	0.115
		OA	5.4		

*the difference is significant at a level of p<0.05

Table 5-8: Gender structure for joined samples per interest group with the results of the Pearson's chi squared test of differences (df=1) in the structure between years.

Interest group	Year	Female (%)	Male (%)	Pearson's chi square	P (2-sided)
Farmers N=526	2010	30.1	69.9	1.133	0.306
	2012	34.5	65.5		
Hunters N=749	2010	2.6	97.4	1.531	0.216
	2012	4.3	95.7		
General public N=1134	2010	33.6	66.4	1.460	0.237
	2012	37.0	63.0		

Table 5-9: Mean age per interest group and year for joined samples with the results t-test for independent samples for differences between years.

	Year	Mean	SD	t	df	P (2-sided)
Farmers	2010, N=254	53.78	13.21	-1.983	519	0.048*
	2012, N=267	56.28	15.39			
Hunters	2010, N=419	49.55	14.31	-0.882	742	0.378
	2012, N=325	50.48	14.18			
General public	2010, N=607	52.36	14.45	-1.714	1140	0.087
	2012, N=535	53.85	15.03			

*the difference is significant at a level of p<0.05

Table 5-10: The rates of participants residing in a city versus countryside for joined samples per interest group with the results of the Pearson's chi squared test of differences (df=1) in the structure between years.

Interest group	Year	City (%)	Countryside (%)	Pearson chi square	P (2-sided)
Farmers N= 526	2010	6.9	93.1	11.643	0.001*
	2012	1.1	98.9		
Hunters N=728	2010	18.0	82.0	2.787	0.114
	2012	23.0	77.0		
General public N=1127	2010	21.9	78.1	2.627	0.108
	2012	26.0	74.0		

*the difference is significant at a level of p<0.05

Table 5-11: Education structure for joined samples per interest group with the results of the Pearson's chi squared test of differences (df=3) in the structure between years.

Interest group	Year	Unfinished primary school	Primary school	Secondary school	Higher education	Pearson chi square	P (2-sided)
Farmers N= 525	2010	5.8	27.5	56.2	10.5	11.716	0.008*
	2012	4.5	40.4	43.1	12.0		
Hunters N=741	2010	1.2	10.7	86.3	19.9	2.638	0.451
	2012	0.9	8.8	65.9	24.4		
General public N=1139	2010	2.2	12.6	54.6	30.6	5.806	0.121
	2012	0,7	10.3	56.6	32.4		

*the difference is significant at a level of p<0.05

Table 5-12: The rates of hunters in the joined samples of farmers and general public with the results of the Pearson's chi squared test of differences (df=1) in the structure between years.

	Year	Hunter (%)	Pearson chi square	P (2-sided)
Farmers N= 527	2010	13.1	0.279	0.586
	2012	11.6		
General public N=1141	2010	6.6	0.008	0.931
	2012	6.7		

Table 5-13: The rates of sheep and goat farmers in the joined samples of hunters and general public with the results of the Pearson's chi squared test of differences (df=1) in the structure between years.

	Year	Farmer (%)	Pearson chi square	P (2-sided)
Hunters N= 739	2010	12.0	1.266	0.261
	2012	9.4		
General public N=1140	2010	7.3	0.000	0.991
	2012	7.3		

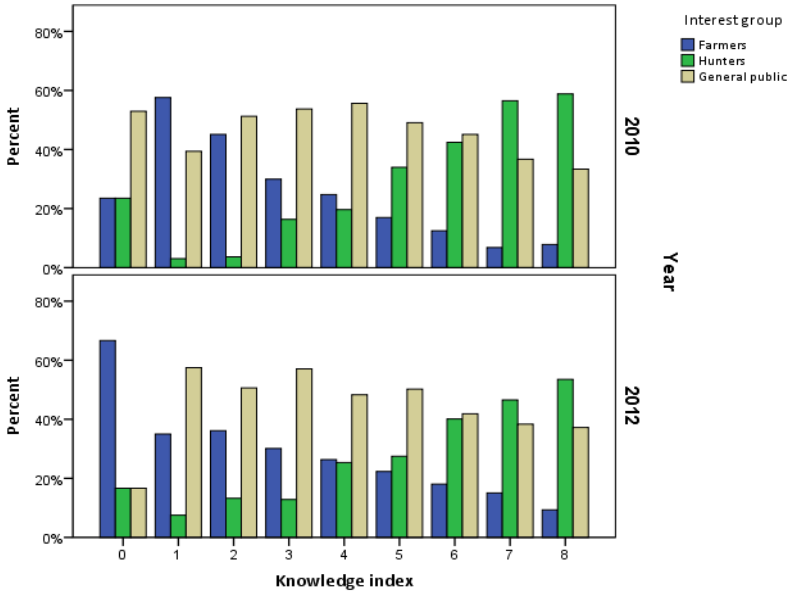

Figure 5-8: Knowledge index frequency distribution in the three interest groups by years.

Table 5-15: Multiple linear regression for the criterion variable "wolf acceptance" for pooled imputed missing values data. Variables are sorted by the contribution size to the model (t value). Significant predictors are bold ($p>0.05$). Original data $R^2 = 0.28$, adjusted $R^2 = 0.27$; average imputed data $R^2=0.26$ and adjusted $R^2 = 0.26$)

Predictor variable	Unstandardized coefficients		t	p	Imputation of missing values effect	
	B	SE			Relative variance increase	Relative efficiency
Farmer [a]	-0.60	0.06	-9.29	0.000	0.15	0.96
Knowledge index	0.11	0.01	9.17	0.000	0.00	1.00
Age	-0.01	0.01	-7.09	0.000	0.01	1.00
Education	0.15	0.03	4.91	0.000	0.03	0.99
Experienced wolf caused damage [a]	-0.33	0.08	-3.89	0.000	0.01	1.00
Heard about the SloWolf project [a]	0.22	0.06	3.67	0.002	0.57	0.88
General public [a]	-0.15	0.05	-2.77	0.006	0.15	0.96

[a] No=0, Yes=1

Table 5-16: Multiple linear regression for criterion variable "conservation of wolves" for pooled imputed missing values data. Variables are sorted by the contribution size to the model (t value). Significant predictors are bold (p>0.05); Original data R^2 = 0.26, adjusted R^2 =0.25; Missing values imputed data average R^2 = 0.23, adjusted R^2 =0.22).

Predictor variable	Unstandardized coefficients		t	p	Imputation of missing values effect	
	B	SE			Relative variance increase	Relative efficiency
General public [a]	0.83	0.05	15.73	0.000	0.04	0.99
Farmer [a]	0.55	0.06	8.90	0.000	0.01	1.00
Seen wolf in the wild [a]	-0.22	0.04	-5.07	0.000	0.11	0.97
Age	-0.01	0.01	-4.46	0.000	0.13	0.96
Knowledge index	0.05	0.01	4.38	0.000	0.03	0.99
Year [b]	0.17	0.05	3.43	0.001	0.16	0.95
Residence type [c]	-0.16	0.05	-3.17	0.002	0.01	1.00
Gender [d]	-0.14	0.05	-2.97	0.003	0.01	1.00
Wolf presence area [e]	0.09	0.04	2.42	0.016	0.01	0.99
Participation: volunteer [a]	0.45	0.19	2.46	0.014	0.03	0.99
Heard about the SloWolf project [a]	-0.11	0.05	-2.04	0.045	0.21	0.94
Information: attended a lecture [a]	-1.07	0.53	-2.03	0.049	0.01	0.99

[a] No=0, Yes=1; [b] 2010=0, 2012=1; [c] City=0, Countryside=1; [d] Female=0, Male=1; [e] Permanent presence=0, Occasional presence=1

Table 5-17: Knowledge index median in the three interest groups and p-values of Mann-Whitney U test of independent samples.

Interest group	2010	2012	P-value Mann-Whitney U test
Farmers	4.0	4.0	0.102
Hunters	6.0	6.0	0.345
General public	5.0	5.0	0.551

*significant difference in distribution at p<0.05

Table 5-18: Rates of correctly answered questions about wolves that comprise the knowledge index seperately for the three interest groups. Rates for each group are compared by year with the Pearson's chi square test with df=1 for each test. Percent of missing answers for each question are also shown.

Knowledge item	Interest group	Percent of correct answers 2010 (%)	Percent missing answers 2010 (%)	Percent of correct answers 2012 (%)	Percent missing answers 2012 (%)	Pearson's chi square	P-value (2-sided)
Wolf body mass Rec2B3	Farmers	39,9	0,8	47,9	0	3,390	0,066
	Hunters	58,6	1,0	63,4	1,8	1,720	0,190
	General public	48,4	2,7	46,1	4,0	0,567	0,452
Wolf main food source Rec2B4	Farmers	61,3	0,8	59,0	0,4	0,272	0,602
	Hunters	88,9	1,5	82,3	8,5	6,254	0,012**
	General public	73,0	1,5	63,0	8,6	12,147	0,000*
Wolf hunting succes Rec2B5	Farmers	16,9	0,4	30,3	0	12,903	0,000*
	Hunters	58,6	1,5	56,0	0,9	0,507	0,476
	General public	40,7	2,9	41,3	3,4	0,051	0,822
Wolf social organization Rec2B6	Farmers	73,2	0,4	73,3	0,4	0,000	0,984
	Hunters	86,0	1,5	96,0	8,2	19,834	0,000*
	General public	76,6	1,5	85,5	4,0	13,933	0,000*
Arrival of wolves in Slovenia Rec2B7	Farmers	62,7	0	59,9	0	0,437	0,508
	Hunters	84,8	1,0	84,1	4,3	0,072	0,789
	General public	76,8	1,5	77,0	3,2	0,010	0,922
Historical distribution of wolves in Slovenia Rec2B8	Farmers	33,7	0	39,0	0	1,539	0,215
	Hunters	37,6	1,2	38,4	1,5	0,049	0,825
	General public	35,9	1,4	34,4	1,1	0,266	0,606
Reason for wolf decline in the past Rec2B9	Farmers	44,7	0	47,7	0,4	0,484	0,487
	Hunters	81,8	1,2	76,9	6,1	2,572	0,109
	General public	66,6	2,2	61,7	4,8	2,775	0,096
Wolf protection status in Slovenia Rec2B12	Farmers	61,4	0,4	63,3	0	0,196	0,658
	Hunters	78,7	1,0	77,4	4,3	0,172	0,678
	General public	59,4	1,5	62,4	4,0	1,017	0,313

*significant difference in distribution at p<0,05

**significant difference in distribution at p<0,001

Table 5-19: The median for the opinion of number of wolves living in Slovenia as seen by the three interest groups and p-values of Mann-Whitney U test of independent samples.

Interest group	2010		2012		P-value Mann-Whitney U test
	Median	N	Median	N	
Farmers	150	57	100	154	0.047*
Hunters	100	344	60	283	0.000**
General public	100	422	80	409	0.000**

*significant difference in distribution at p<0,05

**significant difference in distribution at p<0,001

Table 5-20: The median of acceptable number of wolves in Slovenia for the three interest groups and p-values of Mann-Whitney U test of independent samples.

Interest group	2010		2012		P-value Mann-Whitney U test
	Median	N	Median	N	
Farmers	40	85	100	147	0.001*
Hunters	100	347	57	280	0.000**
General public	100	383	100	369	0.177

*significant difference in distribution at p<0,05

**significant difference in distribution at p<0,001

Table 5-21: The rates of respondents answering the question *»In your opinion, is the number of wolves in Slovenia: decreasing, stable or increasing?«*. Differences between years are tested with the Pearson's chi squared test (df=2).

Interest group	Year	Decreasing (%)	Stable (%)	Increasing (%)	Pearson's chi square	P (2-sided)
Farmers	2010, N=212	5.7	25.0	69.3	21.331	0.000**
	2012, N=225	15.1	36.0	48.9		
Hunters	2010, N=408	6.9	29.2	63.9	29.938	0.000**
	2012, N=326	16.2	38.4	45.3		
General public	2010, N=571	25.4	34.2	40.4	14.053	0.001*
	2012, N=512	34.7	34.1	31,2		

*significant difference in distribution at p<0.05

**significant difference in distribution at p<0.001

Table 5-22: The rates of respondents answering the question *»Is the damage caused by wolves in Slovenia: increasing, decreasing or stable?«.* Differences between years are tested with the Pearson's chi squared test (df=3).

Interest group	Year	Increasing (%)	Decreasing (%)	Stable (%)	Not sure (%)	Pearson's chi square	P (2-sided)
Farmers	2010, N=253	51.4	9.9	1.2	37.5	9.034	0.029*
	2012, N=267	50.9	18.4	0.7	30.0		
Hunters	2010, N=408	64.7	22.1	3.7	9.6	15.209	0.002*
	2012, N=326	50.9	31.9	6.1	11.0		
General public	2010, N=571	44.3	7.4	21.9	26.4	0.935	0.817
	2012, N=512	41.4	7.8	22.9	27.9		

*significant difference in distribution at p<0.05

Table 5-23: The rates of respondents answering the question *»In your opinion, is the number of wolves in Slovenia for their long term conservation: too small, enough or too many? «.* Differences between years are tested with the Pearson's chi squared test (df=3).

Interest group	Year	Too small (%)	Enoguh (%)	Too many (%)	Not sure (%)	Pearson's chi square	P (2-sided)
Farmers	2010, N=255	5.1	35.7	31.8	27.5	26.808	0.000**
	2012, N=267	10.5	48.7	14.6	26.2		
Hunters	2010, N=406	17.5	55.4	20.2	6.9	11.774	0.008*
	2012, N=326	24.5	57.7	14.1	3.7		
General public	2010, N=578	26.4	39.4	14.5	21.6	10.254	0.017*
	2012, N=515	31.8	38.3	14.0	15.9		

*significant difference in distribution at p<0.05

**significant difference in distribution at p<0.001

Table 5-24: »Wolf acceptance« factor score mean in the three interest groups and the results of the t-test for independent samples of differences between years.

Interest group	2010		2012		t	df	P (2-tailed)
	Mean	N	Mean	N			
Farmers	-0.67	242	-0.68	257	0.182	491.6	0.856
Hunters	0.46	363	0.47	259	-0.153	656	0.879
General public	-0.02	529	0.04	458	-1.133	985	0.258

Table 5-25: The rates of respondents that reported hearing about the SloWolf project with the results of the Pearson's chi squared test of differences (df=1) between years.

Interest group	Year	Heard about the SloWolf project (%)	Pearson's chi square	P (2-sided)
Farmers	2010, N=253	24.9	0.001	0.000**
	2012, N=256	38.9		
Hunters	2010, N=407	83.3	17.402	0.000**
	2012, N=322	93.5		
General public	2010, N=586	30.2	45.988	0.000**
	2012, N=509	50.3		

**significant difference in distribution at p<0.001

Table 5-26: Frequencies and rates of respondents reporting their information sources in 2012 about the SloWolf project.

Interest group	Media		Personal communication		Participated in the project		Do not remember		Other	
	%	N	%	N	%	N	%	N	%	N
Farmers	26.2	70	6.0	16	2.2	6	2.7	1	3.4	9
Hunters	39.3	129	32.3	106	11.0	36	3.7	12	8.2	27
General public	36.1	190	16.8	66	1.5	8	3.2	17	12.5	66

Table 5-27: Frequencies and rates of respondents reporting their participation in the SloWolf project in 2012.

Interest group	Preparation of the wolf management action plan		2010 Attitude survey		Wolf prey management workshops		Volunteer (wolf howling/ snow tracking)		Protection measures donation (fence/ guarding dog)		Collecting samples for genetic monitoring	
	%	N	%	N	%	N	%	N	%	N	%	N
Farmers	0.0	0	2.2	6	0.0	0	1.5	4	0.4	1	0.4	1
Hunters	3.7	12	22.0	72	7.6	25	7.6	25	0.3	1	23.5	77
General public	0.8	4	3.6	19	0.8	4	0.8	4	0.2	1	0.8	4

9.3. Appendix III: Themes and questions on public participation

Table 6-3: Themes and questions derived from Reed's criteria as a guide for semi-structured interviews. The order of questions does not represent the order in which they were asked. Some questions were analysed with more than one criterion, but asked only once.

Reed's criteria	Themes	Questions
1.Stakeholder participation needs to be underpinned by a philosophy that emphasises empowerment, equity, trust and learning		• Do you think your input will be/was incorporated into decisions about wolf conservation/ management? • What outcomes do you expect by the end of the project? • Tell me something about your engagement with the representatives of other interest groups in the project. Do you believe all views were equally accepted? • Do you feel that your input wasn't respected despite of strong arguments? Please explain. • How important do you think it is, that all views are equally represented?
2.Where relevant, stakeholder participation should be considered as early as possible and throughout the process	• **Early involvement** • **Stakeholder's input** • **Flexibility**	• How did your involvement in the SloWolf project start? • When did it start- in the implementation or preparation phase of the project? • In which actions of the SloWolf project did you participate? • What was your overall input? • Tell me about your involvement in the SloWolf project. Describe the process. • How important do you think is early involvement in the process?
3.Relevant stakeholders need to be analysed and represented systematically	• **Relevant stakeholders** • **Level of participation**	• Why do you think you were asked to be involved? • Who do you think should be included in wolf conservation and management, how and why? Are there specific groups? • How important do you think it is to include the general public and interest groups into wolf conservation and management?
4.Clear objectives for the participatory process need to be agreed among stakeholders at the outset	• **Clear goals and objectives** • **Agreed objectives**	• Were the objectives of your contribution made clear to you? • Did you feel that your positions were acknowledged in the process or did you have to negotiate them? • Did you have the chance to express your concerns? Were they addressed appropriately? • How important do you think it is that participants are familiar with project/action goals?
5.Methods should be selected and tailored to the decision-making context, considering the objectives, type of participants and appropriate level of engagement	• **Methods of involvement** • **Satisfaction with the process** • **Proposed changes**	• Were you satisfied with the process of your involvement in the SloWolf project? Please explain. • What would you change about the process? • What do you think about the organization of the meetings (time, place)? • What do you like the most about the process?

Reed's criteria	Themes	Questions
6.Highly skilled facilitation is essential	• **Skilled facilitation**	• Do you remember the facilitator and his job? • What were the qualities and weaknesses of the facilitator/ action coordinator? • How important do you feel good facilitation is, when different interest groups are involved and why?
7.Local and scientific knowledge should be integrated	• **Learning** • **Understandable material**	• Did your understanding of the wolf conservation/ management issue change during the process and how? How much did you learn during the process? • Did you learn anything else than about wolves and wolf management? • Was the material you received during the process understandable for you? • How important is learning in the process?
8.Participation needs to be institutionalized	• **Institutionalization** • **Continuation of participation**	• Do you believe you will continue to participate in issues related to wolf management and conservation? Please explain. • What does your future participation depend on? • How important do you think is continuation/ institutionalization of the participatory process in wolf conservation/management?